Teck Coal
Environment Office
Bag Service 2000, 421 Pine Avenue
Sparwood, B.C. Canada V0B 2G0

+1 250 425 3352 Tel
www.teck.com

Technical Report Overview

Report: 2019 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs

Overview: This report presents the 2019 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 Operations required under Permit 107517. This report summarizes the results of groundwater quality in 2019 and compares them to relevant screening values. It also compares groundwater chemistry to nearby surface water chemistry to understand groundwater transport pathways.

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

For More Information

If you have questions regarding this report, please:

• Phone toll-free to 1.855.806.6854

• Email **feedbackteckcoal@teck.com**

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

2019 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs

Fording River Operations

Greenhills Operations

Line Creek Operations

Elkview Operations

Coal Mountain Operations

Regional Groundwater Monitoring Program

VOLUME I OF III

Prepared for:

Teck Coal Limited

March 31, 2020

Internal Ref: 671557 › Final › V1

Report Contributors

This report was prepared by multiple contributors. Responsible authors and reviewers for each section are identified in the table below. Stefan Humphries and Michael Brewster reviewed the document in its entirety.

Section	Author	Reviewer
1, 2, 3; Introduction, ENV Approval Conditions, Geochemical Screening	Kirsti Medig, Katrina Cheung	Stefan Humphries
4 FRO	Kirsti Medig	Genevieve Pomerleau
5 GHO	Katrina Cheung	Genevieve Pomerleau, Stefan Humphries
6 LCO	Chris Henry	Michael Brewster
7 EVO	Leslie Harker	Stefan Humphries
8 CMO	Tyler Gale	Michael Brewster
9.3.1 and 9.3.2; Background and Study Area 1	Kirsti Medig	Stefan Humphries, Genevieve Pomerleau
9.3.3; Study Area 2	Chris Henry	Stefan Humphries
9.3.4, 9.3.5; Study Areas 3 and 4	Katrina Cheung	Stefan Humphries
9.3.6; Study Areas 5 and 6	Chris Henry	Michael Brewster
9.3.7, 9.3.8, 9.3.9, 9.3.10, 9.3.12; Study Areas 7, 8, 9, 10, 12	Leslie Harker	Stefan Humphries
9.3.11; Study Area 11	Tyler Gale	Michael Brewster
9.4, 9.5	Stefan Humphries	Michael Brewster
10 Conclusions and Recommendations	All (per relevant report section above)	All (per relevant report section above)

SNC • LAVALIN

Signature Page

Prepared By:

PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
Dr. K. P. R. MEDIG
47651
March 31, 2020

Kirsti Medig, PhD, P.Geo.
Project Geologist
Environment & Geoscience
Engineering, Design & Project Management

PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
L. L. HARKER
40673
Mar 31, 2020

Leslie Harker, MSc, P.Geo.
Project Hydrogeologist
Environment & Geoscience
Engineering, Design & Project Management

PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
K. Y. CHEUNG
40773
March 31 2020

Katrina Cheung, MSc, P.Geo.
Project Hydrogeologist
Environment & Geoscience
Engineering, Design & Project Management

PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
T. GALE
42249
March 31/20

Tyler Gale, MASc, P.Geo.
Project Hydrogeologist
Environment & Geoscience
Engineering, Design & Project Management

Chris Henry, MSc
Project Hydrogeologist
Environment & Geoscience
Engineering, Design & Project Management

Reviewed By:

PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
S. A. HUMPHRIES
31909
Mar 31/20

Stefan Humphries, MSc, P.Geo.
Senior Hydrogeologist
Environment & Geoscience
Engineering, Design & Project Management

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
G. POMERLEAU
29857
March 31/20

Genevieve Pomerleau, MSc, P.Eng.
Senior Hydrogeologist
Environment & Geoscience
Engineering, Design & Project Management

PROFESSIONAL GEOSCIENTIST
PROVINCE OF BRITISH COLUMBIA
M. L. BREWSTER
28289
March 31, 2020

Michael Brewster, MSc, P.Geo.
Senior Hydrogeologist
Environment & Geoscience
Engineering, Design & Project Management

Executive Summary

At the request of Teck Coal Limited (Teck), SNC-Lavalin Inc. (SNC-Lavalin) has completed the reporting requirements for the 2019 Annual Site-Specific Groundwater Monitoring Program (SSGMP) for Fording River Operations (FRO), Greenhills Operations (GHO), Elkview Operations (EVO), and Coal Mountain Operations (CMO), and the Regional Groundwater Monitoring Program (RGMP). Teck's Operations are in southeastern British Columbia's Elk Valley. The reports were completed based on requirements outlined in Permit 107517 issued by the Ministry of Environment & Climate Change Strategy (ENV). The 2019 Line Creek Operations (LCO) SSGMP was completed by Golder Associates Ltd. (Golder) and a summary was included within this report.

In 2019, quarterly groundwater monitoring and sampling events were completed for wells included in the 2017 RGMP and 2018 SSGMP updates. Quarterly manual and/or continuous groundwater level measurements were collected for monitoring wells. Groundwater samples for these programs were analyzed for parameters on the respective analyte lists. Any modifications to the programs are not expected to impact the overall quality or interpretation of the data.

Groundwater quality was compared to applicable primary and secondary screening criteria focussing on mine-related "constituents of interest" (CI), including nitrate-N, sulphate, dissolved cadmium, and dissolved selenium. Discussion of trends as well as interpretation of water levels and selected parameters were completed by Program (SSGMPs and RGMP). To assess groundwater and surface water interaction and increase our understanding of groundwater transport pathways, groundwater chemistry was compared to chemistry at nearby surface water stations.

The objective of the 2019 SSGMPs was to fulfill the reporting requirements outlined in Section 10.4 of Permit 107517 (as amended on April 4, 2019) as well as providing linkages to the RGMP and Adaptive Management Plan (AMP). This report summarizes the results from the 2019 quarterly groundwater monitoring and sampling activities completed at FRO, GHO, LCO, EVO, and CMO following the approved 2018 SSGMP Updates. The followings sections summarize the 2019 groundwater monitoring and sampling results by program.

FRO SSGMP

Twenty-two monitoring wells and seven supply wells (at two locations) were monitored and sampled for the 2019 FRO SSGMP. FRO can be divided into two primary watersheds, the Henretta Creek and the Fording River watersheds.

Henretta Creek Watershed

In the Henretta Creek Valley, reference well FR_HMW5 is upgradient of mining activity; however, this well continues to have measured and increasing concentrations of dissolved selenium and sulphate in groundwater. This well is scheduled to be replaced with an upgradient reference well in 2020 under the RGMP program. Downgradient monitoring wells FR_HMW1S/D, FR_HMW2, and FR_HMW3 monitor the Henretta spoils and the Henretta backfilled pits. Groundwater analytical results indicate that these areas continue to be a source of loading to groundwater in the Henretta Creek valley bottom and select CI concentrations are similar to or greater than previous years.

Fording River Watershed

In the Fording River Valley upgradient of the South Tailings Pond (STP), shallow monitoring wells FR_TBSSMW-2, FR_GCMW-2, FR_MW-1B are influenced by interaction with surface water in the Fording River, or in the case of FR_GCMW-2, the Clode Creek Settling Pond, and had CI concentrations greater than the primary screening criteria. Deeper monitoring wells FR_TBSSMW-1 and FR_GCMW-1B had CI concentrations less than primary screening criteria, indicating there is mine influence and transport of CI to the Fording River in the shallow aquifer.

Directly downgradient of the STP, CI concentrations in monitoring wells FR_09-04-A/B were less than the primary screening criteria. Farther downgradient of the STP, in the Kilmarnock alluvial fan, groundwater concentrations are greater than the primary screening criteria and the highest in the Fording River Valley (FR_KB-1, FR_KB-2, and FR_KB-3A/B). Mine-influenced Kilmarnock Creek loses to ground over the Kilmarnock alluvial fan and mine-influenced groundwater has been identified downgradient of the fan. CI concentrations decrease downgradient of the fan in FR_MW-SK1A/B and FR_09-01-A/B. FR_MW-SK1B provides vertical delineation of the mine-influenced groundwater adjacent to the South Kilmarnock Phase 2 Settling Pond. Monitoring well FR_09-02-A/B is more reflective of surface water lost to ground from the Fording River south of the STP rather than the mine-influenced groundwater.

Farthest downgradient well FR_GH_WELL4 had dissolved selenium and nitrate-N concentrations greater than the primary screening criteria and are inferred to represent the mine-influenced groundwater from the Kilmarnock Creek alluvial fan.

GHO SSGMP

Seventeen monitoring wells in fourteen locations (four nested) and two supply wells were monitored and sampled for the 2019 GHO SSGMP. The GHO summary provided below is split into the three primary surface water drainage areas: Porter Creek; Greenhills Creek; and the Elk River Valley.

Porter Creek Watershed

In the Porter Creek watershed, monitoring well GH_MW-PC monitors groundwater quality downgradient of historical spoils in the drainage. A hydraulic connection between surface water and groundwater is present, which results in concentrations of dissolved selenium above primary screening criteria in groundwater. Surface water is probably the main transport pathway for loading of CI to the Fording River valley bottom.

Greenhills Creek Watershed

In the Greenhills Creek watershed, groundwater quality at monitoring well GH_MW-SITE-A, is influenced by the overlying Site A Coarse Coal Rejects (CCR), which is considered a source of sulphate. Seeps exist along the toe of the CCR pile and water quality is consistent with groundwater. Groundwater downgradient of the Site A Rejects and Greenhills Creek (GH_MW-GHC-A/B) has consistently contained concentrations of dissolved selenium below primary screening criteria. Sulphate concentrations in the well pair exhibit seasonal fluctuations similar to Greenhills Creek, indicating that it may be sourced from infiltration of the creek over the Greenhills Creek alluvial fan; sulphate in this well could also be sourced from the CCR.

A deep, artesian monitoring well (GH_MW-TD) is located downgradient of the toe of the Site D/E CCR piles and is installed in low permeability material. Low concentrations of CI have been measured in groundwater, indicating the absence of a deep groundwater pathway and interaction with surface water. Seeps exist at the toe of the Site D/E Rejects and are representative of shallow groundwater. Concentrations of CI measured in the seeps are greater than surface water from the Tailings Storage Facility (TSF) and the overlying rejects are inferred to influence shallow groundwater chemistry in this area.

Monitoring well GH_MW-RLP-1D is in the Rail Loop Area within the Greenhills Creek alluvial fan. Low CI concentrations have historically been measured at this location indicating no mine-influence, and there is little to no interaction with surface water due to a relatively continuous aquitard in the Fording River Valley.

Supply wells GH_POTW-09 and GH_POTW17 are in the Greenhills Creek alluvial fan and CI concentrations were generally less than the primary screening criteria. Exceptions in 2019 were at GH_POTW17 where groundwater withdrawals may have induced surface water recharge or created a stronger hydraulic connection with shallow surface water. Another source contributing to sulphate concentrations to the aquifer is the presence of upgradient CCR as noted above.

Elk River Valley

Several monitoring wells installed along the GHO mine permitted boundary in the Elk River valley are used to monitor potential effects on groundwater quality resulting from surface water infiltration, including tributaries originating within the permitted boundary. With the exception of dissolved selenium at GH_MW-MC-2D, which is inferred to be naturally occurring based on the screened lithology, groundwater in the vicinity of No Name Creek, Leask and Mickelson tributaries contained concentrations of CI below the primary screening criteria. Although groundwater in Leask and Mickelson drainages appear to have some mine-influence (i.e., predominantly sulphate-rich relative to bicarbonate), water from the Elk River, which is predominantly calcium-bicarbonate type water, appears to be the main contributor to groundwater quality in these areas.

Mann-Kendall trend analysis shows increasing concentrations of CI in deep groundwater at GH_GA-MW-2 (Wolfram Drainage) since 2014, indicating that infiltration of mine-influenced surface water from Wolfram Creek to the valley bottom has increased over time and is affecting groundwater quality with dissolved selenium concentrations greater than primary screening criteria. Groundwater quality at GH_GA-MW-3 appears to be influenced by both the Elk River side channel and mine-influenced Thompson Creek. During times of peak flow, groundwater quality is more reflective of surface water infiltration from Thompson Creek. At periods of low flow, water from the Elk River side channel infiltrates to ground and influences the groundwater quality at this well. Overall, in recent years, concentrations of CI at GH_GA-MW-3 have decreased and the major ion distribution indicates that there has been a greater influence from side channel on groundwater quality relative to surface water from Thompson Creek.

Downgradient of the major tributaries at GHO, GH_MW-ERSC-1 monitors groundwater quality in the Elk River valley-bottom sediments and surface water infiltration. In 2019, concentrations of CI greater than the primary screening criteria were measured in this well in Q1, Q2 and Q4; concentrations decreased to below the primary screening criteria in Q3. Groundwater in this area appears to be influenced by the Elk River as well as mine-influenced water; however, the potential source and transport pathway of the mine-influenced water is not known due to a limited monitoring well network. The potential source and transport pathway in this area will be further investigated through installation of additional monitoring wells, as part of the Mass Balance program.

LCO SSGMP

The 2019 LCO SSGMP was completed by Golder and consisted of quarterly monitoring and sampling a network of ten monitoring wells, with an additional three wells that were monitored quarterly for water levels but not sampled. The program is focused on monitoring groundwater quality primarily in two areas: the Process Plant area and the Dry Creek area. Groundwater monitoring for the AWTF landfill occurs under a different permit. The groundwater network in the Process Plant area is designed to monitor transport of

CI from upstream sources including the Phase I mining operations, Process Plant ponds, CCR, and reclaimed CCR. The network in the Dry Creek area is designed to monitor potential transport of CI from the Phase II mining operations, which includes waste rock storage at the southern portion of the Dry Creek watershed, north of Phase I mining.

Groundwater flow in the Process Plant area is directed west towards the Elk and Fording Rivers. Groundwater flow in the Dry Creek area is directed towards Dry Creek along a gaining stretch above the confluence with the East tributary, and flow directed parallel to Dry Creek along a losing stretch.

Concentrations of CI were below the primary screening criteria in all groundwater samples collected as part of the SSGMP in both the Dry Creek and Process Plant areas in 2019.

EVO SSGMP

Twenty-five monitoring wells and one supply well were monitored and sampled for the 2019 EVO SSGMP. The EVO summary is presented by the four main surface water drainage areas as defined in the groundwater conceptual model: Grave/Harmer Creek, Elk River proximal to EVO, Erickson Creek and Michel Creek. Grave Creek/Harmer Creek flows into the Elk River Watershed and Erickson Creek flows into the Michel Creek Watershed.

Grave Creek/Harmer Creek

Groundwater from monitoring well EV_GV3gw, located within the Grave Creek/Harmer Creek Watershed, contained CI below primary screening criteria in 2019. The well is installed in a deeper aquifer and a hydraulic connection appears to exist between groundwater and surface water. Seasonal fluctuations in sulphate concentrations were identified in groundwater that were similar to surface water; however, these are not reflected with dissolved selenium in groundwater, suggesting selenium is attenuated in the subsurface. Groundwater transport of CI from the drainage is minimal compared to surface water which is considered the main transport pathway for CI to groundwater in the Elk River valley bottom.

Elk River

Groundwater from monitoring wells EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw, located in tributary creek watersheds (Balmer, Lindsay, Goddard and Otto Creek), within the Elk River Watershed, contained CI concentrations below screening criteria in 2019. Review of available groundwater data indicates there does not appear to be a confirmed groundwater transport pathway on the western slope of EVO and Elk River valley bottom. Surface water from Goddard Creek may lose to ground near Goddard Sedimentation Pond and may influence groundwater quality in this area. There is currently no adequate groundwater monitoring well to confirm the level of surface water influence. This was previously identified as a data gap and will be filled in 2020 as part of the RGMP.

Erickson Creek

Groundwater from monitoring wells EV_WF_SW and EV_ECgw, in the Erickson Creek Watershed, contained CI concentrations below screening criteria in 2019. There is not a strong connection between groundwater at EV_ECgw and surface water in Erickson Creek and the main transport pathway of mine influence to the Michel Creek valley bottom is probably though surface water.

Michel Creek

Groundwater in the Michel Creek Watershed is monitored by 17 monitoring wells and one supply well (EV_RCgw), with more supply wells monitored in the RGMP. Up-valley wells contained CI concentrations above primary and secondary screening criteria in 2019, similar to previous years. Consistent with previous observations, the highest concentrations of sulphate, nitrate-N and dissolved selenium in 2019 were measured at EV_RCgw, which appear to originate from a groundwater pathway of mine-influenced water and not as a result of surface water infiltration from Bodie or Gate Creeks. The source of the elevated concentrations at EV_RCgw is currently unknown but could be related to a groundwater pathway influenced by waste rock upgradient of the area or dewatering of Natal Pit. The source of elevated CI at EV_MW_GT1B and EV_MW_BC1A/B is not clear but is inferred to originate from Gate and/or Bodie Creek, groundwater from EV_RCgw and may be seasonally influenced from surface water in Michel Creek. Continued monitoring and sampling at EV_MW_GT1A/B and EV_MW_BC1A/B is required to further assess the source of CI.

Farther downgradient are nested well pairs EV_MW_MC1A/B and EV_MW_MC2A/B, of which only the shallow nested well EV_MW_MC2B contained dissolved selenium above primary screening criteria. Concentrations of CI at this location were higher compared to concentrations in Michel Creek (EV_MC2) indicating a groundwater pathway. Farther downgradient, the only CI concentration measured above screening criteria was dissolved selenium at shallow EV_MW_SPR1C in Q1 of 2019, which was within range of surface water from Spring Creek (EV_SPR2), Aqueduct Creek (EV_AQ6) and Michel Creek (EV_MC2), but appear to follow concentration patterns of EV_MC2 suggesting the mine-influenced groundwater has attenuated through mixing and dilution.

Wells installed at the base of Baldy Ridge (EV_MW_MC4, EV_MW_AQ1 and EV_MW_AQ2) did not contain CI concentrations above primary screening criteria in 2019. Surface water infiltration associated with tributary drainages does not appear to be a transport pathway to groundwater in the Michel Creek valley bottom and groundwater transport from Baldy Ridge appears to be minimal.

CMO SSGMP Summary

Sixteen monitoring wells were monitored and sampled for the 2019 CMO SSGMP. CMO can be divided into two primary watersheds, the Corbin Creek Valley and the Michel Creek Valley.

Two new monitoring wells were installed in 2019. CM_MW9 is located downgradient of the Main Interceptor Sedimentation Ponds in the Corbin Creek Valley, and CM_MW10 is located downgradient of the Middle Mountain CCR in the Michel Creek Valley. Monitoring and sampling were initiated at CM_MW10 in Q4 2019 and are scheduled to begin at CM_MW9 in 2020 once the water level is shallow enough to complete well development.

Corbin Creek Watershed

Among the six monitoring wells in the Corbin Creek Watershed, CI concentrations exceeding primary screening criteria were limited to sulphate and dissolved selenium at one well (CM_MW5-SH), and only during the first quarter. Mann-Kendall trend analysis indicates the concentration of dissolved selenium has been increasing over the five-year period of record at this well; however, the time-series data indicate the concentrations have been stable since Q4 2017. The sulphate and dissolved selenium at CM_MW5-SH is inferred to be the result of surface water infiltration from Corbin Creek.

Michel Creek Watershed

Among the ten monitoring wells in the Michel Creek valley, CI concentrations exceeding primary screening criteria were limited to sulphate and dissolved selenium at one monitoring well (CM_MW7-DP). The concentration of dissolved selenium has been increasing over the period of record, including 2019, while sulphate has been stable. This well is located at mid-elevation within CMO (in bedrock directly below the spoil footprint) approximately 800 m upgradient of the Michel Creek valley bottom.

Surface water sampling in Michel Creek upstream of the confluence with Corbin Creek was initiated at four new locations in Q4 of 2018 (CM_MW4, CM_MC5, CM_MC6 and CM_MC7). Sampling at these locations was initiated to detect potential loading of CI to Michel Creek from groundwater transport pathways from CMO. Concentrations of sulphate and selenium increase down-stream in Michel Creek, with some seasonal fluctuation; however, the concentrations have consistently been below the BCWQGs since sampling began.

RGMP Summary

This 2019 Annual Report meets reporting requirements for regional groundwater monitoring in the Elk Valley as outlined in Section 10.4 of Permit 107517 (as amended on August 25, 2018). The Elk Valley RGMP started in 2015 and consists of data from selected locations in the FRO, GHO, LCO, EVO, CMO and Regional Drinking Water Sampling Program (RDW) groundwater monitoring programs.

The RGMP focuses on twelve “Study Areas” for the Elk Valley described most recently in the 2017 RGMP Update. This 2019 Annual Report for the RGMP has been prepared following the approved 2017 RGMP Update and incorporates feedback received from the Environmental Monitoring Committee (EMC), Groundwater Working Group (GWG), and ENV on numerous reports.

Background Areas

Background well FR_HMW5 is monitored to understand reference conditions in the Henretta Creek valley bottom upgradient of the FRO permitted mine boundary. Nested monitoring wells, CM_MW3-SH/DP, were installed upgradient of CMO in the Michel Creek Valley to assess groundwater quality in the overburden and shallow bedrock. CI concentrations in background locations FR_HMW5 and CM_MW3-SH/DP were below the primary screening criteria in 2019. Monitoring well FR_HMW5 exhibited increasing trends in dissolved selenium and sulphate and is scheduled to be replaced in 2020. New background wells are scheduled to be installed as part of the RGMP and wells installed as part of other programs will be assessed for inclusion into the background groundwater monitoring network. The sufficiency of the background well network will be reassessed in the 2020 RGMP Update.

Study Area 1

This area was identified because it is the focal point for most upland and tributary valley groundwater flow to the Fording River valley bottom near the FRO and GHO mine-permitted boundaries. Groundwater in monitoring wells FR_09-01-A/B, and FR_GH_WELL4 capture mine-affected groundwater that originates from Kilmarnock Creek, infiltrates the Kilmarnock alluvial fan, and travels downgradient (down-valley) on the eastern side of the Fording River Valley. Loading of CI from mine-influenced Swift, Cataract and Porter creek tributaries into the valley bottom in the Fording River is primarily through surface water. In the Swift and Porter drainages, groundwater is shallow and flows along the bedrock interface through shallow surficial deposits; therefore, concentrations are similar to surface water.

SNC • LAVALIN

Study Area 2

Study Area 2 is north of the LCO Phase II mining area in the Fording River valley bottom where Dry Creek joins the Fording River. Potential transport pathways for CI between the Phase II spoil and groundwater in the valley bottom are currently monitored by wells located in the upstream Dry Creek drainage and in surface water at monitoring stations in Dry Creek and the Fording River. There are no continuous aquifers in the Dry Creek drainage and the primary transport pathway to groundwater in Study Area 2 is via surface water. The effects of potential infiltration of mine-influenced Dry Creek on groundwater in the alluvial fan is expected to be relatively lower than from the Fording River, where loads and concentrations of CI are significantly higher.

Study Area 3

Study Area 3 was selected because the GHO SSGMP identified potential sources (upland groundwater from GHO) as well as surface water and groundwater transport pathways that provided loading to the Fording River valley bottom. Water supply wells monitor groundwater in the Greenhills Creek alluvial fan and Fording River valley bottom aquifer. Concentrations of dissolved selenium and sulphate remained less than the applicable screening criteria, except at GH_POTW17 in Q3 (dissolved selenium) and Q4 (sulphate). Groundwater withdrawals are inferred to affect the groundwater flow regime in the aquifer. Although some surface water infiltration may occur from the withdrawal, relatively thick silt and clay units at surface in the Fording River valley bottom in Study Area 3 generally provide a hydraulic barrier minimizing downward transport of mine-influenced water into the aquifer.

Study Area 4

Study Area 4 is downgradient from the west side of GHO and was designed to capture possible sources of CI from surface water and groundwater in the Mickelson, Leask, Wolfram, and Thompson Creek drainages feeding into the Elk River valley bottom sediment identified in the GHO SSGMP. Dissolved selenium concentrations in groundwater have shown considerable variability (i.e., orders-of-magnitude) in Study Area 4. The local-scale interaction between surface water and groundwater is variable and under investigation under the Mass Balance Investigation program. Groundwater CI concentrations are inferred to be related to variability in surface water quality in nearby tributaries, but also related to the seasonal influence of the Elk River. The source and transport pathway of occasional occurrences of relatively high CI concentrations at GH_MW-ERSC-1, downgradient of Thompson Creek and the Elk River side channel, is unclear and will be investigated under the scope of the Mass Balance Investigation.

Groundwater concentrations of CI were below screening criteria at the supply well RG_DW-01-03 and domestic well RG_DW-01-07, both downgradient (down-valley) of Study Area 4. Concentrations of CI in groundwater at RG_DW-01-03 were greater than concentrations in surface water downgradient of the mine permitted boundary, indicating a groundwater transport pathway exists. To better understand this relationship, the installation of a monitoring well is planned for this area in 2020.

Study Area 5 and 6

Study Area 5 is downstream of LCO Phase I mining operations in the valley bottom where Line Creek joins the Fording River, while Study Area 6 is located farther downstream in the valley bottom at the confluence of the Elk and Fording Rivers. The existing monitoring well network is in the LCO Process Plant area between Study Areas 5 and 6 and does not appear to be mine influenced. There is limited quantitative information for the Elk River valley-bottom aquifer in Study Area 6 downgradient of sources near the LCO Process Plant, or within Study Area 5 where Line Creek flows over an alluvial fan. To reduce that uncertainty, the installation of an additional monitoring well near the southern boundary of Study Area 6 and flow and load accretion studies within Line Creek in Study Area 5 will be completed in 2020.

Study Area 7

Study Area 7 is in the Elk River valley bottom where Harmer Creek flows into the Elk River. Loading of mine-influenced constituents to groundwater is inferred to be primarily from infiltration of Elk River surface water, as groundwater transport of CI is inferred to be minimal. A monitoring well is scheduled to be installed downgradient of Study Area 7 in 2020 to better understand groundwater surface-water interactions and the connectivity of the aquifer used for drinking purposes.

Study Area 8

Study Area 8 is in the Elk River valley bottom where tributary surface water and upland groundwater from Balmer, Lindsay, Otto/Cossarini drainages as well as the Goddard Marsh area, flow into the Elk River valley bottom. There does not appear to be a groundwater transport pathway between the surface water sources identified on the western slope of EVO and Elk River valley bottom. The 2017 RGMP Update identified a gap near the Goddard Sedimentation Pond; this gap is scheduled to be addressed by the installation of an additional monitoring well in 2020.

Study Area 9:

Study Area 9 is in the Michel Creek valley bottom adjacent to EVO and receives tributary surface water and upland groundwater flow from potential sources along the southwestern slope of EVO. A down-valley groundwater pathway was identified where concentrations of CI in groundwater in the Michel Creek valley bottom were above the surface water concentrations and secondary screening criteria. Concentrations of sulphate, nitrate-N, and dissolved selenium generally decrease along the groundwater flow path.

Continuous groundwater elevation data from wells in the Michel Creek valley bottom and the Sparwood Area indicate a seasonal response with highest groundwater levels in the spring, approximately following the same response as Michel Creek suggesting a hydraulic connection between groundwater and surface water. Spatial delineation of dissolved selenium appears to have been achieved in the Michel Creek valley-bottom in 2019, with the exception of EV_MW_SPR1C which was slightly above the screening criteria in Q1 of 2019.

Study Area 10

Study Area 10 is in the Michel Creek valley bottom where Erickson Creek flows into Michel Creek. Groundwater transport of CI in the Erickson drainage to the valley bottom appears to be negligible. Mine-influence on groundwater is probably the result of infiltration of impacted surface water rather than upland/tributary groundwater transport. There were no clear losing reaches identified in Erickson Creek in the Michel Creek valley bottom through flow accretion studies. There is also potential loading of CI to Study Area 10 from South Pit Creek Sediment Pond Decant and the Milligan Creek Sediment Pond Decant where elevated CI concentrations exist in surface water. There is currently no monitoring well along the Study Area 10 boundary to characterize groundwater conditions, which was identified as a gap in the 2017 RGMP Update. The installation of a monitoring well for this Study Area is planned for 2020.

Study Area 11

Study Area 11 is the focal point of groundwater flow at CMO along the Michel Creek valley bottom directly downgradient of the confluence of Michel and Corbin Creeks. CI concentrations were below primary screening criteria for the three monitoring wells in Study Area 11 in 2019. Increasing trends were identified for sulphate and dissolved cadmium at one of three monitoring wells (CM_MW1-OB). The transport pathway to this well appears to be via valley-bottom sediments rather than infiltration of surface water from Michel Creek. Monitoring and sampling data from new wells CM_MW9 and CM_MW10 may support refinement of the transport pathway once available.

Study Area 12

Study Area 12 is in the Elk River valley bottom downgradient from the confluence of Michel Creek and Elk River. Groundwater quality in the deeper aquifer at former municipal well RG_DW-03-04 (Sparwood Well #3) generally reflected Elk River surface water quality. At periods of low flow, including Q1 2019, dissolved selenium concentrations were higher than the Elk River surface water likely due to infiltration of Michel Creek surface water. The data gap identified in the 2017 RGMP Update is planned to be addressed in 2020 with the installation of an additional monitoring well. The extent of mine-influence groundwater in the Elk River valley-bottom aquifer downgradient of Study Area 12 is unknown; however, surface water infiltration (recharge) rather than a valley-bottom groundwater pathway is inferred to be the main transport pathway. Accordingly, groundwater farther down the Elk Valley should continue to reflect or be better than surface water quality.

Recommendations

Recommendations identified in the SSGMP for FRO, GHO, LCO, EVO and CMO and the RGMP are presented in the table below.

SSGMP/RGMP	Recommendation
SSGMP	
FRO	› Install a nested well in the Henretta Creek Valley upgradient of the confluence of the Fording River and Henretta Creek. This location is proposed to monitor a possible groundwater pathway from the backfilled pits in the Henretta Creek Valley to the Fording River Valley. Once a nested well is installed, monitoring at HMW1S/D may be reduced or even eliminated. › Install a nested well in the Henretta Creek Valley upgradient of mining operations to replace FR_HMW5 and cease monitoring FR_HMW5. › Install dataloggers in FR_POTWELLS, FR_MW-1B, FR_09-04-A/B, FR_09-01-A/B, FR_09-02-A/B, and FR_GH_WELL4. › Install a flow meter to monitor pumping rate in FR_GH_WELL4.
GHO	› Replace the data loggers in supply wells GH_POTW09 and GH_POTW17 and set to process continuous water level data and survey to the groundwater datum. › Discontinue monitoring of groundwater well GH_MW-RLP-1D as part of the SSGMP based on recommendations in the 2018 SSGMP Update. › Discontinue monitoring of groundwater well GH_GA-MW-1 as part of the SSGMP. › Reduce monitoring frequency at GH_MW-UTC-A/B to bi-annual (Q2 and Q4 only). › Investigate the significance and representativeness of higher dissolved selenium relative to total selenium concentrations at select wells. › Review results from select wells installed in support of GHO Cougar Pit Extension Phase 2 (CPX2), GHO Tailings Storage Facility (TSF) Permitting and Mass Balance Investigation programs for possible inclusion in the 2020 SSGMP annual report.

SSGMP/RGMP	Recommendation
LCO	› The current monitoring program should continue in coordination with the RGMP and West Line Creek Active Water Treatment Facility (AWTF) program. The recommended frequency and type of monitoring for 2020 is consistent with that of 2019, although adjustments to the program may be considered based on review of suggestions made in the 2018 SSGMP Update. › A reduction in sampling frequency from quarterly to bi-annual should be considered as seasonal trends become characterized, with sampling occurring during freshet (between March and June) when water levels are highest and during winter (November to February) when water levels are lowest. Newly installed wells should be sampled quarterly for at least two years to evaluate seasonality and establish baseline conditions.
EVO	› Survey elevations of surface water monitoring stations at Harmer Creek (EV_HC1), Lindsay Creek (EV_LC1), Goddard Creek (EV_GC2), Erickson Creek (EV_EC1) Gate Creek (EV_GT1) and Bodie Creek (EV_BC1) so level data can be corrected to masl and compared to groundwater elevations. › Install instrumentation in supply wells EV_HW1, EV_MR2, EV_RCgw, EV_WH50gw and EV_BRgw. This is planned for 2020, pending the ability to instrument these wells around existing infrastructure. › Install a pressure transducer at EV_MW_MC1B. › Remove EV_MW_MC3 from the EVO SSGMP as one year of monitoring indicates no mine-influence from EVO. Data from EV_MW_MC3 will be reviewed as part of the 2020 RGMP Update. › Future reports should explore whether upgradient water treatment (including the Saturated Rock Fill) have resulted in a reduction in the levels of Cl in groundwater at EV_BCgw.
CMO	› Complete well development for CM_MW9 once water column length is sufficient and commence quarterly sampling once development is complete. › As specified in the 2018 CMO SSGMP Update Ministry Assessment Report, complete a flow/load accretion analysis for Michel Creek adjacent to CMO (4 monitoring events now completed), identify new monitoring well locations if required, and complete the installations. › Pressure transducers should be installed at monitoring wells CM_MW1-OB and CM_MW1-SH in 2020. Two new pressure transducer deployments are necessary because the water levels in wells with existing pressure transducers (CM_MW5-SH and DP) may be influenced by pumping at the nearby light vehicle wash station supply well. These additional deployments would also serve to refine characterization of groundwater-surface water interaction in the Michel Creek Valley in the central flow path convergence area downgradient of CMO (RGMP Study Area 11). › The pressure transducers installed at CM_MW5-SH and CM_MW5-DP are approaching the end of their service lives and should be replaced by the end of 2020. Pressure transducer water level data should continue to be collected at these locations for continuity of the dataset. › Incorporate new monitoring wells CM_MW9 and CM_MW10 into the Conceptual Site Model (CSM) for the 2021 SSGMP Update.

SSGMP/RGMP	Recommendation
RGMP	
Background	› The background well network will be reassessed in the 2020 RGMP Update. New background wells are planned for installation in 2020 as part of the RGMP and wells installed as part of other programs such as the Castle and CPX2 Expansion Projects (Castle and CPX2 Baseline Programs, respectively) and the Mass Balance Investigation will be assessed for inclusion into the background network. Some of the existing wells that may be candidates for inclusion from Castle and CPX2 Baseline Programs are wells installed in Study Areas 1 and 4 (Drawings 6 and 7; SNC-Lavalin, 2019k). – Wells drilled in support of the Castle Program, FR_MW_FRRD1, FR_MW_CASW6-A/B, and FR_MW_CH1-A/B, installed on the eastern side of the Fording River Valley adjacent to Castle Mountain (SNC-Lavalin, 2019k). – Three nested wells, GH_MW-Willow-1S/D, GH_MW-Willow-2S/D, and GH_MW-Willow-3S/D, near Willow Creek drilled in support of the CPX2 Project (SNC-Lavalin, 2019k). – Two nested wells, GH_MW-Wolf-1S/D and GH_MW-Wolf-2S/D, near Wolf Creek drilled in support of the CPX2 Project (SNC-Lavalin, 2019k). › Once an adequate groundwater data set (two years of quarterly sampling) from these wells is available, these wells will be further assessed for suitability.
Study Area 1	› Develop an updated conceptual model of Study Area 1, that includes studies completed in the Swift, Cataract, and Kilmarnock drainages. › Results of the ongoing Mass Balance Investigation should be included in subsequent reporting to improve the understanding of groundwater quality downgradient of Study Area 1. › Monitoring wells scheduled to be installed as part of the Mass Balance Investigation and select wells should be incorporated as appropriate in the RGMP. › Preliminary results suggest that the Study Area boundary should extend north to encompass FR_09-01-A/B (which is currently part of the Study Area, but not within the boundary) and south to the confluence of the Fording River with Chauncey Creek.
Study Area 2	› There are no recommendations at this time.
Study Area 3	› Replace the data loggers in supply wells GH_POTW10 and GH_POTW15 and set to process continuous water level data and survey to the groundwater datum.
Study Area 4	› Results of the ongoing CPX2 and Mass Balance Investigation should be reviewed for possible inclusion in subsequent reporting to improve the understanding of groundwater quality downgradient of Study Area 4. › Monitoring wells scheduled to be installed as part of the Mass Balance Investigation and select wells should be incorporated as appropriate in the RGMP. › A monitoring well is scheduled to be installed in 2020 within the aquifer providing drinking water supply to multiple users within the Study Area to support the development and implementation of groundwater triggers.
Study Area 5/6	› A nested monitoring well is scheduled to be installed in 2020 adjacent to surface water station EV_ER4 to provide groundwater data in the Elk River valley-bottom aquifer downgradient of LCO.
Study Area 7	› A flow and load accretion study is scheduled to be conducted over the Grave Creek alluvial fan at the confluence with the Elk River.

SSGMP/RGMP	Recommendation
Study Area 8	› A monitoring well is scheduled to be installed in 2020 in the drinking water aquifer in between Study Areas 7 and 8 to support the development and implementation of groundwater triggers. › Add District of Sparwood Well #4 to the RDW program. › A monitoring well is scheduled to be installed in 2020 to replace EV_TW-1 and EV_TW-2. The nested monitoring well will be downgradient of the Goddard Creek Sedimentation Pond adjacent to EV_GC2.
Study Area 9	› Survey the top of casing elevation at EV_BRgw. › Install instrumentation in supply wells EV_HW1, EV_MR2, EV_RCgw and EV_WH50gw. This is planned for 2020, pending the ability to instrument these wells around existing infrastructure. › Remove RG_DW-03-01 from the RGMP and RDW program as it is no longer being used for drinking water. › A nested monitoring well is scheduled for installation in 2020 to replace EV_MCgwS/D that are not representative of the aquifer.
Study Area 10	› A nested monitoring well is scheduled for installation in 2020 in the Michel Creek valley-bottom aquifer downgradient of Erickson Creek and the South Pit decant Pond to monitor groundwater quality.
Study Area 11	› Data collected from new monitoring wells CM_MW9 and CM_MW10 should be included in the 2020 RGMP Update to assess whether these wells provide new information to close the previously identified gap for RGMP Study Area 11 (potentially mine affected groundwater bypassing CM_MW1 via the Rail Loop). An additional new monitoring well is planned for installation in 2020 to address this data gap. › Deployment of pressure transducers at monitoring wells CM_MW1-OB and SH has been recommended under the CMO SSGMP, and these deployments would also serve to refine characterization of groundwater-surface water interaction in Study Area 11.
Study Area 12	› Survey elevation of water level measurement at Environment Canada hydrometric station 08NK016. › A monitoring well is scheduled to be installed in 2020 in the drinking water aquifer in this Study Area to support the development and implementation of groundwater triggers.

Table of Contents

Volume I of III

Table of Contents

VOLUME I OF III

Table of Contents

VOLUME I OF III

Table of Contents

Volume I of III

Table of Contents

VOLUME I OF III

Table of Contents

Volume I of III

Table of Contents

Volume I of III

In-Text Tables

Table of Contents (Cont'd)

Volume I of III (Cont'd)

In-Text Tables (Cont'd)

Table of Contents (Cont'd)

Volume I of III (Cont'd)

In-Text Tables (Cont'd)

Figures

Fording River Operations

Table of Contents (Cont'd)

Volume I of III (Cont'd)

Figures (Cont'd)

Greenhills Operations

Table of Contents (Cont'd)

Volume I of III (Cont'd)

Figures (Cont'd)

Line Creek Operations

Elkview Operations

Table of Contents (Cont'd)

VOLUME I OF III (CONT'D)

Figures (Cont'd)

Coal Mountain Operations

Table of Contents (Cont'd)

Volume I of III (Cont'd)

Tables

SNC·LAVALIN

Table of Contents (Cont'd)

VOLUME I OF III (CONT'D)

Drawings

Table of Contents (Cont'd)

VOLUME I OF III (CONT'D)

Drawings

Appendices

Acronyms and Abbreviations

3D	Three dimensional
AMEC	AMEC Earth & Environmental Ltd
Ammonia-N	Ammonia-Nitrogen
AMP	Adaptive Management Plan
AW	Aquatic Life Water Use
AWTF	Active Water Treatment Facility
AWTF-S	Active Water Treatment Facility South
BCWQG	British Columbia Approved Water Quality Guidelines
CCR	Coarse Coal Rejects
CI	Constituents of interest
CMO	Coal Mountain Operations
COA	Certificate of Analysis
COV	Coefficient of Variance
CP	Compliance Point
CPX2	GHO Cougar Pit Extension Phase 2
CSM	Conceptual Site Model
CSR	Contaminated Sites Regulation
DCWMS	Dry Creek Water Management System
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DW	Drinking Water Use
EMA	*Environmental Management Act*
EMC	Environmental Monitoring Committee
EMS	Environmental Monitoring Station
ENV	Ministry of Environment & Climate Change Strategy
EVO	Elkview Operations
EVWQP	Elk Valley Water Quality Plan
Fluor Tetra Tech	Fluor Tetra Tech Inc.
FRO	Fording River Operations
GCDWQ	Guidelines for Canadian Drinking Water Quality
GHO	Greenhills Operations
Golder	Golder Associates Ltd.
GWG	Groundwater Working Group
Hemmera	Hemmera Envirochem Inc.
IW	Irrigation Water Use
KU	Key Uncertainty (part of the AMP)
LCO	Line Creek Operations

Leask Ponds	Leask Creek Sedimentation Ponds
LW	Livestock Water Use
m^3/hr	cubic metres per hour
m^3/day	cubic metres per day
masl	metres above sea level
mbgs	metres below ground surface
mbtoc	metres below top of casing
MDL	Method Detection Limit
mg Se: mg SO_4 (as S)	Milligrams selenium vs milligrams sulphate as sulphur
Mickelson Ponds	Mickelson Creek Sedimentation Ponds
Minnow	Minnow Environmental Inc.
MoE	Ministry of Environment, now known as Ministry of Environment & Climate Change Strategy (ENV)
MQ	Management Questions under the Adaptive Management Plan
MU	Management Unit
n	Number of samples
Nitrate-N	Nitrate-Nitrogen
NS	Not sampled
NTP	North Tailings Pond
OHGE	O'Neill Hydro-Geotechnical Engineering
ORP	Oxidation-Reduction Potential
Porter Pond	Porter Creek Sedimentation Pond
Q1, Q2, Q3, Q4	First quarter, second quarter, third quarter, fourth quarter
QA/QC	Quality Assurance/Quality Control
RDW	Regional Drinking Water Sampling Program
RGMP	Regional Groundwater Monitoring Program
RPD	Relative Percent Difference
RWQM	Regional Water Quality Model
S	Mann-Kendal Statistic
SNC-Lavalin	SNC-Lavalin Inc.
SP&P	Teck's Standard Practices and Procedures
SPO	Site Performance Objective
SRK	SRK Consulting (Canada) Inc.
SSGMP	Site-Specific Groundwater Monitoring Program
STP	South Tailings Pond
TDS	Total Dissolved Solids
Teck	Teck Coal Limited
TG	Technical Guidance
Thompson Pond	Thompson Creek Sedimentation Pond

TKN	Total Kjeldahl Nitrogen
TSS	Total Suspended Solids
TSF	Tailings Storage Facility
UTM	Universal Transverse Mercator
WFTF	West Fork Tailings Facility
Wolfram Ponds	Wolfram Creek Sedimentation Ponds

1 Introduction

This report addresses the annual reporting requirements for the Site-Specific Groundwater Monitoring Programs (SSGMP) at Teck Coal Limited's (Teck) five coal mines as well as the Regional Groundwater Monitoring Program (RGMP) in southeastern British Columbia's Elk Valley, as outlined in Permit 107517[1] issued by the Ministry of Environment & Climate Change Strategy[2] (ENV). The five coal mines include Fording River Operations (FRO), Greenhills Operations (GHO), Line Creek Operations (LCO), Elkview Operations (EVO), and Coal Mountain Operations (CMO; Drawing 1). The Elk River and associated tributary system flows north to south through the Elk Valley. The Fording River and Michel Creek represent the largest of the tributary catchments within the broader Elk River watershed. The Elk Valley includes the communities of Elkford, Sparwood, Hosmer, Fernie, and Elko, and is in the Ktunaxa First Nation traditional territory.

SNC-Lavalin Inc. (SNC-Lavalin) and Teck developed a RGMP to monitor groundwater in the valley bottoms of defined areas within Management Units (MU[s]) 1, 2, 3, 4 and 5 as described in the Elk Valley Water Quality Plan (EVWQP; Teck, 2014) and shown on Drawing 1. The surficial and bedrock geology for the region are presented on Drawings 2 to 5.

An SSGMP is required for each of Teck's five coal mines in the Elk Valley. The annual reports for the RGMP and SSGMPs for EVO, FRO, GHO, and CMO presented herein, were written by SNC-Lavalin. The annual report for the LCO SSGMP was written by Golder Associates Ltd. (Golder) and appended to this report as well as summarized herein (Appendix II). Site features and monitoring locations are provided on Drawings 6, 7, 8, 9, and 10 for FRO, GHO, LCO, EVO, and CMO, respectively.

1.1 Background

An RGMP is required in Permit 107517. In September 2017, the RGMP was updated and submitted ("2017 RGMP Update", SNC-Lavalin, 2017c) focusing on mine-related constituents including selenium, cadmium, sulphate, and nitrate-nitrogen, or "constituents of interest" (hereafter referred to as CI). The 2017 RGMP Update was approved by ENV on February 19, 2020. Since submission of the 2017 RGMP, the following related submissions and activities have taken place (Table A).

Table A: Submissions and activities since the 2017 RGMP Update

Timeline	Activity
September 30, 2017	Submission of the 2017 RGMP Update.
March 31, 2018	Submission of 2017 SSGMP Annual Reports.
May 8 and 9, 2018	Groundwater Working Group (GWG) meeting to discuss groundwater in the Adaptive Management Plan (AMP) and GWG and Environmental Monitoring Committee (EMC) feedback on the RGMP.
October 31, 2018	2018 SSGMP Update Report submitted to ENV.

[1] Permit 107517, amended April 4, 2019.
[2] Formerly known as Ministry of Environment (MoE).

Table A (Cont'd): Submissions and activities since the 2017 RGMP Update

Timeline	Activity
March 31, 2019	2018 SSGMP Annual Reports for FRO, EVO, LCO, CMO, and GHO submitted to ENV.
April 2 to 9, 2019	SSGMP assessment report letters provided by ENV for each operation.
April 10 and 11, 2019	GWG meeting to discuss the groundwater conceptual site model (CSM), RGMP progress update, and RGMP links to the AMP.
May 16, 2019	2018 RGMP Annual Report submitted to ENV.
July 25, 2019	GWG Meeting to discuss data gaps and proposed schedules to fill those gaps. Discussion also included the progress on groundwater trigger development.
September 30, 2019	2018 SSGMP Update Reports re-submitted to ENV.
November 26 and 27, 2019	GWG meeting to discuss progress on groundwater trigger development, current program data gaps, and a proposed 2020 program work plan.
January 29, 2020	GWG meeting to discuss the Terms of Reference and Prioritization Framework for the 2020 RGMP Update.
February 19, 2020	Approval of the 2017 RGMP Update by ENV.
February 20, 2020	GWG meeting to discuss proposed RGMP drilling and Prioritization Framework.
March 11, 2020	Approval of the FRO, GHO, EVO, LCO, CMO 2018 SSGMP Updates.

1.2 Regulatory Requirements

1.2.1 Site-Specific Groundwater Monitoring Programs

An SSGMP is required for each of Teck's five coal mines in the Elk Valley as outlined in Permit 107517 issued by ENV. Sections 9.2.2 and 10.4 of Permit 107517 include information for the site-specific programs described below.

Sections 9.2.2 of Permit 107517 states the following:

- The Permittee must develop and implement a comprehensive groundwater monitoring program at each mine site, prepared by a Qualified Professional. This program must include the following:
  - i. Characterization of the groundwater system, aquifer characteristics (e.g., hydraulic conductivity and storativity), water quality, and connectivity to the surface water system;
  - ii. Characterization of seasonal variability in the groundwater system (quality and quantity);
  - iii. Provision of a site-specific conceptual model and the information necessary to support the development and verification of water quality predictions for the mine site. The site-specific conceptual model shall be provided with the groundwater monitoring plan update on October 31, 2019 and updated with subsequent revisions to the groundwater monitoring plan; and
  - iv. Site-specific, numerical groundwater models may be required to support permitting activities. Numerical models, where required, must consider all available, relevant monitoring data (e.g., groundwater and surface water monitoring, stream flow, and precipitation data) and be developed by a Qualified Professional to meet the intended modeling purpose.

Section 10.4 of the Permit indicates:

› The Permittee must prepare on an annual basis a report or series of reports summarizing groundwater activities and monitoring results for the Site-Specific Groundwater Monitoring Programs by March 31.

1.2.2 Regional Groundwater Monitoring Program

This report fulfills reporting requirements listed in Section 10.4 of Permit 107517, specifically:

› Regional groundwater monitoring results and interpretation must be compiled into a written report and submitted on an annual basis for each calendar year to the Director by May 16 of the following year. The Annual Report must include summaries of the site-specific groundwater reports.

The report(s) must include, but is not limited to:

i. A map of monitoring locations with EMS and Permittee descriptors;

ii. Cross sections showing well installation details, stratigraphy, groundwater elevations, and flow. Cross sections should be in the direction of groundwater flow and perpendicular to groundwater flow;

iii. Drawings showing locations and water quality data of groundwater sampling points;

iv. A summary of background information on that year's program, including discussion of program modifications relative to previous years;

v. A summary of measured parameters, including appropriate graphs and comparison of results to, Approved and Working Water Quality Guidelines, or other criteria and benchmarks as specific by the Director;

vi. If applicable a summary of exceedances of screening benchmarks;

vii. Evaluation and discussion of spatial patterns and temporal trends;

viii. A summary of all QA/QC issues during the year; and

ix. Recommendations for further study or measures to be taken.

1.3 RGMP Purpose Statements and Objectives

The RGMP currently monitors twelve areas, referred to as "Study Areas", to understand potential regional groundwater pathways of mine-related constituents including selenium, cadmium, sulphate, and nitrate-nitrogen, or CI. These areas are defined based on identified receptors and source and transport pathways information from SSGMPs for the five operating mines in the Elk Valley (SNC-Lavalin, 2017c).

Using the framework of the EVWQP, Teck has developed three purpose statements and supporting objectives for the RGMP. These were developed in consultation with the GWG and presented in the 2017 RGMP Update (SNC-Lavalin, 2017c).

1.3.1 Purpose Statements and Objectives

The purpose statements and objectives that relate to each of the purpose statements are listed in Table B.

Table B: Purpose Statements and Objectives to support purpose statements

Purpose Statements	Objective
Purpose 1: Using the framework of the EVWQP, the RGMP will be updated to monitor and evaluate potential quality effects to groundwater resources from mining activities to protect current groundwater users (initial focus) in the Elk Valley. Monitoring and evaluations will continue to inform management decisions that work towards protection of future groundwater users in the Elk Valley.	To identify the current receptors (i.e., drinking water, aquatic life, livestock watering and irrigation watering) and evaluate the potential for a complete transport pathway between source and receptors.
	To collect groundwater quality information from a monitoring network with appropriate locations to assess the presence of complete transport pathways (i.e., between source and receptors) for constituents of interest.
	Evaluate groundwater quality information against established screening criteria to assess potential effects to identified users and evaluate temporal/spatial trends.
Purpose 2: Using the framework of the EVWQP, the RGMP will be updated to monitor and evaluate groundwater as a potential pathway for transport of mine-related constituents of interest to surface water to support management decisions under the AMP.	To collect necessary groundwater information to support the refinement of surface water quality predictions.
	To evaluate the need to manage groundwater to meet surface water quality compliance.
Purpose 3: Using the framework of the EVWQP, the RGMP will be updated to evaluate and refine the CSM for source, transport and fate of mine-related constituents of interest in groundwater in the Elk Valley.	To review and synthesize regional and site-specific groundwater monitoring data on a three-year timeframe to update and refine the Regional CSM.

1.4 Linkages between the SSGMPs and RGMP

The SSGMPs focus on identifying and monitoring possible sources of mine-related constituents in groundwater as well as transport pathways to groundwater in the valley bottom of the main stem rivers (i.e., Elk and Fording Rivers, Michel Creek). Most of the site-specific groundwater monitoring is within mine operation permitted boundaries. The RGMP focuses on groundwater fate and transport in the valley bottom of the main stems, and how they relate to applicable receptors. Regional groundwater monitoring has been completed within and outside mine operation permitted boundaries. The RGMP also includes data from the Regional Drinking Water Sampling Program (RDW).

1.5 Linkage to Adaptive Management Plan

As required in Permit 107517 Section 11, Teck has developed an AMP to support implementation of the EVWQP to achieve water quality targets, including calcite targets, ensure that human health and the environment are protected, and where necessary, restored, and to facilitate continuous improvement of water quality in the Elk Valley. Following an adaptive management framework, the AMP identifies six Management Questions (MQ) that will be re-evaluated at regular intervals as part of AMP updates throughout EVWQP implementation. The AMP also identifies key uncertainties (KU) that need to be reduced to fill gaps in current understanding and support achievement of the EVWQP objectives.

The results presented in this report provide information relevant to five of the six MQs and many of the KUs identified in the AMP. Groundwater quality monitoring data along with data collected from other programs are needed for re-evaluating the answers to MQ 1 ("Will water quality limits and Site Performance Objectives (SPO) be met for selenium, nitrate, sulphate and cadmium?"), MQ 2 ("Will the aquatic ecosystem be protected by meeting the long-term SPOs?"), MQ 3 ("Are the combinations of methods for controlling selenium, nitrate, sulphate and cadmium included in the implementation plan the most effective approach for meeting limits and SPOs?"), MQ 5 ("Does monitoring indicate that mine-related changes in aquatic ecosystem conditions are consistent with expectations?"), and MQ 6 ("Is water quality being managed to be protective of human health?").

Groundwater quality monitoring data assist in reducing KU 1.2 ("How will uncertainty in the Regional Water Quality Model (RWQM) be evaluated to assess future achievement of limits and SPOs?"); KU 2.1 ("How will the science-based benchmarks be validated and updated?"); KU 2.2 ("How will the integrated assessment methodology used to derive area-based SPOs be validated and updated?"); KU 3.4 ("What additional flow and groundwater information do we need to support water quality management?"); KU 6.1 ("Is our understanding of local groundwater conditions for current and future drinking water use sufficient to minimize human exposure to constituents?"); KU 6.2 ("Is the spatial extent of mine-influenced groundwater sufficiently characterized to manage water quality in order to support meeting the environmental objectives of the EVWQP?"); and KU 6.3 ("What are appropriate groundwater-related triggers and how can they be used?"). Progress on reducing these key uncertainties, and associated learnings, will be described in Annual AMP Reports. Groundwater triggers under KU 6.3 will be developed in consultation with the Groundwater Working Group (GWG) and implemented in the appropriate monitoring programs once developed.

Groundwater monitoring results relevant to MQs and KUs are discussed in Section 9.5. Refer to the AMP (Teck, 2018c) for more information on the adaptive management framework, MQ, KU, Response Framework, Continuous Improvement, linkages between the AMP and other EVWQP programs, and AMP reporting.

1.6 Permit Requirements and Report Structure

The 2019 Annual Report Elk Valley Regional and Site-Specific Groundwater Monitoring Programs has been prepared following the approved 2017 RGMP Update (SNC-Lavalin, 2017a), the approved 2018 SSGMP Updates (SNC-Lavalin, 2019g, 2019h, 2019i; Golder, 2019f; SRK, 2019b), and the annual groundwater reporting requirements listed in Section 10.4 of Permit 107517. The structure and content of this report have incorporated past feedback from the EMC and GWG on previous reports. The 2019 Annual Reports for the SSGMPs and RGMP address the permit conditions as summarized in Table C.

The report presents the monitoring results nearest to the source areas (SSGMPs), followed by the down-gradient receiving environment (RGMP). The monitoring required under the RGMP generally overlaps with the SSGMPs, as monitoring is required at many locations under both an SSGMP and the RGMP. Where monitoring requirements overlap between an SSGMP and the RGMP, the results are presented in the SSGMP section and discussed in the regional context in the corresponding RGMP Study Area section.

SNC·LAVALIN

Table C: Summary of SSGMP and RGMP Permit Requirements and Report Sections

Description of Permit Requirement	Relevant Report Sections					
	FRO	GHO	LCO	EVO	CMO	RGMP [a]
i. A map of monitoring locations with EMS and Permittee descriptors;	Section 4.1; Drawing 6	Section 5.1; Drawing 7	Section 6; Drawing 8; Appendix II Figure 2-5	Section 7.1; Drawing 9	Section 8.1; Drawing 10	Section 9.1
ii. Cross sections showing well installation details, stratigraphy, groundwater elevations, and flow. Cross sections should be in the direction of groundwater flow and perpendicular to groundwater flow;	Drawings 13 to 19	Drawings 23 to 26	Drawings 31 and 32; Appendix II Figures 2-3a, 2-3b, 2-3c	Drawings 37 to 42	Drawings 47 to 55	Drawing 60
iii. Drawings showing locations and water quality data of groundwater sampling points;	Drawings 6, 20 to 23	Drawings 7, 27 to 30	Drawings 7, 33 to 36; Appendix II Figures 4-3, 4-4	Drawings 43 to 46	Drawings 10, 56 to 59	All SSGMP Drawings
iv. A summary of background information on that year's program, including discussion of program modifications relative to previous years;	Section 4.2; Appendix I	Section 5.2; Appendix I	Appendix II Sections 3 and 4; Appendix I	Section 7.2; Appendix I	Section 8.2; Appendix I	Section 9.2; Appendix I
v. A summary of measured parameters, including appropriate graphs and comparison of result to, Approved and Working Water Quality Guidelines, or other criteria and benchmarks as specified by the Director;	Sections 3 and 4.3; Figures FR-1 to FR-19	Sections 3 and 5.3; Figures GH-1 to GH-29	Sections 3 and 6; Appendix II Section 5	Sections 3 and 7.3; Figures EV-1 to EV-22	Sections 3 and 8.3; Figures CM-1 to CM-22	Sections 3 and 9.3

SNC•LAVALIN

Table C(Cont'd): Summary of SSGMP and RGMP Permit Requirements and Report Sections

Description of Permit Requirement	Relevant Report Sections					
	FRO	GHO	LCO	EVO	CMO	RGMP [a]
vi. If applicable, a summary of exceedances of screening benchmarks;	Sections 4.3.2 and 4.3.3	Sections 5.3.2, 5.3.3, 5.3.4	Section 6; Appendix II Section 5	Sections 7.3.3, 7.3.4, 7.3.5, and 7.3.6	Sections 8.3.3 and 8.3.4	Section 9.3
vii. Evaluation and discussion of spatial patterns and temporal trends;	Sections 4.3.2 and 4.3.3	Sections 5.3.2, 5.3.3, 5.3.4	Section 6; Appendix II Section 5	Sections 7.3.3, 7.3.4, 7.3.5, and 7.3.6	Sections 8.3.3 and 8.3.4	Section 9.3
viii. A summary of all QA/QC issues for the year; and	Section 10.1; Appendix VIII	Section 10.2; Appendix VIII	Section 10.3; Appendix II Section 4.2	Section 10.4; Appendix VIII	Section 10.5; Appendix VIII	Section 10.6; Appendix VIII
ix. Recommendations for further study or measures to be taken.	Section 12	Section 12	Section 12; Appendix II Section 7	Section 12	Section 12	Section 12

Notes:

[a] Relevant report sections listed under the RGMP are supplemental to those listed under the five SSGMPs, which are also applicable to the RGMP.

2 ENV Approval Conditions and Previous Recommendations

The ENV assessment letters for the SSGMP updates and annual reports as well as approval letters for the 2017 RGMP and the 2018 SSGMP updates are in Appendix I. Recommendations from the assessment letters and relevant recommended approval conditions related to the 2018 annual reports for each mine site are outlined in Appendix I. This also includes the location in this report where different recommendations were addressed. Appendix I also includes recommendations from the 2018 Annual SSGMP reports as well as the 2018 SSGMP Update reports.

3 Geochemical Screening and Interpretation Methodology

3.1 Regulatory Screening

RGMP and SSGMP groundwater quality data are screened against different criteria based on applicable receptors. A technically-based screening process was described in the 2017 RGMP Update. Primary and secondary screening criteria may be adjusted based on the needs and requirements for other programs under the AMP.

3.1.1 Primary Screening Criteria

The primary screening criteria provide the main indicators for groundwater quality and the approach is consistent with regulatory guidance, including: Technical Guidance Document 6 (TG 6): *Assessment of Hydraulic Properties for Water Use Determination* (BC ENV, 2015) for *Environmental Management Act* (EMA) Applications; and Technical Guidance Document 15 (TG 15): *Concentration Limits for the Protection of Aquatic Receiving Environments* (BC ENV, 2017). The primary screening process considers the following receptors.

› Human Health – groundwater used for drinking water for current and future use as a default use, consistent with TG 6. Primary screening of groundwater data for protection of drinking water (DW) is conducted against the applicable *Contaminated Sites Regulation* (CSR; BC ENV, 2019a) DW.

› Freshwater Aquatic Life – groundwater discharging to aquatic environments as a default use, consistent with TG 6. Primary screening of groundwater data for protection of aquatic life is completed against CSR aquatic life (AW) standards. Consistent with TG 15, and as a conservative approach, the application of *British Columbia Approved Water Quality Guidelines* (BCWQG; BC ENV, 2019b) to wells within 10 m of the high-water mark is applied.

› Irrigation and Livestock Watering – groundwater for livestock or irrigation watering use. This use is not described in TG 6; however, these uses are applied to be conservative as livestock and irrigation water supplies are sourced from groundwater wells in some locations. Because the EMC have indicated that livestock watering use was used as a surrogate for wildlife watering, livestock watering should be applied as a default use. Primary screening of groundwater data protection of irrigation and livestock watering is completed against CSR Irrigation (IW) and Livestock (LW) standards.

This screening process allows for comparison of water to uniform criteria for groundwater protection across the Elk Valley using the CSR standards as well as the Approved and Working BCWQG, as applicable. The default uses, which consist of human health, freshwater aquatic life, irrigation watering, and livestock watering as a surrogate for wildlife are applied across the entire valley.

Table 1, attached, summarizes the primary screening criteria for the SSGMP and RGMP wells. SNC-Lavalin reviewed wells within ten metres of a high-water mark, consistent with TG 15 described above, and found that EV_OCgw and EV_WF_SW are within 10 metres (m) of a high-water mark. Results from these monitoring wells were compared to BCWQG for AW.

3.1.2 Secondary Screening

A secondary screening criterion is applied when recharge of groundwater from surface water with elevated CI results in groundwater with higher concentrations than BCWQG and CSR standards (SNC-Lavalin, 2017c). The secondary screening criteria provides context for Teck's operational surface water quality requirements, as well as a technical-based framework for regional evaluation of groundwater to protect aquatic life in the Elk Valley. Surface water quality is collected at Order Stations that are specified in Permit 107517. Each surface water Order Station has an area-based Site Performance Objective (SPO) and Compliance Point (CP) concentration, which is specified in Permit 107517.

Dissolved selenium is the only constituent with CP and SPO values greater than the primary screening criteria (i.e., CSR AW, DW, IW, LW, and BCWQG AW). Therefore, if dissolved selenium concentrations exceeded primary screening criteria, then secondary screening for dissolved selenium was applied. CP and SPO criteria in the main stem rivers differs along the flowpath. Depending on location, criteria were applied to groundwater wells inferred to be upgradient of the nearest downstream surface water CP or SPO Order Station (Table D).

As a secondary screening step for drinking water use, groundwater concentrations for dissolved selenium were screened against the *Guidelines for Canadian Drinking Water Quality* (GCDWQ; Health Canada, 2017) to provide context in relation to recent toxicological studies. The GCDWQ for selenium was updated in October 2014 from 10 to 50 µg/L and is similar to the value developed in the Human Health Risk Assessment (Ramboll Environ., 2016).

Table D: Secondary Groundwater Screening Criteria for Aquatic Life

Operation/ Program[1]	Study Area(s)	SPO		CP	
		Surface Water Station (EMS ID)[2]	Selenium (µg/L)	Surface Water Station (EMS ID)[2]	Selenium (µg/L)
FRO	Background	GH_FR1 (0200378)	63	FR_FRCP1 (E300071)	130
GHO	Background	GH_ER1 (E206661)	19	GH_ERC (E300090)	15
CMO	Background	EV_ER1 (0200393)	19	CM_MC2 (E258937)	15
FRO	1	GH_FR1 (0200378)	63	FR_FRCP1 (E300071)	130
LCO/GHO/ RDW	2,3	GH_FR1 (0200378)	63	GH_FR1 (0200378)	80
GHO	4	GH_ER1 (E206661)	19	GH_ERC (E300090)	15
LCO	6	EV_ER4 (0200027)	23	-	-
EVO/RDW	7,8,12	EV_ER1 (0200393)	19	-	-
EVO/RDW	9,10	EV_ER1 (0200393)	19	EV_MC2 (E300091)	28
CMO	11	EV_ER1 (0200393)	19	CM_MC2 (E258937)	19

Notes:

[1] Operation/Program refers to the Operation (FRO, GHO, LCO, EVO, CMO) or Program (RDW) that is responsible for carrying out the monitoring related to each Study Area.

[2] Environmental Monitoring System.

'-' denotes no surface water station.

3.2 Analytical Visual Representation

Groundwater analytical data from FRO, GHO, EVO, CMO, and RDW collected in 2019 are presented by operation in Tables 2 through 6, respectively. The tables include comparison to current applicable regulatory standards and guidelines per the methodology described above. Groundwater analytical data from LCO collected in 2019 are in the LCO SSGMP (Appendix II). Sampling locations are shown by operation on Drawings 6 to 10. RDW sampling locations are on drawings associated with the closest operation.

Hydrographs and time-series plots for CI as well as Piper plots and Schoeller plots showing major ion distribution for select locations (if required) are presented in attached Figures. Based on the distribution of concentrations, select graphs have been presented on a logarithmic scale.

3.3 Statistical Trend Analysis

Concentration trends for CI in groundwater were evaluated based on available historical analytical data using the Mann-Kendall analysis. Results from statistical tests display quantifiable patterns in geochemical concentrations over time; however, it is noted that this test is only a statistical test and should be used along with other lines of evidence to confirm patterns over time.

The Mann-Kendall statistical test is a non-parametric trend analysis test that identifies changes in environmental conditions (Gilbert, 1987). The analysis tests the null hypothesis of no trend against the alternative hypothesis of a significant trend. Sampling locations with less than seven sampling events were not selected for assessment. Where field duplicates were collected, the higher value was selected for analysis. Concentrations below the method detection limit (MDL) were assigned the MDL concentration. Trend analysis was not completed for parameters where concentrations were consistently less than, or within 5 times the MDL. Based on the results of the Mann-Kendall trend analysis, further analysis of seasonal trends for select locations and parameters may be warranted if there is a sufficient dataset (at least seven years of samples in the same season).

The analysis for each parameter is determined by calculating Mann-Kendall Statistic (S), the percent confidence of a significant trend, and the coefficient of variance (COV). The S value is calculated as the number of calculated positive differences minus the number of calculated negative differences; differences are calculated in a time-series by assuming an initial S value of 0 (e.g., no trend). If a data value in the time-series is higher than a value from earlier in the period, S increases by 1. Conversely, if a data value later in the time-series is lower than a value from earlier in the dataset, S decreases by 1. A high positive S is one indicator of an increasing trend, while a low negative is an indicator of a decreasing trend. The percent confidence of a significant trend is calculated using a Kendall probability table, which requires the S value of the test and the number of samples (n). The Kendall table identifies the probability of rejecting a null hypothesis (no trend) of a given level of significance. The confidence level is subsequently calculated by subtracting the probability from 1 (Newell et al., 2007). A COV value is the standard deviation divided by the average and presented as a percent. A COV below 100% can be used to infer stability in groundwater concentrations, whereas a value above 100% indicates a non-stable trend and a greater degree of scatter. The process of determining a significant trend and stability is in Table E (Aziz et al., 2003).

‘No trend’ and ‘stable’ both indicate that neither an increasing nor a decreasing trend could be discerned within the specified confidence limit. However, a ‘stable’ result also signifies that data had minimal scatter (less than 100% COV), which further emphasizes that concentrations are relatively unchanging over time.

The analytical results are subject to a variety of influences affecting the analysis of trends and stability. Such factors include subtle variations in sample acquisition or laboratory techniques and disparities caused by seasonality and other natural cycles. Consequently, these factors should be considered when establishing and validating actual trends in aquifer conditions with any certainty.

Table E: Mann-Kendall Analysis Decision Matrix

S	Trend Confidence	Concentration Trend
S>0	> 95 %	Increasing
S>0	90 – 95 %	Probably Increasing
S>0	< 90 %	No Trend
S 0		No Trend
S 0	< 90 % and COV < 100 %	Stable
S<0	90 – 95 %	Probably Decreasing
S<0	> 95 %	Decreasing

Notes:
S – Mann-Kendall Statistic
COV – coefficient of variation

4 Fording River Operations SSGMP

The basis for the SSGMP is the groundwater CSM, developed from information in previous reports (Golder, 2013, 2015a; SNC-Lavalin, 2015a, 2017b, 2018a, 2019b) and presented in the 2018 SSGMP Update (SNC-Lavalin, 2019g). The CSM includes descriptions of the physical setting, hydrology, geology, mine related features, physical hydrogeology, and chemical hydrogeology and presents detailed analysis and interpretation of groundwater flow patterns, groundwater geochemistry, groundwater – surface water interactions and potential sources and transport pathways of CI in groundwater to the main stem valley bottom at FRO.

The FRO SSGMP covers two primary watersheds: the Henretta Creek Valley and the Fording River Valley. Within the Henretta Creek Watershed, monitoring wells have been grouped into two sub-areas: upgradient/ background reference location and locations around the Henretta backfilled mine pits and spoil piles. Within the Fording Watershed, monitoring wells have been grouped into the following sub-areas: upgradient of the South Tailings Pond (STP), directly downgradient of the STP, within the Kilmarnock Creek alluvial fan and downgradient of the alluvial fan.

4.1 Groundwater Monitoring Locations

The 2019 groundwater monitoring locations were sampled in accordance with the approved FRO SSGMP Update (SNC-Lavalin, 2019g). The groundwater monitoring program consists of 18 groundwater monitoring locations, including 22 monitoring wells (six are nested) and seven supply wells (at two locations). The wells are listed in Table F along with the associated rationale. A summary of potential sources of CI and possible transport pathways to groundwater at FRO are identified in the SSGMP Update (SNC-Lavalin, 2019g). An analyte list of constituents submitted for analysis is in Appendix III. Additional details including Universal Transverse Mercator (UTM) locations, elevations, well installation details, description of screened lithologies, and estimated hydraulic conductivities are provided in appended Table 2a and on borehole logs in Appendix IV. Field sampling methodologies and Teck's Best Management Practices are in Appendix V. Monitoring well locations are shown on Drawing 6 and on Block Diagrams in Appendix VI – Figures 1 and 2.

Table F: FRO – Summary Groundwater Monitoring Locations and Rationale

Watershed/Sub-Area		Well ID	Well Type	Rationale
Henretta Creek Watershed	Henretta Backfilled Pits and Spoils	FR_HMW1S FR_HMW1D	Monitoring	› Monitor groundwater in backfilled pits between the Henretta reclaimed channel and the spoils to the north, downgradient of the discharge area for the Henretta Pit sump water. › Monitor deep groundwater system high in Cl in backfilled pits and continue to evaluate connectivity to surface water and shallow groundwater.
		FR_HMW2	Monitoring	› Monitor upland groundwater high in Cl north of the Henretta reclaimed channel near the base of the spoil.
		FR_HMW3	Monitoring	› Monitor groundwater in backfilled pits in the eastern portion of the former South Henretta Pit. › This well provides local-scale triangulation to assess groundwater flow direction near the pits.
	Reference	FR_HMW5	Monitoring	› Monitor reference groundwater conditions upgradient of mining impacts in Henretta valley bottom.
Fording River Watershed	Upgradient of the STP	FR_TBSSMW-1 FR_TBSSMW-2	Monitoring	› Monitor groundwater and attenuation downgradient of Turnbull spoil and Henretta Valley and provide more understanding of groundwater-surface water interactions in Fording River valley bottom.
		FR_POTWELLS[a]	Supply	› Monitor groundwater and attenuation downgradient of Henretta Valley and the Turnbull spoil.
		FR_GCMW-1B	Monitoring	› Monitor groundwater quality downgradient of Clode Creek and Clode Settling Pond as several potential sources and transport pathways to groundwater were identified.
		FR_GCMW-2		
		FR_MW-1B	Monitoring	› Monitor seepage from upgradient spoils, Turnbull Pit, and Clode Creek and Lake Mountain Pit Lake.

Table F (Cont'd: FRO – Summary Groundwater Monitoring Locations and Rationale

Watershed/Sub-Area		Well ID	Well Type	Rationale
Fording River Watershed (Cont'd	Directly downgradient of the STP	FR_09-04-A FR_09-04-B	Monitoring	› Monitor groundwater quality in valley-bottom sediments downgradient of the South Tailings Pond. Monitor seepage from the South Tailings Pond to overburden material immediately downgradient within the Fording River valley bottom.
	Kilmarnock Alluvial Fan and downgradient	FR_09-02-A FR_09-02-B	Monitoring	› Monitor groundwater quality in valley-bottom sediments downgradient of the South Tailings Pond and South Kilmarnock Settling Ponds. Assess influence of losing Fording River to valley-bottom sediments.
		FR_09-01-A FR_09-01-B	Monitoring	› Monitor groundwater quality in valley-bottom sediments downgradient of the South Tailings Pond and South Kilmarnock Settling Ponds. Monitor mine impact at the southern extent of the mine-permitted area. › Monitor additional inputs to Fording River valley-bottom sediments downgradient of the South Tailings Pond.
		FR_GH_WELL4[b]	Supply	› Monitor mine-influenced groundwater downgradient of the FRO mining operations.
		FR_KB-1, FR_KB-2, FR_KB-3A FR_KB-3B	Monitoring	› Monitor mine-influenced groundwater quality and hydraulic gradients to the Kilmarnock Creek alluvial fan.
		FR_MW-SK1A FR_MW-SK1B	Monitoring	› Monitor mine-influenced groundwater quality and hydraulic gradients downgradient of the Kilmarnock Creek alluvial fan and South Tailings Pond on the eastern side of the Fording River Valley.

Notes:

[a] FR_POTWELLS consists of six wells: FR_PW91, FR_PW92, FR_PW93, FR_PW94, FR_PW95, and FR_PW96.

[b] As a recommendation of the hydrogeological assessment, monitoring of a dedicated well (FR_GH_WELL4) from FR_GHHW began in the fourth quarter (Q4) of 2017.

4.2 Program Modifications

Data were collected in accordance with the approved FRO SSGMP Update (SNC-Lavalin, 2019g) with some exceptions. A summary and discussion of modifications to the program outlined in the FRO SSGMP are provided in Table G below.

Table G: FRO – Summary of Program Modifications

#	Well ID	Q[a]	Modification	Reason
1	FR_HMW5	1	Unable to sample well.	Water frozen in well.
2	FR_TBSSMW-1	3, 4	Well sampled twice in specified quarter.	Well sampled twice in specified quarter as part of objectives of a separate program.
3	FR_TBSSMW-2	3, 4		
4	FR_GCMW-1B	3		
5	FR_KB-1	2		
6	FR_KB-2	2, 4		
7	FR_KB-3A	1, 4		
8	FR_KB-3B	1, 4		
9	FR_09-04-A/B	2	No water level data.	Field data sheets misplaced.
10	FR_KB-1	4	No field data.	Field parameters not collected.

Notes:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4).

4.3 Results and Discussion

4.3.1 Climate

Climate data was provided by Teck for the Sewage Treatment Facility Air Quality Station at FRO (FR_STFMET; 652556 E, 5559108 N; 1,021 metres above sea level [masl]). The climate station is approximately 520 m east of the Fording River, near the South Kilmarnock Settling Ponds. Total annual precipitation was 521.7 mm; which is expected to increase with elevation throughout the site (Figure FR-1). Monthly precipitation varies from 9.4 mm in January to approximately 102 mm in July, with most of the precipitation falling as snow between November and April. Daily average air temperatures range from -15.2ºC in February to 13.7ºC in August. The mean annual air temperature is 1.1ºC.

4.3.2 Henretta Creek Valley Watershed

4.3.2.1 Groundwater Elevations

Manual depths to groundwater measured in 2019 were compiled in Table 2b. Manual and continuous water level data (barometrically corrected with the FR_GH_WELL3 barologger) in the Henretta Creek Valley were plotted on time-series graphs (Figures FR-2 and FR-3). The 2019 fourth quarter (Q4) groundwater elevations are shown on Drawing 11. Flow directions are provided on the drawings; however, there is insufficient data for groundwater elevation contours. Monitoring well locations are shown on Block Diagrams in Appendix VI – Figure 1.

Reference Well Groundwater Elevations

Both manual and datalogger groundwater elevations from January 2015 to November 2019 were plotted on a time-series graph (Figure FR-2). In 2019, manual and continuous water level measurements from FR_HMW5 (Table 2b; Figure FR-2) show seasonal water level variation. Continuous measurements generally display higher groundwater elevations in FR_HMW5 during freshet, reflecting both low and high elevation snow melt. The 2019 data display rising groundwater elevations in mid-May, peak elevations at the end of May, fluctuations through to August, and lesser fluctuation and decreasing elevation for the rest of the year. The maximum groundwater elevation fluctuation was approximately 0.4 m in 2019.

Henretta Backfilled Pits and Spoils Groundwater Elevation

Manual and datalogger groundwater elevations from January 2015 to October 2019 for each well were plotted on a time-series graph (Figure FR-3). Select time intervals in 2015 and 2016 and the first quarter of 2019 for FR_HMW1S were not recorded. Manual and datalogger measurements were concordant in 2019 in each well except for FR_HMW2. Groundwater elevations at wells FR_HMWD1S/D displayed similar fluctuations throughout the year with higher elevations recorded between May and July. In 2019, the vertical groundwater gradient was upward from the gravel (probably waste rock)/coal/bedrock unit to the gravel (probably waste rock) unit. The calculated vertical hydraulic gradients varied from 0.008 to 0.012 m/m (Table 2b).

Groundwater elevations at well FR_HMW2 displayed an approximately 0.2 m rise from June to August, but without a strong seasonal trend. The lack of a seasonal trend is probably because this well is completed in waste rock on the valley flank. The 2019 data indicate a discrepancy of approximately 0.3 m between manual and data logger groundwater elevations in the first quarter (Q1) and third quarter (Q3). A 30 m length of Waterra tubing was lost down this well in 2017. The lost tubing along with the currently used length of tubing may be physically blocking access in the well resulting in compromised datalogger and water level probe measurements. Discrepancies in manual and datalogger measurements are probably a result of the tubing as they have been noted since 2017. Several unsuccessful attempts have been made to remove the tubing.

Well FR_HMW3 displayed seasonal groundwater fluctuations in spring and summer (mid-May to late July) with a maximum fluctuation of 0.9 m between March and June.

4.3.2.2 Groundwater Quality

Field parameters measured in 2019 for the Henretta Valley wells were similar to those measured in 2018 with the exception of dissolved oxygen (DO) values that were higher in FR_HMW1S, FR_HMW2, FR_HMW3, and FR_HMW5 and lower in FR_HMW1D (Table 2c). Analytical results compared to primary screening criteria are in Tables 2c and 2d and secondary screening criteria are in Table 2e. A summary of CI compared to primary screening criteria for the Henretta Valley is presented in Table H. Spatial distributions of CI are in Drawings 20 to 23. Mann-Kendall trend analyses are in Table I and Appendix VII. Certificates of Analysis (COAs) for data are in Appendix X.

Table H: FRO – Summary of CI compared to Primary Groundwater Screening Criteria in the Henretta Creek Valley

Parameter[1,2] / 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
FR_HMW1S	141	120	135	123	1,940	1,710	1,810	1,730	-	-	-	-				
FR_HMW1D	151	133	133	122	2,110	1,950	1,840	1,840	-	-	-	-				-
FR_HMW2	73.3	75.2	79.3	57.5	1,690	1,730	1,620	1,760	-	-	-	-				
FR_HMW3	-	-	-	-	-	-	-	-	-	-	-	-				
FR_HMW5	NS	-	-	-	NS	-	-	-	NS	-	-	-	NS	-	-	-
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

[2] '–' denotes result is below primary screening criteria.

[3] Where a duplicate was collected, or if more than one sample was collected in a quarter, the higher concentration is provided.

[4] Standard varies with hardness.

'NS' denotes sample not collected.

Dissolved selenium concentrations in wells FR_HMW1S and FR_HMW2 were also greater than the CP (130 µg/L) and GCDWQ DW (50 µg/L) secondary screening criteria and wells FR_HMW1S/D, FR_HMW2, and FR_HMW3 were greater than the CDWQ DW guidelines.

In addition to CI, dissolved lithium, manganese, and uranium concentrations were greater than the primary screening criteria in select wells in the Henretta Creek Valley. Concentrations were similar to those measured in 2018.

- Dissolved lithium concentrations were greater than the CSR DW standard in each of the sampled wells in the Henretta Creek Valley in most quarters.
- Dissolved manganese and uranium concentrations were greater than the CSR IW standards in FR_HMW1D and FR_HMW1S in each quarter.

A review of dissolved lithium concentrations in groundwater in the Elk Valley between 2015 and 2017 indicated that dissolved lithium concentrations in groundwater are naturally high across the Elk Valley. This is further discussed in the RGMP Section. A review of background lithium concentrations will be completed for the 2020 RGMP Update.

Dissolved manganese concentrations are consistent with previous years. Higher concentrations of dissolved manganese were correlated with lower concentrations of DO. In the Henretta Creek Valley, dissolved manganese concentrations greater than the CSR IW standard (335 – 680 µg/L in FR_HMW1S/D) had DO concentrations ranging from 0.16 to 4.86 mg/L. Wells with dissolved manganese concentrations below the CSR IW standard had DO concentrations between 6.06 to 9.93 mg/L (with one outlier at 0.25 mg/L). Low DO concentrations reflecting reducing conditions may account for higher manganese concentrations in these deep wells where limited exchange with atmospheric oxygen is expected.

Dissolved uranium concentrations are consistent with previous years. Dissolved uranium concentrations in FR_HMW1S/D were between 10.7 and 12.8 µg/L. In FR_HMW2 dissolved uranium concentrations between Q1 and Q3 were marginally above the CSR IW standard of 10 µg/L (10.3 to 10.7 µg/L), whereas Q4 concentrations were below the CSR IW standard. Groundwater at these locations is more mineralized as reflected by total dissolved solid (TDS) concentrations (3,190 to 4,090 mg/L), probably resulting from the proximity to source materials (i.e., waste rock), which are a possible contributor of elevated dissolved uranium concentrations. Other wells in the Fording River Valley with dissolved uranium concentrations above the primary screening criteria also have elevated TDS concentrations. There are no current drinking water receptors in the Henretta Valley.

Mann-Kendall trend analyses were completed for data from the Henretta Creek Valley with seven or more sampling events (Table I; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table I: FRO – Summary of Mann-Kendall Trend Analysis for CI in the Henretta Creek Valley

Well ID \ Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
FR_HMW1S	**Decreasing**	**Increasing**	Decreasing	**Increasing**
FR_HMW1D	**Decreasing**	**Increasing**	Increasing	**Stable**
FR_HMW2	**Decreasing**	**Increasing**	Probably Decreasing	**Increasing**

Table I (Cont'd: FRO – Summary of Mann-Kendall Trend Analysis for CI in the Henretta Creek Valley

Well ID \ Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
FR_HMW3	Decreasing	Decreasing	Decreasing	**Increasing**
FR_HMW5	-	Increasing	-	Increasing

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shade and bold**.
'-' Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

Although Mann-Kendall results indicate dissolved cadmium concentrations are increasing in FR_HMW1D, concentrations are one order of magnitude below the lowest range of the hardness dependent CSR AW standard. Other increasing trends are discussed in the sections below.

4.3.2.3 Discussion

Reference Water Quality

Groundwater quality results for reference well FR_HMW5 were below the primary screening criteria for each sample; however, concentrations for three CI (dissolved selenium, sulphate and nitrate-N) were the highest recorded concentrations since sampling began (Figures FR-4 and FR-5). In Q3 2019, dissolved selenium concentrations measured the highest recorded value (4.95 µg/L) since monitoring began (except for an anomalous value in Q2 2017) and concentrations correspond to an increasing trend identified in the Mann-Kendall analysis (Table I; Appendix VII). Dissolved selenium concentrations in 2019 were greater than the adjacent surface water monitoring station, FR_HC3, in three of the four quarters measured (Figure FR-4). Similarly, dissolved sulphate concentrations in Q4 2019 reached the highest recorded value since monitoring began (57.4 mg/L) and are reflective of an increasing trend in Mann-Kendall analyses. Sulphate concentrations display a moderate seasonal fluctuation with the lowest concentrations in Q2 and the highest in Q4, but do not reflect the same marked seasonal variation in surface water at FR_HC3. Lastly, nitrate-N concentrations reached the highest recorded value (0.0081 mg/L), and although they are well below the primary screening criteria, Q4 results are greater than the MDL for the second year in a row.

An increase in recordable concentrations of dissolved selenium and sulphate was identified in previous annual reports and recommendations were made to monitor concentrations, assess trends, and reassess this well as a background well under the RGMP (SNC-Lavalin, 2018a, 2019b, 2019e, 2019g). Based on consecutive increasing concentrations and an increasing trend in dissolved selenium and sulphate, this well will be replaced in 2020 under the RGMP with a new background well upgradient of the current location.

Henretta Spoils

Monitoring well FR_HMW2 was installed within the spoil and screened at the base of the pile to monitor upland groundwater high in CI north of the Henretta reclaimed channel. Based on the Mann-Kendall analysis, both dissolved selenium and sulphate display an increasing trend. Dissolved selenium concentrations are markedly less in Q1 to Q3 2019 (407 to 522 µg/L) compared to 2018 results; however, the Q4 concentration (745 µg/L) is similar to those measured 2018 (Figure FR-6). Sulphate concentrations are similar or slightly less (1,620 to 1,760 µg/L) than concentrations measured for the same quarter in 2017 and 2018 (Figure FR-7); however, Mann-Kendall results indicate an overall increasing trend since 2012. Nitrate-N concentrations remain above primary screening criteria; however, Mann-Kendall results suggest a decreasing trend which is reflected in the lowest recorded concentration (57.5 mg/L) to date in Q4 2019 (Figure FR-8). The decreasing trend in nitrate-N concentrations is probably from the depletion of the nitrate source in the spoil; this has been measured at other spoils across the valley (Teck, 2018d). Concentrations measured at well FR_HMW2, indicate that the spoil is an ongoing source of dissolved selenium and sulphate to valley-bottom groundwater. Consistent with the CSM, CI concentrations in surface water at FR_HC1 are low, suggesting limited loading to Henretta Creek from groundwater in the spoil at FR_HMW2.

Henretta Backfilled Pits

FR_HMW1S/D were installed in backfilled pits between the Henretta reclaimed channel and the spoils to the north. Dissolved selenium concentrations in FR_HMW1S displayed seasonal variation with the highest concentration in 2019 measured in Q1 (March; 214 µg/L) and Q3 (July; 213 µg/L) and the lowest measured in Q4 (October; 109 µg/L), also the lowest concentration measured since Q3 2013 (Figure FR-6). Mann-Kendall analyses for FR_HMW1S suggest an increasing trend for dissolved selenium, which is reflective of 2017 and 2018 results; however, 2019 results have decreased. Ongoing statistical analyses are warranted to monitor trends. The highest dissolved selenium concentration in 2019 in FR_HMW1D was measured in Q1 (March; 199 µg/L) and steadily declined to the lowest measured in Q4 (October; 5.91 µg/L). The Mann-Kendall statistical analyses for FR_HMW1D suggest a stable trend. Dissolved selenium concentrations in both wells are greater than in surface water at FR_HC1, except for Q4 in FR_HMW1D, and do not reflect seasonal trends in surface water.

Sulphate concentrations in FR_HMW1D were higher than in FR_HMW1S in each quarter in 2019. Concentrations have been increasing in FR_HMW1D when compared with previous years (Figure FR-7), with the highest concentrations since measuring began recorded in Q1 2019 (2,110 mg/L). This is also reflected in Mann-Kendall analyses from both wells which suggest an increasing trend. Mann-Kendall analyses of nitrate-N concentrations reflect a decreasing trend and 2019 results (except FR_HMW1D Q2) were less than that concentrations recorded in 2018 (Figure FR-8). Like FR_HMW2, decreasing nitrate-N is probably a result of the depletion of nitrate-N at the source (Teck, 2018d).

Monitoring well FR_HMW3 monitors groundwater in backfilled pits in the eastern portion of the former South Henretta Pit. Dissolved selenium and sulphate concentrations are similar to previous years. Dissolved selenium and sulphate concentrations in 2019 reflect seasonal variation in surface water at FR_HC1 although concentrations are higher in groundwater (Figure FR-6 and FR-7). Mann-Kendall analyses suggest an increasing trend for dissolved selenium which is reflected in analytical results in Figure FR-6 from 2017 to present. Mann-Kendall analyses suggest a decreasing trend for sulphate. Nitrate-N concentrations are moderately less than previous years (Figure FR-8) and Mann-Kendall analyses suggest a decreasing trend. This decrease is attributed to depletion of nitrate-N at the source.

CI concentrations at downstream surface water station FR_HC1 are lower than CI concentrations measured at monitoring wells FR_HMW1S/D, FR_HMW2 and FR_HMW3, suggesting limited loading to Henretta Creek from groundwater around the backfilled pits. Lower concentrations of CI in surface water suggests that groundwater systems in the backfilled pits are separate from the shallow surficial flow system. However, it may still be possible that groundwater from the backfilled pits flows toward the Fording River Valley (SNC-Lavalin, 2019g). A nested monitoring well is recommended in the Henretta Valley before the confluence with the Fording River to assess this possibility. Once a nested well is installed, monitoring at HMW1S/D may be reduced or even eliminated.

4.3.3 Fording River Valley Watershed

4.3.3.1 Groundwater Elevations

Manual depths to groundwater measured in 2019 were compiled in Table 2b. Manual and continuous water level data (barometrically corrected with the FR_GH_WELL3 barologger) in the Fording River Valley were plotted on time-series graphs (Figures FR-9, FR-11 to FR-14). The 2019 fourth quarter groundwater elevations are shown on Drawing 11. Flow directions are provided on the drawings; however, there is insufficient data for groundwater contours. Monitoring well locations are shown on Block Diagrams in Appendix VI – Figure 2.

Upgradient of the South Tailings Pond (STP)

Manual and continuous groundwater measurements were collected at FR_TBSSMW-1 and FR_TBSSMW-2 downgradient of the confluence of Henretta Creek and the Fording River (Table 2b; Figure FR-9). One year of data were available for analysis. The manual and continuous water level data were concordant and display seasonal variation with the highest elevations between March and August reflecting low and high elevation snow melt and infiltration. Lower elevations were measured in the fall and winter months resulting in an annual fluctuation of approximately 2 m.

Although groundwater elevations are not available for FR_POTWELLS, cumulative average daily pumping rates were measured from the six wells that make up FR_POTWELLS (Figure FR-10). The average daily pumping rate was 157 m^3/hr (cubic metres per hour), the minimum was 122 m^3/hr and the maximum 224 m^3/hr.

Manual and continuous water levels were measured for FR_GCMW-1B and FR_GCMW-2 in 2019 and were concordant (Table 2b; Figure FR-11). A portion of the continuous water level data for FR_GCMW1-B for 2019 is missing. The results display higher groundwater elevations in May. These wells are directly downgradient of the Clode Settling Ponds and may be influenced by seepage from the ponds.

Manual water levels were measured for FR_MW-1B for each quarter in 2019 (Table 2b; Figure FR-11). Groundwater elevations followed a seasonal trend with higher elevations in May. Groundwater elevations fluctuated by approximately 0.48 m.

Directly downgradient of the South Tailings Pond

Manual water measurements were collected for FR_09-04-A/B, directly downgradient of the STP in three quarters in 2019 (Table 2b; Figure FR-12). Water level measurements from Q2 2019 were misplaced. Groundwater elevations show little variation probably because of seepage influence from the adjacent STP. The vertical flow is inferred to be downwards from the shallow sandy gravel unit to the deeper gravel unit based on the calculated vertical gradient (0.156 to 0.160 m/m; Tables 2a, 2b).

Kilmarnock Alluvial Fan and Downgradient Locations

Manual and continuous water level data were collected from four monitoring wells in the Kilmarnock alluvial fan (Figure FR-13). Continuous measurements were recorded from December 2018 to March/April 2019 and from June 2019 to December 2019. Continuous measurements are missing from FR_KB-1 for approximately two weeks in November. Manual and continuous water level measurements are concordant except for Q1 in FR_KB-2. FR_KB-1 and FR_KB-2 fluctuated approximately 1.0 m annually whereas FR_KB-3A/B fluctuated approximately 3 m throughout the year. Each of the four wells recorded the highest elevations in June/July and the lowest elevations in the winter months. Vertical flow in nested wells FR_KB-3A/B is inferred to be downward from the shallow gravel unit to the deeper sand unit and ranges from 0.017 to 0.020 m/m (Tables 2a, 2b).

Manual water level data were measured for FR_09-01-A/B and FR_09-02-A/B in each of the four quarters (Table 2b; Figure FR-14). Groundwater elevation at both locations followed a seasonal trend with higher groundwater elevations recorded in May and the lowest elevations measured in March. Water levels at FR_09-01-A/B and FR_09-02-A/B varied between March and May by approximately 5.0 and 4.8 m, respectively. Inferred vertical gradients are downward in both nested wells from the shallow sandy gravel unit to the deeper gravel unit (Table 2a). Gradients in FR_09-01-A/B range from 0.033 to 0.069 m/m and from 0.078 to 0.104 m/m in FR_09-02-A/B (Table 2b). The vertical gradient was stronger at FR_09-02-A/B than FR_09-01-A/B, possibly because it is closer to the Fording River that is inferred to be losing to ground over this reach.

Manual and continuous water level data were collected for FR_MW-SK1A/B beginning in April 2019 (Table 2b; Figure FR-14). The highest elevations were measured in June and the lowest in October, which was the last recorded measurement for 2019. The approximate annual fluctuation is 5.0 m. The vertical gradient (0.008 to 0.020 m/m) is inferred to be upward from the deeper silty sand and gravel unit to the shallower sand and gravel unit (Table 2a, 2b).

FR_MW-09-01-A/B, FR_MW-09-02-A/B and FR_MW-SK1A/B are downgradient or side-gradient from the unlined South Kilmarnock Phase 2 Secondary Settling Pond. Part of the groundwater elevation fluctuation at these monitoring wells is probably the result of groundwater mounding due to seepage from the pond during freshet.

4.3.3.2 Groundwater Quality

Analytical results compared to primary screening criteria are in Tables 2c and 2d and secondary screening criteria are in Table 2e. Spatial distributions of CI are in Drawings 20 to 23. Mann-Kendall trend analyses are in Table K and Appendix VII. COAs for data are in Appendix X. Monitoring well locations are shown on Block Diagrams in Appendix VI – Figure 2.

Upgradient of the South Tailings Pond

Field parameters measured upgradient of the STP in 2019 were similar to those measured in 2018 (Table 2c). A summary of CI compared to primary screening criteria for the wells upgradient of the STP is presented in Table J.

SNC • LAVALIN

Table J: FRO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Fording River Valley Upgradient of the STP

Parameter[1,2] / 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
FR_TBSSMW-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_TBSSMW-2	-	-	-	-	-	-	-	-	-	-	-	-		12.7	12.8	
FR_POTWELLS	-	-	-	-	-	-	-					-		-	-	17.4
FR_GCMW-1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_GCMW-2	83.5	35.7	31.3	42.7	574	-	-	-	-	-	-	-				
FR_MW-1B	17.0	-	-	12.8	-	-	-	-	-	-	-	-		19.8	18.5	
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

2 '–' denotes result is below primary screening criteria.

3 Where a duplicate was collected, or if more than one sample was collected in a quarter, the higher concentration is provided.

4 Standard varies with hardness.

Monitoring well FR_GCMW-2 had dissolved selenium concentrations greater than the secondary screening criteria (GCDWQ DW guideline). The remaining wells in the Fording River Valley upgradient of the STP had dissolved selenium concentrations less than the applicable secondary screening criteria (Table 2e).

In addition to CI, fluoride and dissolved barium, lithium, and molybdenum concentrations were greater than the primary screening criteria in select wells (Table 2c or 2d).

- Dissolved lithium concentrations were greater than the primary screening criteria in each well except for FR_POTWELLS.
- Dissolved barium and molybdenum concentrations were greater than primary screening criteria in FR_TBSSMW-1.
- Dissolved molybdenum and fluoride concentrations were greater than primary screening criteria in FR_GCMW-1B.

Dissolved lithium concentrations are inferred to be background (SNC-Lavalin, 2017c). Fluoride and dissolved barium and molybdenum were identified in the 2017 RGMP Update as naturally occurring constituents in several Study Areas (SNC-Lavalin, 2017c). Fluoride was not identified in nearby surface water station, FR_CC1. However, fluoride concentrations greater than the CSR standard were previously measured in deeper well, FR_GCMW-1A, which is installed directly above bedrock (SNC-Lavalin, 2017d). Barium concentrations in FR_TBSSMW-1 have historically been greater than the applicable standards (SNC-Lavalin, 2017d). Molybdenum concentrations in FR_TBSSMW-1 and FR_GCMW-1B have also historically been greater than the applicable standards (SNC-Lavalin, 2017d).

Mann-Kendall trend analyses were completed for data from the upper Fording River Valley north of the STP with seven or more sampling events (Table K; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table K: FRO – Summary of Mann-Kendall Trend Analysis for CI in the Fording River Valley Upgradient of the STP

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
FR_POTWELLS	Decreasing	No trend	-	**No trend**
FR_MW-1B	No trend	No trend	-	**No trend**

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.

'-' Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

Directly downgradient of the STP

Field parameters measured directly downgradient of the STP and upgradient of the Kilmarnock alluvial fan in 2019 were similar to those measured in 2018 (Table 2c). A summary of CI compared to primary screening criteria for the wells directly downgradient of the STP is presented in Table L.

Table L: FRO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Fording River Valley Directly Downgradient of the STP

Parameter[1,2] / 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
FR_09-04-A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_09-04-B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSR AW	1,280 – 4,290[4]				400				0.5 – 4[4]				20			
CSR IW	n/a				n/a				5				20			
CSR LW	1,000				100				80				30			
CSR DW	500				10				5				10			

Notes:
[1] Primary screening criteria: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.
[2] '–' denotes result is below primary screening criteria.
[3] Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.
[4] Standard varies with hardness.
'NS' denotes sample not collected.

Non-order constituent concentrations greater than the primary screening in FR_09-04-A/B included dissolved lithium and manganese (Table 2d). Lithium has been attributed to background concentrations (SNC-Lavalin, 2017c). Greater concentrations of dissolved manganese are often correlated with low concentrations of DO (<1.0 mg/L) indicating reducing conditions. DO concentrations at FR_09-04-A/B were between 0.06 and 0.7 mg/L and may account for higher manganese concentrations.

Mann-Kendall trend analyses were completed for data from wells directly downgradient of the STP with seven or more sampling events (Table M; Appendix VII). Refer to Section 3.3 for explanation of criteria used to identify significant trends.

Table M: FRO – Summary of Mann-Kendall Trend Analysis for CI in the Fording River Valley Directly Downgradient of the STP

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
FR_09-04-A	No trend	No trend	Increasing	Decreasing
FR_09-04-B	Probably Decreasing	No trend	Increasing	Decreasing

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.
'-' Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

The Mann-Kendall analysis indicates increasing trends in dissolved cadmium concentrations; however, the highest dissolved cadmium concentrations are four times less than the upper limit of the CSR AW standard and not considered a concern.

Kilmarnock Alluvial Fan and Downgradient Locations

Field parameters measured in wells in and downgradient of the Kilmarnock alluvial fan in 2019 were similar to those measured in 2018 (Table 2c). A summary of CI compared to primary screening criteria for these wells is presented in Table N.

SNC·LAVALIN

Table N: FRO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Fording River Valley in the Kilmarnock Alluvial Fan and Downgradient Locations

Parameter[1,2] / Well ID	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
	Q1	Q2	Q3	Q1	Q2	Q3	Q4	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
FR_KB-1	97.5	98.3	27.2					65.1	-	-	-	-	790	813	-	592
FR_KB-2	95.2	102	28.4					66.0	-	-	-	-	745	819	-	503
FR_KB-3A	64.7	69.2	71.4					63.3	-	-	-	-	547	593	583	569
FR_KB-3B	76.7	74.4	54.0					54.5	-	-	-	-	625	584	-	-
FR_MW-SK1A	66.0	31.2	28.7					41.3	-	-	-	-	537	-	-	-
FR_MW-SK1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FR_09-01-A	21.3	36.5	23.5					38.7	-	-	-	-	-	-	-	-
FR_09-01-B	21.1	20.5	19.3					20.4	-	-	-	-	-	-	-	-
FR_09-02-A	21.9	13.3	12.7					10.4	-	-	-	-	-	-	-	-
FR_09-02-B	21.8	31.9	-					-	-	-	-	-	-	-	-	-
FR_GH_WELL4	37.7	43.1	36.7					31.9	-	-	-	-	-	-	-	-
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

2 '–' denotes result is below primary screening criteria.

3 Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.

4 Standard varies with hardness.

'NS' denotes sample not collected.

Dissolved selenium concentrations in FR_KB-1, FR_KB-2, FR_KB-3A/B, FR_MW-SK1A, FR_09-01-A/B, FR_09-02-A/B, and FR_GH_WELL4 were also greater than secondary screening criteria (Table 2e).

Non-order constituents that were greater than the primary screening criteria were dissolved lithium, manganese, uranium, and nitrite-N (Table 2c and 2d). Dissolved lithium was greater than primary screening criteria in each well and is attributed to background concentrations (SNC-Lavalin, 2017c). The remaining constituents are as follows.

- Nitrite-N concentrations in FR_GH_WELL4 were greater than CSR AW in Q1.
- Dissolved manganese concentrations in FR_MW-SK1B were greater than CSR IW in each quarter.
- Dissolved uranium concentrations FR_KB-1 and FR_KB-2 were greater than CSR IW in Q1 and Q2.

Historically, nitrite-N concentrations in FR_GH_WELL4 have been less than primary screening criteria.

Nitrite-N concentrations in this well should be monitored going forward to detect any increasing trends. Dissolved manganese concentrations are inferred to be naturally occurring due to limited interaction with the atmosphere at FR_MW-SK1B (screened 65.5 to 67.0 metres below ground surface [mbgs] just above bedrock). Reducing conditions were identified in FR_MW-SK1B with low DO values (0.14 to 0.41 mg/L) and oxidation-reduction potential (ORP) values (-52.7 to 26.4 mV).

Dissolved uranium concentrations in FR_KB-1 and FR_KB-2 in Q1 and Q2 were between 12.2 and 13.4 µg/L. The remaining quarters were below the CSR IW standard. Groundwater at these locations is more mineralized in Q1 and Q2 as reflected by TDS concentrations (2,410 to 2,490 mg/L), probably resulting from the proximity to source materials with high uranium content (i.e., waste rock), which may be a contributor of elevated dissolved uranium concentrations. Surface water from Kilmarnock Creek travels through waste rock before infiltrating the alluvial fan where these wells are installed. Other wells in the Fording River Valley with dissolved uranium concentrations above the primary screening criteria also have elevated TDS concentrations. It is also worth noting there are no drinking water receptors in the Fording River Valley.

Mann-Kendall trend analyses were completed for data from wells in the Kilmarnock alluvial fan and downgradient locations with seven or more sampling events (Table O; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table O: FRO – Summary of Mann-Kendall Trend Analysis for CI in the Fording River Valley in the Kilmarnock Alluvial Fan and Downgradient Locations

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
FR_09-01-A	**Stable**	Stable	Stable	**No trend**
FR_09-01-B	**Stable**	Stable	Probably Decreasing	**Probably Increasing**
FR_09-02-A	**Stable**	Stable	Probably Decreasing	**No Trend**
FR_09-02-B	**Stable**	No Trend	Decreasing	**No Trend**
FR_GH_WELL4	**Decreasing**	No Trend	Decreasing	**No Trend**

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.

'-' Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

4.3.3.3 Discussion

In the Fording River Valley, nitrate-N, sulphate, and dissolved selenium were above the primary screening criteria. Temporal and spatial trends are discussed in the Fording River Valley upgradient of the STP, directly downgradient of the STP, and in and downgradient of the Kilmarnock alluvial fan.

Upgradient of the STP

Monitoring wells FR_TBSSMW-1 and FR_TBSSMW-2 were installed directly south of the confluence of Henretta Creek and the Fording River in 2017 and included in the SSGMP in 2019 (Drawing 6). The wells monitor seepage and attenuation in the Fording River valley bottom directly downgradient of the Turnbull Spoil and Henretta Valley. Dissolved selenium concentrations in shallow well FR_TBSSMW-2, which was screened in gravel (6.8 to 8.3 mbgs), are greater than the applicable primary screening criteria and reflect surface water concentrations and seasonal variation in the Fording River at downgradient surface water monitoring station FR_FR1 (Figure FR-15). Sulphate and nitrate-N concentrations in this well are also the same as concentrations measured in the Fording River (FR_FR1; Figures FR-16 and 17), further supporting the hypothesis of a surface water/groundwater interaction at this location. In contrast, deeper well TBSSMW-1 screened in silty sand and gravel just above bedrock (20.9 to 22.4 mbgs) had CI concentrations less than the primary screening criteria and, in some cases, less than the detection limit (Figures FR-15 to FR-17; Tables 2c and 2d). Therefore, there is no indication of surface water/groundwater interaction at TBSSMW-1.

Farther downgradient, wells FR_POTWELLS also monitors seepage and attenuation in the Fording River valley bottom downgradient of the Turnbull Spoil and Henretta Valley. Dissolved selenium concentrations in FR_POTWELLS were similar to concentrations measured in previous years and were marginally less than concentrations measured in 2018 (Figure FR-15). Dissolved selenium concentrations in Q2 and Q3 were less than primary screening criteria. Mann-Kendall analyses indicate that there is no identifiable trend in dissolved selenium data. Dissolved selenium, sulphate, and nitrate-N concentrations in FR_POTWELLS closely follow seasonal variations and concentrations measured in the Fording River at FR_FR1 (Figures FR-15 to FR-17).

The highest dissolved selenium concentrations measured in FR_TBSSMW-2 (36.3 µg/L) and FR_POTWELLS (25.3 µg/L) are 21 times lower than the highest concentrations measured in the Henretta Valley (FR_HMW3; 745 µg/L) suggesting that a direct down-valley groundwater transport pathway from the Henretta Valley to the Fording River Valley is improbable. Furthermore, the similarity in magnitude and seasonal variation of dissolved selenium concentrations in shallow groundwater wells FR_TBSSMW-2 and FR_POTWELLS and surface water in the Fording River at FR_FR1 suggests a strong surface water and shallow groundwater connection.

Monitoring wells FR_GCMW-1B and FR_GCMW-2 were installed directly downgradient of the Clode Settling Pond in 2017 and added to the SSGMP in 2019 (Drawing 6). These wells monitor groundwater quality directly downgradient of Clode Creek and the Clode Settling Pond. Dissolved selenium, sulphate, and nitrate-N concentrations in deeper well FR_GCMW-1B (screened 14.4 to 15.9 mbgs) were less than primary screening criteria and have decreased significantly since sampling began in 2017 (Table 2c and 2d; Figures FR-15 to FR-17). CI concentrations in groundwater are less than CI concentrations measured in surface water at upstream and downstream surface water monitoring locations FR_FR-1 and FR_FR2, respectively. Field parameters in this well are indicating that reducing conditions which may account for low concentrations of CI, which are attenuated to different levels under reducing conditions. Alternatively, CI may be absent deeper in the aquifer. In contrast, shallow well FR_GCMW-2 (screened 7.6 to 9.1 mbgs) has dissolved selenium, sulphate, and nitrate-N concentrations greater than the primary screening criteria and several orders of magnitude greater than groundwater in FR_GCMW-1B (Figures FR-15 to FR-17). CI concentrations in FR_GCMW-2 are also several orders of magnitude greater than surface water in the Fording River (FR_FR1 and FR_FR2; Figures FR-15 to FR-17) but are similar to or slightly less than concentrations in Clode Creek (FR_CC1). Consequently, this well may be influenced from seepage of CI that has not been attenuated in the Clode Creek Settling Pond.

Farther downgradient, well FR_MW-1B monitors groundwater in the Fording River valley bottom from upgradient spoils, Turnbull Pit, Clode Creek, and Lake Mountain Pit Lake (Drawing 6). This shallow well (screened 5.2 to 8.2 mbgs) has dissolved selenium and nitrate-N concentrations greater than the primary screening criteria (Tables 2d and 2e; Figures FR-15 to FR-17). CI concentrations resemble previous years. Mann-Kendall analyses indicate ‘no trend’ for each CI; however, when seven years of data become available, seasonal Mann-Kendall analyses may be warranted to determine if a trend can be identified based on seasonal variability in concentrations. CI concentrations in FR_MW-1B are of similar magnitude and follow seasonal variation in the Fording River (FR_FR2; Figures FR-15 to FR-17). This suggests that this well is hydraulically connected to the Fording River and is influenced by surface water.

Notably, downgradient deep well FR_MW_NTPNE (screened 16.4 to 17.9 mbgs just above bedrock), installed north of the North Tailings Pond (NTP) and monitoring wells FR_MW_NTPSE (screened 9.1 to 10.1 mbgs just above bedrock) and FR_MW_STPNW (screened 8.2 to 9.5 mbgs just above bedrock) installed downgradient of the NTP and down- to cross-gradient of the STP as part of the Flood Mitigation Program, had CI concentrations less than the primary screening criteria (Drawing 6). Groundwater conditions near the NTP and the STP will be further assessed as part of the FRO Flood Mitigation Project.

Directly Downgradient of the STP

Concentrations of CI in nested monitoring wells FR_09-04-A/B, installed directly downgradient of the STP, remain below the primary screening criteria (Tables 2c and 2d; Figures FR-18 to FR-20). Mann-Kendall results indicate ‘decreasing’ (dissolved selenium), ‘no trend’ (sulphate), and both ‘no trend’ (FR_09-04-A) and ‘probably decreasing’ (FR_09-04-B) for nitrate-N. Despite a decreasing trend for dissolved selenium, results in 2019 were approximately an order of magnitude greater than results from previous years, although well below the applicable screening criteria. Low dissolved selenium concentrations are attributed to attenuation from reducing conditions in the STP area. Selenium and nitrate-N attenuation in groundwater is expected in tailings ponds and underlying aquifers (SRK Consulting Inc. (SRK), 2018b). Selenium attenuation is expected to initiate as soon as nitrate-N begins to reduce via denitrification (SRK, 2018b). These wells both have reducing conditions that reduce mobility of CI and/or may reflect attenuation of CI from the adjacent NTP and STP.

Relatively shallow monitoring wells FR_MW_STPSW-A/B (6.7 to 8.1 mbgs and 3.0 to 4.5 mbgs, respectively) were installed in 2019 as part of the FRO Flood Mitigation program south of the STP and directly east to the Fording River. These wells have dissolved selenium and nitrate-N (FR_MW_STPSW-B only) concentrations greater than the primary screening criteria. In this section of the Fording River, flow accretion studies have indicated that the river is losing to ground (Golder, 2019a). This may account for CI in groundwater directly adjacent to the Fording River in FR_MW_STPSW-A/B, but not in more easterly wells FR_09-04-A/B that are more heavily influenced by the STP. Groundwater conditions and surface water and groundwater connectivity along the Fording River in the STP area will be further assessed as part of the FRO Flood Mitigation Project.

Kilmarnock Alluvial Fan and Downgradient Locations

Monitoring wells FR_KB-1, FR_KB-2, and FR_KB-3A/B were installed in 2018 as part of the Active Water Treatment Facility South Program (AWTF-S) and incorporated into the SSGMP in 2019 (Drawing 6). The wells are in the Kilmarnock alluvial fan and monitor groundwater quality in the fan where Kilmarnock Creek loses to ground (Golder, 2019a). Well FR_KB-1 is screened 5.2 to 8.2 mbgs in silty gravel, sand, and bedrock; FR_KB-2 is screened 13.1 to 16.2 mbgs in silty sand and bedrock; FR_KB-3A is screened 35.4 to 38.4 mbgs in sand above bedrock; and FR_KB-3B is screened 18.3 to 21.3 mbgs in sand. Dissolved selenium and nitrate-N concentrations were greater than the primary screening criteria in each well in each quarter (Figures FR-18 and FR-20). Sulphate concentrations were greater than the primary screening criteria in select quarters in FR_KB-1, FR_KB-2, and FR_KB-3B and in each quarter in FR_KB-3A (Figure FR-19). Sulphate concentrations were more variable in shallower wells (240 to 819 mg/L) and relatively consistent in the deeper well (493 to 593 mg/L; Table 2c). CI concentrations in wells FR_KB-1 and FR_KB-2 approximately mimicked concentrations and seasonality in Kilmarnock Creek at FR_KC1 whereas FR_KB-3B displayed a lag and less variation in concentration compared to the creek. CI concentrations in deep well FR_KB-3A were more muted and did not follow seasonality displayed in surface water at FR_KC1 (Figures FR-18 to FR-20).

Monitoring wells FR_MW_SK1A/B were installed in late 2018 and incorporated into the SSGMP in 2019 (Drawing 6). The wells, adjacent to the South Kilmarnock Phase 2 Secondary Settling Pond, were installed as part of the SSGMP to monitor effects of Kilmarnock Creek drainage on groundwater quality, confirm the preferential flow path of groundwater from the Kilmarnock alluvial fan, confirm the vertical extent of the aquifer, and to increase lateral coverage in the southern area at FRO.

In the shallow well, FR_MW-SK1A (screened approximately 15.0 to 16.5 mbgs in sand and gravel) dissolved selenium, sulphate (Q1 only), and nitrate-N, were greater than the primary screening criteria (Tables 2c and 2d; Figures FR-18 to FR-20). Dissolved selenium was greater than secondary screening criteria (Table 2e). CI concentrations were similar to surface water concentrations in Kilmarnock Creek at FR_KC1 and displayed the same seasonality as the creek. In the deep well, FR_MW-SK1B (screened 65.6 to 67.1 mbgs in sand and gravel above bedrock), CI were less than the primary screening criteria with no seasonal variation. This suggests that FR_MW-SK1A intersects mine-influenced groundwater on the eastern side of the valley from the Kilmarnock alluvial fan and that the mine-influenced groundwater is vertically delineated by FR_MW-SK1B.

Monitoring wells FR_09-01-A/B (shallow/deep) and FR_09-02-A/B (shallow/deep) are downgradient of Kilmarnock Creek alluvial fan and settling ponds (Drawing 6). Dissolved selenium concentrations were greater than the primary screening criteria and similar to or slightly greater (FR_09-01-A, FR_09-02-B) than concentrations measured in 2018 (Figure FR-18). Additionally, each well had concentrations greater than the secondary screening criteria. Mann-Kendall results for dissolved selenium indicate ‘no trend’ for each well except for FR_09-01-B which indicated a ‘probably increasing’ trend. The ‘probably increasing’ trend may be an artefact of seasonal variation. Once there are sufficient data, seasonal Mann-Kendall trend analyses should be completed for dissolved selenium at this location. Nitrate-N concentrations in both nested well pairs were also greater than the primary screening criteria and similar to 2018 concentrations (Figure FR-20). Mann-Kendall results display a stable trend for each well. Sulphate concentrations were less than the primary screening criteria and marginally higher than 2018 in FR_09-01-A/B and similar to 2018 in FR_09-02-A/B (Figure FR-19). Mann-Kendall results indicate a stable trend for each well except for FR_09-02-B which has no trend.

There are two transport pathways for elevated CI in groundwater in the Fording River valley bottom: surface water recharge of groundwater from infiltration of the Fording River; and surface water infiltration of Kilmarnock Creek in the alluvial fan and down-valley transport of CI-influenced groundwater. Monitoring wells FR_09-01-A/B are east of wells FR_09-02-A/B and based on concentrations consistently higher than surface water concentrations measured in the Fording River (FR_FR2 and FR_FR4) are inferred to be influenced by Kilmarnock Creek (FR_KC1; Figure FR-18). In contrast, concentrations and seasonality in FR_09-02-A/B are more reflective of concentrations in the Fording River (FR_FR2 and FR_FR4), except for Q2 when CI concentrations are typically higher than concentrations measured in the Fording River. Higher CI concentrations in Q2 at this location are inferred to be the result of infiltration from the South Kilmarnock Phase 2 Secondary Settling Pond which is only at capacity during freshet (SNC-Lavalin, 2019m).

Farther downgradient at FR_GH_WELL4, dissolved selenium and sulphate concentrations are greater than in 2018 and nitrate-N concentrations are similar to 2018 (Drawing 6; Figures FR-18 to FR-20). Dissolved selenium and nitrate-N were greater than the primary and secondary (selenium only) screening criteria (Tables 2c to 2e). Mann-Kendall results indicate 'no trend' for sulphate and dissolved selenium and a decreasing trend for nitrate-N. In contrast to previous years, dissolved selenium and sulphate concentrations were seasonally greater than in FR_09-01-A. CI concentrations at FR_GH_WELL4 are higher than concentrations measured in the Fording River and inferred to be influenced by Kilmarnock Creek (FR_KC1).

Tributary valley-bottom groundwater flow from the Kilmarnock Creek drainage is a major source of mining-related constituents to Fording River valley-bottom groundwater in the area downgradient of the of the confluence with Kilmarnock Creek. Contributions of CI to groundwater from the Kilmarnock drainage are evident from the distribution of concentrations in monitoring wells. The highest concentrations measured were in the Kilmarnock alluvial fan (FR_KB-1, FR_KB-2, FR_KB-3A/B) followed by decreasing concentrations downgradient at FR_09-01-A/B and marginally increasing concentrations at FR_GH_WELL4, farthest downgradient. Monitoring well FR_09-02-A/B is farther west compared to FR_09-01-A/B with lower concentrations suggesting that the mine-influenced groundwater from the Kilmarnock drainage preferentially travels on the eastern side of the Fording River Valley in this area. Distribution of the mine-influenced groundwater downgradient of FR_GH_WELL4 will be addressed in the RGMP Study Area 1 (Section 9.3.2).

5 Greenhills Operations SSGMP

The following sections describe the 2019 GHO SSGMP. The basis for the SSGMP was the groundwater CSM, developed from information in previous reports and presented in the 2018 SSGMP Update (SNC-Lavalin, 2019h). The CSM includes descriptions of the physical setting, hydrology, geology, mine related features, physical hydrogeology, and chemical hydrogeology and presents detailed analysis and interpretation of groundwater flow patterns, groundwater geochemistry, groundwater – surface water interactions and potential sources and transport pathways of CI in groundwater at GHO.

The GHO SSGMP covers three primary surface water drainage areas: Porter Creek, Greenhills Creek and the Elk River Valley. Within the Greenhills Creek watershed, the monitoring wells have been grouped based on four sub-areas: Site A Rejects, Tailings Storage Facility (TSF) and Site D/E Rejects, Rail Loop Area, and Greenhills Creek Alluvial Fan. Within the Elk River Valley, monitoring wells have been grouped into the following sub-areas: No Name Drainage, Mickelson Drainage, Leask Drainage, Wolfram Drainage, Thompson Drainage (Upper and Lower), and Downgradient of Thompson Drainage.

5.1 Groundwater Monitoring Locations

The 2019 groundwater monitoring locations were sampled in accordance with the approved SSGMP for GHO and recommendations from the 2018 Annual Groundwater Monitoring Report and the 2018 SSGMP Update (Hemmera Envirochem Inc. [Hemmera], 2014; SNC-Lavalin, 2019d; 2019h). The groundwater monitoring program consists of 14 groundwater monitoring locations, including 17 monitoring wells (four are nested) and two supply wells. The wells monitored and sampled as part of the 2019 annual program are listed in Table P along with the associated rationale. A summary of potential sources of CI and possible transport pathways to groundwater at GHO are identified in the SSGMP Update (SNC-Lavalin, 2019h). An analyte list of constituents submitted for analysis is in Appendix III. Additional details including UTM locations, elevations, well installation details, description of screened lithologies, and estimated hydraulic conductivities are provided in Table 3a and on borehole logs in Appendix IV. Field sampling methodologies and Teck's Best Management Practices are in Appendix V. Monitoring well locations are shown on Drawing 7 and on Block Diagrams in Appendix VI – Figures 3 to 5. Cross sections showing well installation, stratigraphy, and groundwater elevations are presented on Drawings 24 to 26 and the cross section lines are shown on Drawing 7.

SNC·LAVALIN

Table P: GHO – Summary of Groundwater Monitoring Locations and Rationale

Watershed/Sub-Area		Well ID	Well Type	Rationale
Porter Creek Watershed (Fording River)		GH_MW-PC	Monitoring	› Monitor groundwater quality and surface water infiltration near the Porter sedimentation pond associated with historical waste spoils in the Porter Creek drainage.
Greenhills Creek Watershed(Fording River)	Site A Rejects	GH_MW-GHC-A/B[a]	Monitoring	› Nested well pair to monitor shallow and deep groundwater quality downgradient of Site A to E Coarse Coal Rejects (CCR), the coal process plant, and the overland conveyor.
		GH_MW-SITE-A[b]	Monitoring	› Monitor groundwater quality beneath the Site A CCR for one year.
	TSF and Site D/E Rejects	GH_MW-TD	Monitoring	› Monitor groundwater quality downgradient of the TSF and Site D and E CCR.
	Rail Loop Area	GH_MW-RLP-1D[c]	Monitoring	› Monitor groundwater quality in the vicinity of the clean coal and dryer buildings/ponds and the rail loop/load out area.
	Greenhills Creek Alluvial Fan	GH_POTW09	Supply	› Supply well located in the Greenhills Creek alluvial fan. Monitors groundwater quality relating to surface water infiltration from Greenhills Creek to the valley bottom.
		GH_POTW17	Supply	› Supply well located in the Fording River valley-bottom aquifer near the rail loop area. › Monitors groundwater quality relating to surface water infiltration from Greenhills Creek to the valley bottom.
Elk River	No Name Drainage	GH_GA-MW-1	Monitoring	› Upgradient of mining impacts in the Elk River valley bottom, to monitor reference groundwater conditions near No Name Creek.
	Mickelson Drainage	GH_MW-MC-1S/D GH_MW-MC-2S/D	Monitoring	› Monitor groundwater quality near the Mickelson Creek sedimentation ponds. › Monitor the groundwater system in the Mickelson drainage to evaluate connectivity to surface water and shallow groundwater.
	Leask Drainage	GH_GA-MW-4	Monitoring	› Monitor groundwater in the valley bottom associated with waste spoils in Leask, Wolfram, and Thompson Creek drainages and sedimentation ponds at the base of each drainage system. › Monitor the groundwater system to evaluate connectivity to surface water and shallow groundwater.
	Wolfram Drainage	GH_GA-MW-2	Monitoring	
	Thompson Drainage	GH_GA-MW-3	Monitoring	
		GH_MW-UTC-A/B[d]	Monitoring	› Nested well pair monitoring groundwater quality related to the Upper Thompson Creek sedimentation pond. › The wells monitor groundwater quality originating from the Rosebowl/Upper Thompson and wetted areas where there is waste rock.

Table P (Cont'd): GHO – Summary of Groundwater Monitoring Locations and Rationale

Watershed/Sub-Area		Well ID	Well Type	Rationale
	Downgradient of Thompson Drainage	GH_MW-ERSC-1	Monitoring	› Monitor groundwater quality in the Elk River valley-bottom sediments downgradient of GHO and to monitor surface water infiltration from the Elk River side channel.

Notes:
[a] GH_MW-GHC-A was previously known as GH_MW-GHC-1D and GH_MW-GHC-B was previously known as GH_MW-GHC-1S.
[b] GH_MW-SITE-A was previously known as GHO_CCR-12-01.
[c] The 2018 SSGMP Update has recommended the removal of this well from the program.
[d] GH_MW-UTC-A was previously known as GH_MW-UTC-1D and GH_MW-UTC-B was previously known as GH_MW-UTC-1S.

As presented in the table above, nested monitoring wells GH_MW-MC-1S/D and GH_MW-MC-2S/D have been added to the SSGMP Program. In 2019, these monitoring wells were sampled as part of the GHO Cougar Pit Extension Phase 2 (CPX2) Program every two months and sampling will eventually be reduced to quarterly sampling when appropriate.

5.2 Program Modifications

Data were collected in accordance with the approved GHO SSGMP Update (SNC-Lavalin, 2019h) with some exceptions. A summary and discussion of modifications to the program outlined in the GHO SSGMP are provided in Table Q below.

Table Q: GHO – Summary of Program Modifications

#	Well ID	Q[a]	Modification	Reason
1	GH_MW-SITE-A	1-3	Unable to sample well.	Monitoring well contained insufficient water quantity (dry) at time of sampling.
2	GH_MW-GHC-A/B	1	Missing continuous water level data.	Barologger was not set to record until late March.
3	GH_GA-MW-1 GH_GA-MW-4 GH_MA-MW-2 GH_GA-MW-3	1	No continuous water level data.	Continuous loggers timed out prior to Q1 commencing.
4	GH_MW-ERSC-1	2	No continuous water level data.	Level logger was not submerged below static water level; therefore, no continuous water level data was collected.
5	GH_MW-MC-1S/D GH_MW-MC-2S/D	2,4	Well sampled twice in specified quarter.	Well sampled twice in specified quarter as part of objectives of a separate program.
6	GH_MW-GHC-A	3	Missing continuous water level data.	Barologger timed out and water level data could not be compensated for a portion of the quarter.
7	GH_MW-RLP-1D	3	Missing continuous water level data.	Barologger timed out and water level data could not be compensated for a portion of the quarter.

Table Q (Cont'd): GHO – Summary of Program Modifications

#	Well ID	Q[a]	Modification	Reason
8	Field Blanks (GH_GWB1 and GH_GWB3)	3	Missing dissolved organic carbon (DOC) and dissolved metals.	Parameters were not requested.
9	GH_MW-UTC-A GH_MW-UTC-B	4	No continuous water level data.	Monitoring well GH_MW-UTC-A was frozen, therefore the datalogger could not be retrieved. The data logger in GH_MW-UTC-B timed out during the quarter.
10	GH_MW-UTC-A	4	Unable to sample well.	Water frozen in well.

Notes:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4).

5.3 Results and Discussion

5.3.1 Climate

Climate data was provided by Teck for the General Office Continuous Monitoring Station at GHO (652345 E, 5550219 N; 1975 masl). The climate station is approximately 1.8 km west of Greenhills Creek and is above the General Office. Daily precipitation data between 2015 and 2019 has been plotted on Figures GH-1, GH-4, GH-5, and GH-11 to -14. A mean annual precipitation of 716.44 mm was recorded between 2015 and 2019, which is expected to increase with elevation throughout the site. In 2019, monthly precipitation varied from 28.5 mm in September to approximately 161.8 mm in December, with the majority of precipitation falling as snow in the winter months. Daily average air temperatures in 2019 ranged from -15.5ºC in February to 13.6ºC in August; the mean annual air temperature in 2019 was 0.59ºC.

5.3.2 Porter Creek Watershed

5.3.2.1 Groundwater Elevations

Quarterly manual groundwater levels measured in 2019 are compiled in Table 3b. Manual and corrected continuous water level data from December 2016 to December 2019 were plotted on a hydrograph to assess seasonal variability and long-term trends (Figure GH-1). Data presented on Figure GH-1 have been compensated using the barologger deployed in the Porter Creek sedimentation pond (Porter Pond) area (GH_MW-PC barologger). The groundwater elevation measured in Q4 is shown on Drawing 11. Only one monitoring well exists in the Porter Creek watershed; therefore, potentiometric contours could not be inferred; instead, interpreted groundwater flow vectors have been provided.

Groundwater elevations at GH_MW-PC have been relatively consistent since the well was installed in 2016 fluctuating by 0.9 m since December 2016 as shown on Figure GH-1. Groundwater elevations have consistently been higher during spring freshet between mid-March and June.

Surface water elevations in Porter Pond were recorded between September and December 2019. Calculated surface water elevations only fluctuated by 0.07 m during this timeframe, ranging from 1574.10 to 1574.17 masl. Surface water elevations measured during this timeframe were approximately 2.5 m lower than groundwater elevations at GH_MW-PC in Q3 and Q4.

5.3.2.2 Groundwater Quality

Field measured parameters are presented in Table 3c. Overall the results were consistent with the expected ranges for groundwater encountered at GH_MW-PC in previous years.

Analytical results for GH_MW-PC compared to primary and secondary screening criteria are presented in Tables 3c and 3d (primary screening) and Table 3e (secondary screening) and spatial distribution of CI are presented in Drawings 27 to 30. A Block Diagram has been included in Appendix VI – Figure 3 and has been updated with minimum and maximum concentrations of CI measured in 2019. Mann-Kendall trend analyses were completed based on criteria outlined in Section 3.3 and results are included in Appendix VII. COAs for data are provided in Appendix X. A summary of results for CI compared to primary screening criteria is presented in Table R below.

Table R: GHO – Summary of CI compared to Primary Groundwater Screening Criteria in the Porter Creek Watershed

Parameter[1,2] / 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
GH_MW-PC	-	-	-	-	-	-	-	-	-	-	-	-				
CSR AW	400				1,280 – 4,290[3]				0.5 – 4[3]				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 is below primary screening criteria..
3 Standard varies with hardness.

Concentrations of dissolved selenium at GH_MW-PC also exceeded the following secondary screening criteria in 2019.

- GCDWQ (50 µg/L) during all four quarters.
- CP GH_FR1 (63 µg/L) in Q2 to Q4.

Dissolved lithium was the only non-order constituent measured at GH_MW-PC (Q3 only) to have concentrations above the applicable standards. Elevated concentrations of lithium relative to the applicable standards are naturally high across the Elk Valley and inferred to originate from natural sources SNC-Lavalin, 2017c). In previous years, concentrations of dissolved chromium and copper above the applicable standard were measured; however, concentrations decreased to less than the applicable standards in 2019.

In previous years, an increase in turbidity during purging activities and lack of stabilization of field parameters has been identified as an issue at GH_MW-PC, resulting in concentrations of dissolved constituents (i.e., copper and chromium) above the applicable CSR standards. In 2019, field parameters stabilized during purging activities and turbidity remained low. SNC-Lavalin understands that Teck replaced copper fittings in the monitoring well in 2019; therefore, higher concentrations of dissolved constituents, such as copper, are no longer expected at this location.

Mann-Kendall trend analysis was completed for CI with more than seven sampling events. A summary of results is provided in Table S below. Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table S: GHO – Summary of Mann-Kendall Trend Analysis for CI in the Porter Creek Watershed

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_MW-PC	Decreasing	Stable	No Trend	**No Trend**

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold**.
"-" Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

5.3.2.3 Discussion

Spoils in the upper catchment of Porter Creek contribute CI to surface water and the creek is considered mine-influenced, as indicated by elevated CI above BCWQG. Porter Creek flows through a rock drain under the spoil and along the valley flanks to the valley bottom and subsequently to unlined Porter Pond, where it likely loses to ground (SNC-Lavalin, 2019h) in the Fording River Valley. Since sampling began in 2016, dissolved selenium and sulphate concentrations have followed seasonal trends with the highest concentrations measured in Q2. Selenium is the only CI above screening criteria in the Porter Creek watershed (60 to 83.3 µg/L in 2019). No long-term trend in dissolved selenium concentrations is discernible, which may be an artefact of seasonal variation. Once there are sufficient data, seasonal Mann-Kendall trend analysis should be completed for dissolved selenium at this location to confirm whether a trend is present.

Concentrations of sulphate and dissolved selenium in groundwater from monitoring well GH_MW-PC are the same order of magnitude as concentrations measured in surface water from GH_PC1 (Figures GH-2 and GH-3) and follow similar seasonal trends indicating a strong connectivity between groundwater and surface water. This is also supported by similar water types in surface water and groundwater (SNC-Lavalin, 2019h). Monitoring well GH_MW-PC was installed upstream of Porter Pond, which is why the groundwater elevations are higher than the pond. The well was drilled adjacent to the creek and the borehole log indicates that bedrock at this location is shallow (5.5 mbgs), with groundwater in the Porter drainage inferred to flow along the bedrock interface through shallow surficial deposits, generally following topography (Hemmera, 2017). Surface water is expected to be the main transport pathway for loading of mine-influenced constituents to the Fording River.

5.3.3 Greenhills Creek Watershed

5.3.3.1 Groundwater Elevations

Quarterly manual groundwater levels measured in 2019 are compiled in Table 3b. Manual and corrected continuous groundwater elevation data from January 2017 to December 2019 were plotted on hydrographs to assess seasonal variability and long-term trends (Figures GH-4 and GH-5). Data presented on Figures GH-4 and GH-5 have been compensated using the barologger deployed in GH_MW-GHC-A and GH_MW_FC2. The groundwater elevations measured in Q4 are shown on Drawing 11. Potentiometric contours were not inferred as there are limited monitoring wells with groundwater elevations in the area. As a result, triangulation could not be completed, and interpreted groundwater flow vectors have been provided.

Site A Rejects

In 2019, groundwater elevations at shallow nested well GH_MW-GHC-B were on average 7 m higher than at deep nested well GH_MW-GHC-A with water levels increasing in both wells in the spring months during freshet (Figure GH-4). In 2019, the vertical hydraulic gradient at the nested well pair was downwards with gradients ranging from 0.44 to 0.64 m/m, consistent with historical data (Table 3b).

During Q1 and Q2 2019, monitoring well GH_MW-SITE-A was dry. Manually measured groundwater elevations in Q3 and Q4 were 1703.98 and 1704.05 masl, respectively. This well was added in 2019 SSGMP program based on the 2018 SSGMP Update; therefore, there are limited groundwater elevation data for this location.

Tailings Storage Facility and Site D/E Rejects

Artesian conditions were identified at GH_MW-TD in 2019, consistent with historical monitoring data.

Rail Loop Area

Groundwater elevations at GH_MW-RLP-1D ranged from 1,489.90 to 1,491.20 masl (April to July) in 2019, fluctuating by 1.3 m. Since well installation in 2016, groundwater elevations have been highest in Q2 during freshet (Figure GH-5). Manual water level measurements were consistent with continuous logger data obtained in 2019.

Greenhills Creek Alluvial Fan

Continuous water levels were measured at GH_POTW09 and GH_POTW17; however, the dataloggers in the supply wells require significant calibration in order to process the data, which could not be performed in time for this annual report. These dataloggers are scheduled to be replaced in 2020. Pumping rates from the supply wells were also recorded and daily averages for 2019 are presented in Figure GH-6. Pumping rates for supply wells GH_POTW10 and GH_POTW15 are also included in Figure GH-6 and are discussed as part of the RGMP in Section 9.3.4.1. In 2019, GH_POTW09 was pumped year-round with average daily rates ranging from 25 to 53 m^3/hr. Supply well GH_POTW17 was pumped at a lower average daily rate compared to GH_POTW09 ranging from 1 to 18 m^3/hr. This well was not pumped on select days in Q2 (one day), Q3 (four days), and Q4 (four days). In October 2019, pumping rates at GH_POTW17 increased from approximately 7 m^3/hr to 18 m^3/hr to compensate for GH_POTW15 being offline. By mid-October, rates at GH_POTW17 were subsequently reduced back to 7 m^3/hr once pumping re-commenced at GH_POTW15.

SNC·LAVALIN

5.3.3.2 Groundwater Quality

Analytical results for wells in the Greenhills Creek watershed compared to primary and secondary screening criteria are presented in Tables 3c and 3d (primary screening) and Table 3e (secondary screening). Spatial distribution plots of CI are presented in Drawings 27 to 30. A Block Diagram has been included in Appendix VI – Figure 4 and has been updated with minimum and maximum CI concentrations measured in 2019. Mann-Kendall trend analyses were completed based on criteria outlined in Section 3.3 and results are included in Appendix VII. COAs for data are provided in Appendix X.

Site A Rejects

Field measured parameters are presented in Table 3c. Overall the results were consistent with the expected ranges for groundwater encountered near the Site A Rejects in previous years. A summary of results for CI compared to primary screening criteria is presented in Table T.

Table T: GHO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Greenhills Creek Watershed near the Site A Rejects

Parameter[1,2,3] / Well ID	Sulphate (mg/L)				Nitrate-N (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
GH_MW-GHC-A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GH_MW-GHC-B	-	-	-	-	612	593	595	573	-	-	-	-	-	-	-	-
GH_MW-SITE-A	NS	NS	NS	-	NS	NS	NS	1,340	NS	NS	NS	-	NS	NS	NS	-
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 below 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.

NS – No Sample.

In addition to CI, dissolved iron and manganese concentrations were greater than the primary screening criteria in Q4 2019 at GH_MW-SITE-A and GH_MW-GHC-B (manganese only). Results for dissolved manganese at GH_MW-GHC-B in 2019 were consistent with historical results. Monitoring well GH_MW-SITE-A was sampled for the first time in Q4 2019. Both of these wells are screened in low permeability sediments or above the surficial sediment/bedrock interface. Dissolved manganese and iron are inferred to be naturally occurring at these locations due to limited interaction with the atmosphere. Reducing conditions were identified in Q4 at both GH_MW-GHC-B and GH_MW-SITE-A with low DO values (0.46 mg/L and 0.49 mg/L, respectively) and ORP values (-1.4 mV and -66.1 mV, respectively).

Mann-Kendall trend analysis was completed for data from wells near the Site A Rejects with more than seven sampling events (Table U; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table U: GHO – Summary of Mann-Kendall Trend Analysis for CI in the Greenhills Creek Watershed near the Site A Rejects

Well ID \ Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_MW-GHC-A	No Trend	Stable	Stable	No Trend
GH_MW-GHC-B	No Trend	Stable	No Trend	Prob. Decreasing

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold**.

Tailings Storage Facility and Site D/E Rejects

Field measured parameters are presented in Table 3c. Overall the results were consistent with the expected ranges for groundwater encountered in the vicinity of the Tailings Storage Facility and Site D/E Rejects in previous years. A summary of results for CI compared to primary screening criteria is presented in Table V.

Table V: GHO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Greenhills Creek Watershed near the Tailings Storage Facility and Site D/E Rejects

Parameter[1,2]	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
Well ID	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
GH_MW-TD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSR AW	400				1,280 – 4,290[3]				0.5 – 4[3]				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 below primary screening criteria for given constituents.

[3] Standard varies with hardness.

In addition to CI, dissolved manganese concentrations were greater than the primary screening criteria at GH_MW-TD in all four quarters in 2019, consistent with historical results. Monitoring well GH_MW-TD is an artesian well screened in low permeability sediments and confined reducing conditions are inferred. Dissolved manganese is inferred to be naturally occurring due to limited interaction with the atmosphere.

Mann-Kendall trend analysis was completed for data from wells near the TSF and Site D/E Rejects with more than seven sampling events (Table W; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

SNC·LAVALIN

Table W: GHO – Summary of Mann-Kendall Trend Analysis for CI in the Greenhills Creek Watershed near the Tailings Storage Facility and Site D/E Rejects

Well ID \ Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_MW-TD	-	Decreasing	Increasing	-

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold.**

"-" Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

The Mann-Kendall analysis indicates an increasing trend in dissolved cadmium concentrations; however, the highest dissolved cadmium concentration is at least an order of magnitude lower than the upper limit of the CSR AW standard.

Rail Loop Area

Field measured parameters are presented in Table 3c. Overall the results were consistent with the expected ranges for groundwater encountered in the Rail Loop Area in previous years. A summary of results for CI compared to primary screening criteria is presented in Table X.

Table X: GHO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Greenhills Creek Watershed in the Rail Loop Area

Parameter[1,2,3]	Nitrate-N (mg/L)				Sulphate (mg/L)				Dissolved Cadmium (µg/L)				Dissolved Selenium (µg/L)			
Well ID	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
GH_MW-RLP-1D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CSR AW	400				1,280 – 4,290[3]				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 below 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.

In addition to CI, dissolved lithium and fluoride were greater than the primary screening criteria at GH_MW-RLP-1D in 2019, consistent with historical data. Dissolved lithium concentrations in groundwater are inferred to originate from natural sources and are naturally high across the Elk Valley (SNC-Lavalin, 2017c). This well is installed to a total depth of 82.5 m and is interpreted to be relatively hydraulically isolated from groundwater or surface water systems that would be mine-influenced, as a relatively continuous aquitard has been identified above the screened interval at GH_MW-RLP-1D. Fluoride concentrations at this location are also interpreted to be naturally occurring and derived from water interaction with unconsolidated materials.

Mann-Kendall trend analysis was completed for data from wells near the Rail Loop Area with more than seven sampling events (Table Y; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table Y: GHO – Summary of Mann-Kendall Trend Analysis for CI in the Greenhills Creek Watershed

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_MW-RLP-1D	-	Prob. Decreasing	-	Decreasing

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold.**
"-" Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

Greenhills Creek Alluvial Fan

Field measured parameters are presented in Table 3c. Overall the results were consistent with the expected ranges for groundwater encountered in the Greenhills Creek alluvial fan in previous years. A summary of results for CI compared to primary screening criteria is presented in Table Z.

Table Z: GHO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Greenhills Creek Watershed in the Greenhills Creek Alluvial Fan

Parameter[1,2] / 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
GH_POW09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GH_POTW17	-	-	-	-	-	-	-	504	-	-	-	-	-	-	10.3	-
CSR AW	400				1,280 – 4,290[3]				0.5 – 4[3]				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 below primary screening criteria for given constituents.
[3] Standard varies with hardness.

Concentrations of dissolved selenium in Q3 at GH_POTW17 did not exceed the applicable secondary screening criteria (Table 3e). Concentrations of non-order constituents in groundwater from wells installed in the Greenhills Creek alluvial fan were all less than the primary screening criteria.

Mann-Kendall trend analyses were completed for data from wells near the Greenhills Creek alluvial fan with more than seven sampling events (Table AA; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table AA: GHO – Summary of Mann-Kendall Trend Analysis for CI in the Greenhills Creek Watershed in the Greenhills Creek Alluvial Fan

Well ID \ Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_POTW09	Prob. Decreasing	Increasing	Stable	Increasing
GH_POTW17	Increasing	**No Trend**	Decreasing	**Prob. Increasing**

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold**.

"-" Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

Results from the Mann-Kendall trend analyses completed on CI in groundwater indicate concentrations are predominantly stable, decreasing or had no discernible trend, with the exception of select CI, where increasing or probably increasing trends were identified. Although increasing trends were identified at GH_POTW_09 (sulphate and dissolved selenium) and GH_POTW17 (nitrate-N), concentrations remain at least an order of magnitude lower than the CSR standards. The Mann-Kendall trend analysis for dissolved selenium at GH_POTW17 indicates a probably increasing trend, with concentrations measured marginally above the CSR DW standard in Q3. Additional discussion is provided below.

5.3.3.3 Discussion

Greenhills Creek and tributary Gardine Creek flow south and along the valley flanks across till deposits, with Greenhills Creek flowing through rock drains underneath the Hawk and East Spoils. Gardine Creek flows south adjacent to the Site B Rejects. Seeps daylight in the vicinity of the rejects and are inferred to report to Gardine Creek. The spoils and the rejects contribute CI to surface water and the creeks are considered mine-influenced, as indicated by dissolved selenium and sulphate concentrations above the BCWQG AW. Where the creeks converge, surface water flows towards the valley bottom and infiltrates the Greenhills Creek alluvial fan (SNC-Lavalin, 2019h).

Site A Rejects

Monitoring well GH_MW-SITE-A is installed through the Site A Rejects to target the CCR/native material interface. Based on low groundwater elevations and in some instances dry well conditions (2012 and 2019) the CCR in this area is generally dry. In 2019, groundwater could only be sampled in Q4 and contained the highest measured concentration of sulphate in groundwater sampled in the Greenhills Creek watershed (1,340 mg/L). Several seeps with high sulphate concentrations in 2019 (up to 2,390 mg/L) have been identified along the toe of the Site A/B Rejects (SRK, 2019h). These seeps are inferred to represent daylighting groundwater, which suggests that the CCR is a source of sulphate. O'Neill Hydro-Geotechnical Engineering (OHGE) indicated shallow groundwater beneath the CCR is predominantly recharged by infiltration of precipitation and only a small volume of seepage from the TSF (OHGE, 2018).

Nested well pair GH_MW-GHC-A/B is along the toe of the Site A Rejects, downgradient of where seeps daylight. Concentrations of dissolved selenium have consistently been greater at the deep nested well (3.39 to 4.81 µg/L in 2019) compared to shallow well GH_MW-GHC-B (0.073 to 0.387 µg/L in 2019), as shown on Figure GH-7. Conversely, sulphate concentrations at GH_MW-GHC-B have historically been greater than concentrations measured at GH_MW-GHC-A, with no discernible trend (Figure GH-8). Fluctuations in sulphate concentrations in the nested well pair are similar suggesting hydraulic connectivity between the two units (i.e., till and bedrock).

Surface water interaction with groundwater is variable across the Greenhills Catchment. Surface water concentrations of selenium in the Fording River (GH_FR1) and Greenhills Creek (GH_GH1) have consistently been one to three orders-of-magnitude higher than in groundwater (Figure GH-7) and generally followed seasonal trends influenced by freshet. Dissolved selenium in groundwater in the nested well pair GH_MW-GHC-A/B does not exhibit the same range and trends as surface water.

Unlike dissolved selenium however, sulphate concentrations at GH_MW-GHC-A/B are higher than surface water from the Fording River (GH_FR1) but lower than Greenhills Creek (GH_GH1). Sulphate concentrations do not exhibit the same seasonality as surface water and have relatively consistent concentrations over time. It has previously been suggested in the 2018 SSGMP Update that the sulphate concentrations are resultant from infiltration of mine-influenced Greenhills Creek; however, with the additional information from GH_MW-SITE-A and the seeps in the area, it is possible that the source of the sulphate is the CCR. Additional study of this, including at Gardine Creek, is being conducted under the GHO TSF Permitting project (SNC-Lavalin, 2019h).

Monitoring well GH_MW-GHC-B is completed in low permeability till (Drawing 25). Field and analytical parameters, such as low nitrate-N concentrations and low DO (less than 1 mg/L), negative ORP values, and measurable dissolved iron and manganese (greater than 100 µg/L), suggest reducing conditions. Results from the Mann-Kendall trend analysis also indicate a decreasing trend in dissolved selenium at GH_MW-GHC-B. Concentrations of sulphate greater than 30 mg/L were measured at GH_MW-GHC-B, which is indicative that groundwater undergoing preferential selenium attenuation. (SRK, 2018a and b).

Tailings Storage Facility and Site D/E Rejects

Monitoring well GH_MW-TD is a deep artesian well completed in low permeability medium-dense sand and silt (inferred to be till) overlying bedrock. The well is in the upland area downgradient and south of the TSF and the Site D/E Rejects. Monitoring well GH_MW-TD is considered to intercept the deeper groundwater flow system (SNC-Lavalin, 2019h). In 2019, dissolved selenium and sulphate at GH_MW-TD did not display significant variation (Figures GH-7 and GH-8). Dissolved selenium concentrations have remained below the CSR standards and in many instances less than the MDL. Reducing conditions exist at GH_MW-TD, indicative of the potential for selenium attenuation in groundwater in the Fording River Valley.

Seeps at the toe of the Site D/E Rejects are interpreted to be representative of shallow groundwater downgradient of the TSF (SNC-Lavalin, 2019h). Although water from seeps in this area lose to ground at times of low flow, concentrations of Cl from seep GH_E1 in 2019 were greater than concentrations measured in monitoring well GH_MW-TD, indicative that deep groundwater is not hydraulically connected to the shallow groundwater system. Based on previous studies, seeps in this area also contain concentrations of Cl greater than surface water from the TSF and the overlying rejects are likely influencing the seep water and therefore groundwater chemistry (SNC-Lavalin, 2019h).

SNC·LAVALIN

Rail Loop Area

Monitoring well GH_MW-RLP-1D was installed in the Rail Loop Area within the Greenhills Creek alluvial fan; mapped Aquifer 1054 IC (sand and gravel). Concentrations of dissolved selenium at GH_MW-RLP-1D were less than the MDL in Q1 through Q3 in 2019. Low concentrations of CI measured in groundwater at GH_MW-RLP-1D and the hydrograph suggest that there is little surface water interaction with the Fording River, likely due to a relatively continuous overlying aquitard (Drawing 24). The 2018 SSGMP Update indicates that GH_MW-RLP-1D is insufficient for monitoring groundwater related to the rail loop area (SNC-Lavalin, 2019h). Monitoring and sampling of GH_MW-RLP-1D should be discontinued and a shallower monitoring well completed above the till unit should be installed in the rail loop to target a potential shallower water-bearing zone.

Greenhills Creek Alluvial Fan

Supply well GH_POTW09 is near the Rail Loop Area and GH_POTW17 is downgradient of Greenhills sedimentation pond (Greenhills Pond); both are installed within the Greenhills Creek alluvial fan. Concentrations of CI have historically been less than applicable standards, with the exception of a few occurrences of dissolved selenium at both wells and sulphate at GH_POTW17 (Figures GH-9 and GH-10). Groundwater withdrawal from these wells may have an effect on groundwater flow regime in the Greenhills Creek alluvial fan. Groundwater extraction could induce downward vertical hydraulic gradients that may result in surface water infiltration from Greenhills Creek or a stronger hydraulic connection with shallow groundwater; however, a lower permeability silty clay unit exists over the lower portions of the fan that likely impedes downward migration.

In 2019, concentrations of CI in these wells remained below the standards, except at GH_POTW17 in Q3 (dissolved selenium at 10.3 µg/L) and Q4 (sulphate at 504 mg/L). The highest pumping rates at this well were recorded in October 2019 when pumping rates were approximately three times higher than the rest of the year (Figure GH-6). The highest concentrations of dissolved selenium at this well are typically measured in late Q2/Q3 (June to August); if pumping regimes for previous years are similar to 2019 then the exceedances are inferred to be a result of higher pumping rates. Calculated selenium to sulphate (as S) ratios [mg Se: mg SO_4 (as S)] for groundwater from GH_POTW17 ranged from 3.3×10^{-5} to 6.4×10^{-5} mg Se: mg SO_4 (as S), with the greatest ratios measured in Q3 and Q4. Based on studies completed by SRK (2018a) in the Elk River Valley, waste rock contact water is characterized by a selenium to sulphate ratio of approximately 5×10^{-4} mg Se: mg SO_4 (as S) or higher. Therefore, dissolved selenium in the supply well is inferred to be a result of infiltration of mine-influenced water. The time series graph for dissolved selenium shows some seasonality suggesting connection to Greenhills Creek (GH_GH1) with a lag time (Figure GH-9). The creek is the most likely source of dissolved selenium as the CCR are not considered a major source. The results from the Mann-Kendall analysis for this well indicate no trend was observed for sulphate and a probably increasing trend for dissolved selenium. The time series graph for sulphate at GH_POTW17 confirms the ‘no trend’ and indicates much less seasonality, differing from Greenhills Creek. This indicates that an additional source may be contributing sulphate to groundwater in the aquifer, which may be the CCR.

No clear seasonal trend in dissolved selenium or sulphate was been identified at GH_POTW09. Although Mann-Kendall trend analyses indicate overall increasing trends for both CI, concentrations remain less than the applicable standards and less than concentrations in surface water from Greenhills Creek (GH_GH1). The low concentrations of CI and lack of seasonality indicate that minimal hydraulic connectivity exists between Greenhills Creek and GH_POTW09; however, Cl concentrations at this well may be influenced by periods of high groundwater withdrawals. In 2019, the average pumping rates per quarter were consistent ranging from 47 m^3/hr (Q3) to 49 m^3/hr (Q1 and Q2), but dissolved selenium concentrations did not appear to be abnormally high in 2019 (0.861 to 1.19 µg/L). No pumping rates were available for previous years.

5.3.4 Elk River Valley Watershed

5.3.4.1 Groundwater Elevations

Quarterly manual groundwater levels measured in 2019 are compiled in Table 3b. Manual and corrected continuous water level data from January 2015 to December 2019 were plotted on hydrographs to assess seasonal variability and long-term trends (Figures GH-11 and GH-14). Data presented on Figures GH-11 and GH-13 have been compensated using the barologgers deployed in GH_GA-MW-2, GH_MW-UTC-A and in the Willow Creek drainage (GH_Barologger_Willow_1S).

The groundwater elevations measured in Q4 are shown on Drawing 11. Potentiometric contours were not inferred as the well distribution is spaced linearly along the valley which does facilitate triangulation. Instead interpreted groundwater flow vectors have been provided.

No Name Drainage

Historically, there has not been a seasonal trend at GH_GA-MW-1 and a time lag of approximately 30 days has been measured for groundwater levels to return to static levels after a sampling event. This lag is consistent with a low hydraulic conductivity of 1 x 10^{-12} m/s (Hemmera, 2017), as presented on Figure GH-11.

Mickelson Drainage

Groundwater elevations between December 2018 and December 2019 at nested wells GH_MW-MC-1S/D and GH_MW-MC-2S/D are presented on Figure GH-12. Nested wells GH_MW-MC-1S/D and shallow well GH_MW-MC-2S exhibited similar trends throughout 2019. Groundwater elevations at these wells were highest in June and lowest in December and January (GH_MW-MC-2S only) with the greatest fluctuation measured at GH_MW-MC-1S (1.2 m). No trend in groundwater elevation was evident at deep monitoring well GH_MW-MC-2D in 2019, with water levels fluctuating by only 0.4 m.

During the 2019 monitoring events, upward vertical hydraulic gradients were calculated for both nested well pairs, with gradients ranging from 0.01 to 0.03 m/m at GH_MW-MC-1S/D and 0.22 to 0.27 m/m at GH_MW-MC-2S/D.

Leask and Wolfram Drainages

Groundwater elevations have been measured in the Leask and Wolfram drainages at shallow well GH_GA-MW-4 and deep well GH_GA-MW-2, respectively (Figure GH-13). Groundwater elevations in monitoring wells GH_GA-MW-4 and GH_GA-MW-2 exhibited seasonal trends with higher elevations from April through June, during freshet in the Elk River. The Wolfram drainage is farther down the Elk River Valley than the Leask drainage. Groundwater elevations in this drainage were approximately 4.5 m lower than at Leask drainage.

Thompson Drainage

Similar to the Leask and Wolfram Drainages, groundwater elevations in the Lower Thompson drainage at GH_GA-MW-3 exhibited a seasonal trend with higher elevations during freshet in the Elk River (Figure GH-13). The seasonal trends in the Lower Thompson drainage were more pronounced than in the drainages farther upgradient, with elevations fluctuating by approximately 4 m in 2019.

In the Upper Thompson catchment, groundwater elevations at shallow nested well GH_MW-UTC-B were on average 1.0 m higher than at the deep nested well GH_MW-UTC-A (Figure GH-14). In 2019, groundwater elevations in GH_MW-UTC-B were greatest during freshet (March through June), consistent with historical measurements. Although slight seasonality has historically been measured at GH_MW-UTC-A, there was no seasonality in 2019. Deep well GH_MW-UTC-A was purged prior to monitoring static water level in the shallow well during all three events. Because the wells are considered hydraulically connected, static water level readings in shallow well GH_MW-UTC-B may not be representative of static conditions. A lag time of approximately 20 days for groundwater levels to approach static has been identified at GH_MW-UTC-A, consistent with a low hydraulic conductivity of 2.4×10^{-8} m/s (Hemmera, 2017). Because of this, the shallow well is interpreted to have not recovered at the time static water level measurements were collected.

In 2019, the vertical hydraulic gradient at GH_MW-UTC-A/B was downwards ranging from 0.03 to 0.05 m/m, consistent with historical data (Table 3b). The vertical gradient could not be calculated in Q4 as the shallow well was frozen at time of monitoring.

Downgradient of Thompson Drainage

Monitoring well GH_MW-ERSC-1 is adjacent to the Elk River and down-valley from the Thompson drainage and the Elk River side channel; groundwater elevations for this well are presented on Figure GH-13. Limited continuous water level data were available in 2019 as the datalogger was not fully submerged between the Q1 and Q3 sampling events. Seasonal trends in groundwater elevations have historically been identified at this monitoring well, with higher elevations during spring freshet (up to 3.7 m in 2018) in the Elk River; however, in 2019, these trends were significantly muted relative to historical data, fluctuating by only 1.2 m. The magnitude of fluctuations of groundwater elevations in 2019 was more consistent with fluctuations in 2015 and 2016.

5.3.4.2 Groundwater Quality

Analytical results for wells in the Elk River watershed were compared to primary and secondary screening criteria and are presented in Tables 3c and 3d (primary screening) and Table 3e (secondary screening). Spatial distribution plots of CI are presented on Drawings 27 to 30. A Block Diagram has been included in Appendix VI – Figure 5 and has been updated with minimum and maximum concentrations of CI measured in 2019. Mann-Kendall trend analyses were completed based on criteria outlined in Section 3.3 and results are included in Appendix VII. COAs for data are provided in Appendix X.

No Name Drainage

Field measured parameters are presented in Table 3c. Overall the results were consistent with historical ranges for groundwater encountered in this area. A summary of results for CI compared to primary screening criteria is presented in Table BB below.

SNC·LAVALIN

Table BB: GHO – Summary of CI Compared to Primary Groundwater Screening Criteria in the No Name Drainage of the Elk River 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
GH_GA-MW-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 below 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.

In addition to CI, dissolved boron, lithium, strontium, and manganese (Q4 only) concentrations were greater than the primary screening criteria in 2019, which is consistent with historical results. Concentrations of these parameters in groundwater from GH_GA-MW-1 are likely the result of natural processes; dissolved lithium concentrations are naturally high across the Elk Valley (SNC-Lavalin, 2017c).

In 2018, concentrations of dissolved copper greater than the applicable CSR AW standard were measured at GH_GA-MW-1 during all four quarters. SNC-Lavalin understands that Teck replaced copper fittings in the monitoring well in 2019; therefore, elevated concentrations of dissolved copper relative to the primary screening criteria are no longer expected at this location and were not measured in 2019.

Mann-Kendall trend analysis were completed for CI in groundwater from the No Name drainage with more than seven sampling events (Table CC; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table CC: GHO – Summary of Mann-Kendall Trend Analysis for CI in the No Name Drainage of the Elk River Watershed

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_GA-MW-1	Decreasing	Decreasing	Decreasing	Decreasing

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold.**

Mickelson Drainage

Field measured parameters are presented in Table 3c. Overall the results were consistent with historical ranges for groundwater encountered in this area. A summary of results for CI compared to primary screening criteria is presented in Table DD below.

SNC·LAVALIN

Table DD: GHO – Summary of CI compared to Primary Groundwater Screening Criteria in the Mickelson Drainage of the Elk River 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
GH_MW-MC-1D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GH_MW-MC-1S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GH_MW-MC-2D	-	-	-	-	-	-	-	-	-	-	-	-	11.4	18.9	-	
GH_MW-MC-2S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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 below 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.

Dissolved selenium concentrations in wells GH_MW-MC-2D (Q2 and Q4) were also greater than the CP screening criteria (15 µg/L; Table 3e).

In addition to CI, lithium concentrations were greater than the CSR DW during all sampling at all wells, except for GH_MW-MC-1S in 2019. Concentrations of chloride, fluoride, dissolved arsenic, boron, and sodium were also greater than the primary screening criteria at GH_MW-MC-2D during all events, except for dissolved arsenic in December 2019. Dissolved lithium concentrations in groundwater are inferred to originate from natural sources and are naturally high across the Elk Valley (SNC-Lavalin, 2017c). Concentrations of fluoride, dissolved arsenic, boron and sodium greater than primary criteria at GH_MW-MC-2D are likely the result of natural processes (SNC-Lavalin, 2017c).

Monitoring wells in the Mickelson drainage were installed in Q4 2018. Currently there are insufficient data to complete Mann-Kendall trend analyses. Based on the current sampling interval, there should be sufficient data for Mann-Kendall analyses in Q4 2025.

Leask and Wolfram Drainages

Field measured parameters are presented in Table 3c. Overall the results were consistent with historical ranges for groundwater encountered in this area. A summary of results for CI compared to primary screening criteria is presented in Table EE below.

Table EE: GHO – Summary of CI compared to Primary Groundwater Screening Criteria in the Leask and Wolfram Drainages of the Elk River 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
GH-GA-MW-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GH_GA-MW-2	-	-	-	10.1	-	-	-	-	-	-	-	-	18.4	11.1	17.9	
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 below 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.

Dissolved selenium concentrations at GH_GA-MW-2 (Q1 and Q3) were also greater than the CP screening criteria (15 µg/L).

In addition to CI, lithium concentrations were greater than the primary screening criteria during all sampling events in 2019 at GH_GA-MW-4 and GH_GA-MW-2. Dissolved molybdenum concentrations were also greater than the primary screening criteria at GH_GA-MW-2 during all sampling events in 2019, consistent with historical results. Dissolved molybdenum and lithium concentrations in groundwater are inferred to originate from natural sources; dissolved lithium concentrations are naturally high across the Elk Valley (SNC-Lavalin, 2017c).

Mann-Kendall trend analyses were completed for CI in groundwater from the Leask and Wolfram drainages with more than seven sampling events (Table FF; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table FF: GHO – Summary of Mann-Kendall Trend Analysis for CI in the Leask and Wolfram Drainages of the Elk River Watershed

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_GA-MW-4	Decreasing	Decreasing	Decreasing	Decreasing
GH_GA-MW-2	**Increasing**	Increasing	Increasing	**Increasing**

Notes:
1 Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold.**

Results from the Mann-Kendall trend analyses have identified increasing trends for all CI at GH_GA-MW-2 (Wolfram Drainage). Although increasing trends were identified for dissolved cadmium, concentrations remain marginally greater than the detection limit and at least one order of magnitude less than the applicable CSR standards. Concentrations of sulphate at GH_GA-MW-2 also remained below the applicable CSR standards in 2019. Additional discussion of trends is provided below.

Thompson Drainage

Field measured parameters are presented in Table 3c. Overall the results were consistent with historical ranges for groundwater encountered in this area. A summary of results for CI compared to primary screening criteria is presented in Table GG below.

Table GG: GHO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Thompson Drainage of the Elk River 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
GH_GA-MW-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11-
GH_MW-UTC-A	-	-	-	NS	-	-	-	NS	-	-	-	NS	-	-	-	NS
GH_MW-UTC-B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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 below 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.
'NS' denotes no sample.

The dissolved selenium concentration in GH_GA-MW-3 (Q3) was also greater than the CP screening criteria (15 µg/L).

In addition to CI, lithium concentrations were greater than the primary screening criteria during all sampling events in 2019 in groundwater from all wells sampled in the Thompson Drainage. Concentrations of fluoride, dissolved boron, molybdenum and sodium greater than the primary screening criteria were also measured at GH_MW-UTC-A during all 2019 sampling events, consistent with historical results. Elevated concentrations of these constituents relative to the primary screening criteria are inferred to originate from natural sources; dissolved lithium concentrations are naturally high across the Elk Valley (SNC-Lavalin, 2017c).

Mann-Kendall trend analysis was completed for CI in groundwater from the Thompson drainage with more than seven sampling events (Table HH; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table HH: GHO – Summary of Mann-Kendall Trend Analysis for CI in the Thompson Drainage of the Elk River Watershed

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_GA-MW-3	Decreasing	No Trend	-	**No Trend**
GH_MW-UTC-A	-	Prob. Decreasing	Stable	Stable
GH_MW-UTC-B	No Trend	Stable	Decreasing	No Trend

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold.**

"-" Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

Downgradient of Thompson Drainage

Field measured parameters are presented in Table 3c. Overall the results were consistent with historical ranges for groundwater encountered in this area. A summary of results for CI compared to primary screening criteria is presented in Table II below.

Table II: GHO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Elk River Watershed Downgradient of Thompson Drainage

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
GH_MW-ERSC-1	13.5	-	-	-	-	-	-	-	-	-	-	-		16.6	-	
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 CSR standards for **Aquatic Life (AW),** Drinking Water (DW), Livestock (LW), and *Irrigation (IW)*.

[2] '–' denotes result below 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.

Dissolved selenium concentrations at GH_MW-ERSC-1 were greater than the SPO secondary screening criteria (19 µg/L). In the Elk River Valley, only dissolved selenium from GH_MW-ERSC-1 in Q1 was greater than the GCDWQ DW guideline (50 µg/L).

In addition to CI, only dissolved lithium concentrations were greater than the primary screening criteria in groundwater from GH_MW-ERSC-1 in 2019, which is consistent with historical data. Dissolved lithium concentrations in groundwater are inferred to originate from natural sources and are naturally high across the Elk Valley (SNC-Lavalin, 2017c).

Mann-Kendall trend analysis was completed for CI in groundwater downgradient of the Thompson drainage with more than seven sampling events (Table JJ; Appendix VII). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table JJ: GHO – Summary of Mann-Kendall Trend Analysis for CI in the Elk River Watershed Downgradient of Thompson Drainage

Well ID \ Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_MW-ERSC-1	**Increasing**	Increasing	Increasing	**Increasing**

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is bold. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is shaded and bold.

Results from the Mann-Kendall trend analyses have identified increasing trends for all CI at GH_MW-ERSC-1. Although increasing trends were identified for sulphate and dissolved cadmium, concentrations remained below the applicable CSR standards in 2019. Additional discussion of trends is provided below.

5.3.4.3 Discussion

No Name Drainage

Currently, there is no waste rock in the No Name Creek drainage and no other mining-related sources of CI are present; therefore, GH_GA-MW-1 has been considered a reference location. No clear seasonality in dissolved selenium and sulphate concentrations was identified in groundwater results for monitoring well GH_GA-MW-1 (Figures GH-15 and GH-16). The significant declines in water levels during sampling and slow recovery are interpreted to be related to low permeability at this well (1 x 10^{-12} m/s).

The 2018 SSGMP Update (SNC-Lavalin, 2019h) indicated that groundwater at GH_GA-MW-1 is predominantly sodium-bicarbonate-sulphate type water, likely due to the low permeability formation, cation exchange with bedrock and/or till and reducing conditions (Figure GH-17). Sulphate concentrations in surface water from No Name Creek (GH_NNC) and upstream of GHO (GH_ERC) were approximately one order of magnitude less than concentrations measured in groundwater at GH_GA-MW-1 (249 to 300 mg/L in 2019) as shown in Figure GH-16, suggesting that surface water is not influencing the groundwater chemistry at this location, which is not unexpected given the low permeability of the formation.

Mickelson Drainage

Currently, there is no waste rock in the Mickelson Creek drainage; however, cast over material is present in the upper flanks. Based on the GHO Pit Drainage and Pumping Management Plan future pumping from Phase 6 Pit may be periodically directed into Mickelson Creek; however, no pit water was directed to the creek in 2019 (Teck, 2018a). Surface water at Mickelson Creek flows over till/morainal materials and loses to ground on the upper valley flanks over debris flow materials (SNC-Lavalin, 2019h).

Two nested monitoring wells (GH_MW-MC-1S/D and GH_MW-MC-2S/D) were installed near Mickelson sedimentation ponds (Mickelson Ponds) in Q4 2018 as part of the CPX2 Program (SNC-Lavalin, 2019l). Concentrations of CI in groundwater from all four monitoring wells were less than the primary screening criteria, with the exception of dissolved selenium at deep well GH_MW-MC-2D (Figures GH-18 and GH-19).

Nested well pair GH_MW-MC-1S/D is located downgradient of Mickelson Ponds. Both wells exhibited seasonal changes in water level in 2019, with the highest elevations measured in Q2 during freshet. Throughout 2019, an upward gradient was measured between these wells; however, in Q2 this gradient decreased to 0.01 m/m from 0.03 m/m in Q3 and Q4. Concentrations of CI measured at shallow well GH_MW-MC-1S were consistent with values measured in the Elk River (GH_ER2), with the exception of dissolved selenium in Q1 and Q2. Dissolved selenium concentrations were marginally greater than in the Elk River but remained less than Mickelson Creek (GH_MC1) (Figures GH-18 and GH-19). Concentrations of CI in the deep well GH_MW-MC-1D remained at least one order of magnitude lower than in the Elk River.

Groundwater from GH_MW-MC-1S and -1D was calcium-bicarbonate and sodium-calcium-bicarbonate type water, respectively (Figure GH-20). The evolution of calcium-bicarbonate towards sodium-bicarbonate water type with depth is interpreted to be related to cation exchange as part of a longer flow path and reducing conditions. Overall, both monitoring wells are inferred to be hydraulically connected to the Elk River, as evidenced by seasonal fluctuations of water levels similar concentrations of CI in the shallow well and similar water types. However, groundwater at GH_MW-MC-1S appears have an immediate connection to the Mickelson Creek as higher concentrations of dissolved selenium relative to the Elk River in Q1 and Q2 are indicative of mixing with mine-influenced water. Mickelson Ponds are unlined and surface water from the ponds is inferred to infiltrate to ground in the area. Elevated concentrations of dissolved selenium at GH_MW-MC-1S, relative to those measured in the Elk River, are inferred to originate from Mickelson Creek.

Nested well pair GH_MW-MC-2S/D is located farther upgradient in the Mickelson Creek drainage and overall contains higher concentrations of CI than at GH_MW-MC-1S/D. Groundwater elevations in shallow well GH_MW-MC-2S exhibited seasonal fluctuations in water level, with the highest elevations measured in Q2 during freshet. Significantly muted seasonal fluctuations in water level were observed in deep well GH_MW-MC-2D, relative to GH_MW-MC-2S and nested pair GH_MW-MC-1S/D. Water levels at GH_MW-MC-2S fluctuated by approximately 0.6 m. A relatively strong upward gradient existed at this nested well pair compared to GH_MW-MC-1S/D ranging from 0.22 to 0.27 m/m. In 2019, concentrations of CI in shallow well GH_MW-MC-2S were consistent with concentrations measured in Mickelson Creek (GH_MC1) (Figure GH-18). Deep monitoring well GH_MW-MC-2D contained the highest measured concentrations of dissolved selenium in the Mickelson drainage, with values greater than measured concentrations in the creek (Figure GH-18). Conversely, sulphate concentrations at this well were less than what was measured in Mickelson Creek, and at times less than the Elk River (Figure GH-19).

Groundwater from GH_MW-MC-2S and -2D was calcium-bicarbonate and sodium-bicarbonate-chloride type water, respectively (Figure GH-20). Although the major ion distribution at GH_MW-MC-2S is relatively similar to GH_MW-MC-1S, it contains a slightly greater sulphate component, indicative of interaction with mine-influenced water from Mickelson Creek. Based on seasonal fluctuations of water elevations, consistent with freshet, shallow well GH_MW-MC-2S is also inferred to be influenced by the Elk River. Deep well GH_MW-MC-2D was installed in a sand and gravel unit directly above the bedrock contact. Sodium and chloride concentrations are inferred to originate from natural sources and have previously been identified in groundwater overlying or within bedrock from the Fernie Formation (SNC-Lavalin, 2017c). In addition, sodium enrichment in groundwater relative to calcium and magnesium is typical of the evolution of groundwater along a longer flow path due to cation exchange (SNC-Lavalin, 2017c).

Since the groundwater at GH_MW-MC-2D appears to reflect a longer groundwater flow path, the dissolved selenium measured at this well appears to be naturally sourced. To further examine this, selenium to sulphate (as S) ratios in groundwater from GH_MW-MC-2D were calculated and ranged from 6.1 x 10^{-3} to 1.7 x 10^{-4} mg Se: mg SO_4 (as S) and have been plotted on Figure GH-21. Based on studies completed by SRK in the Elk River Valley, waste rock contact water is characterized by a selenium to sulphate ratio of approximately 5 x 10^{-4} mg Se: mg SO_4 (as S) or higher (SRK, 2018a). Groundwater from GH_MW-MC-2D does not fall along the mixing line with non-mine influenced and mine-influenced water. Therefore, based on the Se:SO_4 ratios and water type, the dissolved selenium is inferred to be naturally occurring.

Leask Drainage

Waste rock from the West Spoil is present in the upper catchment of Leask Creek. Dewatering activities from Phase 6 pit are directed to Leask Creek and contribute CI to surface water. Flows from Wolfram Creek and Mickelson Creek are also diverted to Leask sedimentation pond (Leask Pond) when the infiltration capacity at their ponds is not sufficient (Hemmera, 2014). In 2019, Teck indicated water from Phase 6 Pit was discharged to Leask Creek between early June and late September at rates ranging from 845 to 10,722 cubic metres per day (m^3/day). Leask Creek is considered to be mine-influenced as indicated by elevated concentrations of CI above BCWQG. Leask Creek flows over an alluvial fan into unlined Leask Ponds and is inferred to lose water to the ground (SNC-Lavalin, 2019h). Based on personal communication with Minnow Environmental Inc. (Minnow; 2020), overland flow from Leask Ponds to the Elk River was seasonally observed in 2019 and in previous years no overland flow was observed, which is indicative that Leask Pond has a high infiltration capacity (SNC-Lavalin, 2019f). Monitoring well GH_GA-MW-4 is downgradient of Leask Creek, near Leask Ponds, and concentrations of dissolved selenium, nitrate-N and sulphate exhibit decreasing Mann-Kendall trends, with concentrations decreasing by up to 17 times since sampling began (Figures GH-22 to GH-24). Between Q3 2015 and Q1 2017, a similar mixed cation-sulphate water type was identified at GH_GA-MW-4 and in mine-influenced surface water from Leask Ponds (GH_LC1; SNC-Lavalin, 2019h). Since 2017, the major ion distribution in groundwater from GH_GA-MW-4 has shifted to calcium-bicarbonate, consistent with the Elk River (Figure GH-17; SNC-Lavalin, 2019h). Overall, groundwater in this area is inferred to be hydraulically connected to surface water from Leask Ponds, with recharge from the pond affecting the groundwater quality; however, since 2017, the major ion distribution indicates that groundwater has been more influenced by mixing with the Elk River and less by mine-influenced surface water (SNC-Lavalin, 2019h).

As concentrations of CI increased in March and April 2019 in the ponds (inferred to be related to the re-direction of Phase 6 Pit dewatering to the creek), subsequent increases in CI in groundwater were measured. Although these increases were measured in 2019, Mann-Kendall trend analyses indicate overall decreasing trends for all CI at GH_GA-MW-4, while concentrations at Leask Ponds have overall continued to increase. Therefore, although concentrations of CI in groundwater appear to be seasonally influenced by Leask Creek, a greater influence from mixing with Elk River surface water recharge is inferred since 2017.

In Q4 of 2019, two nested monitoring wells were installed near Leask Ponds as part of the GHO CPX2 Program (GH_MW_LC1-A/B and GH_MW_LC2-A/B; Drawing 7). The wells were installed to obtain a better understanding of deep groundwater quality in the area, as well as groundwater – surface water interaction in the area. The results from this program should be assessed for possible future inclusion of these wells in the SSGMP.

Wolfram Drainage

Surface water in the headwaters of the Wolfram Creek upper catchment flows through waste rock from the West Spoil. Similar to Leask Creek, dewatering of Phase 6 pit throughout the year is expected to contribute CI to surface water. In 2019, Teck indicated water from Phase 6 Pit was discharged to Wolfram Creek year-round at rates of 4,252 to 7,086 m^3/day from January to late September, and 7.6 to 7,593 m^3/day from late October to late December, with the highest discharge rates occurring between July and August (Q3) and in late November (Q4). Mine-influenced surface water subsequently flows to the valley bottom over bedrock and/or till in the upper parts of the catchment and over glaciofluvial deposits in the lower part of the catchment.

Wolfram sedimentation ponds (Wolfram Ponds; unlined), which are at the base of Wolfram Creek, and on glaciofluvial deposits, promotes surface water infiltration in the vicinity of GH_GA-MW-2. Elevated concentrations of CI above the applicable criteria have historically been measured in surface water in Wolfram Ponds (GH_WC1); however, they have been orders of magnitude greater than in groundwater at GH_GA-MW-2 (Figures GH-22 to GH-24). A direct hydraulic connection between surface water and groundwater is not expected, as GH_GA-MW-2 is a deep well under a number of locally confining units (Drawing 26), groundwater in this area is interpreted to be seasonally influenced by surface water. This is supported by a muted seasonal fluctuation of groundwater elevations at this location.

In Q4 of 2019, three monitoring wells (GH_MW_WC1-A/B/C) were installed downgradient of Wolfram Ponds as part of the GHO CPX2 Program (Drawing 7). The wells were installed to obtain a better understanding of groundwater quality and groundwater-surface water interaction in the area. The results from this program should be assessed for possible future inclusion of these wells in the SSGMP.

Thompson Drainage

Upper Thompson Creek

Surface water in the headwaters of the Thompson Creek catchment flow through rock drains underneath the West Spoil in North Thompson Creek and Upper Thompson Creek. Mine-influenced surface water subsequently flows over till and bedrock towards the Lower Thompson sedimentation pond (Lower Thompson Pond). Nested monitoring wells GH_MW-UTC-A/B are near the Upper Thompson sedimentation pond (Upper Thompson Pond). Groundwater samples from the nested well pair have historically contained concentrations of CI below the primary screening criteria with no significant variation in concentrations over time (Figures GH-25 to 27). Groundwater from the upland monitoring wells GH_MW-UTC-A and -B have predominantly been calcium-bicarbonate rich and sodium bicarbonate rich, respectively, indicative that limited groundwater-surface water interaction has occurred in this area (SNC-Lavalin, 2019d).

Lower Thompson Creek

Monitoring well GH_GA-MW-3 is downgradient of Thompson Creek and Lower Thompson Pond. Groundwater at this location has historically contained elevated concentrations of CI relative to the primary screening criteria (Figures GH-22 to -24). The highest concentrations (i.e., up to two orders of magnitude) of dissolved selenium, nitrate-N, and sulphate at GH_GA-MW-3 have historically been measured in Q1 and Q2; however, in 2019, sulphate was highest in Q4 (177 mg/L)). Mann-Kendall trend analyses indicated overall decreasing trend in nitrate-N and no discernible trend was observed for dissolved selenium or sulphate at GH_GA-MW-3.

At this location, the timing of peak groundwater elevations in 2019 is between April and May indicating influence from recharge of snow melt in the upper catchment. Increasing concentrations between Q1 and Q3 are also consistent with increasing CI in Thompson Creek (GH_TC2) during this period. Therefore, the loading of CI in groundwater appears to be greatest during this time period. Concentrations of sulphate and dissolved selenium in groundwater at GH_GA-MW-3 were less than concentrations in surface water from the creek.

Since 2016, the major ion distribution in groundwater at GH_GA-MW-3 water has been predominantly mixed-cation bicarbonate, except during times of peak flow in Thompson Creek, where the distribution shifts to mixed-cation sulphate (Figure GH-28; SNC-Lavalin, 2019d). Although the major ion distribution in groundwater in 2019 was predominantly bicarbonate rich, the proportion of bicarbonate relative to sulphate decreased throughout the year, and in Q4, a bicarbonate-sulphate rich water type was calculated. The shift in major ion distribution in 2019 is indicative that groundwater quality is being influenced by a greater proportion of mine-influenced water compared to previous years. Mine-influenced water is interpreted to originate predominantly from Thompson Creek; however, infiltration of elevated CI in the Elk River side channel during times of high flow may also be locally influencing the CI distribution in groundwater.

Downgradient of Thompson Drainage

Monitoring well GH_MW-ERSC-1 is downgradient of Thompson Creek near the confluence of the Elk River side channel and the Elk River. The highest concentrations of CI in groundwater have historically been measured during winter and spring months (late Q4 to early Q2; Figures GH-29 to -31); however, this trend is not consistent on a year over year basis with the highs only occurring during 2015, 2018 and 2019. The water type at this location has historically been predominantly calcium bicarbonate, consistent with the Elk River and the side channel. Concentrations of CI have historically been less than the primary screening criteria; however, since 2017, occurrences of dissolved selenium and nitrate-N above the primary screening criteria were observed (Figures GH-29 to -31). In Q1 2019, concentrations of sulphate also increased, and water type shifted from predominantly sulphate rich with concentrations of dissolved selenium and nitrate-N increasing to historical highs (73.2 µg/L and 12.5 mg/L, respectively). Concentrations subsequently decreased and between Q2 and Q4 the water type changed from bicarbonate/sulphate rich to bicarbonate rich, potentially due to infiltration of the Elk River. A similar shift of water type was noted in 2017 and 2018, with sulphate rich water in Q4 2017 and Q1 2018 (Figure GH-32; SNC-Lavalin, 2019d). Overall, Mann-Kendall trend analyses indicate increasing trends in nitrate-N, sulphate, and dissolved cadmium have been observed with no discernible trend for dissolved selenium. As groundwater elevations fluctuate seasonally at this location, seasonal Mann-Kendall trend analyses should be completed for dissolved selenium once sufficient data exist. The potential source and transport pathway of mine-influenced water to this location is not known.

In Q4 2019, two shallow monitoring wells were installed along the west side of the TSF near Rush Creek and Fowler Creek as part of the GHO TSF Permitting Program (GH_MW_FC1 and GH_MW_FC2; Drawing 7). Rush and Fowler creeks intersect the Elk River farther south of GH_MW-ERSC-1 and were installed to assess shallow groundwater quality in this area. The installation of additional monitoring wells has also been proposed as part of the Mass Balance Investigation and are expected to be installed in 2020. Groundwater analytical results from these locations should be assessed, along with surface water from Rush and Fowlers creeks (GH_RC1 and GH_FC1, respectively) for possible future inclusion in the SSGMP.

6 Line Creek Operations SSGMP

The 2019 SSGMP for LCO was completed by Golder (2020) and is included in Appendix II. A summary of the program and results is provided here. Any interpretation of results presented below is that of Golder. Additional information, including cross sections with interpreted stratigraphy and potentiometric contours showing interpreted groundwater flow are also provided in the 2019 LCO SSGMP (Appendix II).

The LCO SSGMP focuses on monitoring groundwater quality primarily in two areas: the Process Plant area in the vicinity of where Line Creek joins the Fording River, and the Dry Creek area upstream of where Dry Creek joins the Fording River. The areas are shown along with the monitoring locations on Drawing 8, while geological cross sections through the Process Plant area are included in Drawings 31 and 32. Groundwater monitoring of the Phase I mining area is reported separately by Golder on an annual basis, while groundwater monitoring outside of the LCO area is also reported separately as part of the RGMP. Although Golder include data from down-valley monitoring wells GH_POTW10 and RG_DW-02-20 in the SSGMP report for context, they are not included in the summary here as they are part of the regional program and discussed in Sections 9.3.4 (RGMP Study Area 3) and 9.3.7 (RGMP Study Area 7) below.

Potential sources of CI in the Process Plant area include the Process Plant Ponds and CCR, Line Creek, Fording River, and reclaimed CCR. The potential pathways for all CI sources in the Process Plant include infiltration to the valley-bottom aquifer and transport to the Elk and/or Fording Rivers. The Dry Creek spoil is the potential source of CI in the Dry Creek area, with potential pathways including infiltration to a discontinuous upland aquifer and transport to Dry Creek, and infiltration to the valley-bottom aquifer from surface water in Dry Creek and the Fording River.

The program includes quarterly monitoring and sampling at six wells in the Dry Creek area (LC_PIZDC1306, LC_PIZDC1307, LC_PIZDC1308, LC_PIZDC1404S, LC_PIZDC1404D, LC_PIZDC0901) and four wells within the Process Plant area (LC_PIZP1101, LC_PIZP1103, LC_PIZP1104, LC_PIZP1105) as well as three additional wells which are monitored only (LC_PIZP1001, LC_PIZP1002, and LC_PIZP1003). Data was collected in accordance with the LCO SSGMP Update (Golder, 2019f).

Groundwater elevations in the Process Plant area ranged from approximately 1,235 to 1,268 masl. Groundwater flow in the valley-bottom aquifer was directed west towards the Elk and Fording Rivers. Groundwater elevations in the Dry Creek area ranged from approximately 1,685 to 1,707 masl. Above the confluence between Dry Creek and the East Tributary groundwater flow is directed towards and discharges to Dry Creek. Near and downgradient of the confluence with the East Tributary, groundwater flow is directed parallel to Dry Creek where the creek loses to ground over a stretch likely associated with coarse sediment of the East Tributary alluvial fan. Vertical gradients in shallow and deep monitoring well pairs in the Dry Creek area were directed downward when calculated for Q4 data in 2019.

Concentrations of CI were below the primary screening criteria in all groundwater samples collected as part of the SSGMP in both the Dry Creek and Process Plant areas in 2019. Concentrations of several non-order constituents exceeded the primary screening criteria in groundwater samples collected from both areas in 2019, including dissolved barium, cobalt, lithium, and molybdenum in the Dry Creek area, and chloride, boron, cobalt, fluoride, lithium, manganese, and molybdenum in the Process Plant area. In all cases the concentrations of these non-order constituents were within their historical ranges and their presence in groundwater is interpreted to be due to naturally-occurring processes.

Mann-Kendall analyses were completed for Q1 and Q4 data since 2014 for two wells in each of the Dry Creek and Process Plant areas to investigate trends in the concentrations of CI. In the Process Plant area, an increasing trend of dissolved selenium in Q1 and a probably increasing trend of dissolved cadmium in Q4 were identified at LC_PIZP1104, while increasing trends of dissolved cadmium in Q1 and of sulphate in both Q1 and Q4 were identified at LC_PIZP1105. A decreasing trend in the concentrations of sulphate in Q4 was also identified at LC_PIZP1104. An increasing trend of dissolved selenium at LC_PIZDC0901 was identified in Q4, while all other analyses of Q1 and Q4 CI concentrations in Dry Creek indicated either stability or that there was no trend.

No QA/QC concerns were identified with respect to CI, except for one nitrate-N concentration that was five times the laboratory MDL in the trip blank collected in Q1.

7 Elkview Operations SSGMP

The following sections describe the 2019 EVO SSGMP. The basis for the SSGMP was the groundwater CSM, developed from information in previous groundwater reports generated between 2011 and 2018 by AMEC Earth & Environmental Ltd (AMEC; 2011), Golder (2014a, 2014b, 2015b, 2015c, 2015d), SNC-Lavalin (2011, 2015a, 2015b, 2016, 2017a, 2017c, 2018b, 2018c, 2019c, 2019e, 2019i) and Teck (2014, 2016b, 2017) and presented in the approved 2018 SSGMP Update (SNC-Lavalin, 2019i). The CSM includes descriptions of the physical setting, hydrology, geology, mine-related features, physical hydrogeology, chemical hydrogeology and presents detailed analysis and interpretation of groundwater flow patterns, groundwater geochemistry, groundwater – surface water interactions and potential sources and transport pathways of CI in groundwater at EVO.

The EVO SSGMP covers two main Watersheds: the Elk River and Michel Creek. Results and discussion are presented by the four main surface water drainage areas as defined in the groundwater conceptual model (SNC-Lavalin, 2019i): Grave/Harmer Creek, Elk River proximal to EVO, Erickson Creek and Michel Creek. Grave Creek/Harmer Creek flows into the Elk River Watershed and Erickson Creek flows into the Michel Creek Watershed.

7.1 Groundwater Monitoring Locations

The 2019 groundwater monitoring locations were sampled in accordance with the 2018 SSGMP Update, which were selected based on potential sources for groundwater and transport pathways to the main stem of the Elk River (SNC-Lavalin, 2019i). The EVO SSGMP includes a total of 26 groundwater monitoring locations, including 25 monitoring wells (13 are nested) and one supply well. Table KK provides a list of locations, as well as rationale for each monitoring well. Drawing 9 indicates the locations of monitoring wells relative to key surface water and mine site features. Additional details including UTM locations, elevations, well installation details, description of screened lithologies, and estimated hydraulic conductivities are provided in Table 4a and on borehole logs in Appendix IV. Field sampling methodologies and Teck's Best Management Practices are provided in Appendix V.

SNC·LAVALIN

Table KK: EVO – Summary of Groundwater Monitoring Locations and Rationale

Watershed	Area	Well ID	Well Type	Rationale
Elk River	Grave/Harmer Creek	EV_GV3gw	Monitoring	› Monitor groundwater quality and levels within valley fill sediments downgradient of the EVO Dry Creek Spoils.
	Elk River Proximal to EVO	EV_BALgw	Monitoring	› Monitor groundwater quality and levels downgradient of spoils in Balmer Creek catchment.
		EV_LSgw	Monitoring	› Monitor groundwater quality and levels in valley fill sediments downgradient of spoils in upper Lindsay Creek.
		EV_GCgw	Monitoring	› Monitor groundwater quality and levels in the valley sediments near Goddard Creek and adjacent to Lagoons B and C, and in the Goddard Marsh.
		EV_OCgw	Monitoring	› Monitor groundwater quality and levels in valley fill sediments near Otto Creek and Lagoon D.
Michel Creek	Erickson Creek	EV_WF_SW	Monitoring	› Monitor groundwater downgradient from the West Fork Tailings Facility (WFTF).
		EV_ECgw	Monitoring	› Monitor groundwater quality and levels within valley fill sediments downgradient of Erickson Spoils.
	Michel Creek	EV_RCgw	Supply	› Monitor groundwater quality and levels in valley fill sediments near Michel Creek down gradient of Bodie Creek, Bodie Sedimentation Pond, Gate Creek and Gate Creek Sedimentation Pond.
		EV_MW_GT1A	Monitoring	
		EV_MW_GT1B	Monitoring	
		EV_MW_BC1A	Monitoring	
		EV_MW_BC1B	Monitoring	
		EV_BCgw	Monitoring	
		EV_MW_MC1A	Monitoring	› Monitor groundwater quality and levels along the Michel Creek valley bottom.
		EV_MW_MC1B	Monitoring	
		EV_MW_MC2A	Monitoring	
		EV_MW_MC2B	Monitoring	
		EV_MW_SPR1A	Monitoring	
		EV_MW_SPR1B	Monitoring	
		EV_MW_SPR1C	Monitoring	
		EV_MCgwD	Monitoring	› Monitor groundwater quality and levels in valley fill sediments near Michel Creek; wells selected are not influenced by down-valley groundwater transport of elevated Cl.
		EV_MCgwS[1]	Monitoring	
		EV_MW_MC3[2]	Monitoring	
		EV_MW_AQ1	Monitoring	› Monitor groundwater quality and levels at the base of Baldy Ridge near Aqueduct Creek.
		EV_MW_AQ2	Monitoring	
		EV_MW_MC4	Monitoring	

Notes:

1 The EVO SSGMP Update only included EV_MCgwD; however the RGMP includes both EV_MCgwD/S. In order to not separate the results and discussion of these wells, both EV_MCgwD and EV_MCgwS are presented in the EVO SSGMP.

2 Monitoring well EV_MW_MC3 was included in the EVO SSGMP Update; however, because this well was installed to target potential sources of Cl from Sparwood Ridge (and not EVO) this well was moved to the RGMP (Section 9.3.9). This well will be reviewed as part of the 2020 RGMP Update. SNC-Lavalin recommends removing this well from the EVO SSGMP once one year of monitoring is complete and confirms no mine-influence from EVO (which will be completed as part of this annual report).

As part of on-going work associated with the RGMP, single well response testing was conducted at EV_MCgwS/D on November 5, 2019. A summary of the methodology, results and interpretation are provided in Appendix IX.

7.2 Program Modifications

Data were collected in accordance with the EVO SSGMP Update (SNC-Lavalin, 2019i).

7.3 Results and Discussion

Results and discussion are presented below based on the four main surface water drainage areas as defined in the groundwater conceptual model (SNC-Lavalin, 2019i): Grave/Harmer Creek, Elk River proximal to EVO, Erickson Creek and Michel Creek. Previous EVO SSGMP annual reports included the Elk River distal to EVO (monitored by EV_ER1gwS/D); however, the 2018 SSGMP Update identified that this area represents groundwater transport in the valley bottom of the main stem of the Elk River and recommended this area be monitored as part of the RGMP (SNC-Lavalin, 2019i), which is provided in Section 9.3.12.

A summary of wells included in each drainage area, well installation details and hydrogeological information for each well are provided in appended Table 4a. Manual groundwater level measurements from 2019 and calculated vertical gradients are provided in Table 4b. Time series plots of groundwater levels and surface water levels are provided in appended Figures EV-1, -2, -6, -8, -9, -11, -12, -13, -14, -15 and -21. Continuous groundwater level data was compensated for barometric influences using the barologger installed at EV_ER1gwS. Drawing 12 presents a summary of groundwater elevations from Q4 of 2019, inferred potentiometric contours (in the Michel Creek Watershed) and inferred groundwater flow direction.

Field measured parameters and analytical results compared to screening criteria are presented in Tables 4c, 4d and 4e. Drawings 43 to 46 provide a summary of 2019 CI concentrations. Appended Figures EV-3, -4, -5, -7, -10, -16, -17, -18, -19, -20 and -22 compare concentrations of CI in groundwater to surface water data from the relevant drainage areas to assess potential interactions.

7.3.1 Climate

The Environment Canada Sparwood climate station (1,138 masl) recorded a mean annual precipitation of 613 mm based on the data recorded for the periods of 1981 to 2010 (Environment Canada, 2018). The majority of the precipitation occurs in the winter and spring. Daily precipitation from 2015 to 2019 is provided in Figure EV-1. The daily average recorded temperature between 1980 and 2010 was 4.4°C; highest average temperatures were recorded in the month of July (15.8 °C) and lowest average temperatures were recorded in the month of December (-7.3 °C).

7.3.2 Hydrology

The main surface water courses near EVO are the Elk River, which flows from north to south along the western boundary of EVO and Michel Creek, which flows from the southeast to the northwest, along the southwestern boundary of EVO and discharges to the Elk River at the town of Sparwood (Drawing 9). There are several small creeks that flow to the Elk River and Michel Creek, (Golder, 2015c), including:

› West flowing creeks that discharge to the Elk River (from north to south): EVO Dry Creek (which flows into Harmer Creek), Grave Creek (to which Harmer Creek flows into), Six Mile Creek, Balmer Creek, Fennelon Creek, Feltham Creek, Lindsay Creek, Goddard Creek, Cossarini Creek, and Otto Creek.

› West and south flowing creeks that discharge into Michel Creek (north to south): Qualtieri Creek, Aqueduct Creek, Noname Creek, Spring Creek, Bodie Creek, Gate Creek, South Gate Creek, Thresher Creek, Milligan Creek, South Pit Creek, and Erickson Creek.

Of the above listed creeks, Harmer Creek (which flows to Grave Creek) and Erickson Creek are considered major tributary drainages that originate within EVO boundaries and drain water to the north and south, respectively. Golder (2015c) reported that Feltham and Lindsay Creeks are captured by the Lindsay Interceptor ditch and flow into Goddard Creek (shown on Drawing 9). Qualtieri Creek has recently been re-directed to Aqueduct Creek.

Surface water levels and analytical data were incorporated in the interpretation of groundwater data, in accordance with the EVO SSGMP Update (SNC-Lavalin, 2019i). Surface water level data at Harmer Creek (EV_HC1), Lindsay Creek (EV_LC1), Goddard Creek (EV_GC2), Michel Creek (EV_MC2) and the Elk River (Environment Canada Station 08NK016) is shown on Figure EV-1 along with precipitation data. Surface water levels from the Elk River and Michel Creek appear to be responsive to precipitation (i.e., episodes of higher precipitation are correlated to increases in level).

Erickson Creek level data is provided on Figure EV-9 along with precipitation data and groundwater elevations. Similar to the Elk River and Michel Creek, Erickson Creek levels appear to be responsive to precipitation (i.e., episodes of higher precipitation are correlated to increases in level). Gate Creek level data does not follow water levels in Michel Creek and does not appear to be responsive to precipitation (Figure EV-12). Gate Creek levels are also be influenced by dewatering flows from Natal Pit (SNC-Lavalin, 2019i).The elevation of Harmer Creek (EV_HC1), Lindsay Creek (EV_LC1) and Goddard Creek (EV_GC2) surface water monitoring stations has not been surveyed and therefore figures show the surface water elevation as 'height above local datum'. It is recommended that the elevation of water level measurement at these monitoring stations locations and Bodie Creek (EV_BC1) be surveyed.

7.3.3 Grave Creek/Harmer Creek Watershed

7.3.3.1 Groundwater Elevations

Between January 2015 and December 2019, groundwater elevations at EV_GV3gw followed a seasonal trend with higher groundwater levels recorded in spring months and annual water level fluctuations up to 0.9 m (Figure EV-2). Groundwater levels are typically at their highest between April and June and at their lowest in October. Annual maximums in groundwater elevations for spring of 2017 and 2018 were approximately 0.3 m higher than spring of 2015, 2016 and 2019. Seasonal elevation trends in groundwater follow similar patterns to surface water levels measured at Harmer Creek (EV_HC1; Figure EV-2). It is noted that there is greater resolution in groundwater level compared to surface water data due to the measurement frequency. In addition, surface water levels at EV_HC1 are presented as height above local datum and it is recommended this surface water station be surveyed.

The manually measured groundwater elevation of EV_GV3gw for the fourth quarter of 2019 and inferred groundwater flow direction are shown on Drawing 12 in relation to other EVO SSGMP wells.

7.3.3.2 Groundwater Quality

There were no CI concentrations measured above primary screening criteria at EV_GV3gw as indicated in Table LL below (Drawings 43 to 46).

Table LL: EVO – Summary of CI Compared to Primary Groundwater Screening Criteria in the Grave Creek/Harmer 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
EV_GV3gw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

[2] '–' denotes result is below primary screening criteria.

[3] Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.

[4] Standard varies with hardness.

Dissolved lithium was the only constituent measured above CSR standards in all samples collected in 2019 from EV_GV3gw which is inferred to be naturally occurring (SNC-Lavalin, 2017c; 2018b; 2019c).

Mann-Kendall trend analysis was completed for CI at wells with more than seven data points. A summary of results is provided in Table MM below. Refer to Section 3.3 for explanation of criteria used to identify significant trends.

Table MM: EVO – Summary of Mann-Kendall Trend Analysis for CI in the Grave Creek/Harmer Creek Watershed

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
EV_GV3gw	Decreasing	Stable	Decreasing	Increasing

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is bold. Where the CI were measured above secondary screening criteria for selenium, the result is shaded and bold.

Results from the Mann-Kendall trend analyses completed for CI in groundwater indicated concentrations are decreasing or stable, with the exception of dissolved selenium, where an increasing trend was identified; however, dissolved selenium concentrations between 2015 and 2019 fluctuated between 3.35 µg/L to 4.36 µg/L and remain below the CSR DW standard of 10 µg/L. A time-series of dissolved selenium concentrations is provided in Appendix VII, which depicts that the selenium concentrations increase on a very gradual slope; using the difference in concentrations measured over five years (2015 to 2019), the calculated increase in dissolved selenium concentrations per year is 0.2 µg/L per year.

7.3.3.3 Discussion

Discussion of trends in groundwater quality in the Grave Creek/Harmer Creek Watershed focuses on dissolved selenium as it is the only CI identified to have an increasing trend in the Mann-Kendall trend analysis (Table MM, Appendix VII). Dissolved selenium concentrations measured in groundwater at EV_GV3gw were lower (3.2 to 18.1 times) and exhibited little variation compared to surface water concentrations measured in Harmer Creek at surface water CP EV_HC1, as shown in Figure EV-3. Dissolved selenium concentrations measured in 2019 at EV_GV3gw were within the range of previous results (3.4 to 4.4 µg/L between November 2013 and December 2019) with no distinct seasonal trend observed. Surface water dissolved selenium concentrations in EV_HC1 fluctuate seasonally (ranged between 14.2 and 60.7 µg/L between November 2013 and December 2019) and are typically lower during freshet which is consistent with the effect of dilution on constituents in a freshet dominated regime.

Review of water elevation trends in EV_GV3gw and EV_HC1 (Figure EV-2) suggest a hydraulic connection between surface water and groundwater; however, the seasonal fluctuations observed in surface water dissolved selenium concentrations are not reflected in groundwater. The lack of seasonal fluctuations in dissolved selenium in groundwater could be because EV_GV3gw is installed relatively deep (well screen installed between 22.9 and 24.4 mbgs) and is therefore representative of a deeper groundwater system. Alternatively, the lack of fluctuation in dissolved selenium concentrations in groundwater could be due to attenuation. In order to assess whether dissolved selenium is being attenuated in the subsurface, sulphate concentrations in groundwater at EV_GV3gw were compared to surface water concentrations at EV_HC1 (Figure EV-4). Sulphate concentrations in groundwater at EV_GV3gw (129 to 151 mg/L; 2015 – 2019) are within range of concentrations at EV_HC1 (70 to 245 mg/L; 2015 - 2019) and appear to vary seasonally with the highest concentrations observed after the seasonal high observed in surface water. The hydraulic connection identified between surface water and groundwater, combined with sulphate concentrations in groundwater within range of surface water and fluctuate seasonally, suggests dissolved selenium concentrations are attenuating in the subsurface. Ratios of selenium to sulphate as S in groundwater at EV_GV3gw and surface water at EV_HC1 were compared to the range of ratios in mine contact waters, waters affected microbial reduction and natural non-contact waters (Figure EV-5, modified from SRK, 2018b). Surface water from EV_HC1 plots along the mixing line between contact waters and natural non-contact water, while groundwater from EV_GV3gw plots between all three water types, suggesting groundwater at EV_GV3gw is influenced by contact waters and may also be affected by microbial reduction.

Relatively low CI concentrations (below primary screening criteria) at EV_GV3gw suggest groundwater transport of CI from the Harmer Creek/Grave Creek drainage is minimal compared to surface water; therefore, surface water is considered the main transport pathway for CI to groundwater in the Elk River valley bottom. These findings are consistent with results presented for Study Area 7 in the RGMP (see Section 9.3.7) as well as previous investigations (SNC-Lavalin, 2018b; 2018c; 2019c; 2019e; 2019i).

7.3.4 Elk River Watershed

7.3.4.1 Groundwater Elevations

Between January 2015 and December 2019, groundwater elevations at EV_LSgw and EV_GCgw and followed a seasonal trend with slightly higher groundwater elevations in the spring and a maximum annual water level fluctuation of 0.7 to 1.1 m (Figure EV-6). Annual maximums in 2019 at EV_LSgw and EV_GCgw were lower than maximums recorded between 2015 and 2018. Seasonal elevation trends in groundwater at EV_GCgw follow similar patterns to surface water levels measured at Goddard Creek (EV_GC2) suggest a hydraulic connection between surface water and groundwater. It is noted that there is greater resolution in groundwater level compared to surface water data due to the measurement frequency. In addition, surface water levels at EV_GC2 are presented as height above local datum and it is recommended this surface water station be surveyed.

Groundwater elevations between January 2015 and December 2019 at EV_OCgw follow less of a defined seasonal trend (Figure EV-6) and may be influenced by water levels in nearby Lagoon D, inferred to be losing water to ground. The annual water level fluctuations were lower in 2019 (0.7 m) compared to previous fluctuations between 2015 and 2018 (1.7 m).

The manually measured groundwater elevation of EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw for the fourth quarter of 2019 and inferred groundwater flow direction are shown on Drawing 12 in relation to other EVO SSGMP wells.

7.3.4.2 Groundwater Quality

There were no CI concentrations detected above primary screening criteria at EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw as shown in Table NN below on Drawings 43 to 46.

Table NN: EVO – Summary of CI compared to Primary Groundwater Screening Criteria in the Elk River 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
EV_BALgw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_LSgw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_GCgw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_OCgw**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

2 '–' denotes result is below primary screening criteria.

3 Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.

4 Standard varies with hardness.

Other parameters (non-order constituents) were measured above primary screening criteria in 2019 in at least one quarter.

- Fluoride concentrations were measured above the IW and LW standard at EV_OCgw.
- Dissolved lithium concentrations were measured above the DW standard at EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw.
- Dissolved manganese was measured above the IW standard at EV_LSgw.
- Dissolved molybdenum was measured above the IW standard at EV_OCgw.

Non-order constituent results from 2019 were similar to previous years and are inferred to be naturally occurring, consistent with findings presented previous assessments (SNC-Lavalin, 2017c; 2018b; 2019c). Review of the borehole log for EV_OCgw (provided in Appendix IV) indicates this well is installed directly overlying the bedrock surface suggesting the source of fluoride and molybdenum likely originates from bedrock. Field measured DO values in 2019 from EV_LSgw ranged from 0.2 mg/L to 0.5 mg/L, suggesting the source of manganese at this well may be related to reducing conditions due to anoxic conditions.

Mann-Kendall trend analysis was completed for CI at wells with more than seven data points. Trend analysis results are presented in Table OO below. Refer to Section 3.3 for explanation of criteria used to identify significant trends.

Table OO: EVO – Summary of Mann-Kendall Trend Analysis for CI in the Elk River Watershed

Well ID / Parameter[1,2]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
EV_BALgw	Stable	Decreasing	Decreasing	Decreasing
EV_LSgw	No Trend	Decreasing	-	Decreasing
EV_GCgw	-	No Trend	-	-
EV_OCgw	No Trend	Increasing	-	Probably Decreasing

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.

[2] '–' denotes indicates Mann-Kendall trend analysis was not completed as concentrations were consistently less than or marginally greater than the detection limit.

Results from the Mann-Kendall trend analyses completed for CI in groundwater indicated concentrations are predominantly stable, decreasing or had no discernible trend, except for sulphate at EV_OCgw where increasing trends were identified. Sulphate concentrations at EV_OCgw between 2015 and 2019 ranged from 47.5 to 76.5 mg/L and are an order of magnitude below the CSR DW standard (500 mg/L). A time-series of sulphate concentrations is provided in Appendix VII, which depicts sulphate concentrations increase along a very gradual slope; using the difference in concentrations measured over five years (2015 to 2019), the increase per year is approximately 5.8 mg/L per year.

7.3.4.3 Discussion

Surface water chemistry data from tributaries in the Elk River Watershed with groundwater monitoring locations (Balmer Creek, Lindsay, Goddard and Otto) contain selenium concentrations above BCWQG for AW; therefore, discussion of chemistry trends in the Elk River Watershed is focused on selenium. Dissolved selenium concentrations in groundwater at EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw have been below screening criteria (EV_GCgw non detect) and relatively stable since March of 2014 (Figure EV-7). Trend analyses indicate dissolved selenium concentrations are decreasing (EV_BALgw, EV_LSgw) or probably decreasing (EV_OCgw). As shown on Drawing 46, the 2019 selenium concentrations at these four wells were at least one order of magnitude lower than the CSR DW standard (10 µg/L).

Concentrations of dissolved selenium from EV_BALgw and EV_LSgw were at least an order of magnitude lower than surface water from surface water in their respective tributaries of Balmer Creek (EV_BLM2) and Lindsay Creek (EV_LC1) suggesting that surface water is the primary transport pathway for CI to the valley bottom; this is supported by decreasing trends in these groundwater wells.

Consistent with previous observations, the highest selenium concentrations in surface water were measured from Goddard Creek (EV_GC2); Teck indicated the high concentrations are sourced from the Cedar Pit, where it is likely that a fault seepage influences Goddard Creek as it flows through the tunnel to the valley bottom. Despite the hydraulic connection identified between groundwater at EV_GCgw and EV_GC2 (Figure EV-7), high concentrations of dissolved selenium concentrations measured in surface water (9.6 µg/L to 119 µg/L between 2015 and 2019) are not reflected in groundwater at EV_GCgw (selenium concentrations are below the detection limit since Q3 of 2015). The low dissolved selenium concentrations measured in groundwater at EV_GCgw are likely because this well is installed relatively deep (screened between 12.6 m and 15.6 m) within a silty clay unit (shown on cross sections M-M' and N-N'; Drawings 37 and 38, respectively). Goddard Creek is interpreted to lose to ground near Goddard Settling Ponds and Goddard Marsh and may influence shallow groundwater quality in this area; EV_GCgw does not appear capture this potential flow path, which was identified as a data gap in the 2017 RGMP Update (SNC-Lavalin, 2017c; 2018b; 2019c).

Review of available groundwater data from monitoring locations in the Elk Valley Watershed indicate there does not appear to be a confirmed groundwater transport pathway between the surface water sources identified on the western slope of EVO and Elk River valley bottom (SNC-Lavalin, 2017b; 2018b; 2019c).

7.3.5 Erickson Creek Watershed

7.3.5.1 Groundwater Elevations

Between January 2015 and December 2018 groundwater elevations in EV_ECgw fluctuated up to 2.3 m while in 2019 groundwater elevations fluctuated 1.5 m (Figure EV-8). The annual maximum groundwater elevation in 2019 was 0.73 m lower than the annual maximum recorded between 2015 and 2018. Groundwater levels are typically at their highest between mid-April and mid--June and at their lowest in October. Groundwater elevations at EV_ECgw follow a seasonal trend with higher groundwater levels recorded in spring months and show some similarity to level trends in surface water level in Erickson Creek (EV_EC1; e.g., freshet peak in 2017); however, there appears to be additional influences on groundwater levels throughout the year, in addition to seasonal level trends (Figures EV-8 and EV-9). In 2019, groundwater levels fluctuated up to 1.5 m, as mentioned previously, whereas surface water levels at EV_EC1 fluctuated only 0.5 m.

It is noted that there is greater resolution in groundwater level compared to surface water data due to the measurement frequency. In addition, surface water levels at EV_EC1 are presented as height above local datum and it is recommended this surface water station be surveyed.

Manual groundwater elevations at EV_WF_SW in 2019 exhibited greater fluctuations (27.9 m) in 2019 (1514.99 to 1542.88 masl), compared to measurements measured between 2015 and 2018 which fluctuated 9.6 m (1530.97 to 1540.13; Figure EV-8). EV_WF_SW is installed in waste rock and is located downgradient of the West Fork Tailings Facility (WFTF) which is a settling location for solid material present in the tailings discharge. AMEC (2011) reported that groundwater levels increased eight metres, from approximately 1523 to 1531 masl, between 2005 (when the WFTF began operation) and 2011. The increase in groundwater levels at EV_WF_SW after the WFTF began operation indicates water levels in EV_WF_SW are highly influenced by levels in the WFTF. Additional discussion of reasons for the greater fluctuation in groundwater levels at EV_WF_SW in 2019 is provided in Section 10.4.

7.3.5.2 Groundwater Quality

There were no CI concentrations detected above primary screening criteria at EV_WF_SW and EV_ECgw as shown in Table PP (Drawings 43 to 46).

Table PP: EVO – Summary of CI Compared to Primary Groundwater Screening Criteria in 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
EV_WF_SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_ECgw**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.
[2] '–' denotes result is below primary screening criteria.
[3] Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.
[4] Standard varies with hardness.

Other parameters (non-order constituents) were measured above primary screening criteria in 2019 in at least one quarter.

- Dissolved lithium at EV_ECgw and EV_WF_SW.
- Dissolved manganese at EV_WF_SW.
- Dissolved molybdenum at EV_ECgw.

Concentrations of dissolved manganese at EV_WF_SW appear to be locally sourced and are typically associated with reducing conditions (i.e., low DO < 1 mg/L); however, review of DO concentrations in 2018 and 2019 (1.3 mg/L to 3.2 mg/L) suggest some interaction with the atmosphere. EV_WF_SW is installed in waste rock and receives water from the WFTF (AMEC, 2011) which could be a potential source of manganese (SNC-Lavalin, 2019c).

Mann-Kendall trend analysis was completed for CI at wells with more than seven data points. Trend analysis results are presented in Table QQ below. Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table QQ: EVO – Summary of Mann-Kendall Trend Analysis for CI in the Michel Creek Watershed

Well ID / Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
EV_ECgw	No Trend	Decreasing	No Trend	Probably Increasing
EV_WF_SW	No Trend	Decreasing	Stable	Stable

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.

Results from the Mann-Kendall trend analyses completed for CI in groundwater indicated concentrations are predominantly stable, decreasing or had no discernible trend, except for a probably increasing trend identified for dissolved selenium at EV_ECgw driven by the 2019 Q4 dissolved selenium value of 1.39 µg/L; if the 2019 Q4 dissolved selenium concentration is removed from the trend analysis, the resulting analysis indicates 'No Trend'. It is noted that despite the increasing trend identified, the dissolved selenium concentration at this EV_ECgw is significantly below the most stringent CSR standard (DW standards of 10 µg/L). Further discussion of the Q4 2019 dissolved selenium concentration is presented in the following section.

7.3.5.3 Discussion

Dissolved selenium concentrations in groundwater at EV_ECgw and EV_WF_SW have been stable since March 2014, with no distinct seasonal trend observed (Figure EV-10); concentrations measured in 2019 were an order of magnitude lower than the CSR DW standard (Drawing 46). The Q4 2019 dissolved selenium concentration from EV_ECgw (1.39 µg/L) was more than double the previously measured maximum concentration of 0.534 µg/L. The increase in dissolved selenium concentrations may be related to flowing artesian conditions at monitoring well EV_EC2. Monitoring wells EV_EC1 and EV_EC2 (Drawing 9) were installed as part of a hydrogeological assessment in support of an Active Water Treatment Facility (AWTF) (Golder, 2019c) and encountered strong flowing artesian conditions originating from a sand unit deeper than the screened interval of EV_ECgw. EV_EC2 flowed for approximately one day in March 2019 and contained total selenium concentrations up to 7.1 µg/L (three samples were collected between March 4 and March 5, 2019; Golder, 2019c). Dissolved selenium concentrations from March 2019 at EV_EC2 and total and dissolved concentrations from EV_EC1 were an order of magnitude lower than total concentrations measured from EV_EC2. Nitrate, sulphate and dissolved cadmium concentrations at EV_ECgw measured in Q4 of 2019 were similar to previous concentrations measured between 2015 and 2019; nitrate, sulphate and dissolved cadmium concentrations at EV_EC2 were close to or below the detection limit. Comparison of chemistry concentrations at EV_ECgw, EV_EC1 and EV_EC2 suggests the elevated Q4 2019 dissolved selenium concentration potentially originated from flowing conditions at EV_EC2 and that flowing conditions at EV_EC1 do not influence CI concentrations at EV_ECgw. Continued monitoring of EV_ECgw is recommended to asses any continued influence from flowing artesian conditions at EV_EC1 or EV_EC2.

Review of subsurface information, groundwater chemistry and the groundwater flow regime suggest there is not a strong connection between groundwater at EV_ECgw and surface water in Erickson Creek. EV_ECgw is installed relatively shallow (screened between 2.6 m and 4.1 m) within a sand/clay and sand (shown on inferred cross section O-O'; Drawings 039). Artesian groundwater conditions observed in boreholes adjacent to EV_ECgw (Golder, 2019e), shallow groundwater levels at EV_ECgw typically higher than creek levels (Golder, 2019d), and gaining reaches of Erickson Creek near EV_ECgw (Golder, 2019d), suggest vertical upward flow from groundwater to surface water in this area. Dissolved selenium concentrations measured in groundwater at EV_ECgw and EV_WF_SW were two to three orders of magnitude lower than surface water concentrations measured in Erickson Creek (EV_EC1) (Figure EV-10). Comparison of ion balance and water type further suggests that groundwater at EV_ECgw is not connected to surface water in the area (SNC-Lavalin, 2019i).

Consistent with findings presented for Study Area 10 in the RGMP presented in Section 9.3.10, the effects of mine influence on groundwater in Michel Creek valley bottom where Erickson Creek discharges to Michel Creek are likely to be the result of infiltration of surface water rather than tributary groundwater transport (SNC-Lavalin, 2017c; 2018b; 2019c).

7.3.6 Michel Creek Watershed

7.3.6.1 Groundwater Elevations and Flow Regime

Manual groundwater levels measured in 2019 in wells downgradient of Bodie Creek, Bodie Sedimentation Pond, Gate Creek and Gate Creek Sedimentation Pond (EV_MW_GT1A/B, EV_MW_BC1A/B and EV_BCgw) ranged from 1150.62 masl at EV_BCgw and 1154.77 masl at EV_MW_GT1B. Groundwater elevations from Q4 were used to infer potentiometric contours to evaluate the groundwater flow regime (Drawing 12), and suggested groundwater flow direction in the Michel Creek Valley bottom is towards the northwest and approximately parallel to Michel Creek. Near EV_MW_GT1A/B, EV_MW_BC1A/B and EV_BCgw, the horizontal hydraulic gradient was estimated to be 0.007 m/m. In 2019, the vertical gradient between nested wells EV_MW_GT1A/B, and EV_MW_BC1A/B was downward and ranged from -0.04 to -0.01 m/m. Continuous groundwater elevation data indicate the vertical gradient between EV_MW_BC1A/B was consistently downward (Figure EV-11).

Continuous groundwater elevation data suggest the following:

- EV_MW_GT1B, EV_MW_BC1A/B and EV_BCgw show a seasonal response with annual maximum groundwater levels in the spring and groundwater levels that generally follow the water levels in Michel Creek at EV_MC2 (approximately 2 km downstream) as shown in Figure EV-11.
- EV_MW_GT1A/B does not follow water level fluctuations in Gate Creek Pond discharge (EV_GT1; Figure EV-12), suggesting little hydraulic connection between surface water and groundwater.
- EV_MW_BC1A/B appear to be influenced by surface water levels in Bodie Creek Pond discharge (EV_BC1) in addition to Michel Creek, as there is a correlation between increases in level in Bodie Creek Pond and groundwater levels in EV_MW_BC1A/B which do not coincide with level increases in

Michel Creek (at EV_MC2) (e.g., water level increase at EV_BC1 on May 7 and August 6, 2019; Figure EV-13).

Downgradient of this area, manual water level measurements from 2019 ranged from 1143.41 masl at EV_MW_MC2B to 1145.26 masl at EV_MW_MC1B. Potentiometric contours indicate the groundwater flow direction continues to be towards the northwest and approximately parallel to Michel Creek (Drawing 12). In 2019, the vertical gradient between nested wells EV_MW_MC1A/B was downward and ranged from 0.03 to 0.04 m/m, whereas at EV_MW_MC2A/B it was upward and ranged from 0.009 and 0.01 m/m. In the vicinity of these wells, the horizontal hydraulic gradient was estimated to be 0.006 m/m. Continuous elevation data at EV_MW_MC2B indicate a seasonal response with highest groundwater levels in the spring, approximately following the same response as Michel Creek (EV_MC2; located approximately 0.5 km downstream; Figure EV-11).

Manual groundwater levels measured in Q2, Q3 and Q4 of 2019 in wells installed at the base of Baldy Ridge ranged from 1129.32 masl at EV_MW_MC4 to 1158.20 masl at EV_MW_AQ1. The inferred groundwater flow direction in near EV_MW_MC4, EV_MW_AQ1 and EV_MW_AQ2 is towards the west and appears to be influenced by groundwater sourced from Baldy Ridge (Drawing 12). Groundwater elevations at EV_MW_AQ1 and EV_MW_AQ2 exhibited little fluctuation (< 0.01 m) compared to wells installed close to Michel Creek where fluctuations of up to 0.76m were observed (EV_MCgwD). Continuous groundwater elevation data at EV_MW_AQ1 do not indicate a strong hydraulic connection with Michel Creek (Figure EV-15).

In the Sparwood Area, manual groundwater levels measured in Q2, Q3 and Q4 of 2019 ranged from 1127.87 masl at EV_MCgwD to 1135.16 masl at EV_MW_SPR1B. The inferred groundwater flow direction is towards the west and appears to be influenced by groundwater from Baldy Ridge (i.e., EV_MW_AQ1, EV_MW_AQ2 and EV_MW_MC4) as well as the Elk River (Drawing 12). In 2019, vertical gradients at triple nested EV_MW_SPR1A/B/C were downward between EV_MW_SPR1A/B (-0.022 and -0.018 m/m) and upward between both EV_MW_SPR1B/C and EV_MW_SPR1A/C (0.003 and 0.022 m/m). The vertical gradients between EV_MCgwS/D were downward (-0.056 to -0.045 m/m), consistent with previous results. Near EV_SPR1A/B/C, EV_MCgwD and EV_MW_MC3, the horizontal hydraulic gradient was estimated to range from 0.009 to 0.024 m/m.

Continuous groundwater elevation data between March 2019 and November 2019 at EV_SPR1B/C, EV_MCgwS/D and EV_MW_MC3 followed seasonal responses with highest groundwater levels in the spring generally coincident with Michel Creek (at EV_MC2, located approximately 0.6 to 1.7 km; Figure EV-14).

The EVO SSGMP Update identified that the lack of continuous water level data and pumping rates for the supply wells in the Michel Creek valley bottom (EV_HW1, EV_MR2, EV_RCgw and EV_WH50gw) was a gap as potential effects on the groundwater flow regime and surface water interactions may occur between May and June (SNC-Lavalin, 2019i). Teck is working towards instrumentation of these wells but completing the work is difficult due to existing pump infrastructure and managing confined space health and safety requirements for the installation and ongoing data download. Efforts to install this instrumentation will continue in 2020. The EVO SSGMP Update also recommended installation of a pressure transducer at EV_MW_MC1B.

7.3.6.2 Groundwater Quality

A summary of CI parameters above primary screening criteria are presented in Table RR, in order of upgradient to downgradient within the Michel Creek valley bottom. CI concentrations are shown on Drawings 43 to 46.

SNC·LAVALIN

Table RR: EVO – Summary of CI Compared to Primary Groundwater Screening Criteria in 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
EV_RCgw	31.0	38.2	33.3	33.3	1,140	1,290	1,180	1220	-	-	-	-				
EV_MW_GT1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_GT1B	-	-	17.4	16.9	-	-	840	954	-	-	-	-				
EV_MW_BC1A	15.3	16.2	17.8	18.9	753	798	882	898	-	-	-	-				
EV_MW_BC1B	18.4	18.0	20.0	24.5	893	849	1,010	1,040	-	-	-	-				
EV_BCgw	-	-	-	-	-	-	-	-	-	-	-	-				17.7
EV_MW_MC2A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MC2B	-	-	-	-	-	-	-	-	-	-	-	-				
EV_MW_MC1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MC1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_SPR1A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_SPR1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_SPR1C	-	-	-	-	-	-	-	-	-	-	-	-	16.8	-	-	-
EV_MCgwS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MCgwD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_AQ1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_AQ2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MW_MC4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

2 '–' denotes result is below primary screening criteria.

3 Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.

4 Standard varies with hardness.

Concentrations of CI from 2019 at EV_RCgw, EV_BCgw and EV_MCgwD were similar to previous years with the exception of EV_BCgw where concentrations of dissolved selenium at EV_BCgw in 2019 (17.7 µg/L to 38.5 µg/L) were notably lower compared to previous years (between 2015 and 2018 concentrations ranged from 17.9 µg/L to 97.6 µg/L); in Q4 of 2019, dissolved selenium concentrations decreased below the CSR AW/IW standard (20 µg/L) and CSR LW standard (30 µg/L) but remained above the DW standard (10 µg/L). In addition, concentrations of sulphate and nitrate-N at EV_BCgw in 2019 were lower compared to previous years and are consistently below standards (nitrate-N below CSR AW since Q4 2016 and sulphate below CSR standards since 2015).

Secondary screening for selenium was completed where sample concentrations were above primary screening criteria. Selenium concentrations in 2019 exceeded the CP (EV_MC2 = 28 µg/L) and/or the CGDWQ for DW (50 µg/L) at EV_RCgw, EV_MW_GT1B, EV_MW_BC1A/B, EV_BCgw and EV_MW_MC2B.

Non-order constituents were measured above primary screening criteria in 2019 in at least one quarter.

- Fluoride at EV_MW_SPR1B, EV_MCgwD and EV_MW_MC3.
- Chloride at EV_MW_MC1B.
- Dissolved barium at EV_MW_MC2A and EV_MW_MC1A/B.
- Dissolved copper at EV_RCgw.
- Dissolved iron at EV_MW_MC1B.
- Dissolved lithium at EV_MCgwS/D and EV_MW_MC2A.
- Dissolved manganese at EV_MW_BC1A, EV_MW_MC1B, EV_MW_SPR1A and EV_MCgwD.
- Dissolved molybdenum at EV_MW_BC1B, EV_MW_SPR1B, EV_MCgwD and EV_MW_MC3.
- Dissolved uranium at EV_MW_GT1B and EV_MW_BC1B.

The sources of select non-order constituents above CSR standards (i.e., chloride, fluoride, dissolved barium, lithium and molybdenum) appear to originate from natural sources (e.g., interaction with bedrock or unconsolidated materials) and elevated concentrations of these constituents have been observed in other wells across the Elk Valley (SNC-Lavalin, 2017b; 2018b; 2019c). Dissolved iron (EV_MW_MC1B) and manganese (EV_MW_BC1A, EV_MW_MC1B, EV_SPR1A, EV_MCgwD) are typically associated with reducing conditions which correspond with the low DO observed at these locations.

The source of dissolved copper at EV_RCgw (above CSR standards in Q3 of 2019) is not known but is potentially mine-influenced as concentrations of dissolved copper and CI have been consistently measured above standards at this location between 2015 and 2019. Alternatively, the copper could be sourced from piping in the well distribution system. Dissolved copper was measured at historical record high concentration of 575 µg/L in Q2 of 2018. As concentrations of copper above CSR standards have only been measured at EV_RCgw, the extent appears to be localized (SNC-Lavalin, 2019c; 2019i).

The source of dissolved uranium at EV_MW_GT1B and EV_MW_BC1B is not known but is potentially mine-influenced as concentrations of dissolved uranium and CI have been measured at these locations in 2019 (SNC-Lavalin, 2019j). Dissolved uranium concentrations in 2019 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 may suggest probable sources are surface water from Bodie and Gate Creek Sedimentation Pond. Concentrations of dissolved uranium have only been measured in groundwater at EV_MW_GT1B and EV_MW_BC1B and therefore, the extent is inferred to be localized.

Mann-Kendall trend analysis results are presented in Table SS below. Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table SS: EVO – Summary of Mann-Kendall Trend Analysis for CI in the Michel Creek Watershed

Well ID / Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
EV_RCgw	**Decreasing**	**Probably Increasing**	Probably Increasing	**No Trend**
EV_BCgw	Decreasing	Decreasing	Decreasing	**Decreasing**
EV_MCgwD	Increasing	Decreasing	Increasing	No Trend
EV_MCgwS	Probably Decreasing	Increasing	-	No Trend

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.

Of the parameters identified to have increasing trends, sulphate at EV_RCgw is the only parameter above primary screening criteria (CSR DW standard of 500 mg/L). A time-series of sulphate and dissolved cadmium concentrations is provided in Appendix VII, which depicts concentrations increase along a very gradual slope. EV_RCgw contains the highest CI concentrations measured in groundwater, as summarized in Table RR and should continue to be monitored.

Increasing trends were identified for nitrate-N and dissolved cadmium at EV_MCgwD. Dissolved cadmium at EV_MCgwD is two to four orders of magnitude below the most stringent primary screening standard (CSR AW standard of 4 µg/L for hardness > 210 mg/L). Nitrate-N at EV_MCgwD is two to three orders of magnitude below the most stringent primary screening standard (CSR DW standard of 10 mg/L). Time-series graphs of nitrate-N and dissolved cadmium are provided in Appendix VII, which indicate an increase appears to have occurred between 2017 and 2019. Since Q1 of 2019, concentrations of both nitrate-N and dissolved cadmium have decreased; in Q4 of 2019 the nitrate-N concentration at EV_MCgwD was below the detection limit. Increasing trends for nitrate-N and dissolved cadmium at EV_MCgwD were orders of magnitude below the standard and results from Q2, Q3 and Q4 indicating concentrations are decreasing. Groundwater at EV_MCgwD should continue to be monitored.

There was an increasing trend identified for sulphate at EV_MCgwS; however, sulphate has not been measured above primary screening criteria (highest concentration was 168 mg/L in Q1 of 2019) and the slope of the increasing trend is very gradual, as shown on the time-series graph in Appendix VII. Groundwater at EV_MCgwS should continue to be monitored.

7.3.6.3 Discussion

Source of CI at EV_RCgw

Consistent with previous observations, the highest concentrations of sulphate, nitrate-N and dissolved selenium in 2019 were measured at EV_RCgw, which appear to originate from a groundwater pathway of mine-influenced water and not as a result of surface water infiltration from Bodie or Gate creeks. Concentrations of these constituents at EV_RCgw were higher than at Gate Creek Pond (EV_GT1) and Bodie Creek Pond (EV_BC1), with the exception of a few samples (Figures EV-16, EV-17 and EV-18).

The source of the elevated concentrations at EV_RCgw is currently unknown but could be related to waste rock upgradient of the area or dewatering of Natal Pit. A similar range of CI concentrations were measured in shallow groundwater approximately 70 m up-valley as part of Phase 2 of the Sparwood Area Groundwater Supporting Study (SNC-Lavalin, 2019a); this suggests that the source is farther upgradient (SNC-Lavalin, 2019j). The source of EV_RCgw will be further investigated as part of the 2020 RGMP Update.

Groundwater-Surface Water Interaction near Gate Creek Pond

Downgradient of Gate Creek Pond (EV_GT1) and cross gradient of EV_RCgw are nested wells EV_MW_GT1A/B. Deep nested location EV_MW_GT1A (screened between 62.2 and 63.7 mbgs) does not contain CI above primary screening criteria, while the shallow nested location EV_MW_GT1B (screened between 2.7 and 4.3 mbgs) does. Results from Q1 and Q2 2019 indicated dissolved selenium above standards but concentrations were relatively low (34.3 - 39.6 µg/L) compared to results from Q3 and Q4 (122 – 161 µg/L). Sulphate and nitrate-N also followed a similar trend. CI concentrations from Q3/Q4 of 2019 from EV_MW_GT1B were within range of surface water concentrations at Gate Creek Pond (Figures EV-16, EV-17 and EV-18), above concentrations in Michel Creek and were less than concentrations from EV_RCgw.

Review of data from 2019 indicate the source of elevated CI in shallow groundwater at EV_MW_GT1B is not clear and may receive loading from Gate Creek Pond (based on the shallow installation depth and comparison of CI concentration) as well as seasonal influence from surface water in Michel Creek (diluting groundwater at EV_MW_GT1B; SNC-Lavalin, 2019j) as CI concentrations in Q1 and Q2 were lower compared to Q3 and Q4. Infiltration of surface water to groundwater as a pathway for CI is supported by the downward vertical flow direction in groundwater measured between EV_MW_GT1A/B in 2019. A hydraulic connection was not clear at EV_MW_GT1B (Figure EV-13); however, it is possible shallow groundwater at EV_MW_GT1B receives water from unlined Gate Creek Pond, which could be losing to ground. It is also possible elevated concentrations of CI from groundwater near EV_RCgw contribute to CI concentrations at EV_MW_GT1B. Continued monitoring and sampling from EV_MW_GT1B is required to further assess the source of CI.

Groundwater-Surface Water Interaction near Bodie Creek Pond

Further downgradient are nested wells EV_MW_BC1A/B which contain CI concentrations in 2019 above screening criteria but lower than EV_RCgw and within range of surface water at Gate Creek Pond (EV_GT1) and Bodie Creek Pond (EV_BC1) (Figures EV-16, EV-17 and EV-18). The shallow well EV_MW_BC1B (screened between 3.4 and 4.9 mbgs) contained consistently higher concentrations of sulphate, nitrate-N and dissolved selenium compared to the deep well EV_MW_BC1A (screened between 22.9 and 24.4 mbgs).

The source of elevated sulphate, nitrate-N and dissolved selenium at EV_MW_BC1A/B is not clear but is inferred to originate from infiltrating surface water from Bodie Creek Pond (EV_BC1) and/or potentially groundwater transport from the same source as EV_RCgw. Infiltration of Bodie Creek surface water as a potential source of CI is supported by the hydraulic connection between Bodie Creek Pond and groundwater levels at EV_MW_BC1A/B (Figure EV-13), comparison of CI concentrations as well as the downward vertical flow direction in groundwater measured between EV_MW_BC1A/B in 2019. Continued monitoring and sampling from EV_MW_BC1A/B is required to further assess the source of CI.

Further downgradient at EV_BCgw, 2019 concentrations of sulphate, nitrate-N and dissolved selenium were similar to historical. Dissolved selenium was measured above screening criteria, but trend analysis indicates a decreasing trend. Concentrations of sulphate, nitrate-N and dissolved selenium were higher compared to Michel Creek (EV_MC2; Figures EV-16, EV-17 and EV-18), indicating a groundwater transport pathway. However, as shown in Table RR, concentrations of dissolved selenium at EV_BCgw were lower compared to upgradient groundwater at EV_RCgw, EV_MW_GT1A/B and EV_MW_BC1A/B, suggesting mixing and dilution along the groundwater flow path.

Groundwater-Surface Water Interactions Down-Valley

Further downgradient are nested well pairs EV_MW_MC1A/B and EV_MW_MC2A/B, of which only the shallow well EV_MW_MC2B (screened between 4.8 and 6.9 mbgs) contained dissolved selenium above primary screening criteria. In contrast, the deep nested location EV_MW_MC2A (screened between 51.7 and 53.2 mbgs) and EV_MW_MC1A/B (screened between 25.0 and 26.5 mbgs and 3.34 and 4.9 mbgs, respectively) contained dissolved selenium concentrations below the MDL or marginally above the MDL. Concentrations of EV_MW_MC2B were higher compared to concentrations in Michel Creek (EV_MC2) (Figures EV-16, EV-17 and EV-18) indicating there is a groundwater pathway of CI in this location.

In the Sparwood Area, the only CI concentration measured above screening criteria was dissolved selenium at shallow EV_MW_SPR1C (screened between 3.7 and 5.2 mbgs) in Q1 of 2019. In 2019, groundwater dissolved selenium concentrations at EV_MW_SPR1C were within range of surface water at Spring Creek (EV_SPR2), Aqueduct Creek (EV_AQ6) and Michel Creek (EV_MC2), but appear to follow concentration patterns of EV_MC2 suggesting that the mine-influenced groundwater has attenuated. Vertical gradients between EV_SPR1B/C indicate upward groundwater flow suggesting some of the mixing may be due to dispersion in groundwater; continued monitoring and sampling from EV_MW_SPR1A/B/C is required to further assess the source of CI.

Baldy Ridge

Wells installed at the base of Baldy Ridge (EV_MW_MC4, EV_MW_AQ1 and EV_MW_AQ2) did not contain CI concentrations above primary screening criteria in 2019. Groundwater originates from Baldy Ridge so down-valley flow in Michel Creek is not dominant in this area. Phase 2 of the Sparwood Area Groundwater Supporting Study (SNC-Lavalin 2019a) indicated the main transport pathway of CI from sources from Baldy Ridge to groundwater in the Sparwood Area valley-bottom sediments is through surface water infiltration associated with drainages of Aqueduct and Qualtieri Creeks which contain dissolved selenium concentrations above primary screening criteria. Results from 2019 from EV_MW_AQ1 and EV_MW_AQ2 indicate little influence on the groundwater from surface water infiltration of Aqueduct Creek at EV_MW_AQ1 (i.e., no concentrations of CI above screening criteria), and it is likely similar conditions are present in the Qualtieri Creek based on similar location along the slope and lithology anticipated to be consistent with what was observed at EV_MW_AQ1. Therefore, initial results from 2019 suggest there is no effect from surface water infiltration from Aqueduct Creek; this should be confirmed with additional monitoring.

8 Coal Mountain Operations SSGMP

The CMO SSGMP Update (SRK, 2018c) specifies the monitoring methods, frequencies, locations, and analysis requirements for CMO. These requirements were formulated based on the groundwater CSM, which was developed based on information from previous reports (SRK, 2013, 2014a, 2014b, 2015a, 2015b, 2016a, 2016b; Teck, 2016a, 2017, 2018c). Descriptions of the physical setting, hydrology, geology, mine related features, physical hydrogeology, and chemical hydrogeology are included in the CSM, which is presented in the 2018 SSGMP Update (SRK, 2018c).

The geological context for CMO is also presented in the regional bedrock geology (Drawing 5) and surficial geology (Drawing 3) maps. The local geological context is presented in cross sections (Drawings 47 to 55) and a block diagram (Appendix VI; Figure 12).

CMO entered Care and Maintenance in the second quarter of 2019. Groundwater monitoring in accordance with the 2018 SSGMP Update was not affected by the change in operating status.

8.1 Groundwater Monitoring Locations

Groundwater monitoring was conducted at nine locations in 2019 (Drawing 10). These nine locations include a total of 16 monitoring wells, with nested wells at a subset of the locations (Table TT). Well construction details are included in Table 5a and borehole logs in Appendix IV.

Table TT: CMO – Summary of Groundwater Monitoring Locations and Rationale

Watershed	Well ID	Well Type	Rationale
Corbin Creek Valley	CM_MW6-SH CM_MW6-DP	Monitoring	› Monitor groundwater quality in valley-bottom sediments and bedrock downgradient of Corbin Pond, which receives seepage from East Spoils, 34 Pit and 37 Pit via the Corbin Creek Rock Drain. › Nested well pair provides for measurement of vertical hydraulic gradient and identification of potential sources of water quality in valley-bottom sediments and Corbin Creek.
	CM_MW5-SH CM_MW5-DP	Monitoring	› Monitor groundwater quality in valley-bottom sediments and bedrock downgradient of 14 Pit, CMO spoils in Corbin Creek watershed, and North Ditch. › Nested well pair provides for measurement of vertical hydraulic gradient and identification of potential sources of water quality in valley-bottom sediments and Corbin Creek. › Deployed pressure transducers provide high-resolution temporal characterization of groundwater elevation and hydraulic gradient variability.
	CM_MW9 [A, C]	Monitoring	› Monitor groundwater quality in valley-bottom sediments downgradient of Main Interceptor Sedimentation Ponds.

Table TT (Cont'd): CMO – Summary of Groundwater Monitoring Locations and Rationale

Watershed	Well ID	Well Type	Rationale
Corbin Creek Valley (Cont'd)	CM_MW4-SH CM_MW4-DP	Monitoring	› Monitor groundwater quality in valley bottom (both wells screened in bedrock) downgradient of Main Interceptor Sedimentation Ponds. › Nested well pair provides for measurement of vertical hydraulic gradient.
Michel Creek Valley	CM_MW3-SH CM_MW3-DP	Monitoring	› Monitor groundwater quality and groundwater-surface water interaction in valley-bottom sediments upstream of CMO (reference wells).
	CM_MW7-SH CM_MW7-DP	Monitoring	› Monitor groundwater quality proximal to spoils and 34 Pit in Michel Creek catchment, providing an indication of potential constituent loads travelling to valley bottom through groundwater. › Monitor groundwater levels proximal to 34 Pit.
	CM_MW8	Monitoring	› Monitor groundwater quality proximal to spoils and 37 Pit in Michel Creek catchment, providing an indication of potential constituent loads travelling to valley bottom through groundwater. › Monitor groundwater levels proximal to 37 Pit (water level understood to be controlled by connectivity through bedrock to 34 Pit) to provide an indication of flow directions around the open pit.
	CM_MW2-SH	Monitoring	› Monitor groundwater quality in valley-bottom sediments downgradient of spoils and open pits within Michel Creek catchment and West Ditch. › Monitor groundwater levels in valley-bottom sediments to provide indication of groundwater-surface water interaction along segment of Michel Creek adjacent to CMO.
	CM_MW10 [A]	Monitoring	› Monitor groundwater quality downgradient of Middle Mountain CCR along flow pathways expected to report to valley-bottom sediments along Michel Creek.
	CM_MW1-OB [B] CM_MW1-SH [B] CM_MW1-DP [B]	Monitoring	› Monitor groundwater in regional receiving environment downgradient of CMO. › Well nest includes three screens, providing an indication of the potential vertical transport pathways affecting the groundwater as well as groundwater-surface water interaction with Michel Creek.

Notes:
[A] New installations 2019.
[B] Monitoring at these wells is also conducted under the RGMP (Study Area 11).
[C] Monitoring at CM_MW9 is planned to commence in 2020 following completion of well development.

8.2 Program Modifications

New monitoring wells were installed at two locations in 2019: CM_MW9 and CM_MW10. These wells were installed in accordance with the recommendations in the 2018 CMO SSGMP Update. Sampling commenced at CM_MW10 in Q4 of 2019. Completion of well development at CM_MW9 is planned for Q2 2020, when water levels will be shallower and the water column in the standpipe adequately long to conduct development.

Water level measurements and sampling were conducted at all other monitoring wells included in the SSGMP Update during each quarter in 2019 (Table UU).

Table UU: CMO – Summary of Program Modifications

#	Well ID	Q[a]	Modification	Reason
1	CM_MW9	3-4	Well installed, sampling to be initiated Q2 2020.	Installation in accordance with SSGMP Update. Well development underway up to end of 2019.
2	CM_MW10	3-4	Well installed, sampling initiated Q4.	Installation in accordance with SSGMP Update.

[a] Q denotes Quarter (Q1, Q2, Q3, Q4).

8.3 Results and Discussion

Results and discussion are organized based on the two watersheds that receive water from CMO: Corbin Creek and Michel Creek. The 2019 results are presented in the geological context in a cross section (Drawing 47) and Block Diagram (Appendix VI; Figure 12). Drawings 56 to 59 provide a summary of 2019 CI concentrations. Figures CM-1 to CM16 present precipitation, water level and chemistry data for discussion purposes.

8.3.1 Climate

Climate data was provided by Teck for the Andy Goode meteorological station, located in the rail loop area at CMO. The precipitation data (Figure CM-1) indicate that 2019 was a typical year in terms of total precipitation relative to the period for-which groundwater monitoring has been conducted at CMO (2015-2019). Total precipitation was 681 mm in 2019, while the range over the last five years has been 571 to 791 mm. The 2018-2019 winter was unusually dry, with 291 mm water equivalent recorded between October 2018 and March 2019 (426 to 464 mm previous three years). Summer 2019 was unusually wet, with 372 mm recorded between April and September 2019 (201 to 292 mm previous four years).

8.3.2 Hydrology

CMO is within the Corbin Creek and Michel Creek watersheds (Drawing 10). Corbin Creek drains from the mountainous terrain to the east of CMO and flows northward along the valley bottom directly to the east of CMO. Michel Creek drains from mountainous terrain to the south and west of CMO and flows northward along the valley bottom directly to the west of CMO. Corbin Creek drains into Michel Creek within CMO, between the mine and rail loop.

Corbin Creek flows through a rock drain where it passes beneath the CMO East Spoils. Pengelly Creek, a tributary of Corbin Creek, also flows through a rock drain as it approaches CMO from the east. Both rock drains flow into Corbin Pond, and Corbin Creek continues flowing to the north from the pond outflow.

Runoff within CMO reports to a series of ditches. These ditches convey the collected flow to the Main Interceptor Sedimentation Ponds. Outflow from the Main Interceptor Sedimentation ponds reports to Corbin Creek a few hundred metres above the confluence with Michel Creek.

Surface water levels and water quality data were incorporated into the interpretation of groundwater data, in accordance with the 2018 CMO SSGMP Update (SRK, 2018c). The incorporated surface water stations are as follows.

› CM_CCPD (Corbin Creek at outflow or Corbin Pond, Figures CM-3, CM-5, CM-7, CM-9).

› CM_CC1 (Corbin Creek near confluence with Michel Creek, Figures CM-2, CM-4, CM-6, CM-8).

› CM_MC1 (Michel Creek adjacent to CM_MW3, upstream of CMO, Figures CM-11, CM-13, CM-15, CM-17).

› CM_MC2 (Michel Creek downstream of CMO and RGMP Study Area 11, Figures CM-12, CM-14, CM-16).

Hydrographs at all four of these stations reflect a typical response for the regional precipitation seasonality. Peak flows occur in late spring (freshet). Secondary peaks frequently occur in the fall in association with elevated rainfall. Low flows occur in the winter when precipitation is largely stored in the snowpack. The 2019 hydrographs follow the typical trend observed in previous years.

The 2018 CMO SSGMP Update (SRK, 2018c) specified the introduction of four additional surface water monitoring stations along Michel Creek (CM_MC4, CM_MC5, CM_MC6 and CM_MC7). These four monitoring stations are adjacent to CMO and were added to the program to serve detection of CI load accretion associated with potential groundwater transport pathways from CMO spoils.

8.3.3 Corbin Creek Watershed

8.3.3.1 Groundwater Elevations

The groundwater elevation results in the Corbin Creek watershed are grouped into two areas for discussion: the lower Corbin Creek Valley and Corbin Pond. The lower Corbin Creek Valley includes monitoring wells in the section of the watershed between the Process Plant and the Confluence with Michel Creek. Corbin Pond includes monitoring wells directly downgradient of the pond and serving to monitor for seepage from the pond. All measurements and calculated vertical hydraulic gradients are presented in Table 5b.

Groundwater elevations in lower Corbin Creek were measured at CM_MW5-SH and CM_MW5-DP (Figure CM-2). Pressure transducers suspended in these two wells recorded groundwater levels at six-hour intervals. The pressure transducer data were compensated for atmospheric pressure variability using a barometric data logger deployed above the water column at CM_MW5-DP. Seasonal variability at these wells followed a similar pattern in 2019 as previous (2015 to 2018). The pressure transducers indicate groundwater level hydrographs followed the same pattern as the surface water. Annual high-water levels occurred during the spring (April to July) corresponding with freshet, and annual lows during the winter (December to February). The annual range of groundwater levels was approximately 3 m for both wells in 2019, which is similar to previous years. The vertical hydraulic gradient between the two wells was 0.05 to 0.06 (downward) in 2019 (Table 5b), consistent with previous measurements (e.g., mean of 0.052 downward reported for 2018 measurements).

Groundwater elevations below Corbin Pond were measured at CM_MW6-SH and CM_MW6-DP (Figure CM-3). Seasonal variability at these wells also followed a similar pattern in 2019 as previous, with the highest levels measured during the spring (Q2) and lowest during the winter (Q1). Groundwater elevations at CM_MW6-DP have varied in a range approximately one metre lower in 2018 and 2019 (ranging 1575.36 m to 1576.95 m) than 2016 and 2017 (1576.58 m to 1578.43 m). Groundwater elevations at both wells were similar in 2018 and 2019. The vertical hydraulic gradient between CM_MW6-SH and DP was 0.09 to 0.12 (upwards) in 2019, similar to previous measurements (e.g., mean of 0.122 upward reported for 2018 measurements).

Monitoring wells CM_MW4-SH and CM_MW4-DP were flowing artesian when visited during each quarter for groundwater sampling in 2019.

Occasional water elevation drops have been recorded in the pressure transducer data for CM_MW5-SH and CM_MW5-DP. These drops are characterized by sudden step-wise one to two metre declines in groundwater level followed by recovery over a period lasting hours to days, and occur more frequently for CM_MW5-DP. These drops do not appear in the barometric data (used for compensation) and do not appear to be associated with instrument malfunctions. A 23 m deep groundwater supply well supports a light vehicle washing station approximately 100 m to the north of CM_MW5-SH/DP, across Corbin Creek. Flow meter logs have been used to estimate a mean annual pumping rate of 6.4 m^3/day. The facility recycles water and the well is pumped as needed to fill holding tanks, and therefore the flow rate while pumping would be greater than the annual daily mean. CM_MW5-DP is screened at 23.8 to 26.9 m, which is similar to the wash station supply well. Given the proximity of this supply well it is possible the drops observed in the pressure transducer data are a result of drawdown in response to pumping.

Q4 groundwater elevation measurements are presented spatially on Drawing 12. Potentiometric contours could not be inferred with the distances and elevation differences between monitoring wells. Interpreted groundwater flow vectors have been included.

In general, the groundwater elevations in the Corbin Creek Valley in 2019 were within historical ranges. The interpretations in the CSM (SRK, 2018c) regarding flow directions in the Corbin Creek Valley remain valid. Groundwater flows from high elevation areas to valley bottoms, and along valley bottoms approximately aligned with stream flow directions.

8.3.3.2 Groundwater Quality

Concentrations of CI are presented spatially on Drawings 56 (nitrate), 57 (sulphate), 58 (dissolved cadmium), and 59 (dissolved selenium).

Concentrations of CI in the Corbin Creek Valley were below primary and secondary screening criteria at all monitoring wells except for the Q1 sample collected from CM_MW5-SH (Table VV). No selenium concentrations exceeded the secondary screening criterion (19 µg/L for CP E258937), nor the guideline for GCDWQ (50 µg/L).

SNC·LAVALIN

Table VV: CMO – Summary of CI Compared to Primary Groundwater 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
CM_MW6-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW6-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW5-SH	-	-	-	-	**595**	-	-	-	-	-	-	-	13.3	-	-	-
CM_MW5-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW4-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW4-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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 applied 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 located within 10 m of surface water and results are compared to BCWQG for AW.
[2] '–' denotes result below 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.
'NS' denotes no sample.

Seven non-order constituents had concentrations exceeding one or more CSR standard at one or more monitoring wells in 2019: chloride, fluoride, dissolved barium, dissolved lithium, dissolved manganese, dissolved molybdenum, and dissolved sodium (Tables 5d and 5e). These exceedances are inferred to be naturally occurring. Appendix II of SNC-Lavalin (2017c) documents a study examining the potential for non-order constituents to exceed primary screening criteria in natural (background) groundwater in the Elk Valley. The lines of evidence used to assess the likelihood of the non-order constituent exceedances in the Corbin Creek Valley to be naturally occurring were aligned with those documented in the study, and are listed below.

- Concentrations are above primary screening criteria at CM_MW3-SH or CM_MW3-DP (reference wells upgradient of CMO).
- Concentrations are non-trending as indicated by visual inspection of the timeseries data.
- Non-order constituents exceeded primary screening criteria in a monitoring well that had non-exceedance for all CI.

- Concentration of non-order constituent at the monitoring well with primary screening criteria exceedance is on the same order of magnitude as concentrations at CM_MW3-SH or CM_MW3-DP (reference wells).

Mann-Kendall trend analysis indicates the concentration of selenium at CM_MW5-SH has been increasing over the five-year period of record (Table WW). Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Concentrations of all other CI have been non-trending or decreasing. Time series of nitrate, sulphate, and dissolved selenium concentrations are presented in Figures CM-4 to CM-9. Complete Mann-Kendall analyses are presented in Appendix VII.

Table WW: CMO – Summary of Mann-Kendall Trend Analysis for CI in the Corbin Creek Watershed

Parameter[1,2] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
CM_MW6-DP	No Trend	No Trend	-	No Trend
CM_MW6-SH	-	Decreasing	-	Stable
CM_MW5-DP	Decreasing	Decreasing	-	Decreasing
CM_MW5-SH	Decreasing	**No Trend**	Stable	**Increasing**
CM_MW4-DP	Stable	-	-	-
CM_MW4-SH	-	-	-	-

Notes:
1 Where CI were measured above primary screening criteria in 2019, the trend result is bold. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold**.
"-" Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

8.3.3.3 Discussion

Discussion for the Corbin Creek valley is focused on the one monitoring well where increasing trends and concentrations of CI above screening criteria were identified in 2019 (CM_MW5-SH). Sulphate and dissolved selenium concentrations exceeded the CSR DW Standard at CM_MW5-SH in Q1 2019. The Mann-Kendall analysis indicated the selenium concentration at CM_MW5-SH has been increasing over the five-year period of record, while the concentration of sulphate has had no trend.

The dissolved selenium trend appears to be characterized by a rapid increase in late 2017 followed by stabilization (Figure CM-4). Concentrations were similar in 2019 (6.75 to 13.3 µg/L) and over the previous five sampling events (6.55 to 13.2 µg/L between Q4 2017 and Q4 2018 inclusive), and lower prior to Q4 2017 (4.45 to 9.22 µg/L).

Monitoring results that provide insight to the source of the sulphate and dissolved selenium at CM_MW5-SH include the following.

- The concentrations in Corbin Creek at CM_CC1 (900 m down-valley of CM_MW5-SH/DP, Figures CM-4 and CM-6) and CM_CCPD (Corbin Pond outflow approximately 1.2 km up-valley, Figures CM-5 and CM-7) have consistently been greater than CM_MW5-SH.

- The concentrations at CM_MW5-DP (screened in bedrock 15 m deeper than CM_MW5-SH) are approximately one order of magnitude lower than CM_MW5-SH (screened in gravel).
- Concentrations at CM_MW6-SH and DP (both screened in bedrock up-valley of CM_MW5-SH) have consistently both been more than one order of magnitude lower than CM_MW5-SH.
- Concentrations at CM_MW5-SH vary seasonally approximately in alignment with Corbin Creek.
- The vertical hydraulic gradient between CM_MW5-SH and CM_MW5-DP is downward (0.05 to 0.06).

These monitoring results suggest the potential sources of sulphate and dissolved selenium at CM_MW5-SH are infiltration into the aquifer from Corbin Creek followed by down-valley flow in the valley-bottom sediments. The concentration of dissolved selenium in Corbin Creek (Figures CM-4 and CM-5) appears to align with concentrations measured at CM-MW5-SH. Given the stability of these selenium concentrations at CM_MW5-SH over 2018 to 2019, no further investigation is recommended.

8.3.4 Michel Creek Watershed

8.3.4.1 Groundwater Elevations

Groundwater elevation results in the Michel Creek watershed are grouped into three areas for discussion: monitoring wells within the CMO mine footprint, Michel Creek valley bottom above the confluence with Corbin Creek, and Michel Creek Valley bottom below the confluence with Corbin Creek. The monitoring wells in the Michel Creek watershed below the confluence with Corbin Creek also serve as the monitoring locations for RGMP Study Area 11. All measurements and calculated vertical hydraulic gradients are presented in Table 5b.

Groundwater elevations within the CMO mine footprint were measured at CM_MW7-SH/DP and CM_MW8 (Figure CM-10). Groundwater elevations at these wells in 2019 were within the range of measurements over the five-year period of record. The vertical hydraulic gradient between CM_MW7-SH and DP was 0.005 to 0.007 (upward) in 2019, which is similar to previous measurements (e.g., mean of 0.007 upward for 2018 measurements).

Groundwater elevations in the Michel Creek Valley bottom above the confluence with Corbin Creek were measured at CM_MW3-SH/DP and CM_MW2-SH (Figure CM-11). Groundwater elevations at these wells were within the range of measurements over the five-year period of record. The vertical hydraulic gradient between CM_MW3-SH and DP was 0.02 to 0.03 (upwards) in 2019, which is consistent with previous measurements (e.g., mean of 0.035 upward for 2018 measurements).

Groundwater elevations in the Michel Creek Valley bottom below Corbin Creek were measured at well nest CM_MW1-OB/SH/DP (Figure CM-12). The groundwater elevations followed the previously characterized trend of seasonal variability and were within the range established over the period of record. The vertical hydraulic gradient measured between the deepest (CM_MW1-DP) and middle (CM_MW1-SH) well ranged 0.04 to 0.05 (upward) in 2019, which is similar to previous measurements (e.g., mean of 0.037 in 2018). The vertical hydraulic gradient between the middle and shallowest well (CM_MW1-OB) was 0.05 (downwards) for all four measurements in 2019, which is consistent with the previous measurements (e.g., mean of 0.050 downwards for 2018 measurements).

One groundwater level measurement was recorded for new monitoring well CM_MW10 in 2019 (1523.67 masl). Q4 groundwater elevation measurements are presented spatially on Drawing 12. Potentiometric contours could not be inferred with the distances and elevation differences between monitoring wells. Interpreted groundwater flow vectors have been included.

In general, the groundwater elevations in the Michel Creek valley were unchanged in 2019 relative to previous. The interpretations in the CSM (SRK, 2018c) regarding flow directions in the Michel Creek Valley remain valid. Groundwater flows from high elevation areas to valley bottoms, and along valley bottoms approximately aligned with stream flow directions.

8.3.4.2 Groundwater Quality

Concentrations of CI are presented spatially on Drawings 56 (nitrate), 57 (sulphate), 58 (dissolved cadmium), and 59 (dissolved selenium).

Concentrations of CI in the Michel Creek Valley were below primary and secondary screening criteria at all monitoring wells except CM_MW7-DP (Table XX). No selenium concentrations exceeded the secondary screening criterion (19 µg/L for CP E258937), nor the guideline for GCDWQ (50 µg/L).

SNC • LAVALIN

Table XX: CMO – Summary of Cl Compared to Primary Groundwater Screening Criteria in the Michel Creek Watershed

Parameter[1,2,] / 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
CM_MW3-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW3-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW7-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW7-DP	-	-	-	-	1,010	1,190	1,170	1,150	-	-	-	-	-	17.8	14.2	10.4
CM_MW8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW2-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW1-OB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW1-SH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CM_MW1-DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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 applied are CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)*
[2] '–' denotes result below 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. 'NS' denotes no sample.

Eight non-order constituents had concentrations exceeding one or more CSR standard at one or more monitoring wells in 2019: chloride, dissolved barium, dissolved boron, dissolved lithium, dissolved manganese, dissolved molybdenum, dissolved sodium, and dissolved strontium (Tables 5d and 5e). These exceedances are inferred to be naturally occurring. Rationale for these determinations are as discussed for the Corbin Creek Valley (Section8.3.3.2).

Mann-Kendall trend analysis indicates the concentration of dissolved selenium at CM_MW7-DP has been increasing over the five-year period of record (Table YY), occurring in alignment with exceedance of the CSR DW standard. Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Increasing trends were also identified for sulphate and dissolved cadmium at CM_MW1-OB and sulphate at CM_MW3-SH. Concentrations of all other CI have been non-trending or decreasing. Timeseries of nitrate, sulphate, and dissolved selenium concentrations are presented in Figures CM-13 to CM-17. Complete Mann-Kendall analyses are presented in Appendix VII. Increasing trends are discussed further in Section 8.3.4.3.

Table YY: CMO – Summary of Mann-Kendall Trend Analysis for CI in the Michel Creek Watershed

Parameter[1,2] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
CM_MW3-DP	-	-	-	-
CM_MW3-SH	No Trend	Increasing	Stable	No Trend
CM_MW8	No Trend	Decreasing	Decreasing	-
CM_MW7-DP	Decreasing	**No Trend**	No Trend	**Increasing**
CM_MW7-SH	Decreasing	Probably Decreasing	Decreasing	-
CM_MW2-SH	-	No Trend	-	No Trend
CM_MW1-DP	No Trend	Decreasing	Decreasing	Decreasing
CM_MW1-OB	Decreasing	Increasing	Increasing	Stable
CM_MW1-SH	-	Decreasing	No Trend	Decreasing

Notes:

1 Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold.**

"-"Denotes trend analysis was not completed as concentrations of parameter have consistently been less than, or marginally greater than, the detection limit.

8.3.4.3 Discussion

The groundwater results for the Michel Creek watershed are grouped into three areas for discussion.

- The West Spoils and Pits, for monitoring wells within the footprint of CMO.
- Michell Creek Valley bottom above the confluence with Corbin Creek, directly down-gradient of the West Spoils and Pits.
- Michell Creek Valley bottom below the confluence with Corbin Creek, corresponding with RGMP Study Area 11.

The discussion is focussed on monitoring wells where CI concentrations exceeded screening criteria in 2019, and where the Mann-Kendall trend analysis indicated increasing trends.

West Spoils and Pits

Monitoring Wells CM_MW7-SH/DP and CM_MW8 are screened in fractured bedrock directly beneath the West Spoils (Drawing 10). Concentrations of CI at CM_MW7-DP were elevated relative to valley-bottom monitoring wells in the Michel Creek Valley, while concentrations were similar to the valley-bottom wells at CM_MW7-SH and CM_MW8. Concentrations of all CI were also assessed to be decreasing or non-trending at CM_MW7-SH and CM_MW8.

Nitrate-N concentrations at CM_MW7-DP have historically approached the CSR DW standard (Figure CM-17). The Mann-Kendall analysis indicates a decreasing trend, and the gap between the CSR DW standard and concentrations was greater in 2019 than previously (concentrations of 1.93 to 5.11 mg/L in 2019 vs. standard of 10 mg/L).

Sulphate concentrations at CM_MW7-DP were assessed to be non-trending by Mann-Kendall analysis. Concentrations measured in 2019 were within the range measured previously.

Dissolved selenium concentrations have increased over the period of record at CM_MW7-DP. Concentrations in Q2-Q4 2019 were the first three exceedances of the CSR DW standard. The mean concentration over the four consecutive quarters in 2019 was 11.8 µg/L. The mean concentration over the four consecutive quarters between Q3 2016 and Q2 2017 (earliest four consecutive quarters with samples) was 2.1 µg/L.

Dissolved selenium concentrations at CM_MW7-SH have been two to three orders of magnitude lower than CM_MW7-DP for the last three years (near or below the analytical detection limit of 0.05 µg/L), suggesting distinct flow pathways intersected by the two well screens. Sulphate concentrations at CM_MW7-SH have usually been below primary screening criteria, but greater than the reference wells (CM_MW3-SH and CM_MW3-DP), suggesting contact with oxidizing spoils. CM_MW7-SH may be screened along a flow pathway with less contact with spoils than CM_MW7-DP. The elevated sulphate and dissolved selenium concentrations at CM_MW7-DP indicate seepage of water into the fractured bedrock following contact with the CMO spoils. Groundwater sampled at CM_MW7-DP is expected to report to either the West Ditch (500 m to the west) or the Michel Creek valley-bottom sediments (800 m to the west).

Surface water stations CM_MC4, CM_MC5, CM_MC6 and CM_MC7 were introduced in Q4 2018 to serve detection of potential loading of CI to Michel Creek from groundwater (Figures CM-18, CM-19, CM-20 and CM-21). Concentrations of sulphate and selenium increase down-stream in Michel Creek, with some seasonal fluctuation. However, concentrations of all CI in Michel Creek above the confluence with Corbin Creek have been below BCWQG since sampling began in Q4 2018. The concentration profile along Michel Creek above the confluence with Corbin Creek will be the subject of a load accretion study in 2020.

Michel Creek Valley Bottom above Confluence with Corbin Creek

The Mann-Kendall analysis identified an increasing trend for sulphate at CM_MW3-SH; however, inspection of the timeseries data (Figure CM-15) indicates this trend is characterized by small year-over-year increases in concentrations in 2018 and 2019 that may be attributable to natural variability. The annual concentration ranges for sulphate at CM_MW3-SH are as follows:

- 13.4 to 14.8 mg/L in 2016.
- 12.5 to 15.4 mg/L in 2017.
- 14.8 to 15.9 mg/L in 2018.
- 15.8 to 17.7 mg/L in 2019.

CM_MW3-SH is located upgradient of CMO in the Michel Creek Valley, and therefore effects resulting from mining activity are not expected at this location.

Michel Creek Valley Bottom below Confluence with Corbin Creek

The primary sources of Cl at CM_MW1-OB are inferred to be mixing with surface water and down-valley flow in the valley-bottom aquifer, as discussed in the 2017 RGMP Update (SNC-Lavalin 2017). Monitoring results informing this inference include the following.

- The vertical hydraulic gradient between CM_MW1-OB (shallowest well) and CM_MW1-SH (middle depth well) is downwards (0.05).
- Concentrations of Cl are greater in CM_MW1-OB than the two deeper wells.
- The sand and gravel sediments underlying Michel Creek are thin (3.3 m at CM_MW1) and underlain by a thick layer of clay (13 m at CM_MW1) in contact with bedrock.

The Mann-Kendal trend analysis for sulphate at CM_MW1-OB appears to capture a modest year-over-year increase aligned with the surface water (Figure CM-16), although concentrations in 2019 (283 to 310 mg/L) were within the range measured in 2018 (264 to 322 mg/L). Concentrations remained below primary screening criteria in 2019.

The Mann-Kendall analysis identified an increasing trend for dissolved cadmium; however, this trend appears to be isolated to the 2018 and 2019 data. The concentrations measured in 2018 and 2019 (ranging 0.0569 to 0.0821 µg/L) were within the previously measured range (0.0474 to 0.122 µg/L for 2015 to 2019). The lowest primary screening criterion for dissolved cadmium is 0.5 µg/L (CSR AW), and concentrations at CM_MW1-OB have consistently been around half an order of magnitude lower.

Dissolved cadmium concentrations at CM_MW1-OB have generally been higher than CM_MC2 (Figure CM-22), suggesting a transport pathway within the sand and gravel sediments rather than infiltration from the creek. Concentrations at CM_MW2-SH (0.123 to 0.127 µg/L) were greater than CM_MW1-OB (0.0611 to 0.0833 µg/L) in 2019. Concentrations at new monitoring wells CM_MW9 and CM_MW10 may also be informative in refining the transport pathway once complete annual datasets are available.

9 Regional Groundwater Monitoring Program

The five SSGMPs focus on identifying and monitoring potential sources of mine-related constituents and transport pathways to groundwater in the valley bottom of the main stem rivers. The RGMP focuses on groundwater fate and transport in the valley bottom of the main stem rivers, and how it relates to applicable receptors. The RGMP includes monitoring conducted under the RDW in addition to the monitoring conducted under the five SSGMPs.

The basis for the RGMP is the regional groundwater CSM, most recently presented in the 2017 RGMP Update (SNC-Lavalin, 2017c). The regional CSM identified 12 areas (referred to as “Study Areas”) where groundwater monitoring may be required to understand potential groundwater transport of mining-related CI in the main stem valley-bottom sediments. The 2019 RGMP monitoring results are presented for each of the 12 Study Areas in Sections 9.3.2 to 9.3.12. Among the 38 monitoring wells in the RGMP, four are not within the mine-permitted areas and are sampled as part of the RDW (Table 6a). Where there is overlap between monitoring results for an SSGMP and an RGMP Study Area, the results are presented in the SSGMP section and summarized in the Study Area section. The Study Area outlines are shown on Drawings 2 to 5.

9.1 Groundwater Monitoring Locations

The 2019 groundwater monitoring locations were sampled in accordance with the approved RGMP Update (SNC-Lavalin, 2017c). The groundwater monitoring program consists of 38 wells. The wells are listed in Table ZZ along with the associated rationale. A summary of potential sources of CI (nitrate-N, sulphate, dissolved cadmium, and dissolved selenium) and possible transport pathways to groundwater are identified in the RGMP Update (SNC-Lavalin, 2017c). Monitoring well locations are shown on Drawings 6 to 10 and on Block Diagrams in Appendix VI – Figures 2 to 12. Construction details for monitoring wells sampled under the RDW (monitoring wells not included in one of the five SSGMPs) are included in Table 6a.

Table ZZ: RGMP – Groundwater Monitoring Locations

Descriptor	Monitoring Wells	Well Information
Background	FR_HMW5	› Monitor reference groundwater conditions upgradient of mining impacts in Henretta Valley bottom.
	CM_MW3-SH/DP	› Monitor reference groundwater conditions upgradient of CMO in Michel valley bottom.
Study Area 1 Links to FRO SSGMP and GHO SSGMP (Porter Creek)	FR_09-01-A FR_09-01-B	› Monitor groundwater quality in valley-bottom sediments downgradient of the South Tailings Pond and South Kilmarnock Settling Ponds. › Monitor mine impact at the southern extent of the mine-permitted area. › Monitor additional inputs to Fording River valley-bottom sediments downgradient of the South Tailings Pond.

SNC·LAVALIN

Table ZZ (Cont'd): RGMP – Groundwater Monitoring Locations

Descriptor	Monitoring Wells	Well Information
Study Area 1 (Cont'd) Links to FRO SSGMP and GHO SSGMP (Porter Creek)	FR_GH_WELL4[2]	› Monitor mine-influenced groundwater downgradient of the FRO mining operations.
	GH_MW-PC	› Monitor groundwater quality and surface water infiltration near the Porter Pond associated with historical waste spoils in the Porter Creek drainage.
Study Area 2 Links to LCO SSGMP (Dry Creek Watershed)	LC_PIZDC1307 LC_PIZDC1308	› Multi-level overburden sentry wells upgradient of Study Area 2 in the LCO Dry Creek valley bottom. › monitor potential influence of planned upland and tributary valley-bottom development at LCO Phase II.
Study Area 3 Links to GHO SSGMP (Greenhills Creek Watershed)	GH_POTW09 GH_POTW10[a] GH_POTW15[a]	› Supply well located in the Fording River valley-bottom aquifer near the rail loop area. › Monitors groundwater quality relating to surface water infiltration from Greenhills Creek to the valley bottom.
	GH_POTW17	› Supply well located in the Greenhills Creek alluvial fan. › Monitors groundwater quality relating to surface water infiltration from Greenhills Creek to the valley bottom.
	GH_MW-RLP-1D	› Monitor groundwater quality in the vicinity of the clean coal and dryer buildings/ponds and the rail loop/load out area.
Study Area 4 Links to GHO SSGMP (Elk River Valley Watershed)	GH_GA-MW-4 GH_GA-MW-2 GH_GA-MW-3	› Monitor groundwater in the valley-bottom associated with waste spoils in Leask, Wolfram, and Thompson Creek drainages and ponds at the base of each drainage system. › Monitor the groundwater system to evaluate connectivity to surface water and shallow groundwater.
	GH_MW-ERSC-1	› Monitor groundwater quality in the Elk River valley-bottom sediments downgradient of GHO. › Monitor surface water infiltration from the Elk River side channel.
	RG_DW-01-03 [a]	› Located 5 km downgradient of Study Area 4. › Monitor groundwater within Elk River valley bottom sediment downgradient of Study Area 4.
	RG_DW-01-07 [a]	› Located 15 km downgradient of Study Area 4. › Monitor groundwater within the Elk River valley bottom downgradient of Study Area 4.
Study Area 5/6 Links to LCO SSGMP (Line Creek Watershed)	LC_PIZP1101	› Located southwest of the effluent ponds at the LCO Process Plant Site, upgradient of Study Area 6. › Monitor potential influence from the LCO Process Plant Site on the Elk River valley bottom in Study Area 6.

SNC·LAVALIN

Table ZZ (Cont'd): RGMP – Groundwater Monitoring Locations

Descriptor	Monitoring Wells	Well Information
Study Area 7 Links to EVO SSGMP (Grave Creek/Harmer Creek Watershed)	EV_GV3gw	› The nearest upgradient well of Study Area 7, within the Grave Creek valley bottom. › Monitor upland and tributary valley-bottom input from drainages to the northeast of EVO.
	RG_DW-02-20 [a]	› Located 4 km downgradient of Study Area 6. › Monitor groundwater in the Elk River valley bottom in Study Area 7.
Study Area 8 Links to EVO SSGMP (Elk River Watershed)	EV_LSgw	› Located near the discharge of Lindsay Creek to the Elk River. › Monitor potential inputs to Study Area 8 from upland, tributary valley bottom, and Elk River valley-bottom features along the western slope of EVO.
	EV_OCgw	› Located immediately downgradient of Lagoon D and adjacent to Otto Creek. › Monitor potential inputs to Study Area 8 from upland, tributary valley bottom, and Elk River valley-bottom features along the western slope of EVO.
Study Area 9 Links to EVO SSGMP (Michel Creek Watershed)	EV_BCgw	› Located downgradient of the confluence of Bodie Creek and Michel Creek. › Monitor spatial distribution of water quality within Michel Creek valley-bottom sediment in relation to potential inputs in Study Area 9.
	EV_MCgwS EV_MCgwD	› Located 1.8 km upgradient of the confluence of Michel Creek and the Elk River. › Monitor spatial distribution of water quality within Michel Creek valley-bottom sediments in relation to potential inputs in Study Area 9.
	EV_BRgw EV_RCgw EV_WH50gw	› Located Michel Creek valley bottom upgradient and downgradient of Gate Creek and Bodie Creek confluence with Michel Creek. › Monitor spatial variation in groundwater quality within Michel Creek valley bottom in relation to Study Area 9.
	RG_DW-03-01 [a]	› Located 1.2 km upgradient of the confluence of Michel Creek and the Elk River. › Monitor groundwater within Elk River valley-bottom sediment downgradient from Study Area 9.
Study Area 10 Links to EVO SSGMP (Erickson Creek Watershed)	EV_ECgw	› Nearest upgradient well of Study Area 10, within Erickson Creek valley bottom. › Monitor potential influence of upland and tributary valley-bottom groundwater from the southwest portion of EVO to Study Area 10.

Table ZZ (Cont'd): RGMP – Groundwater Monitoring Locations

Descriptor	Monitoring Wells	Well Information
Study Area 11 Links to CMO SSGMP (Michel Creek Watershed)	CM_MW1-OB CM_MW1-SH CM_MW1-DP	› Multi-level sentry well immediately downgradient of CMO and the confluence of Michel Creek and Corbin Creek. › Selected to monitor groundwater in the Michel Creek valley bottom in Study Area 11.
Study Area 12 Links to EVO SSGMP (Elk River Watershed) and downstream of all Elk Valley operations	EV_ER1gwS EV_ER1gwD	› Located adjacent to the Elk River, 1 km downgradient of the confluence with Michel Creek. › Multi-level sentry well to monitor groundwater in Elk River valley-bottom sediment in Study Area 12.
	RG_DW-03-04 [a]	› Located near the border of MU4 and MU5 in the Elk River valley bottom. › Monitor deep overburden groundwater in the Elk River valley bottom at the southern extent of Study Area 12.

[a] identifies monitoring wells included in the RGMP and not included in one of the five SSGMPs

9.2 Program Modifications

Groundwater levels were monitored, and groundwater samples collected at each location included in the RGMP for each quarter. Exceptions to the 2019 RGMP are in Table AAA.

Table AAA: RGMP – Summary of Program Modifications

Study Area(s)	Well ID	Q[a]	Modification	Explanation
Background	FR_HMW5	1	Unable to sample well.	Water frozen in well.
9	RG_DW-03-01	4	Private well not serviceable.	Sample could not be collected.

Notes:
[a] Q denotes Quarter (Q1, Q2, Q3, Q4).

9.3 Results and Discussion

9.3.1 Background (Reference Conditions)

Background well FR_HMW5 is monitored to understand reference conditions in the Henretta Creek valley bottom upgradient of the FRO permitted mine boundary. It is completed in fluvial and/or alluvial sediment. Cl concentrations in this well have increased in recent years and the suitability of this background well has been re-assessed. It was recommended to continue monitoring groundwater quality in this well with plans to replace the well in 2020 as part of the RGMP.

Nested monitoring wells, CM_MW3-SH/DP, were installed upgradient of CMO in the Michel Creek Valley to assess groundwater quality in the overburden and shallow bedrock. These wells are upstream of mining activities and representative of background groundwater conditions in this area.

9.3.1.1 Groundwater Elevations

Summaries of groundwater elevations in FR_HMW5 and CM_MW3-SH/DP, can be referenced in Sections 4.3.2.1 and 8.3.4.1, respectively.

9.3.1.2 Groundwater Quality

Summaries of results above primary screening criteria for FR_HMW5 and CM_MW3-SH/DP are in Sections 4.3.2.2 and 8.3.4.2, respectively.

9.3.1.3 Discussion

Groundwater quality results for CI for reference wells FR_HMW5, CM_MW3-SH, and CM_MW3-DP were below the primary screening criteria for each quarter in 2019. Dissolved selenium concentrations in FR_HMW5 were consistently higher each quarter in 2019 than in the same quarter in 2018 (except for Q1 when the water in the well was frozen in both years). Mann-Kendall analyses indicate an increasing trend for dissolved selenium and sulphate, which reflects observations in time-series graphs (Figures FR-4 and FR-5). Reference well FR_HMW5 is scheduled to be replaced as a reference well in 2020. Mann-Kendall analyses in CM_MW3-SH identified an increasing trend for sulphate; however, although increasing, time-series data shows small incremental increases year to year that remain below the primary screening criteria (Figure CM-15). These are probably attributed to natural variability as CM_MW3-SH is upgradient of CMO in the Michel Creek Valley and therefore effects from mining are not expected at this location. Increasing sulphate concentrations at this location will continue to be monitored and trends will be reassessed on an ongoing annual basis.

9.3.2 Study Area 1: Fording River Valley Bottom Downgradient of Fording River Operations, Cataract and Porter Creeks

This area was identified because it is the focal point for most upland and tributary valley groundwater flow to the Fording River valley bottom near the FRO and GHO mine-permitted boundaries (Drawing 6; Block Diagrams Figures 2 and 3 in Appendix VI). It is the primary off-site migration pathway from FRO. Study Area 1 is downgradient of the STP, South Kilmarnock Settling Ponds, Kilmarnock Creek, Swift Creek, Cataract Creek, and Porter Creek watersheds.

The Fording River floodplain south of the STP and near the Kilmarnock Settling Ponds consists of glaciofluvial and fluvial deposits of medium- to coarse-grained unconsolidated sediment and is considered the predominant aquifer for Study Area 1. The aquifer is unconfined with a saturated thickness ranging from ~ 5 m, directly south of the STP, to > 68 m farther downgradient. Wells installed in valley-bottom sediment are shown on cross section E-E’ (Drawing 17).

Four wells are included in Study Area 1: monitoring wells FR_09-01-A/B (nested) and GH_MW-PC and supply well FR_GH_WELL4. FR_09-01-A/B and FR_GH_WELL4 were selected to monitor valley-bottom groundwater quality near the southern site boundary of FRO and GH_MW-PC was selected to monitor upland groundwater quality in shallow overburden near Porter Creek (SNC-Lavalin, 2017c).

Monitoring wells installed as part of other programs over the last two years as well as geophysical studies, flow accretion studies, and drive point sampling results have been incorporated into the discussion for Study Area 1. Relevant monitoring wells are included on Drawing 6. Information from the SSGMP, AWTF-S Program, Castle Expansion Project, and Mass Balance Investigation was included in the discussion.

9.3.2.1 Groundwater Elevations

Summaries of groundwater elevations in FR_09-01-A/B and GH_MW-PC can be referenced in Sections 4.3.3.1 and 5.3.2.1, respectively.

9.3.2.2 Groundwater Quality

Summaries of results above primary screening criteria for FR_09-01-A/B, FR_GH_WELL4, and GH_MW-PC are in Sections 4.3.3.2 and 5.3.2.2, respectively.

9.3.2.3 Discussion

Upland and tributary groundwater from Kilmarnock, Swift, and Cataract creeks flows into the Fording River valley bottom. Discussion below consists of a conceptual understanding of surface water and groundwater in Study Area 1 based on data from the FRO SSGMP, RGMP and existing surface water data. It is noted that a significant volume of work in the Study Area has been performed as part of other programs, some of which are ongoing. A complete summary of this work is not within the scope of this annual report; however, some findings are captured below. A more complete synthesis and updated conceptual model for Study Area 1 will be completed for the RGMP Update in 2020. The discussion is framed by catchment and is intended to be complemented by the Block Diagrams shown in Appendix VI Figures 2 and 3.

Kilmarnock Creek

Groundwater quality in Study Area 1 is affected by upgradient groundwater transport of CI from the Kilmarnock Creek alluvial fan as discussed in Section 4.3.3.3. Mine-affected surface water from the creek loses to ground in the alluvial fan, as demonstrated by flow accretion studies and data from monitoring wells FR_KB-1, FR_KB-2, and FR_KB-3A/B, installed in the fan (Drawing 11). These wells have the highest concentrations of CI in wells sampled in the Fording River Valley downgradient of the STP and reflect concentrations and seasonality in Kilmarnock Creek at surface water station FR_KC-1 (Figures FR-18 to FR-20). A gravel channel has been identified as a preferential pathway in the alluvial fan through a series of pumping tests (Golder, 2019a; Drawing 18). Mine-influenced groundwater extends from the alluvial fan in the down-valley direction (i.e., south) as shown in the Block Diagram and described in SNC-Lavalin (2019b; 2019g).

Approximately 1 km downgradient of the Kilmarnock Creek alluvial fan, monitoring data from wells FR_MW-SK1A/B suggest the mine-influenced groundwater continues in down-valley direction. The wells are east of the South Kilmarnock Phase 2 Secondary Settling Pond (Drawing 6). Shallow well FR_MW-SK1A had the second highest CI concentrations in the Fording River Valley downgradient of the STP. CI concentrations in deep well FR_MW-SK1B, installed above bedrock at 68 mbgs, were less than the primary screening criteria and provide vertical delineation of the mine-influenced groundwater. The 2019 CI concentrations in the shallow well follows the same seasonality as the upgradient wells and Kilmarnock Creek confirming the eastern presence of the mine-influenced groundwater from the alluvial fan; however, additional loading of CI to groundwater may result from infiltration of surface water at the settling pond as mounding conditions have seasonally be observed (SNC-Lavalin, 2019m).

Flow accretion studies completed in the fall of 2018 indicate that the Fording River is losing to ground south of the STP to approximately 650 m upgradient of FR_MW_FRRD1 (Golder, 2019a; Drawings 6 and 11).

Swift Creek

Due west of FR_MW-SK1A/B, Swift Creek converges with the Fording River on the western side of the valley. Waste rock exists through most of the catchment and sedimentation ponds exist in the upland area above the confluence with the Fording River. Several investigations have been completed to assess groundwater bypass of mine-affected groundwater at the proposed AWTF intake structures ([Fluor Tetra Tech Inc.] Fluor Tetra Tech, 2015; SNC-Lavalin, 2017b; Wood, 2019). Bedrock is relatively shallow (2.0 to 3.8 mbgs) near the Swift Creek Settling Ponds and overlain by sandy, gravelly, or cobbly silt (Fluor Tetra Tech, 2015). Concentrations of CI in surface water were generally greater than shallow groundwater and groundwater concentrations were highest near the sedimentation ponds (Fluor Tetra Tech, 2015; SNC-Lavalin, 2017b). Losses from sedimentation ponds are relatively low compared to surface flows (Kerr Wood Leidal, 2019). Groundwater/surface water levels indicated discharge to Swift Creek, and lower CI concentrations in groundwater near to the confluence of Swift Creek and the Fording River suggest that most of the loading to the Fording River valley bottom is through surface water rather than groundwater (SNC-Lavalin, 2017b). The conceptual model developed in SNC-Lavalin (2017b) continues to be valid; a more robust synthesis of the various studies and updated conceptual model will be generated as part of the 2020 RGMP Update.

Downgradient of the confluence with Swift Creek and the Fording River, monitoring wells FR_09-01-A/B (RGMP/SSGMP) and FR_09-02-A/B (SSGMP only) are mine-influenced as they contain CI in groundwater greater than the primary and secondary screening criteria. CI concentrations in FR_09-01-A/B, located farther east in the valley are more reflective of those in Kilmarnock Creek (FR_KC1) suggesting influence from the mine-affected groundwater. CI concentrations at FR_09-01-A/B are lower than in upgradient wells FR_MW-SK1B and in the Kilmarnock alluvial fan suggestion dispersion (dilution) of the mine-influenced groundwater along the flow path. CI concentrations in FR_09-02-A/B are more reflective of the Fording River which is consistent with the understanding that the Fording River is losing to ground in this area (Figures FR-18 to FR-20; Section 4.3.3.3). Higher CI concentrations in Q2 at this location are inferred to be the result of infiltration from the South Kilmarnock Phase 2 Secondary Settling Pond which is only at capacity during freshet (SNC-Lavalin, 2019m).

Cataract Creek

Cataract Creek converges with the Fording River on the western side of the valley downgradient of FR_09-02-A/B. Like the Swift Creek drainage, bedrock is shallow (2.3 to 3.2 mbgs) and overlain with sandy, gravelly, or cobbly silt (Fluor Tetra Tech, 2015). Adjacent to the ponds, CI concentrations in surface water are more than two orders of magnitude greater than in groundwater (Fluor Tetra Tech, 2015; SNC-Lavalin, 2017b). Groundwater is not mine-affected adjacent to the Cataract Creek Sediment Ponds but is mine-affected in the farthest downgradient well before the confluence with the Fording River (Fluor Tetra Tech, 2015; SNC-Lavalin, 2017b). This may be the result of mine-affected surface water infiltrating to the shallow groundwater at this location (SNC-Lavalin, 2017b). However, at the point of discharge to the Fording River, Cataract Creek flows over low permeability bedrock in a waterfall fashion indicating that mine-contact water from the Cataract Creek drainage is transported primarily through surface water (SNC-Lavalin, 2017b). The Fording River is losing at the confluence of Cataract Creek and therefore creek water infiltrates to ground in the valley bottom. When the Fording River is dry, flows from Cataract Creek are interpreted to be the only flow in the river bed. In late 2019, Cataract Creek was diverted to Swift Creek.

On the eastern side of the Fording River valley bottom, supply well FR_GH_WELL4 (RGMP/SSGMP) contained CI concentrations greater than the primary and secondary screening criteria, indicative of mine influence (Figures FR-18 to FR-20). Dissolved selenium and sulphate concentrations have increased since 2018 and all CI are greater than upgradient wells FR_09-01-A/B except for Q4. Increasing concentrations at FR_GH_WELL4 may be attributed to concentration of the mine-influenced groundwater in shallow surficial materials, a concept that is currently being explored in the Mass Balance Investigation.

Porter Creek

Downgradient monitoring well GH_MW-PC (SSGMP/RGMP), near the confluence of Porter Creek on the western side of the valley, contains dissolved selenium concentrations greater than primary and secondary screening criteria, indicating mine influence. Dissolved selenium and nitrate-N concentrations are less than those measured at well FR_GH_WELL4, whereas sulphate concentrations are marginally higher. Groundwater at this location is inferred to be reflective of surface water infiltration from Porter Creek, which is considered is the main transport pathway for loading of CI in the valley-bottom drainage. This is supported by comparison of chemistry to GH_PC1 (Figures GH-2 and -3). Groundwater in the Porter drainage is inferred to flow along the bedrock interface through shallow surficial deposits, generally following topography.

Downgradient Fording River

Farther down the Fording River valley, there are monitoring wells on the eastern side between the Porter Creek drainage to past the confluence of Chauncey Creek, including FR_MW_FRRD1, FR_MW_CASW6-A/B, and FR_MW_CH1-A/B. These wells have CI concentrations less than the primary screening criteria and provide lateral delineation of the mine-influenced groundwater on the eastern side of the valley bottom.

9.3.3 Study Area 2: Fording River Valley Bottom Downgradient of LCO Dry Creek

Study Area 2 is of interest because it receives drainage from the permitted LCO Phase II mining in the southern portion of the LCO Dry Creek watershed. The LCO Phase II mining includes an estimated 500 ha footprint of waste rock storage (Golder, 2016). The Dry Creek Water Management System (DCWMS) was constructed to divert, convey, and treat mine-influenced surface water from the Dry Creek watershed. The DCWMS was fully commissioned in July 2015 and intercepts mine-influenced water and distributes it to two sediment ponds for treatment of Total Suspended Solids (TSS). Clarified water is returned to Dry Creek directly downstream of sediment ponds (Golder, 2016).

Although there are no groundwater wells in the Fording River valley-bottom aquifer in this area, a groundwater pathway to the valley bottom has not been identified due to the lack of a continuous aquifer. The valley bottom in the LCO Dry Creek watershed consists of a relatively thick till unit with discontinuous lenses of gravelly till (Appendix VI Figure 6). The till has a relatively low hydraulic conductivity, on the order of 10^{-7} to 10^{-9} m/s. Dry Creek is intermittently dry along some reaches and losses to groundwater are expected. Despite the lenses of gravel in the consolidated till, a continuous aquifer was not identified in the drainage and localized subsurface flow is only expected in the shallow fluvial sediments in the creek bed. Monitoring wells LC_PIZDC1308 and LC_PIZDC1307 are shallow and deep wells installed in a colluvium/till (gravel and cobbles) and basal till (silty gravel), respectively, downstream of the DCWMS. These wells are downgradient of any potential mine influence; however, as noted in the 2017 RGMP Update (SNC-Lavalin, 2017a) the primary transport pathway to groundwater in the Fording River valley bottom is through surface water in Dry Creek, which is monitored by surface water station LC_DC3. Study Area 2 boundaries, monitoring wells LC_PIZDC1307 and LC_PIZDC1308, and downstream surface water monitoring locations in Dry Creek are shown on the LCO Sample Location Plan (Drawing 8).

9.3.3.1 Groundwater Elevations

Groundwater elevation results for monitoring wells LC_PIZDC1307 and LC_PIZDC1308 are presented in Appendix B of Golder's 2019 SSGMP included in Appendix II and shown on Figure LC-1. Data presented on Figure LC-1 has been compensated using the barologger deployed in the Dry Creek pond area (baro LC_DCP1). The data indicate that groundwater elevations fluctuate seasonally with a greater magnitude of fluctuation observed in the deeper LC_PIZDC1307. Vertical gradients are downward although reversals have occurred historically during freshet in 2017 and 2018 when water levels were very high (Figure LC-1). In 2019, the lowest groundwater elevations were observed in March at both wells while the highest were observed in June at deep well LC_PIZDC1307 and July at shallow well LC_PIZDC1308. Groundwater elevations in 2019 fluctuated by approximately 4.7 m at LC_PIZDC1307 and by 1.4 m at LC_PIZDC1308. The vertical gradient during the fourth quarter event was calculated to be 0.070 m/m, downward (Golder, 2020).

9.3.3.2 Groundwater Quality

Analytical results for monitoring wells LC_PIZDC1307 and LC_PIZDC1308 are also presented in Golder's 2019 SSGMP included in Appendix II, while spatial distribution plots of CI are presented on Drawings 33 through 36. Concentrations of all CI met the primary screening criteria for all events at both wells in 2019. Concentrations of several non-order constituents exceeded the primary screening criteria, including barium, cobalt, lithium, and molybdenum. Results from 2019 were consistent with findings from the 2018 RGMP (SNC-Lavalin, 2019e) and 2017 RGMP Update (SNC-Lavalin, 2017a). Review of the borehole log for LC_PIZDC1307 (provided in Appendix F of the 2019 LCO SSGMP included in Appendix II) indicates this well is installed in basal till, suggesting the source of barium and molybdenum likely originates from bedrock (SNC-Lavalin, 2017a). Lithium concentrations are naturally high in groundwater across the Elk Valley. It is noted that there are no drinking water or irrigation wells located in Study Area 2.

9.3.3.3 Discussion

To assess groundwater and surface water interactions in the Dry Creek drainage, selenium concentrations in groundwater at LC_PIZDC1307 and LC_PIZDC1308 were compared to concentrations in surface water in Dry Creek at LC_DC1 and LC_DC3 on Figure LC-2. Concentrations in the Fording River at LC_FRDSDC are also shown for context. Selenium concentrations in groundwater in the Dry Creek catchment have been relatively low (near the detection limit) and stable since December 2014 and lower than concentrations measured in Dry Creek. Selenium concentrations in Dry Creek surface water (LC_DC3) are two orders of magnitude higher than in groundwater and have increased since 2017 (Figure LC-2) with no corresponding increase in groundwater, further supporting the concept that surface water is the primary pathway to the Fording River valley bottom. Fording River concentrations at station LC_FRDSDC, in Study Area 2, were higher than surface water concentrations in Dry Creek. The current loading of CI to groundwater from infiltration of Dry Creek over the alluvial fan is interpreted to be minimal, compared to the existing load of CI in the Fording River.

9.3.4 Study Area 3: Fording River Valley Bottom Downgradient of GHO Rail Loop and Greenhills Creek

Study Area 3 was selected because the GHO SSGMP identified potential sources (upland groundwater from GHO) as well as surface water and groundwater transport pathways that provided loading to the Fording River valley bottom. Study Area 3 is downgradient from GHO, and Greenhills Creek is the main tributary that flows into the Fording River valley bottom. Fording River valley-bottom sediment in Study Area 3 is approximately 70 m thick and consists mainly of coarse-grained glaciofluvial deposits (sand and gravel) confined by a clay/silty clay unit (Drawings 24 and 25).

The wells included in Study Area 3 are supply wells GH_POTW09, GH_POTW10, GH_POTW15 and GH_POTW17 and monitoring well GH_MW-RLP-1D. Well completion details including UTM locations, elevations, well installation details, description of lithologies, and estimated hydraulic conductivities (if available) are provided in Table 3a and on borehole logs in Appendix IV. Monitoring wells and relevant surface water locations for Study Area 3 are shown on Drawing 7. Cross sections H-H’ and I-I’ show the inferred geology perpendicular and parallel, respectively, to groundwater flow in the valley bottom in Study Area 3 (Drawings 24 and 25). A Block Diagram showing ranges in CI concentrations has also been included in Appendix VI (Figure 4).

9.3.4.1 Groundwater Elevations

Quarterly manual groundwater levels measured in 2019 as well as sampling information are compiled in Table 3b. Groundwater elevations for GH_MW-RLP-1D and pumping rates for GH_POTW09 and GH_POTW17 are presented in Section 5.3.3.1. There are no groundwater elevation data available for the supply wells. Continuous water levels were measured at the supply wells (GH_POTW09, GH_POTW10, GH_POTW15, and GH_POTW17); however, the dataloggers in the supply wells require significant calibration in order to process the data which could not be performed in time for this annual report.

In 2019, supply wells GH_POTW10 and GH_POTW15 were pumped year-round and pumping rates were recorded and are presented on Figure GH-6. Overall, supply well pumping rates were greatest at GH_POTW09 as discussed in Section 5.3.3.1. Supply well GH_POTW15 was pumped at higher rates than GH_POTW10 and GH_POTW17 ranging between 2 m^3/hr and 8.2 m^3/hr. In October, the pump at supply well GH_POTW15 was offline. During this time, the remainder of the supply wells were used and pumping rates at GH_POTW17 were increased to compensate for GH_POTW15 being offline. Supply well GH_POTW10 was pumped at similar rates to GH_POTW17 (Figure GH-6), ranging from 4.6 m^3/hr to 15 m^3/hr. There were some instances in 2019 where the water levels at both GH_POTW10 and GH_POTW15 decreased to below the pump intake and the pump was shut off. Once water levels had recovered to a level where pumping could continue, pumping rates increased significantly (i.e., at least 10 m^3/hr greater than average rates in 2019) and subsequently returned within the expected pumping rate range (Figure GH-6)

9.3.4.2 Groundwater Quality

Analytical results for wells in Study Area 3 were compared to primary and secondary screening criteria. Results for monitoring wells located at GHO, including GH_POTW10 and GH_POTW15 are presented in Tables 3c and 3d (primary screening) and Table 3e (secondary screening). Spatial distribution plots of CI are presented on Drawings 27 to 30. A Block Diagram has been included in Appendix VI – Figure 4 and has been updated with ranges in CI concentrations measured in 2019. Mann-Kendall trend analyses are included in Appendix VII and COAs for data are in Appendix X.

Field measured parameters are presented in Table 6c. Overall the results were consistent with the expected ranges for groundwater encountered in this area. A summary of results for CI compared to primary screening criteria is presented in Table BBB below.

Table BBB: RGMP – Summary of CI Compared to Primary Groundwater Screening Criteria in Study Area 3

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
GH_POTW10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GH_POTW15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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 below 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.

Dissolved lithium was the only non-order constituent measured at GH_POTW10 and GH_POTW15 to have concentrations above the applicable standards. Dissolved lithium concentrations are inferred to originate from natural sources and are naturally high across the Elk Valley (SNC-Lavalin, 2017c).

A summary of results above primary screening criteria for wells at GHO are described in Section 5.3.3.2. Concentrations of sulphate greater than the primary screening criteria were measured at GH_MW-GHC-B (Q1 to Q4), GH_MW-SITE-A (Q4), and GH_POTW17 (Q4). Groundwater from supply well GH_POTW17 also contained dissolved selenium greater than the primary screening criteria in Q3.

Mann-Kendall trend analysis was completed for CI at wells with more than seven sampling events. A summary of results is provided in Table CCC below. Trend analysis results for wells at GHO are presented in Section 5.3.4.2.

SNC·LAVALIN

Table CCC: RGMP – Summary of Mann-Kendall Trend Analysis for CI in Study Area 3

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
GH_POTW10	Stable	No Trend	Increasing	Stable
GH_POTW15	Prob. Decreasing	No Trend	Stable	Decreasing

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is bold. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is shaded and bold.

Results from the Mann-Kendall trend analyses completed for CI in groundwater indicated concentrations are decreasing, stable, or no trend, with the exception of dissolved cadmium at GH_POTW10, where an increasing trend was identified. Although dissolved cadmium is interpreted to be increasing, concentrations have been at least two orders of magnitude less than the applicable primary screening criteria and marginally greater than the MDL.

9.3.4.3 Discussion

Discussion of trends in groundwater quality in Study Area 3 focuses on CI concentrations at supply wells GH_POTW10 and GH_POTW15. Results from monitoring wells within the GHO mine-permitted boundaries are discussed in detail in Section 5.3.3.3.

Supply wells GH_POTW10 and GH_POTW15 are installed in a sand and gravel unit underlying a relatively thick and continuous silt and clay of glaciolacustrine origin (Appendix IV). They are located downgradient of Greenhills Pond and the alluvial fan, west of the confluence with Greenhills Creek.

Since 2015, concentrations of dissolved selenium and sulphate at GH_POTW10 and GH_POTW15 have remained less than the applicable primary screening criteria. Mann-Kendall trend analyses indicate that dissolved selenium is stable and decreasing, respectively. Concentrations of CI have fluctuated seasonally in both wells (except for dissolved selenium at GH_POTW15) with the greatest fluctuations measured for sulphate at GH_POTW15 (on average 41 mg/L). Peak concentrations of sulphate at GH_POTW15 have typically been measured in Q2. Concentrations of dissolved selenium at GH_POTW15 have generally been less than the MDL or marginally greater than the MDL. In addition, concentrations of nitrate-N at GH_POTW15 have also remained low, with concentrations at or less than the MDL in 2019. Reducing conditions exist at GH_POTW15 suggesting the potential for selenium attenuation. Once there are sufficient data, seasonal Mann-Kendall trend analysis should be completed for dissolved selenium and sulphate at these locations to confirm the trends.

Supply well GH_POTW10 is located near the confluence of Greenhills Creek and the Fording River. Of the supply wells installed in the Greenhills catchment, the highest selenium concentrations have been observed at GH_POTW17 and GH_POTW10; however, concentrations at GH_POTW10 have remained less than the primary screening criteria. Temporal trends of dissolved selenium at GH_POTW10 appear to lag trends at Greenhills Pond (GH_GH1) and the Fording River (GH_FR1), with concentrations greater in surface water relative to groundwater at GH_POTW10 (Figure GH-9). Concentrations of sulphate at GH_POTW10 were generally consistent with values measured in the Fording River (Figure GH-10). Reducing conditions have also been identified seasonally at GH_POTW10 indicating possible selenium attenuation at this location. The presence of a semi-confining clay layer above GH_POTW10 is inferred to limit the degree of connectivity between the well and recharge from the Fording River or Greenhills Pond.

Generally, silt and clay units at surface in the Fording River valley bottom provide a barrier to downward transport of CI to the aquifer with water supply wells. Overall, dissolved selenium concentrations in the Fording River (GH_FR1) and Greenhills Pond (GH_GH1) were consistently higher than groundwater concentrations at RGMP wells in Study Area 3 (Figures GH-9 to -10), suggesting down-valley transport in groundwater is not significant compared to surface water. However, similar seasonal fluctuations of dissolved selenium measured at GH_POTW09 and GH_POTW17 to surface water from the Fording River and Greenhills Creek, respectively, are indicative that contributions of CI from surface water to groundwater exist.

Monitoring well GH_MW-RLP-1D is in the upland area of Greenhills Creek downgradient of the rail loop area and also installed in the Greenhills Creek alluvial fan and in the same aquifer as the supply wells. Results for monitoring well GH_MW-RLP-1D are discussed in detail in Section 5.3.3.3.

Overall, reducing conditions have been observed in the Greenhills Creek alluvial fan, as evidenced by low nitrate-N concentrations (less than 1 mg/L) and measurable concentrations of dissolved iron and manganese (greater than 50 µg/L and 100 µg/L, respectively) in the supply wells and monitoring well GH_MW-RLP-1D. Reducing conditions along with concentrations of sulphate greater than 30 mg/L are indicative of the potential for preferential attenuation of selenium and nitrate-N in groundwater in the Fording River valley bottom in Study Area 3 (SRK, 2018a and b).

9.3.5 Study Area 4: Elk River Valley Bottom Downgradient of Leask, Wolfram, and Thompson Creeks

Study Area 4 is downgradient from the west side of GHO and was defined because the GHO SSGMP identified potential sources of CI from the Mickelson, Leask, Wolfram, and Thompson Creek drainages into the Elk River valley-bottom sediment. The SSGMP identified surface water infiltration in both upland areas and within the valley bottom as transport pathways to the Elk River valley bottom. Study Area 4 includes four monitoring wells (GH_GA-MW-2, GH_GA-MW-3, GH_GA-MW-4, and GH_MW-ERSC-1), one downgradient water supply well (RG_DW-01-03), and one downgradient domestic well (RG_DW-01-07).

Valley-bottom deposits are predominantly fluvial and glaciofluvial in this area (Appendix VI; Figure 5, Drawing 2) with a number of former Elk River channels identified; however, the strata in boreholes at GH_GA-MW-2 indicated lower permeability till and lacustrine/glaciolacustrine (i.e., soft, silty clay) sediment. To the south at wells GH_GA-MW-3 and GH_GA-MW-4, coarse-grained sediment, including sub-angular gravel, infers glaciofluvial deposits overlying local bedrock. Monitoring well GH_MW-ERSC-1, approximately 1 km south of the Lower Thompson Pond, is installed in inferred fluvial sand and gravel. The linear distribution of the monitoring wells in the valley bottom does not allow for triangulation for determining groundwater flow direction; however, groundwater is expected to discharge to the Elk River, with a flow component parallel or sub-parallel to the river. Cross section J-J' depicts the surficial geology, approximately parallel to the Elk River (Drawing 26). A Block Diagram showing ranges in 2019 CI concentrations and descriptions of the conceptual model has also been included in Appendix VI (Figure 5). Well completion details including UTM locations, elevations, well installation details, description of lithologies, and estimated hydraulic conductivities (if available) are provided in Tables 3a and 6a and on borehole logs in Appendix IV.

SNC·LAVALIN

9.3.5.1 Groundwater Elevations

Quarterly manual groundwater levels measured in 2019 as well as sampling information are compiled in Tables 3b and 6b. Groundwater elevation results for GH_GA-MW-2, GH_GA-MW-3, GH_GA-MW-4, and GH_MW-ERSC-1 are presented in Section 5.3.4.1. There are no groundwater elevation data available for RG_DW-01-03 or RG_DW-01-07 as these are domestic and supply wells, respectively.

9.3.5.2 Groundwater Quality

Analytical results for wells in Study Area 4 were compared to primary and secondary screening criteria. Results for monitoring wells located at GHO are presented in Tables 3c and 3d (primary screening) and Table 3e (secondary screening). The analytical results for wells at GHO are presented and discussed in Section 5.3.4.2. Results for RG_DW-01-03 and RG_DW-01-07 are presented in Tables 6c and 6d (primary screening). Spatial distribution plots of CI are presented on Drawings 29 to 32. Mann-Kendall trend analyses are included in Appendix VII and COAs for data are in Appendix X.

Field measured parameters are presented in Table 6c. Overall the results were consistent with the expected ranges for groundwater encountered in this area. A summary of results for CI compared to primary screening criteria is presented in Table DDD below.

Table DDD: GHO – Summary of CI Compared to Primary Groundwater Screening Criteria in the No Name Drainage of the Elk River 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
RG_DW-01-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DW-01-07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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 below 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 analysis was completed for CI at RG_DW-01-03 and RG_DW-01-07 and a summary is provided in Table EEE below. Trend analyses for monitoring wells at GHO are presented in Section 5.3.4.2.

Table EEE: RGMP – Summary of Mann-Kendall Trend Analysis for CI in Study Area 4

Parameter[1] / Well ID	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
RG_DW-01-03	Increasing	No Trend	Stable	Prob. Increasing
RG_DW-01-07	Increasing	Decreasing	Stable	Stable

Notes:
[1] Where CI were measured above primary screening criteria in 2019, the trend result is bold. Where the CI were measured above the secondary screening criteria for dissolved selenium, the result is **shaded and bold**.

Results from the Mann-Kendall trend analyses completed for CI in groundwater indicated concentrations are decreasing, stable, or no trend, with the exception of dissolved selenium at RG_DW-01-03 and nitrate-N at RG_DW-01-07, where increasing trends were identified. Although dissolved selenium concentrations at RG_DW-01-03 are increasing, concentrations remained at least an order of magnitude lower than the applicable CSR standards. Similarly, concentrations of nitrate-N at both RG_DW-01-03 and RG_DW-01-07 are at least two orders of magnitude less than the applicable CSR standards.

9.3.5.3 Discussion

Discussion of trends in groundwater quality in Study Area 4 focuses on fate and transport of CI in the Elk River valley bottom including the Elk River side channel but also farther downgradient at supply well RG_DW-01-03 and domestic well RG_DW-01-07. Results from monitoring wells within the GHO mine-permitted boundaries are discussed in detail as they relate to sources and transport pathways to the valley bottom in Section 5.3.4.3.

Elk River Side Channel

The Elk River side channel and its interaction with groundwater has previously been studied using available data (SNC-Lavalin, 2019f). A summary is provided below, using 2019 to provide further context on the interaction, but also the fate and transport of CI within the Elk River valley-bottom sediments. Additional monitoring wells and flow and load accretion studies performed as part of the CPX2 Program and Mass Balance Investigation should provide more insight on groundwater-surface water interaction in the side channel areas. Results from these investigations will be assessed for possible future inclusion in the RGMP.

In the vicinity of Leask Ponds, surface water elevations of the side channel approximated from LiDAR were generally consistent with groundwater elevations at GH_GA-MW-4 indicating interaction between the side channel and groundwater. Since 2017, concentrations of CI in groundwater have been decreasing, which is coincident with a shift in water type from sulphate-rich to predominantly bicarbonate-rich, more consistent with the Elk River (SNC-Lavalin, 2019h). Since 2017 groundwater at GH_GA-MW-4 is inferred to be increasingly influenced by infiltration of the Elk River and side channel and less so by mine-influenced surface water; as groundwater becomes increasingly bicarbonate rich (Figure GH-17). Concentrations of CI at this location also remained less than the applicable screening criteria and continued to decrease in 2019.

Further downstream in the side channel, groundwater in the vicinity of Wolfram Ponds at GH_GA-MW-2 has historically been predominantly calcium-bicarbonate type water (similar to the Elk River), suggesting that infiltration of surface water in the side channel occurs. Prior to and including 2018, CI concentrations typically decreased during Q2 and Q3, which is the time of year flows in the side channel are highest, supporting this interpretation. However, increases in sulphate concentrations have shifted the water type to predominantly calcium-sulphate-bicarbonate since Q3 2017 (SNC-Lavalin, 2019h). The Mann Kendall analyses suggested increasing trends in CI concentrations and in 2019, concentrations of CI at GH_GA-MW-2 increased between Q1 and Q4; a historical high value of 354 mg/L was measured in Q4 for sulphate (Figure GH-24). The shift in major ion chemistry since Q3 in 2017 along with higher concentrations of CI indicates that groundwater in the area has either been less influenced by infiltration of the Elk River side channel or more influenced by mine-influenced surface water from Wolfram Creek than in previous years (SNC-Lavalin, 2019h).

Surface water location GH_ER1A is within the side channel, downgradient of Wolfram Creek and GH_GA-MW-2. Although a defined channel exists near the outlet of Wolfram Ponds to the side channel, there was no overland flow for the majority of 2019 (June and July only) indicating the ponds are losing water to ground (Minnow, personal communication, 2020). It is expected that at times of extreme flow, overland connection between Wolfram Ponds and the side channel may exist. Marginally elevated concentrations of CI relative to applicable criteria have been measured in the side channel at GH_ER1A with concentrations fluctuating seasonally and measured above the BCWQG (Q2 2019; SNC-Lavalin, 2019f). These seasonal fluctuations have historically been measured between April and June, with step increases in April/May assumed to result from snow melt in the Wolfram drainage, indicative that loading of CI increases during these months (SNC-Lavalin, 2019d). Since no overland flow exists from Wolfram Ponds year-round, the increases are inferred to result from groundwater discharge to the side channel. This discharge is inferred to only occur in the months the side channel was wetted in the reach downgradient of the confluence with Wolfram Creek, between May and September 2019. During the months where this reach was not wetted, there is no discharge to the side channel. This is shown on Figures GH-22 to -24 where increases in CI at GH-ER1A occur in Q2 with a subsequent decrease to be more reflective of concentrations in the Elk River.

Near Thompson Creek, approximate surface water elevations in the Elk River side channel are consistent with groundwater elevations measured at GH_GA-MW-3 during times of low flow (SNC-Lavalin, 2019f). A permanently wetted area is located at the confluence of Thompson Creek and the Elk River side channel. Downgradient of the wetted area the side channel flows towards the Elk River. Concentrations of CI and the major ion distribution in the wetted area were similar to Thompson Creek, indicative that the creek is influencing water quality in the side channel. The creek is also considered to be an annual source of recharge to groundwater (SNC-Lavalin, 2019d). Infiltration of the side channel is also inferred recharge to be a source of recharge as groundwater is predominantly bicarbonate rich; however, the relative distribution of bicarbonate to sulphate in groundwater decreased in 2019, indicative of increasing mine influence in groundwater (Figure GH-28; SNC-Lavalin, 2019d).

Elk River Downgradient (Down Valley)

Overall, concentrations of CI in groundwater downgradient (i.e., down-valley) of GHO in the Elk River valley bottom decrease relative to concentrations measured in groundwater proximal to GHO. Dissolved selenium concentrations in the valley-bottom groundwater were below screening criteria in water supply well RG_DW-01-03 and domestic well RG_DW-01-07. Concentrations of dissolved selenium measured at RG_DW01-03 have been on average 2 µg/L greater than farther downgradient at RG_DW-01-07 (Figure GH-29). The Mann-Kendall trend analysis indicates probably increasing trends in dissolved selenium at RG_DW-01-03; however, concentrations remained one order of magnitude less than the applicable primary criteria and concentrations have only increased by 1.43 µg/L between February 2014 and November 2019. Farther downgradient, dissolved selenium concentrations at RG_DW-01-07 between 2015 and 2019 are stable. Nitrate-N concentrations were generally consistent in the two wells, with concentrations marginally greater at RG_DW-01-07 (Figure GH-30). Mann-Kendall trend analyses results indicate that nitrate-N is increasing in groundwater from both of these wells; however, concentrations remain one to two orders of magnitude less than the applicable primary screening criteria and increases have been marginal over time. Nitrate-N concentrations increased by 0.508 mg/L between February 2014 and November 2019 at RG_DW-01-03 and by 0.552 mg/L between March 2014 and November 2019 at RG_DW-01-07. Concentrations of sulphate were greatest downgradient at RG_DW-01-07, with concentrations on average 24 mg/L greater than at RG_DW-01-03 in 2019 (Figure GH-31).

Muted seasonal fluctuations in CI exist for dissolved selenium, nitrate-N and sulphate in both RG_DW-01-03 and RG_DW-01-07, with peak concentrations generally in Q2 and Q3. Surface water station GH_ER1 is located in the Elk River approximately 225 m east of RG_DW-01-03 and concentrations of CI fluctuate seasonally with the highest concentrations measured between Q1 and Q2; these are consistent with surface water station GH_ERC near the GHO boundary (Figures GH-29 to GH-31). Since 2015, concentrations of dissolved CI at RG_DW-01-03 have consistently been greater than at GH_ER1 and GH-ERC. The primary mechanism of recharge of groundwater is inferred to be through surface water infiltration from the Elk River and other nearby surface water bodies (i.e., Boivin Creek). However, surface water infiltration does not explain the higher concentrations observed in groundwater at RG_DW-01-03; therefore, there must be an additional contributor of mine constituents in groundwater at this location. This also suggests that there is a groundwater pathway which could be down-valley. This well should continue to be monitored, and a monitoring well is planned under the RGMP nearby to further assess the groundwater pathway. Also, it is recommended that the extent of Study Area 4 be extended to encompass this area.

At RG_DW-01-07 CI concentrations have been similar or marginally greater than in surface water. Peak concentrations of CI at RG_DW-01-07 varied; similar to RG_DW-01-03, nitrate-N concentrations generally peaked in Q2 or Q3; however, concentrations of dissolved selenium and sulphate generally peaked in Q4.

Overall, downgradient groundwater quality with regards to CI in the Elk River valley bottom in Study Area 4 improves on a regional scale, with concentrations decreasing farther downstream of the GHO mine-permitted area. Dissolved selenium concentrations were below screening criteria in supply well RG_DW-01-03, with concentrations further decreasing farther downgradient of Elkford at domestic well RG_DW-01-07. This suggests attenuation in the valley-bottom groundwater down-valley flowpath, likely due to mixing with surface water and additional fresh water inputs.

9.3.6 Study Area 5 and 6: Fording River Valley Bottom Downgradient of LCO

Study Area 5 is of interest because there may be possible inputs of CI from Line Creek and the Process Plant to Fording River valley bottom. After exiting LCO Phase I area, Line Creek flows through incised bedrock towards the Fording River, losing approximately 60 m in elevation (from about 1,300 masl) over an alluvial fan. Study Area 6 is of interest as it spans the Elk River valley bottom and is downgradient of the LCO Process Plant (AMEC, 2010). Additionally, Study Areas 5 and 6 were selected as the RDW Sampling Program identified elevated selenium in groundwater downgradient of the confluence of the Fording and Elk rivers.

Bedrock at the confluence of the Fording and Elk rivers may locally affect river grade and restrict groundwater recharge to the valley bottom (SNC-Lavalin, 2015a). In this area, surficial geology indicates that the depositional environment in the valley bottom was glaciofluvial and fluvial (Appendix VI; Figure 7). Bedrock elevations and detailed surficial stratigraphy, well installation details, and groundwater elevations in Study Areas 5 and 6 are presented on cross sections K-K’ and L-L’ (Drawings 31 and 32). Cross section K-K’ is perpendicular to groundwater flow and extends from Fording River to the north to the East Refuse Expansion to the south. Cross section L-L’ is parallel to groundwater flow and extends from Line Creek in the northeast to the Elk River in the southwest. For the RGMP, there are no monitoring wells within Study Area 5 or 6, with one monitoring well, LC_PIZP1101, located upgradient of Study Area 6 (Drawing 8). Monitoring well LC_PIZP1101 is screened in a deeper sand aquifer at approximately 41 mbgs.

Sources of potentially elevated concentrations of CI in these Study Areas include mining operations upstream of Line Creek (LCO Phase I) and the Elk and Fording Rivers (GHO and FRO), as well as the ponds, CCR, and reclaimed CCR in the LCO Process Plant area. Potential pathways to groundwater include infiltration to the valley-bottom aquifer from Line Creek as it flows over the alluvial fan in Study Area 5, infiltration to the valley-bottom aquifer from the Elk and Fording Rivers in Study Area 6, and infiltration to the valley-bottom aquifer in the Process Plant area between Study Areas 5 and 6.

9.3.6.1 Groundwater Elevations

Groundwater elevation results for monitoring well LC_PIZP1101 are presented in Appendix B of Golder’s 2019 SSGMP included in Appendix II, as well as on Figure LC-3. Data presented on Figure LC-3 has been compensated using the barologger deployed in monitoring well LC_PIZP1105 in the Process Plant area. The logger data shows minimal fluctuation or seasonality throughout the year, varying by only approximately 0.3 m in 2019. Manual measurements varied by approximately 0.5 m between the low measured in January (1,235.66 masl) and high measured in July (1,236.11 masl).

9.3.6.2 Groundwater Quality

Analytical results for monitoring well LC_PIZP1101 are also presented in Golder’s 2019 SSGMP included in Appendix II, while spatial distribution plots of CI are presented on Drawings 33 to 36. Concentrations of all CI met the primary screening criteria standards in all events at monitoring well LC_PIZP1101 in 2019. Concentrations of several non-order constituents exceeded the primary screening criteria, including fluoride, lithium, manganese, and molybdenum. Results from 2019 were consistent with findings from the 2018 RGMP (SNC-Lavalin, 2019e) and 2017 RGMP Update (SNC-Lavalin, 2017a). Review of the borehole log for LC_PIZP1101 (provided in Appendix F of the 2019 LCO SSGMP included in Appendix II) indicates this well is installed in a deep sand aquifer, with limited interaction with atmosphere and limited connection to surface water. The source of fluoride, manganese and molybdenum is likely from natural sources and lithium concentrations are naturally high across the Elk Valley (SNC-Lavalin, 2017a).

9.3.6.3 Discussion

Groundwater from the LCO Process Plant Site flows towards Study Area 6; however, concentrations of CI are low and near the detection limit. This is consistent with historical results from several wells in the Process Plant Site. To assess groundwater and surface water interactions, selenium concentrations measured in groundwater at LC_PIZP1101 have been compared to concentrations in surface water in

Line Creek (LC_LC4) and in the Elk River downstream of Study Area 6 (EV_ER4) on Figure LC-4. Concentrations in groundwater at LC_PIZP1101 have been relatively low and stable since May 2013 and are substantially lower than concentrations measured in Line Creek and in the Elk River. Consequently, the most significant pathway for mine-influenced water in Study Areas 5 and 6 is through surface water from Line Creek.

The 2017 RGMP Update indicated there is a data gap for the Elk River valley-bottom aquifer downgradient of LCO, and as such local groundwater conditions are unknown (SNC-Lavalin, 2017a). The 2017 RGMP Update proposed to include existing monitoring wells to intercept the unconfined sand and gravel aquifer (e.g., LC_PIZP1102), although additional monitoring wells were also deemed to be needed. A nested monitoring well is scheduled to be installed in 2020 near the southern boundary of Study Area 6 adjacent to surface water Order Station and sampling location EV_ER4 to address this gap.

It is suspected that Line Creek may lose to groundwater where flowing over the alluvial fan in Study Area 5, which may be pathway to the valley-bottom aquifer. A flow and load accretion study will also be completed in 2020 to address this data gap.

9.3.7 Study Area 7: Elk River Valley Bottom Downgradient of Grave Creek

This area was selected because the EVO SSGMP identified potential sources of CI in the Harmer Creek watershed. Tributary surface water (i.e., Harmer Creek that flows to Grave Creek) and valley-bottom groundwater ultimately flows into the Elk River valley bottom. Additionally, samples from the RDW Sampling Program (RG_DW-02-20) historically exceeded the primary screening criteria (AW and DW) for selenium; however, it is noted that historical dissolved selenium concentrations at RG_DW-02-20 no longer exceed the CSR AW standards due to the adjusted CSR standard which increased from 10 to 20 µg/L in 2017 (BC ENV, 2019).

The surficial geology in the Grave Creek watershed is mapped as colluvium; however, borehole logging at monitoring well EV_GV3gw (Appendix IV) indicates a relatively large thickness (i.e., up to 25 m) of loose sand and sub-angular gravel and silty gravel deposits (Drawing 5). This well is near the confluence of Grave and Harmer Creeks, and thicker sediments in this area may be reflective of the Grave Creek alluvial fan. The groundwater level at EV_GV3gw is relatively deep, approximately 10 mbgs, with a saturated thickness of approximately 15 m. Based on a comparison of groundwater elevation at EV_GV3gw with the elevation of Grave Creek, the creek appears to have a losing reach in this area, and accordingly the creek is interpreted to be losing along the approximate 120 m drop in elevation to the Elk River (Appendix VI, Figure 8). As such, groundwater from the Grave Creek valley bottom is interpreted to flow into the Elk River valley bottom.

The monitoring wells included in Study Area 7 are monitoring well EV_GV3gw, which monitors upland and tributary valley-bottom input from drainage to the northeast of EVO, and the domestic well RG_DW-02-20 that monitors groundwater in the Elk River valley bottom. Monitoring wells and relevant surface water locations for Study Area 7 are shown on Drawing 9. Drawing 60, cross section T-T', shows the inferred geology parallel to groundwater flow in the valley bottom in Study Area 7.

9.3.7.1 Groundwater Elevations

Groundwater elevation results for EV_GV3gw are presented in Section 7.3.3.1. There are no groundwater elevation data available for RG_DW-02-20 as this is a domestic well.

9.3.7.2 Groundwater Quality Screening Criteria

A summary of results above primary screening criteria for RG_DW-02-20 is presented in Table FFF and shown spatially on Drawings 43 to 46. There were no CI concentrations detected above primary screening criteria at EV_GV3gw as described in Section 7.3.3.2.

SNC·LAVALIN

Table FFF: EVO – Summary of CI Compared to Primary Groundwater Screening Criteria in Study Area 7

Parameter[1,2,] / 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
RG_DW-02-20	-	-	-	-	-	-	-	-	-	-	-	-	13.1	14.5	11.5	10.3
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

2 '–' denotes result is below primary screening criteria.

3 Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.

4 Standard varies with hardness.

Secondary screening was performed for dissolved selenium concentrations in well RG_DW-02-20 and all results were below the secondary screening criteria.

Mann-Kendall trend analysis was completed for CI at wells with more than seven data points. A summary of results is provided in Table GGG below. Trend analysis results for EV_GV3gw are presented in Section 7.3.3.2. Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table GGG: RGMP – Summary of Mann-Kendall Trend Analysis for CI in Study Area 7

Well ID \ Parameter[1]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
RG_DW-02-20	Decreasing	No Trend	No Trend	**Probably Decreasing**

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.

Results from the Mann-Kendall trend analyses completed for CI in groundwater at RG_DW-02-02 indicated concentrations are decreasing or no discernable trend was identified.

9.3.7.3 Discussion

Discussion of trends in groundwater quality in Study Area 7 focuses on dissolved selenium which was above the primary screening criteria in domestic well RG_DW-02-20. Drawing 46 shows the spatial distribution of dissolved selenium of groundwater samples collected in Study Area 7. To assess groundwater and surface water interactions, selenium concentrations measured in groundwater at EV_GV3gw and RG_DW-02-20 were compared to concentrations in surface water in Harmer Creek (EV_HC1) and in the Elk River upstream from the confluence with Grave Creek (EV_ER4), respectively (Figure EV-3). As described in Section 7.3.3.3, low dissolved selenium concentrations in groundwater at EV_GV3gw compared to surface water (EV_HC1) in Harmer Creek and lack of seasonal variation in groundwater selenium concentrations suggests limited interactions between the deep aquifer at EV_GV3gw and surface water in the Harmer Creek/Grave Creek Watershed.

Dissolved selenium concentrations measured at RG_DW-02-20 appear to follow a seasonal trend with the highest concentrations measured during the spring months and were generally within the range of concentrations measured upstream in the Elk River at EV_ER4 but were considerably lower than surface water concentrations in Harmer Creek at EV_HC1.

Loading of mine-influenced constituents to groundwater is inferred to be primarily from infiltration of Elk River surface water as CI concentrations measured at RG_DW-02-20 reflect Elk River surface water quality. As described in Section 7.3.3.3, groundwater transport of CI from the Harmer Creek drainage to the Elk River valley bottom is interpreted to be minimal and based on available information, primary transport of CI from the Harmer Creek drainage to groundwater in the Elk River valley bottom is inferred to be through surface water. A monitoring well is planned in the vicinity of Study Area 7 in 2020 to better understand groundwater surface-water interactions and the connectivity of the aquifer used for drinking purposes.

9.3.8 Study Area 8: Elk River Valley Bottom Downgradient of Balmer, Lindsay and Otto/Cossarini Creeks

This area was selected because the EVO SSGMP identified potential sources of CI on the western slope of EVO and potential transport in the Lindsay, Otto/Cossarini drainages as well as the Goddard Marsh area (Drawing 9); tributary surface water and upland groundwater flow into the Elk River valley-bottom sediments in these areas. Groundwater in Study Area 8 will eventually discharge to the Elk River or flow to the valley bottom of the Elk River in Study Area 12.

The valley-bottom sediments consist mainly of fluvial, glaciofluvial and alluvial fan deposits in this area as the area is near the confluence with Cummings Creek. Underlying the coarse units are finer-grained deposits of lower permeability silt and clay suggesting relatively thick lacustrine/glaciolacustrine deposits exist in the subsurface (Appendix VI; Figure 9). Groundwater flow in upland areas is inferred to be toward the Elk River valley bottom. Groundwater flow direction in the valley bottom is assumed to be parallel or sub-parallel to the Elk River. Inferred geological cross sections M-M’ and N-N’ (Drawings 37 and 38, respectively) depict stratigraphy parallel and perpendicular to the inferred groundwater flow direction.

The monitoring wells in Study Area 8 included the monitoring wells EV_LSgw and EV_OCgw to monitor potential inputs from upland, tributary valley bottom, and Elk River valley-bottom features along the western slope of EVO. These monitoring wells are included in the EVO SSGMP, presented in Section 7.3.4, which includes a comparison of 2019 groundwater elevations and groundwater quality to previous results from 2015 to 2018. A brief discussion of results focused on groundwater fate and transport in the Elk River valley bottom is presented below.

9.3.8.1 Discussion

The 2017 RGMP Update identified that in Study Area 8 there is potential for loading of mine-influenced constituents in tributary surface water along the western slope of EVO to infiltrate to groundwater (SNC-Lavalin, 2017c). As described in Section 7.3.4.3, surface water from Goddard Creek (EV_GC2) contained the highest selenium surface concentrations in surface water and is interpreted to lose to ground near Goddard Settling Ponds and Goddard Marsh, and may influence groundwater quality in this area. Groundwater is not sufficiently monitored in this area and was identified as a data gap in the 2017 RGMP Update (SNC-Lavalin, 2017c). This gap is scheduled to be reduced by the installation of an additional monitoring well in 2020. Consistent with previous findings (SNC-Lavalin, 2017a; 2018b; 2019e), available groundwater data from monitoring wells in Study Area 8 indicate that there is not a confirmed groundwater transport pathway between the surface water sources identified on the western slope of EVO and Elk River valley bottom.

9.3.9 Study Area 9: Michel Creek Valley Bottom Downgradient of EVO (including Sparwood Area)

This area was selected as the EVO SSGMP identified potential sources of CI that may contribute to mine-influenced groundwater in the Michel Creek valley bottom. Study Area 9 is adjacent to EVO and receives tributary surface water and upland groundwater flow from potential sources along the southwestern slope of EVO (Appendix VI, Figure 11).

The predominant hydrostratigraphy within the Michel Creek valley-bottom aquifer consists of glaciofluvial sediments of sand and gravel, which are interspersed with silty sand, silt and clay occurrences (geological cross sections P-P', Q-Q' and R-R'; Drawings 40 to 42 and Block Diagram provided in Appendix VI, Figure 11). These finer-grained units are unlikely to act as a hydraulic barrier due to the lack of lateral continuity and the similar water level responses observed in shallow and deep wells. Therefore, sand and gravels observed in the deeper wells are inferred to be hydraulically connected to the sand and gravel formations encountered in shallower wells, which is supported by comparison of groundwater elevation patterns (Figures EV-11 and EV-14). However, down-valley from EV_MC2A/B, a more continuous low permeability unit is present which likely hydraulically separates deep and shallow groundwater. The low permeability unit was intersected by EV_MCgwS/D and EV_MW_SPR1A/B/C. Hydraulic conductivity testing was conducted at wells screened in this unit (EV_MCgwS/D and EV_MW_SPR1B). Values ranged from 2.8×10^{-7} to 4.1×10^{-6} m/s respectively (Table 4b), which suggests it is low permeability (Appendix IX and SNC-Lavalin, 2019j). The groundwater flow direction in the valley bottom is parallel or sub-parallel to Michel Creek, based on monitoring of recently installed wells (Drawing 12).

The boundaries of Study Area 9 were modified as part of the 2017 RGMP Update (SNC-Lavalin, 2017c) to reflect information from the EVO monitoring program and now extend from South Gate Creek to the confluence of Michel Creek with the Elk River (Drawing 9). It is noted that Study Area 9 has significant overlap with the Sparwood Area, established as part of Permit 107501 requirements and has also been listed as a Study Area in the 2017 RGMP Update. When the 2017 RGMP Update was issued, the Sparwood Area did not have any dedicated monitoring wells. However, new wells have since been drilled as part of the Sparwood Area Groundwater Supporting Study (SNC-Lavalin, 2019a). The EVO SSGMP 2018 Update indicated the Sparwood Area wells should be included in the EVO update; therefore, results and discussion of these wells is provided in the EVO SSGMP section for the Michel Creek Watershed (Section 7.3.6). Discussion of down-valley attenuation, within the Michel Creek valley bottom, including Sparwood Area wells, is provided in the discussion section below.

To monitor Michel Creek valley-bottom groundwater in Study Area 9, the following wells were included: three water supply wells (EV_RCgw, EV_WH50gw and EV_BRgw), three monitoring wells (EV_BCgw and EV_MCgwS/D [nested]), and one domestic well (RG_DW-03-01) to monitor valley-bottom groundwater in Michel Creek. In addition, EV_HW1 is also included in Study Area 9 and is considered a supplemental groundwater monitoring location, identified in the 2018 RGMP Annual Report (SNC-Lavalin, 2019e). Wells EV_RCgw, EV_BCgw and EV_MCgwD are included in both the Michel Creek Watershed and Study Area 9; results and discussion of these wells is provided in the EVO SSGMP section for the Michel Creek Watershed (Section 7.3.6). Results for EV_MCgwS were presented in the Michel Creek Watershed in order keep results for the nested well EV_MCgwS/D together. Monitoring well EV_MW_MC3 was included in the EVO SSGMP Update; however, because this well was installed to target potential sources of CI from Sparwood Ridge (and not EVO), this well was moved to the RGMP (as indicated in Section 7.1). This well will be reviewed as part of the 2020 RGMP Update. Therefore, results and discussion for Study Area 9 includes EV_WH50gw, EV_BRgw, EV_HW1, EV_MW_MC3, and RG_DW-03-01.

9.3.9.1 Groundwater Elevations

Groundwater elevation results for EV_BCgw and EV_MCgwS/D are presented in Section 7.3.6.1. Groundwater elevation data was not available for EV_RCgw, EV_WH50gw, EV_HW1 or RG_DW-03-01. In September of 2019, a Levelogger was installed in supply well EV_BRgw to monitor the effects of groundwater withdrawals from the Michel Creek floodplain sediments. It is recommended that the top of casing elevation at EV_BRgw be surveyed to tie the well into the groundwater datum. Groundwater elevation data at EV_BRgw indicate very small fluctuations in water level during pumping (less than 0.01 m, Figure EV-11). The top of casing elevation at EV_BRgw has also not been surveyed; in order to correct the groundwater elevations to the local datum, the LiDAR ground surface elevation (1149.34 masl) was used plus an assumed stick up of 0.5 m. In order to assess the influence on groundwater withdrawals, additional long-term groundwater elevation data from EV_BRgw is required. We understand pumping rates are not currently available from EV_BRgw; however, it is recommended this well be instrumented with pressure transducers in 2020.

9.3.9.2 Groundwater Quality Screening Criteria

A summary of CI above primary screening criteria are presented in Table HHH. Concentrations of CI from 2019 at EV_WH50gw, EV_BRgw, EV_HW1, and RG_DW-03-01 were similar to previous years. CI concentrations are shown on Drawings 43 to 46.

SNC·LAVALIN

Table HHH: EVO – Summary of CI Compared to Primary Groundwater Screening Criteria in Study Area 9

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_WH50gw	-	-	-	-	-	-	-	-	-	-	-	-	16.2	-	10.3	10.8
EV_BRgw	-	-	-	-	-	-	-	-	-	-	-	-		13.3		
EV_HW1	NS	NS	-	-	NS	NS	-	-	NS	NS	-	-	NS	NS		
EV_MW_MC3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RG_DW-03-01	-	-	-	NS	-	-	-	NS	-	-	-	NS	-	-	-	NS
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: CSR standards for Aquatic Life (AW), Drinking Water (DW), Livestock (LW) and Irrigation (IW) except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

2 '–' denotes result is below primary screening criteria.

3 Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.

4 Standard varies with hardness.

'NS' denotes sample not collected.

Secondary screening for selenium was completed where sample concentrations were above primary screening criteria. Selenium concentrations in 2019 exceeded the CP (EV_MC2 = 28 µg/L) and/or the CGDWQ for DW (50 µg/L) at EV_BRgw (Q3 and Q4) and EV_HW1 (Q3 and Q4).

In addition to CI, dissolved lithium was measured above the CSR DW standard (8 µg/L) in 2019 at all samples from EV_WH50gw, EV_BRgw, EV_HW1, and RG_DW-03-01 except the Q2 sample from EV_WH50gw (7.6 µg/L). The source of lithium is inferred to originate from natural sources (e.g., interaction with bedrock or unconsolidated materials) and elevated concentrations have been observed in other wells across the Elk Valley (SNC-Lavalin, 2017c; 2018b; 2019c).

Mann-Kendall trend analysis was completed for CI with more than seven data points. A summary of results are provided in Table III below. Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table III: RGMP – Summary of Mann-Kendall Trend Analysis for CI in Study Area 9

Well ID / Parameter[1,2]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
EV_WH50gw	Stable	No Trend	No Trend	**No Trend**
EV_BRgw	Decreasing	Probably Increasing	Decreasing	**Stable**
RG_DW-03-01	No Trend	No Trend	-	No Trend

Notes:

[1] Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.

[2] '–' denotes indicates Mann-Kendall trend analysis was not completed as concentrations were consistently less than or marginally greater than the detection limit.

Results from the Mann-Kendall trend analyses completed for CI in groundwater at EV_WH50gw, EV_BRgw and RG_DW-03-01 indicated decreasing, stable or no discernable trend, except for a probably increasing trend for sulphate at EV_BRgw. The maximum sulphate concentration measured at EV_BRgw was 399 µg/L (in Q4 of 2017) and concentrations have not exceeded primary screening criteria. The slope of the increasing trends is very gradual. Furthermore, higher sulphate concentrations have been consistently measured upgradient at EV_RCgw.

9.3.9.3 Discussion

Down Valley Attenuation

In the Michel Creek valley bottom, concentrations of sulphate, nitrate-N and dissolved selenium generally decrease along the groundwater flow path from the highest concentrations measured at EV_RCgw to EV_SPR1A/B/C (Figure EV-20). This could be due to attenuation or mixing with groundwater along the flow path and/or groundwater-surface water interactions (SNC-Lavalin, 2019a; 2019j). Exceptions to the decreasing concentrations along the flow path are listed below.

- Dissolved selenium concentrations at EV_WH50gw in 2019 were lower than upgradient and downgradient locations, consistent with previous results.
- Dissolved selenium measured at EV_MW_MC2B and EV_HW1 were higher than upgradient and downgradient locations.

The relatively lower dissolved selenium concentrations at EV_WH50gw compared to upgradient and downgradient locations could be because this well is installed deeper than surrounding wells (similar to EV_BCgw, described in Section 7.3.6) or is influenced by Michel Creek (as groundwater concentrations are within the range of surface water concentrations at EV_MC2). To further assess the cause of lower CI at EV_WH50gw, pumping rates and well construction details are required. We understand pumping rates are not currently available from EV_WH50gw; however, it is recommended this well be instrumented with pressure transducers (if possible) in 2020. It is also recommended EV_RCgw be instrumented in 2020.

A possible cause for the higher dissolved selenium concentrations at EV_MW_MC2B and EV_HW1 could be because groundwater transport of CI is limited to shallow groundwater in the center of the Michel Creek valley bottom (dissolved selenium was not measured above primary screening criteria at the deep nested location EV_MW_MC2A). Alternatively, there may be an additional source of dissolved selenium in this area. Additional monitoring and sampling are required to further assess the cause of higher dissolved selenium concentrations at EV_MW_MC2B and EV_HW1. Pumping rates are not currently available from EV_HW1; however, it is recommended this well be instrumented with pressure transducers (if possible) in 2020. The EVO 2018 SSGMP Update also recommended supply well EV_MR2 be instrumented if possible.

Groundwater-Surface Water Interactions with Michel Creek

Continuous elevation data from wells along Michel Creek (EV_BCgw, EV_MW_GT1B, EV_MW_BC1A/B, and EV_MW_MC2B) indicate a seasonal response with highest groundwater levels in the spring, approximately following the same response as Michel Creek suggesting a hydraulic connection between groundwater and surface water (Figure EV-11). Groundwater flow directions and vertical gradients indicate that the up-valley reaches of Michel Creek within Study Area 9 may be losing to ground. Concentrations of CI in groundwater are generally higher than those measured in Michel Creek at the up-valley reaches. Farther down valley at EV_MW_MC2A gradients suggest groundwater may be discharging to Michel Creek in this area; additional groundwater monitoring at this location is required to understand whether groundwater is contributing CI to surface water in Michel Creek in this area.

In the Sparwood Area, continuous elevation data from wells along Michel Creek (EV_MW_SPR1B/C, EV_MW_MC3) also indicate a seasonal response with highest groundwater levels in the spring, approximately following the same response as Michel Creek suggesting a hydraulic connection between groundwater and surface water (Figure EV-14). The elevation of surface water in Michel Creek (at EV_MC2) is greater than groundwater elevation at wells in the Sparwood Area suggesting Michel Creek is losing to ground in the Sparwood Area.

Spatial Delineation

Spatial delineation of dissolved selenium appears to be achieved in the Michel Creek valley bottom in 2019, with the exception of EV_MW_SPR1C which was only slightly above the screening criteria in Q1 of 2019. Additional monitoring should occur to confirm this. Downgradient of EV_MW_SPR1C is EV_MCgwS which contained dissolved selenium concentrations below, or very near, the MDL. However, EV_MCgwS is screened in clayey silt underlying coarser sediments. The historical continuous water level data at EV_MCgwS shows a similar seasonal response pattern as other nearby wells screened in coarser material (SNC-Lavalin, 2019c). Therefore, it is possible that despite the relatively low hydraulic conductivity estimated for EV_MCgwS, groundwater is hydraulically connected between EV_MW_SPR1C and EV_MCgwS, and EV_MCgwS represents groundwater quality downgradient of EV_MW_SPR1C.

Additionally, drinking water well RG_DW-03-01, located further downgradient of EV_MW_SPR1C, has concentrations of selenium two orders of magnitude lower than detected at EV_MW_SPR1C.

Teck has indicated that RG_DW-03-01 is no longer used for drinking water and therefore it should be removed from the RDW program and the RGMP. A monitoring well is planned for installation in 2020 in this area. Based on the general decrease in concentrations of sulphate, nitrate-N and dissolved selenium along the groundwater flow path from up-valley in the Michel Creek valley bottom, is it expected that the concentrations continue to attenuate along the shallow groundwater flow path within Study Area 9 (SNC-Lavalin, 2019j).

Sparwood Ridge

Groundwater quality at the base of Sparwood Ridge, downgradient of seeps which previously measured elevated concentrations of dissolved selenium (Site 1B, Site 15 and Site 20; SNC-Lavalin, 2019a) was investigated with the installation and sampling of EV_MW_MC3 (SNC-Lavalin, 2019j). Results from 2019 indicate there were not elevated concentrations of CI at this location suggesting there is not a groundwater transport pathway for CI from Sparwood Ridge. Continued monitoring at this location is required to confirm this interpretation. Evaluation of data from EV_MW_MC3 will be included in the 2020 RGMP Update and Sparwood Ridge data in the 2020 Sparwood Ridge report.

9.3.10 Study Area 10: Michel Creek Valley Bottom Downgradient of Erickson Creek

This area was selected as the EVO SSGMP identified waste rock spoils and other potential sources of CI in the Erickson Creek tributary, which flows into the Michel Creek valley bottom and may contribute to mine-influenced groundwater in the valley bottom.

There is no groundwater well in the Michel Creek valley-bottom aquifer in Study Area 10. Location EV_ECgw is located upgradient in the Erickson Creek tributary and groundwater monitoring of this well has been ongoing to assess potential groundwater transport through the Erickson Creek valley bottom to groundwater in Study Area 10. The Erickson Creek valley bottom consists mainly of colluvium as shown on Drawing 3. The lithology observed at EV_ECgw is consistent with surficial geology mapping and borehole logs (Appendix IV) indicate that till underlies colluvium (Appendix VI; Figure 10). Bedrock was not encountered at this location.

The groundwater flow direction in the Erickson Creek tributary is inferred to follow the direction of Erickson Creek. Artesian groundwater conditions observed in boreholes adjacent to EV_ECgw (Golder, 2019e), shallow groundwater levels at EV_ECgw typically higher than creek levels and gaining reaches of Erickson Creek near EV_ECgw (Golder, 2019d), suggest vertical upward flow from groundwater to surface water in this area. Inferred geological cross sections O-O’ (Drawing 39) depict stratigraphy perpendicular to the inferred groundwater flow direction.

Study Area 10, monitoring well EV_ECgw and relevant surface water locations are shown on Drawing 9. EV_ECgw was included in the EVO SSGMP, presented in Section 7.3.5, which includes presentation of 2019 groundwater elevations and groundwater quality compared to previous results from 2015 to 2018. A brief discussion of results focused on groundwater fate and transport in the from the Erickson Creek tributary to the Michel Creek valley bottom is presented below.

9.3.10.1 Discussion

The 2017 RGMP Update identified the primary potential groundwater transport pathway of CI in Study Area 10 was recharge to groundwater from surface water from Erickson Creek as CI concentrations in Erickson Creek surface water (EV_EC1) are two to three orders of magnitude higher that groundwater concentrations at EV_ECgw (Figure EV-10). However, as described in Section 7.3.5.3, there does not appear to be a strong connection between groundwater at EV_ECgw and surface water in Erickson Creek at EV_EC1 and the vertical groundwater flow direction is interpreted to be upward in the vicinity of EV_EC1. Groundwater-surface water interaction between the valley-bottom aquifer(s) and Erickson Creek will vary both spatially and temporally as flow accretion studies identified gaining and losing reaches of Erickson Creek (Drawing 12; Golder, 2019d).

The Erickson Creek floodplain is made up of interlayered coarse-grained and fine-grained sediments with upward vertical gradient to a shallow unconfined aquifer, which provides gaining or stable reaches of the Erickson Creek (Golder, 2019d). The Golder drive-point piezometers indicated that within the Erickson Creek floodplain, a regular exchange between surface water and groundwater is more likely within the upper nominal 1 m depth during periods of higher surface water levels when the wetted contact surface of the creek is adjacent to the higher hydraulic conductivity sediments (Golder, 2019e). There is currently no groundwater monitoring location in the Erickson Creek floodplain or Study Area 10 boundaries to characterize groundwater conditions in this area, which was identified as a gap in the 2017 RGMP Update (SNC-Lavalin, 2017c). A monitoring well is planned for 2020 to fill this gap in Study Area 10.

In addition to Erickson Creek, there is also potentially loading of CI to Study Area 10 from South Pit Creek Sediment Pond Decant (EV_SP1) and the Milligan Creek Sediment Pond Decant (EV_MG1), located in the valley bottom within Study Area 10. Relatively high CI concentrations exist in surface water at EV_SP1 and EV_MG1 compared to groundwater concentrations and there is no groundwater monitoring well downgradient of this area and as such groundwater quality in Study Area 10 is unknown.

9.3.11 Study Area 11: Michel Creek Valley Bottom Downgradient of CMO

Study Area 11 was identified to be the focal point of groundwater flow at CMO immediately downgradient of the confluence of Michel and Corbin Creeks (e.g., SRK, 2018c). Potential sources of CI exist upgradient of this area and may contribute to the mine influences in groundwater in the Michel Creek valley bottom. Study Area 11 consists of the Michel Creek valley-bottom deposits downgradient of CMO (Drawing 10).

The valley bottoms in Study Area 11 are infilled with till and glacial outwash deposits, as well as fluvial sands and gravels associated with Michel and Corbin Creeks. The geological conditions are shown in cross sections on Drawings 47 to 55 and in a Block Diagram (Appendix VI, Figure 12). Valley-bottom deposits in this area were identified as the primary migration pathway downgradient of the CMO mine-permitted areas. The monitoring locations in Study Area 11 include a nested monitoring well (CM_MW1-OB/SH/DP) installed downgradient of the confluence of Michel and Corbin creeks. Monitoring wells and relevant surface water locations for Study Area 11 are shown on Drawing 10.

The monitoring wells in Study Area 11 (CM_MW1-OB/SH/DP) are included in the 2018 CMO SSGMP Update. The 2019 CMO SSGMP annual report is presented in Section 8.

9.3.11.1 Groundwater Elevations

Groundwater elevations for monitoring wells in RGMP Study Area 11 are discussed in the CMO SSGMP annual report (Section 8.3.4.1). Time series are presented on Figure CM-12. Q4 2019 measurements are presented on Drawing 12.

9.3.11.2 Groundwater Quality Screening Criteria

Groundwater quality results for monitoring wells in RGMP Study Area 11 are presented in the CMO SSGMP annual report (Section 8.3.4.2). CI concentrations are presented as time series (Figure CM-14 for dissolved selenium, Figure CM-16 for sulphate and Figure CM-22 for dissolved cadmium) and on maps (Drawings 56, 57, 58 and 59 for nitrate, sulphate, dissolved cadmium and dissolved selenium, respectively). The results are summarized as follows.

› CI concentrations were below primary screening criteria for all samples in 2019, consistent with previous groundwater quality results (2015 to 2018).
› Concentrations of six non-order constituents exceeded primary screening criteria in one or more of the three monitoring wells (chloride, dissolved barium, dissolved lithium, dissolved molybdenum, dissolved sodium, and dissolved strontium). These are likely from natural sources and lithium concentrations are naturally high across the Elk Valley (SNC-Lavalin, 2017a).
› Mann-Kendall trend analysis indicated increasing trends for sulphate and dissolved cadmium at CM_MW1-OB (Table YY).

9.3.11.3 Discussion

The 2019 results support the previous interpretation that the primary sources of CI in the monitoring wells in Study Area 11 are mixing with surface water and down-valley flow in the valley-bottom aquifer. Lines of evidence supporting this interpretation include the following.

› The vertical hydraulic gradient between the two shallowest wells in the nest at CM_MW1 (-OB and -SH) has consistently been downwards, with a measured value of 0.05 m/m for all four quarters in 2019.
› Concentrations of CI are greater in CM_MW1-OB than the two deeper wells (CM_MW1-SH and CM_MW1-DP).
› The sand and gravel sediments underlying Michel Creek are thin (3.3 m at CM_MW1) and underlain by a thick layer of clay (13 m at CM_MW1) in contact with bedrock.

The dissolved cadmium concentrations at CM_MW1-OB are greater than the deeper wells in the nest and frequently greater than the surface water. These concentration differences suggest a transport pathway within the sand and gravel sediments rather than infiltration from the creek. Concentrations at upgradient monitoring well CM_MW2-SH (Michel Creek valley bottom near confluence of Michel and Corbin Creeks) were greater than CM_MW1-OB in 2019 (0.123 to 0.127 µg/L). Future sampling at new monitoring wells CM_MW9 and CM_MW10 may also be informative in refining the transport pathway once complete annual datasets are available.

The increasing trends identified by Mann-Kendall analysis for sulphate and dissolved cadmium are discussed in Section 8.3.4.3. Neither of these trends warrant further study at this time.

9.3.12 Study Area 12: Elk River Valley Bottom at Study Area Boundary

This area was selected as it is at the boundary of MU 4. Study Area 12 is located downgradient from the confluence of Michel Creek and Elk River. Coarse-grained fluvial and glaciofluvial deposits in Study Area 12 are the primary groundwater-bearing units for domestic and municipal groundwater supplies. District of Sparwood Wells #1 and #2 located north of Study Area 12 extract groundwater from a shallow unconfined sand and gravel unit. A deeper semi-confined to confined sand and gravel aquifer is also present in Study Area 12 (e.g., RG_DW-03-04). The confining layer identified as clay at RG_DW-03-04 is not continuous and the deep unit is inferred to interact with the shallow unit and surface water (Michel Creek and/or Elk River). The extent of the deep unit and the confining layer are not well constrained. Existing wells in Study Area 9 and 12 were used to draw potentiometric contours, which suggests the inferred groundwater flow direction in Study Area 12 is influenced by Michel Creek and are approximately perpendicular to the Elk River. This is flow direction is likely biased due to the absence of monitoring wells south of EV_ER1gwS/D. Cross sections U-U' and V-V' (Drawings 61 and 62) are located approximately parallel and perpendicular to the inferred groundwater flow direction. Figure 11 is a Block Diagram of Study Area 12 (Appendix VI).

The monitoring points in Study Area 12 are EV_ER1gwS/D and RG_DW-03-04 (also identified as the Sparwood Municipal Well #3). Monitoring wells and relevant surface water locations for Study Area 12 are shown on Drawing 12.

9.3.12.1 Groundwater Elevations

Manual and level logger groundwater elevations measured from January 2015 to October 2019 in monitoring wells EV_ER1gwS/D were plotted on a time-series graph (Figure EV-21) along with pumping data for RG_DW-03-04 and daily water level data recorded for Elk River (Environment Canada hydrometric station 08NK016).

Groundwater elevations at EV_ER1gwS and EV_ER1gwD followed a seasonal trend with annual maximums in 2017 and 2018 approximately 0.4 m higher than 2015, 2016 and 2019. The vertical groundwater gradient at the nested well EV_ER1gwS/D was upwards ranging from 0.016 m/m to 0.024 m/m in 2018 (Table 4b), which was similar to previous values.

Fluctuations in EV_ER1gwS generally follow the surface water fluctuation observed at the Elk River hydrometric station suggesting a strong hydraulic connection between groundwater and surface water at this location. Note that the amplitude of the fluctuation in groundwater and surface water are not directly comparable as the hydrometric station is located approximately 15 m north of Sparwood. In addition, we note that the elevation of water level measurement at the hydrometric station is unknown; therefore, the water level data shown on Figure EV-21 are relative and based on the local datum. If possible, it is recommended that the elevation of water level measurement at Environment Canada hydrometric station 08NK016 be surveyed.

9.3.12.2 Groundwater Quality Screening Criteria

A summary of CI above primary screening criteria are presented in Table JJJ. CI concentrations are shown on Drawings 43 to 46.

SNC·LAVALIN

Table JJJ: EVO – Summary of CI Compared to Primary Groundwater Screening Criteria in Study Area 9

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_ER1gwD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_ER1gwS	-	-	-	-	-	-	-	-	-	-	-	-	11.1	11.2	-	10.3
RG_DW-03-04	-	-	-	-	-	-	-	-	-	-	-	-	15.8	-	-	-
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: CSR standards for **Aquatic Life (AW)**, Drinking Water (DW), Livestock (LW) and *Irrigation (IW)* except for wells with a ** which indicates the well is located within 10 m of surface water and results are compared to BCWQG AW.

2 '–' denotes result is below primary screening criteria.

3 Where a duplicate was collected or if more than one sample was collected in a quarter, the higher concentration is provided.

4 Standard varies with hardness.

Dissolved selenium was the only CI above primary screening in Study Area 12. The Q1 sample from RG_DW-03-04 (15.8 µg/L) was the highest concentration measured at this location; between March 2014 and December 2018, measured concentrations ranging from 6.21 to 14.3 µg/L. Concentrations of dissolved selenium at EV_ER1gwS were within range of previous measurements while concentrations at EV_ER1gwD were lower than previously recorded.

In addition to CI, dissolved lithium was measured above the CSR DW standard (8 µg/L) in 2019 at all samples from RG_DW-03-04. The source of lithium is inferred to originate from natural sources (e.g., interaction with bedrock or unconsolidated materials) and elevated concentrations have been observed in other wells across the Elk Valley (SNC-Lavalin, 2017c; 2018b; 2019c).

Mann-Kendall trend analysis was completed for CI with more than seven data points. A summary of results are provided in Table KKK below. Refer to Section 3.3 for an explanation of criteria used to identify significant trends.

Table KKK: RGMP – Summary of Mann-Kendall Trend Analysis for CI in Study Area 12

Well ID \ Parameter[1,2]	Nitrate-N	Sulphate	Dissolved Cadmium	Dissolved Selenium
EV_ER1gwS	Probably Decreasing	No Trend	-	No Trend
EV_ER1gwD	Decreasing	Decreasing	-	Decreasing
RG_DW-03-04	No Trend	Increasing	-	Increasing

Notes:

1 Where CI were measured above primary screening criteria in 2019, the trend result is **bold**. Where the CI were measured above secondary screening criteria for selenium, the result is **shaded and bold**.

2 '–' denotes indicates Mann-Kendall trend analysis was not completed as concentrations were consistently less than or marginally greater than the detection limit.

Results from the Mann-Kendall trend analyses completed for CI in groundwater at EV_ER1gwS/D and RG_DW-03-04 indicated decreasing, stable or no discernable trend, except for increasing trends for sulphate and dissolved selenium at RG_DW-03-04. Although increasing trends were identified at RG_DW-03-04 for sulphate, concentrations are significantly below the CSR DW standard (500 µg/L); between 2014 and 2019 ranged from 70.3 to 124 µg/L. Dissolved selenium concentrations at RG_DW-03-04 fluctuate above and below the CSR DW standard; the slope of the identified increasing trend is gradual and therefore increases have been incremental. The increasing trend is consistent with Teck (2016) which predicted concentrations will increase mitigation activities commence. The source of dissolved selenium is discussed in the following section.

9.3.12.3 Discussion

A time-series plot of dissolved selenium concentrations for groundwater (EV_ER1gwS, EV_ER1gwD and RG_DW-03-04) and surface water stations in the Elk River (EV_ER1) and Michel Creek (EV_MC2) are shown in Figure EV-22, which also includes the Elk River hydrometric station 08NK016 to assess the effect of freshet on selenium concentrations. Drawings 43 to 46 show the spatial distribution of CI for samples collected in Study Area 12.

Consistent with observations in previous annual reports, a clear seasonal trend in dissolved selenium concentrations was observed in the surface water (Elk River and Michel Creek) and groundwater (EV_ER1gwS/D) because of dilution in a freshet dominated regime. Selenium concentrations in groundwater at EV_ER1gwS/D in 2019 were lower than concentrations in Michel Creek and Elk River surface water (EV_MC2 and EV_ER1, respectively) as shown on Figure EV-22. SNC-Lavalin has previously observed that since 2015, selenium concentrations in Michel Creek have been significantly higher compared to Elk River concentrations and groundwater concentrations in EV_ER1gwS/D. The source of this increase is not clear, but it does not appear to be affecting selenium concentrations in EV_ER1gwS/D. Based on comparison of selenium concentrations between groundwater at EV_ER1gwS/D and surface water in the Elk River, surface water infiltration from the Elk River appears to be the main source of selenium in EV_ER1gwS/D.

From 2016 to 2019, groundwater quality in the deeper aquifer at municipal well RG_DW-03-04 (completed at approximately 35 mbgs) appeared to generally reflect Elk River surface water quality. However, selenium concentrations measured at RG_DW-03-04 were above the concentrations measured in Elk River surface water during the fall of 2015 and 2016, as well as in Q1 of 2019 which may suggest influence of Michel Creek surface water on groundwater. The 2017 RGMP Update identified a data gap in the Elk River valley bottom upgradient of RG_DW-03-04 where the groundwater flow path and surface water influence is poorly understood (SNC-Lavalin, 2017c). This gap will be closed through the addition of monitoring well in Study Area 12 in 2020; RG_DW-03-04 is not currently in use as a drinking water source and may be decommissioned in the future (District of Sparwood, personal communication, September 26, 2019). Following installation of the new monitoring well in Study Area 12, it is recommended that it be sampled quarterly and that RG_DW-03-04 be removed from the RGMP sampling schedule.

The extent of mine-influence groundwater in the Elk River valley-bottom aquifer is unknown. However, because groundwater quality in Study Area 12 appears to reflect the Elk River and potentially Michel Creek surface water quality, surface water infiltration rather than a valley-bottom groundwater pathway appears to be the source of elevated CI.

9.4 Groundwater Surface Water Interactions in Other Management Units

As required by Permit 107517, an assessment of potential surface water to groundwater interaction effects in all MUs must be performed. Groundwater-surface water interactions of Study Areas in MUs 1 to 4 are discussed above. Infiltration of the Elk River is interpreted to occur on the local scale downstream of MU 4 based on results from the RDW, now referred to as the RDW program (SNC-Lavalin, 2014). The degree to which surface water infiltration influenced water quality in other MUs is variable and is likely a function of relative levels in the river and groundwater system, river morphology, river gradient, hydraulic properties of the streambed and valley-bottom surficial deposits, distance from river and the degree of pumping from wells (SNC-Lavalin, 2017c). Teck is currently monitoring several domestic water wells in MU 5; the results from this assessment will be considered under the AMP and in future annual reports as appropriate.

9.5 Summary of Results for AMP

A summary of results for the following MQ is provided below:

- MQ3 (“Are the combinations of methods for controlling selenium, nitrate, sulphate and cadmium included in the implementation plan the most effective for meeting limits and site performance objectives?) is in Table LLL.
- MQ6 (“Is water quality being managed to be protective of human health?”) is in Table MMM.

Groundwater monitoring results and other related data are required to re-evaluate the answer to MQ1, 2, and 5. Currently the RGMP is not evaluating data to directly investigate answers to these MQs. Other monitoring programs and groundwater investigations currently support these MQs. Data collected as well as any resulting monitoring requirements may be incorporated into the RGMP at a future date.

Table LLL: Summary of Results Relevant to MQ 3

Topics	Summary for MQ 3
Activities undertaken to answer the MQ/reduce the KU including when (year) and any noteworthy deviations from activities that were planned.	Monitoring of groundwater levels and quality in the Kilmarnock Creek, with four wells included in the FRO SSGMP
Results.	Similar results to Kilmarnock Groundwater Study in support of AWTF-S.
Responses to results (actions done or needed) including any adjustments.	Continue monitoring.
Future activities planned (year) to answer the MQ/ reduce the KU.	Continued monitoring to understand seasonality. Downgradient investigations under the Mass Balance Investigation to reduce uncertainty.
How will these future activities contribute to answering the MQ/ reducing the KU.	Continued monitoring and additional investigations will increase confidence in understanding bypass as well reduce the KU.
What has been learned?	Uncertainty remains on groundwater bypass at Kilmarnock Creek alluvial fan.
Have new KUs arisen from this work?	No.

Table MMM: Summary of Results Relevant to MQ 6

Topics	Summary for MQ 3
Activities undertaken to answer the MQ/reduce the KU including when (year) and any noteworthy deviations from activities that were planned.	Monitoring of groundwater at 101 wells in the RGMP and SSGMPs in 2019.
Results.	Similar results to previous years.
Responses to results (actions done or needed) including any adjustments.	Continue monitoring and fill data gaps through RGMP.
Future activities planned (year) to answer the MQ/ reduce the KU.	Additional groundwater monitoring locations are planned in 2020 to increase the background monitoring network as well as to fill gaps identified in the RGMP in Study Areas 4, 6, 7, 8, 9, 10, 11 and 12.
How will these future activities contribute to answering the MQ/ reducing the KU?	Additional characterization that will inform the RGMP and improve understanding of confirmed/potential transport pathways.
What has been learned?	Groundwater conceptual model continues to be valid.
Have new KUs arisen from this work?	No.

Select KUs that are addressed in the SSGMP/RGMP are listed below.

- KU 3.4: "What additional flow and groundwater information do we need to support water quality management?"
- KU 6.1; "Is our understanding of local groundwater conditions for current and future drinking water use sufficient to minimize human exposure to constituents?"
- KU 6.2: "Is the spatial extent of mine-influenced groundwater sufficiently characterized to manage water quality in order to support meeting the environmental objectives of the EVWQP?"

KU 6.3 ("What are appropriate groundwater related triggers and how can they be used") is currently under development under the AMP and RGMP. Groundwater triggers will be applied through the appropriate monitoring programs once developed. A summary of results related to applicable KUs is provided in Table NNN. More detailed discussions on the activities and learnings associated with evaluating the answer to MQs and reducing KUs will be reported in the Annual AMP Reports.

Table NNN: Summary of Results Relevant to KUs 3.4, 6.1 and 6.2

Topics	Summary for KU 3.4	Summary for KU 6.1	Summary for KU 6.2
Activities undertaken to reduce the KU (and when), and any noteworthy deviations from activities that were planned.	Monitoring of groundwater at four wells drilled as part of the AWTF-S application under the FRO SSGMP.	Monitoring of groundwater at 38 wells in 2019.Drilling investigations in Study Area 9 and Sparwood Area in 2019.	Monitoring of groundwater at 38 wells in 2019. Drilling investigations in Study Area 9 and Sparwood Area in 2019.

Table NNN (Cont'd): Summary of Results Relevant to KUs 3.4, 6.1 and 6.2

Topics	Summary for KU 3.4	Summary for KU 6.1	Summary for KU 6.2
Results.	Similar results to Kilmarnock Groundwater Study in support of AWTF-S. Results confirm that there is bypass. Uncertainty on the residence time of groundwater bypass as well as fate, including possible subsurface attenuation and discharge to the Fording River.	Similar results to previous years: › A transport pathway for mine-influenced groundwater remains in Study Areas 1, 4 and 9. › Data gaps have been filled for Study Area 9, but gaps relating to the understanding of localized conditions remain in Study Areas 1, 4 and downgradient of Study Area 7.	Similar results to previous years, with exceptions: › The reference monitoring well network is insufficient as FR_HMW5 is no longer a suitable reference well. › Down-valley groundwater transport from the Kilmarnock Creek alluvial fan in Study Area 1 is confirmed, and likely extends past the arbitrary Study Area boundary. › Groundwater with Cl concentrations above surface water has been identified in one well within Study Area 4 and another downgradient, suggesting that uncertainty remains in the understanding of the spatial extent of mine influenced groundwater. › The groundwater pathway for mine-influenced water in Study Area 9 discharges to Michel Creek and does not continue at depth into the Sparwood Area.
Responses to results (actions done or needed) including any adjustments.	Continued monitoring of wells used to assess groundwater bypass in Kilmarnock Creek alluvial fan. Mass Balance Investigations initiated in 2019 to address uncertainty.	Continued monitoring. Additional wells were drilled in 2019 in areas where groundwater quality did not meet drinking water criteria: › Five nested wells drilled in the Elk River Valley were installed to provide information on sources and pathways to valley bottom aquifer in Study Area 4. › Nine wells (including five nested) were drilled to delineate Cl extent in Study Area 9 and Sparwood Area.	› Continued monitoring. New wells were added to SSGMP/RGMP monitoring network with subsequent monitoring under SSGMP/RGMP. › A review of data gaps was conducted related to the understanding of the spatial extent of mine-influenced groundwater. › Work plan to fill gaps, including improvement to the reference well network, was developed in consultation with GWG. › Mass Balance Investigations initiated.

SNC·LAVALIN

Table NNN (Cont'd): Summary of Results Relevant to KUs 3.4, 6.1 and 6.2

Topics	Summary for KU 3.4	Summary for KU 6.1	Summary for KU 6.2
Future activities planned (year) to reduce the KU.	› Continued monitoring under FRO SSGMP but also under AWTF-S program. › Drilling and installation of monitoring wells, aquifer pumping tests and subsequent groundwater monitoring of new wells.	One year of groundwater monitoring at newly drilled locations to assess which wells to be added to RGMP if results suggest it reduces KU: › Drilling and monitoring well installation in Study Areas 4 and downgradient of Study Area 7 under the RGMP and in Study Area 1 under the Mass Balance Investigation.	› One year of groundwater monitoring at newly drilled locations to assess which wells to be added to RGMP if results suggest it reduces KU. › Drilling and monitoring well installation in Study Areas 4, 6, 7, 8, 9, 10, 11 and 12. › Wells will also be installed to understand background conditions, and further assessment of the background monitoring network will occur after installation.
How will these future activities contribute to reducing the KU.	The Mass Balance Investigation will reduce uncertainty through quantification of groundwater residence times and flows, as well as the geochemical fate and discharge of mine influenced groundwater.	› Monitoring will inform management of RGMP Study Areas 1, 3 and 4, (where groundwater for drinking water use is considered a potential future receptor) and Study Area 9 and downgradient of Study Area 7 where there is groundwater for drinking water use. › New wells will reduce uncertainty in Study Areas 1 and 4.	› New wells expected to provide additional characterisation of sources and transport pathways of mine-influenced groundwater. Data may be used to support Regional Water Quality Model (RWQM) and Mass Balance Investigation. › Background monitoring network will develop list of mine-related constituents in groundwater which will improve the spatial understanding of mine influence.
What has been learned?	Groundwater bypass occurs in the Kilmarnock Creek alluvial fan and uncertainty exists in groundwater residence times as well as fate and transport.	› Groundwater conceptual model and potential transport pathways supported as previously characterized. › Mine influenced groundwater above drinking water criteria does not extend into Sparwood Area.	› Groundwater conceptual model and potential transport pathways supported as previously characterized. › Additional definition on the extent of mine-influenced groundwater achieved through investigations. › Additional background monitoring wells required.
Have new KUs arisen from this work?	No new KUs identified.	No new KUs identified.	No new KUs identified.

10 Quality Assurance/Quality Control (QA/QC)

Teck provided field and laboratory data relevant to the SSGMPs and RGMP to SNC-Lavalin and Golder. Analysis of the QA/QC data was completed by SNC-Lavalin and Golder. SNC-Lavalin has relied on data and information provided by Teck and has therefore assumed that the information is both complete and accurate. Interpretations and conclusions within this report are made with the assumption that data collection was completed in accordance with Permit 107517, the British Columbia Field Sampling Manual (Clark, 2013), and Teck's Standard Practice and Procedures (SP&P).

A QA/QC program specific to the RGMP is not yet in place; however, each Operation/Program (e.g., SSGMP and RDW) conducted a QA/QC program, which is described in Appendix VIII, except for LCO, which is described in the SSGMP report (Appendix II). The QA/QC assessment completed for the RGMP included shipping and handling issues, summarized results of relative percent differences (RPDs) from duplicate samples, and any detection of analytes in field blanks for QA/QC samples not already identified in the SSGMPs. Summaries of QA/QC methods and results of the QA/QC programs are included in Appendix VIII. A summary of the QA/QC results for each Operation/Program is presented below.

10.1 Fording River Operations QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. Except for three RPD values greater than 50% for three parameters, the remaining RPD values for the remaining parameters sampled were less than 50%. The possibility of higher dissolved cadmium, alkalinity (carbonate as $CaCO_3$) and turbidity concentrations reflected in the RPD results will be considered in the interpretation of the results. Hold time exceedances were considered in analysis of the results. The results reflect low variability for handling and sampling for the program.

The laboratory quality control reports were reviewed, and the data are considered reliable. Detectable concentrations of select parameters in trip and field blanks were marginally above the detection limit for orthophosphate, ammonia-Nitrogen (ammonia-N), total Kjeldahl nitrogen (TKN), and dissolved zinc, boron, and chromium and were well below applicable primary screening criteria where applicable and did not affect the reliability of the data.

10.2 Greenhills Operations QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report, except for dissolved selenium results from GH_MW-RLP-1D (Q4), GH_MW-UTC-A (Q2 and Q3), GH_GA-MW-2 (Q4), GH_GA-MW-3 (Q3 and Q4), and GH_MW-ERSC-1 where concentrations are inferred to be biased high. These dissolved selenium results are considered suspect; however, the inclusion of these results does not affect the overall evaluation of groundwater and the data have therefore not been excluded. Except for one RPD value greater than 50% for one parameter, the remaining RPD values for the remaining parameters sampled were less than 50%.

Hold time exceedances were only for re-analysed samples. Detectable concentrations of select parameters in trip and field blanks were well below applicable primary screening criteria for dissolved boron, sodium, copper, and ammonia-N and did not affect the reliability of the data. The laboratory quality control reports were reviewed, and the data are considered reliable.

10.3 Line Creek Operations QA/QC Summary

The field QA/QC program and laboratory QA/QC results for LCO are presented in the 2019 SSGMP included in Appendix II.

10.4 Elkview Operations QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. RPD values greater than 50% were identified for turbidity and alkalinity (carbonate as $CaCO_3$) in one sample in Q1 and Q3, respectively; however, the remaining RPD values for all other parameters were less than 50%. Hold time exceedances were only for re-analysed samples. Detectable concentrations of select parameters in trip and field blanks were well below applicable primary screening criteria for ammonia-N and did not affect the reliability of the data. The laboratory quality control reports were reviewed, and the data are considered reliable.

The Q3 2019 potentiometric elevation at EV_WF_SW is eight meters lower than the groundwater elevation prior to operation of the WFTF and is therefore considered suspect. The measurement from Q3 of 2019 (163.58 metres below top of casing [mbtoc]) was 13.5 m lower than previous water level measurements and is equivalent to the drilled depth plus the height of stick-up; therefore, it is either a field transcription error or the depth to bottom measured from the top of casing.

10.5 Coal Mountain Operations QA/QC Summary

The field QA/QC program and laboratory QA/QC results for groundwater samples indicate the data collected are acceptable for the analyses conducted in this report. With one exception, all RPD values were less than 50%. Sample temperatures in transport exceeded the Austin (2016) target by 2°C in one batch of samples. Ammonia-N results should be regarded as provisional because concentrations in blanks ranged the same orders of magnitude as the sample results; however, both the results and blank detections are an order of magnitude lower than the primary screening criteria. The laboratory quality control reports were reviewed, and the data are considered reliable.

10.6 Regional Drinking Water Sampling Program QA/QC Summary

RDW program QA/QC data relating to the RGMP were considered acceptable. There were no hold time exceedances and the RPD for turbidity (53 %) above the acceptable level at RG_DW_02-20 in Q3 of 2019 is not considered to influence interpretation of results.

11 Conclusions

Groundwater results and interpretations in 2019 were generally consistent with those outlined in past reports, and most recently the 2019 SSGMP Updates and 2017 RGMP Update (SNC-Lavalin, 2019b, 2019c, 2019d; Golder, 2019b; SRK, 2019b; SNC-Lavalin, 2017c). New findings have been discussed above and are summarized below.

11.1 SSGMP

11.1.1 Fording River Operations

A summary of the 2019 FRO SSGMP is as follows:

- In 2019, quarterly groundwater monitoring and sampling was completed in each of the 22 monitoring wells, except for FR_HMW5 in Q1 when water was frozen in the well. Groundwater sampling was also completed at two supply well locations encompassing 7 wells.
- The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. Except for three RPD values greater than 50% for one parameter in each sample, the remaining RPD values were less than 50%. The laboratory quality control reports were reviewed, and the data were considered reliable. Detectable concentrations of select parameters in trip and field blanks were, for the most part, marginally above the detection limit or well below applicable primary screening criteria and did not affect the reliability of the data.
- Review of continuous groundwater elevation data indicated groundwater elevations follow a seasonal trend with higher groundwater levels recorded in spring months. Exceptions include FR_HMW2 and FR_09-04-A/B, which are affected by mining activity (i.e., tailings ponds or backfilled pits).

Groundwater results and interpretations were similar to previous years, with notable conclusions listed below by drainage.

11.1.1.1 Henretta Creek Valley

- Groundwater in reference well FR_HMW5 has dissolved selenium and sulphate concentrations that were less than primary screening criteria; however, Mann-Kendall results confirm an increasing trend in CI. Dissolved selenium concentrations measured in 2019 were the highest recorded values at this location since monitoring began. Monitoring well FR_HMW5 is currently scheduled to be replaced in 2020 as part of the RGMP program with a new background well upgradient of the current location.
- Results from monitoring well FR_HMW2 indicate that the Henretta Spoils are an ongoing source of dissolved selenium and sulphate to groundwater in the valley bottom. Mann-Kendall analyses indicate an increasing trend for both dissolved selenium and sulphate. Nitrate-N concentrations are decreasing, likely due to source depletion in the spoil. Concentrations in adjacent surface water remain low, suggesting limited loading to Henretta Creek.

- In the Henretta backfilled pits between the Henretta reclaimed channel and the spoils to the north, monitoring wells FR_HMW1S/D continue to have concentrations of dissolved selenium and sulphate above primary screening criteria. Dissolved selenium concentrations are greater in the shallow well and sulphate concentrations are greater in the deeper well. Mann-Kendall analyses suggest an increasing trend for dissolved selenium in FR_HMW1S and a stable trend for FR_HMW1D. For sulphate, Mann-Kendall analyses indicate an increasing trend for both wells. CI concentrations in both wells are not reflective of concentrations in surface water in Henretta Creek, suggesting little groundwater-surface water interaction. However, it may still be possible that some groundwater from the backfilled pits flows toward the Fording River Valley.
- In backfilled pits in the eastern portion of the former South Henretta Pit, monitoring well FR_HMW3 had dissolved selenium and sulphate concentrations similar to previous years. Mann-Kendall analyses suggest an increasing trend for dissolved selenium. Sulphate results for Mann-Kendall analyses suggest a decreasing trend. Nitrate-N concentrations are decreasing and may be a result of depletion at the source.

11.1.1.2 Fording River Valley

- Directly south of the confluence with Henretta Creek in the Fording River Valley, groundwater in shallow well FR_TBSSMW-2, displayed similar CI concentrations and seasonality to the Fording River, whereas deep groundwater at FR_TBSSMW-1 did not. FR_POTWELLS, farther down valley and downgradient, also has a strong surface water connection with the Fording River.
- Downgradient of the Clode Creek and Clode Settling Ponds, shallow well FR_GCMW-2 had CI concentrations greater than the primary screening criteria and concentrations in the Fording River, whereas deeper well FR_GCMW-1B did not. The shallow well may be influenced from seepage from the Clode Creek Settling Pond.
- Farther down valley and downgradient, monitoring well FR_MW-1B has dissolved selenium and nitrate-N concentrations greater than the primary screening criteria. Comparison of groundwater and surface water results suggests a groundwater-surface water interaction with the Fording River.
- Directly downgradient of the STP, CI concentrations in monitoring wells FR_09-04-A/B remain below the primary screening criteria. Low concentrations are a result of attenuation in the STP.
- South of the STP, CI concentrations in the Kilmarnock alluvial fan monitoring wells FR_KB-1, FR_KB-2, and FR_KB-3A/B were the highest measured in the Fording River Valley downgradient of the STP with CI greater than the primary screening criteria. These elevated concentrations are inferred to result from infiltration of Kilmarnock Creek. CI concentrations decrease downgradient in FR_MW-SK1A/B, FR_09-01-A/B, and FR_09-02-A/B. Monitoring wells FR_MW-SK1A/B confirm a shallow mine-influenced groundwater on the eastern side of the Fording River Valley downgradient of the Kilmarnock alluvial fan. There are two transport pathways for elevated CI in groundwater in the Fording River valley bottom: surface water recharge of groundwater from infiltration of the Fording River; and surface water infiltration of Kilmarnock Creek in the alluvial fan and down-valley transport of CI-influenced groundwater. Monitoring wells FR_09-01-A/B are inferred to be influenced by Kilmarnock Creek and monitoring wells FR_09-02-A/B are more reflective of the Fording River with some influence from the Kilmarnock Phase 2 Settling Pond during freshet.

- Farthest downgradient well FR_GH_WELL4 had dissolved selenium and nitrate-N concentrations greater than the primary screening criteria and are inferred to represent the mine-influenced groundwater from the Kilmarnock Creek alluvial fan.

11.1.2 Greenhills Operations

A summary of the 2019 GHO SSGMP is as follows:

- In 2019, quarterly groundwater monitoring and sampling events were completed at each of the 19 SSGMP wells. Two additional sampling events were completed for wells part of the GHO CPX2 Program (GH_MW-MC-1S/D and GH_MW-MC-2S/D). Samples from the site-specific program were submitted for all parameters on the SSGMP analyte list, with the exception of bicarbonate (as HCO_3), carbonate as (CO_3), and hydroxide (as OH). Groundwater samples were not collected from monitoring well GH_MW-SITE-A (Q1 to Q3) and GH_MW-UTC-A (Q4), because the wells were dry and frozen, respectively during the sampling events.
- The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. A notable exception was the dissolved selenium results from GH_MW-RLP-1D (Q4), GH_MW-UTC-A (Q2 and Q3), GH_GA-MW-2 (Q4), GH_GA-MW-3 (Q3 and Q4), and GH_MW-ERSC-1, where the laboratory indicated the results were biased high. These dissolved selenium results are considered suspect; however, they do not affect the overall evaluation. With the exception of one RPD value greater than 50%, the remaining RPD values for the remaining parameters were less then 50%. Overall, the laboratory quality control reports have been reviewed and the data are considered reliable.
- Review of continuous groundwater elevation data indicated groundwater elevations follow a seasonal trend with higher groundwater levels recorded in spring months, except at GH_GA-MW-1, GH_MW-RLP-1D, GH_MW-TD and GH_MW-MC-2D in 2019. There are currently dataloggers in supply wells GH_POTW09 and GH_POTW17; however, the loggers require significant calibration in order to process the data. Downward vertical hydraulic gradients have been calculated at nested well pairs in the Elk River valley (GH_MW-MC-1S/D, GH_MW-MC-2S/D and GH_MW-UTC-A/B) and the Fording River Valley (GH_MW-GHC-A/B).
- Groundwater results and interpretations were similar to previous years, with notable conclusions listed below by drainage.

11.1.2.1 Porter Creek Watershed

- Dissolved selenium and sulphate in tributary surface water from Porter Creek are of the same order of magnitude as concentrations measured in groundwater, indicative of a strong hydraulic connection. Surface water is inferred to be the main transport pathway for loading of mine-influenced constituents to the Fording River valley bottom.

11.1.2.2 Greenhills Creek Watershed

- Concentrations of CI measured at GH_MW-SITE-A are consistent with those measured in seeps along the toe of the Site A Rejects. The groundwater elevation at this well and at seeps are consistent and therefore seeps are considered representative of groundwater. The CCR is a confirmed source of sulphate.
- Concentrations of dissolved selenium in surface water from the Fording River (GH_FR1) and Greenhills Creek (GH_GH1) were approximately one to three orders of magnitude higher than groundwater in the Greenhills Creek alluvial fan. Sulphate concentrations in groundwater at the nested well pair GH_MW-GHC-A/B exhibited similar seasonal fluctuations to surface water from Greenhills Creek and concentrations were within the same range. Sulphate at GH_MW-GHC-A/B may be sourced from infiltration of Greenhills Creek over the alluvial fan. Low dissolved selenium concentrations may be attributed to preferential attenuation in the aquifer.
- Low concentrations of dissolved selenium measured in deep well GH_MW-TD, downgradient of the TSF and the Site D/E Rejects, suggest the absence of a deep groundwater pathway and interaction with surface water. Seeps daylight along the toe of the Site D/E Rejects and are considered representative of shallow groundwater. The overlying rejects in this area are interpreted to influence seep water chemistry.
- Low dissolved selenium and sulphate concentrations in groundwater at GH_MW-RLP-1D suggest little influence from Fording River surface water and the absence of interaction with surface water. This is consistent with the interpretation that relatively continuous aquitard exists in the Fording River Valley in the Greenhills Creek Monitoring Area.
- Concentrations of CI in supply wells (GH_POTW09 and GH_POTW17) have remained less than the primary screening criteria with the exception of dissolved selenium and sulphate at GH_POTW17 in Q3 and Q4, respectively. Similar seasonal trends of dissolved selenium exist in groundwater at GH_POTW17 and surface water Greenhills Creek (GH_GH1), except there was a lag identified in groundwater. Seasonal trends in sulphate at GH_POTW17 differed from the adjacent Greenhills Creek, suggesting an additional source (possibly the CCR) may contribute sulphate to the aquifer. In addition, groundwater withdrawals from the supply wells are also expected to affect the groundwater flow regime and may induce surface water infiltration in the Greenhills Creek catchment.

11.1.2.3 Elk River Valley Watershed

- Concentrations of CI in tributary surface water from Wolfram and Thompson Creeks have historically been greater than concentrations in groundwater, suggesting that surface water is the primary pathway for transport of CI to the Elk River valley bottom. Groundwater in the Mickelson Creek drainage has been sampled since Q4 2018 and should continue to be sampled in order to establish trends.
- Groundwater samples from GH_GA-MW-1, GH_MW-MC-1S and -D, GH_MW-MC-2S, GH_GA-MW-4, and GH_MW-UTC-A and -B, were below the primary screening criteria for dissolved selenium. Based on low selenium concentrations in groundwater, groundwater transport of CI in these areas was inferred to be minimal.

- Elevated concentrations of dissolved selenium relative to primary screening criteria were measured at deep well GH_MW-MC-2D, located in the Mickelson Creek drainage. Based on the depth of the well, major ion distribution, and calculated selenium to sulphate ratios, dissolved selenium concentrations are inferred to be naturally occurring. Groundwater at GH_MW-MC-1S/D and shallow well GH_MW-MC-2S is inferred to be influenced by infiltration from the Elk River in this area. However, shallow wells GH_MW-MC-1S and -2S do appear to have some mine influence related to surface water from infiltration from Mickelson Creek.
- Decreasing trends in CI have been calculated in groundwater from GH_GA-MW-4, located in the Leask Creek drainage. Groundwater in this region appears to be predominantly influenced by infiltration from the Elk River, with the influence from mine influenced Leask Creek decreasing over time.
- Since 2018, increasing concentrations of CI were measured at GH_GA-MW-2 (near Wolfram Creek), reflecting a transition to more sulphate-rich water in deep groundwater.
- Groundwater at GH_GA-MW-3 (near Thompson Creek) appears to be influenced by a combination of the Elk River side channel and mine influenced Thompson Creek. At times of peak flows in the creek, the groundwater chemistry at GH_GA-MW-3 appears to be influenced by infiltration of surface water from Thompson Creek. However, at times of low flow, CI concentrations decrease and the water type shifts from predominantly sulphate-rich to bicarbonate-rich, therefore the influence of Thompson Creek on groundwater at this location appears to be less than the influence from the Elk River.
- Since 2017, concentrations of CI measured in groundwater from GH_MW-ERSC-1, located downgradient of Thompson Creek and the Elk River side channel, have increased with some occurrences greater than the primary screening criteria. The major ion distribution fluctuated throughout 2019 from sulphate rich in Q1 to bicarbonate rich by Q4, consistent with changes in water type identified in 2017 and 2018, as presented in the 2018 SSGMP. Overall, groundwater in this area appears to be influenced by the Elk River as well as mine-influenced water. The source and transport pathway of mine-influenced water to this location is not known and will be investigated as part of the Mass Balance Investigation in 2020.
- Additional wells in the Elk River Valley watershed have been installed as part of the GHO CPX2 and TSF Permitting Programs in the Leask and Wolfram drainages as well as upgradient of Fowler and Rush Creeks (GH_MW_LC1-A/B, GH_MW_LC2-A/B, GH_MW_WC1-A/B/C, GH_MW_FC1, GH_MW_FC2). These wells are sampled quarterly in 2020 as part of the GHO CPX2 and TSF Permitting Programs and results should be reviewed for inclusion in the 2020 SSGMP annual report.

11.1.3 Line Creek Operations

The findings of the 2019 LCO SSGMP completed by Golder (Appendix II) can be summarized as follows.

- The program consisted of quarterly monitoring and sampling of six wells in the Dry Creek area and four wells in the Process Plant area, with an additional three wells in the Process Plant area that were monitored for groundwater elevation but not sampled.
- Groundwater elevations in the Process Plant area ranged from approximately 1,235 to 1,268 masl, with groundwater flow in the valley-bottom aquifer was directed west towards the Elk and Fording Rivers.

- Groundwater elevations in the Dry Creek area ranged from approximately 1,685 to 1,707 masl, with flow directed towards Dry Creek along a gaining stretch above the confluence with the East tributary, and flow directed parallel to Dry Creek along a losing stretch.
- The concentration of nitrate-N was five times the laboratory MDL in the trip blank collected in Q1. No QA/QC concerns were identified with respect to CI.
- Concentrations of CI were below the primary screening criteria in all groundwater samples collected as part of the SSGMP in both the Dry Creek and Process Plant areas in 2019.
- Concentrations of several non-order constituents exceeded the primary screening criteria in groundwater samples collected from both areas in 2019, including dissolved barium, boron, chloride, cobalt, fluoride, lithium, manganese, and molybdenum. In all cases the concentrations of these non-order CI constituents were within their historical ranges and their presence in groundwater is interpreted to be due to naturally occurring processes.
- Mann-Kendall analyses of Q1 and Q4 data since 2014 of four wells identified an increasing trend of dissolved selenium in Q1 and a probably increasing trend of dissolved cadmium in Q4 at LC_PIZP1104, increasing trends of dissolved cadmium in Q1 and of sulphate in both Q1 and Q4 at LC_PIZP1105 and an increasing of dissolved selenium in Q4 of LC_PIZDC0901. A decreasing trend of sulphate in Q4 was also identified at LC_PIZP1104. All other analyses of data in the Process Plant and Dry Creek areas indicated stability or no apparent trend.

11.1.4 Elkview Operations

A summary of the 2019 EVO SSGMP is as follows.

- In 2019, quarterly groundwater monitoring and sampling was completed in 25 monitoring wells and one supply well.
- The field QA/QC program and laboratory QA/QC results for groundwater samples indicated the data collected are acceptable for use in this report. With the exception of two values, RPD values were less than 50%. The laboratory quality control reports were reviewed and the data were considered reliable. Detectable concentrations of select parameters in trip and field blanks were, for the most part, marginally above the detection limit or well below applicable primary screening criteria and did not affect the reliability of the data.
- Surface water levels from the Elk River, Michel Creek and Erickson Creek appear to be responsive to precipitation (i.e., episodes of higher precipitation are correlated to increases in level. Gate Creek level data does not follow water levels in Michel Creek and does not appear to be responsive to precipitation.

Groundwater results and interpretations were similar to previous years, with notable conclusions listed below by watershed.

11.1.4.1 Grave Creek/Harmer Creek Watershed

- There were no CI concentrations measured above primary screening criteria at EV_GV3gw in 2019. Mann-Kendall trend analysis identified an increasing trend for dissolved selenium at EV_GV3gw; however, the increase is gradual (0.2 µg/L per year between 2015 and 2019).

- Review of water elevation trends in EV_GV3gw and EV_HC1 suggest a hydraulic connection between surface water and groundwater; however, the seasonal fluctuations observed in surface water dissolved selenium concentrations are not reflected in groundwater. Seasonal fluctuations in sulphate concentrations were identified in both surface water and groundwater suggesting selenium concentrations may have attenuated in the subsurface. This conclusion was supported by selenium to sulphate ratios in groundwater.
- Consistent with previous assessments, relatively low CI concentrations (below primary screening criteria) at EV_GV3gw suggest groundwater transport of CI from the Harmer Creek/Grave Creek drainage is minimal compared to surface water; therefore, surface water is considered the main transport pathway for CI to groundwater in the Elk River valley bottom.

11.1.4.2 Elk River Watershed

- There were no CI concentrations detected above primary screening criteria at EV_BALgw, EV_LSgw, EV_GCgw and EV_OCgw.
- Mann-Kendall trend analysis identified an increasing trend for sulphate at EV_OCgw. Sulphate concentrations are an order of magnitude below primary screening criteria.
- Surface water from Goddard Creek (EV_GC2) contained the highest selenium surface concentrations in surface water and is interpreted to lose to ground near Goddard Settling Ponds and Goddard Marsh, and may influence groundwater quality in this area. Groundwater is not considered to be adequately monitored in this area, which was identified as a data gap in the 2017 RGMP Update; this gap is scheduled to be filled by the addition of a new monitoring well in 2020.
- Review of available groundwater data from monitoring locations in the Elk Valley Watershed indicate there does not appear to be a confirmed groundwater transport pathway between the surface water sources identified on the western slope of EVO and Elk River valley bottom, consistent with previous assessments.

11.1.4.3 Erickson Creek Watershed

- There were no CI concentrations detected above primary screening criteria at EV_WF_SW and EV_ECgw.
- Mann-Kendall trend analysis identified an increasing trend for dissolved selenium at EV_ECgw, driven by the 2019 Q4 result, more than double the previously measured maximum concentration. The increase in dissolved selenium concentrations may be related to flowing artesian conditions at EV_EC2 infiltrating to ground near EV_ECgw; EV_EC2 flowed for approximately one day in March 2019 and contained total selenium concentrations up to 7.1 µg/L. To assess any continued influence from flowing artesian groundwater at EV_EC1 or EV_EC2, EV_ECgw should continue to be monitored.
- Review of subsurface information, groundwater chemistry and the groundwater flow regime suggest there is not a strong connection between groundwater at EV_ECgw and surface water in Erickson Creek.
- Consistent with findings presented for Study Area 10 in the RGMP, the effects of mine influence on groundwater in Michel Creek valley bottom where Erickson Creek discharges to Michel Creek are likely to be the result of infiltration of surface water rather than tributary groundwater transport.

11.1.4.4 Michel Creek Watershed

- CI were measured above primary screening criteria at EV_MW_SPR1 and above primary and secondary screening for selenium at EV_RCgw, EV_MW_GT1B, EV_MW_BC1A/B, EV_BCgw and EV_MW_MC2B. Concentrations of CI from 2019 at EV_RCgw, EV_BCgw and EV_MCgwD were similar to previous years with the exception of EV_BCgw where concentrations of dissolved selenium at EV_BCgw in 2019 were notably lower compared to previous years.
- Mann-Kendall trend analyses identified a probably increasing or increasing trend at EV_RCgw (sulphate and dissolved cadmium), EV_MCgwD (nitrate-N and dissolved cadmium) and EV_MCgwS (sulphate). Of the parameters identified to have increasing trends, sulphate at EV_RCgw is the only parameter above primary screening criteria. Concentrations of sulphate and dissolved selenium were identified to increase along a very gradual slope. EV_RCgw contains the highest CI concentrations measured in groundwater and should continue to be monitored. Other increasing trends in CI identified at EV_MCgwS/D are below primary screening criteria, however, groundwater at these wells should continue to be monitored.
- Consistent with previous observations, the highest groundwater concentrations of sulphate, nitrate-N and dissolved selenium in 2019 in the Michel Creek valley bottom were measured at EV_RCgw, which appear to originate from a groundwater pathway of mine-influenced water and not as a result of surface water infiltration from Bodie or Gate creeks. The source of the elevated concentrations at EV_RCgw is currently unknown but could be related to waste rock upgradient of the area or dewatering of Natal Pit.
- Review of data from 2019 indicate the source of elevated CI in shallow groundwater at EV_MW_GT1B is not clear and may receive loading from Gate Creek Pond (based on the shallow installation depth and comparison of CI concentration) as well as seasonal influence from surface water in Michel Creek. It is also possible elevated concentrations of CI from groundwater near EV_RCgw contribute to CI concentrations at EV_MW_GT1B.
- The source of elevated sulphate, nitrate-N and dissolved selenium at EV_MW_BC1A/B is not clear but is inferred to originate from infiltrating surface water from Bodie Creek Pond (EV_BC1) and/or potentially groundwater transport from the same source as EV_RCgw.
- Farther downgradient are nested well pairs EV_MW_MC1A/B and EV_MW_MC2A/B, of which only the shallow nested well EV_MW_MC2B contained dissolved selenium above primary screening criteria. Concentrations of EV_MW_MC2B were higher compared to concentrations in Michel Creek (EV_MC2) indicating there is a groundwater pathway of CI in this location. In the Sparwood Area, the only CI concentration measured above screening criteria was dissolved selenium at shallow EV_MW_SPR1C in Q1 of 2019, which was within range of surface water from Spring Creek (EV_SPR2), Aqueduct Creek (EV_AQ6) and Michel Creek (EV_MC2), but appear to follow concentration patterns of EV_MC2.
- Wells installed at the base of Baldy Ridge (EV_MW_MC4, EV_MW_AQ1 and EV_MW_AQ2) did not contain CI concentrations above primary screening criteria in 2019. The main transport pathway of CI from sources from Baldy Ridge to groundwater in the Sparwood Area valley-bottom sediments is through surface water infiltration associated with drainages of Aqueduct, Qualtieri and Cossarini creeks which contain dissolved selenium concentrations above primary screening criteria. Results from 2019 indicate little influence on the groundwater from surface water infiltration of Aqueduct Creek suggesting no effect from surface water infiltration from Aqueduct Creek; this should be confirmed with additional monitoring.

SNC·LAVALIN

11.1.5 Coal Mountain Operations

The groundwater monitoring conducted in 2019 indicated conditions similar to previous monitoring years. Results may be summarized as follows.

- The QA/QC assessment of the data collected at CMO indicate data quality adequate to conduct the analyses and interpretations.
- Groundwater elevations and vertical hydraulic gradients measured in 2019 were consistent with previous years.
- Nine non-order constituents had concentrations exceeding primary screening criteria across CMO in 2019 (chloride, fluoride, and dissolved barium, boron, lithium, manganese, molybdenum, sodium, and strontium). All these exceedances are inferred to be naturally occurring.

11.1.5.1 Corbin Creek Watershed

- CI concentrations exceeding primary screening criteria in groundwater in the Corbin Creek Valley were limited to sulphate and dissolved selenium at one monitoring well (CM_MW5-SH), and only during the first quarter sampling event. CM_MW5-SH was also the only well with CI concentrations above primary screening criteria in previous monitoring years. Mann-Kendall trend analysis indicated an increasing trend for dissolved selenium at this well; however, the time-series data indicate concentrations have been stable since Q4 2017.

11.1.5.2 Michel Creek Watershed

- CI concentrations exceeding primary screening criteria in groundwater in the Michel Creek Valley were limited to sulphate and dissolved selenium at one monitoring well (CM_MW7-DP). The sulphate concentrations sampled from this well in 2019 were within the range measured previously. The dissolved selenium concentrations were greater than previous results (annual mean of 11.8 µg/L in 2019 vs. 2.1 µg/L for the earliest four consecutive quarters with samples, Q3 2016 to Q2 2017), and Mann-Kendall analysis indicated an increasing trend. This well is located at mid-elevation within CMO (in bedrock directly below the spoils footprint) and approximately 800 m upgradient of the Michel Creek valley bottom.
- Increasing trends were identified for sulphate and dissolved cadmium at CM_MW1-OB (also in Study Area 11). Concentrations of both remained below primary screening criteria in 2019. The transport pathway to this well appears to be within the valley-bottom sediments rather than infiltration of surface water from Michel Creek. Monitoring data from new wells CM_MW9 and CM_MW10 may support refinement of the transport pathway interpretation, once available.

SNC·LAVALIN

11.2 RGMP

11.2.1 Background (Reference) Areas

CI concentrations in background wells FR_HMW5 and CM_MW3-SH/DP were below the primary screening criteria in 2019. Lithium, measured in each of the background wells above screening criteria, is interpreted to be naturally occurring. Other non-order constituents greater than the primary screening criteria, included sodium and chloride in CM-MW3-DP, are also inferred to be naturally occurring. Monitoring well FR_HMW5 exhibited increasing trends in dissolved selenium and sulphate and is scheduled to be replaced in 2020.

11.2.2 Study Area 1

Groundwater samples collected from monitoring wells FR_09-01-A/B and FR_GH_WELL4 are mine-affected and groundwater probably originates from Kilmarnock Creek infiltrating into the Kilmarnock alluvial fan and travelling downgradient (down-valley) on the east side of the Fording River Valley. CI concentrations are highest in wells installed in the Kilmarnock alluvial fan and concentrations decrease in wells downgradient as far as FR_GH_WELL4, where concentrations increase moderately, but remain lower than in the alluvial fan. Flow accretion studies south of the STP and groundwater chemistry suggest that FR_09-02-A/B may be influenced by mine-affected surface water infiltration from the Fording River, which loses to ground over this stretch.

Monitoring well GH_MW-PC is farthest downgradient monitoring well on the western side of the Fording River Valley. Dissolved selenium concentrations were greater than the applicable standard and similar to surface water from Porter Pond. There is a strong hydraulic connection between surface water and groundwater in this area. Porter Creek surface water is interpreted to be the main transport pathway for loading of CI to the valley bottom in the Fording River Valley.

11.2.3 Study Area 2

Groundwater quality in LC_PIZDC1308 and LC_PIZDC1307 historically has been consistently below primary screening criteria for the CI. There are no groundwater monitoring wells in the valley bottom, which is identified as a gap. However, potential pathways for CI to groundwater in the valley bottom within Study Area 2 are being monitored by wells upgradient in the Dry Creek drainage and in surface water at monitoring stations in Dry Creek and the Fording River. There are no continuous aquifers in the Dry Creek drainage; therefore, the primary transport pathway to groundwater in Study Area 2 is probably the surface water pathway as groundwater transport through the till is negligible. The effects of Dry Creek mine influence on groundwater in the alluvial fan is inferred to be relatively lower than the infiltration of surface water from Fording River.

11.2.4 Study Area 3

Surface water infiltration appeared to affect groundwater in the supply wells in 2019. Groundwater withdrawals may influence the groundwater flow regime in the Greenhills Creek catchment and Fording River valley-bottom aquifer. However, silt and clay units at surface in the Fording River valley bottom in Study Area 3 generally provide a hydraulic barrier minimizing downward transport of mine-influenced water into the aquifer with water supply wells. Concentrations of CI in surface water are significantly higher than groundwater indicating surface water is the main pathway for mine-influenced water and not groundwater.

11.2.5 Study Area 4

Groundwater dissolved selenium concentrations in Study Area 4 have shown considerable variability (i.e., orders of magnitude) and the local-scale interaction with surface water and groundwater discharge is variable. It is suspected that variable groundwater CI concentrations are due to variability in CI concentrations in surface water from nearby tributaries as well as the seasonal influence of the Elk River side channel. Monitoring wells installed as part of the CPX2 Project should be considered for inclusion in the RGMP in the 2020 RGMP Update. Monitoring wells are planned for Study Area 4 through the Mass Balance Investigation in 2020 and should be considered for inclusion in the 2020 RGMP Update.

Mining influence on groundwater is interpreted to be on the local scale proximal to the infiltration ponds at the base of the valley flanks adjacent to GHO; however, groundwater CI concentrations have been measured above surface water at RG_DW-01-03 which suggests a possible groundwater transport pathway. A monitoring well is planned for this area in 2020 to investigate this potential pathway. Groundwater concentrations of CI were below screening criteria at the supply well RG_DW-01-03 and domestic well RG_DW-01-07. Concentrations of dissolved selenium decrease farther downgradient at RG_DW-01-7; however, sulphate concentrations increase at this location.

11.2.6 Study Area 5 and 6

The existing monitoring network indicates that groundwater in the Process Plant area does not appear to be mine-influenced. There is currently limited quantitative information for the Elk River valley-bottom aquifer downgradient of identified sources near the Process Plant. This was identified as a data gap in the 2017 RGMP Update and will be addressed with additional monitoring wells planned for installation near the southern boundary of Study Area 6 in 2020. A potential pathway between mine-influenced water in Line Creek and groundwater exists as Line Creek flows over the alluvial fan in Study Area 5. This will be investigated in 2020 with flow and load accretion studies.

11.2.7 Study Area 7

Loading of mine-influenced constituents to groundwater is inferred to be primarily from infiltration of Elk River surface water as CI concentrations measured at RG_DW-02-20 reflect Elk River surface water quality. Consistent with previous assessments, groundwater transport of CI from the Harmer Creek drainage to the Elk River valley bottom is therefore interpreted to be minimal and primary transport of CI from the Harmer Creek drainage to groundwater in the Elk River valley bottom is through surface water. A monitoring well is planned near Study Area 7 in 2020 to better understand groundwater surface-water interactions and the connectivity of the aquifer used for drinking purposes.

11.2.8 Study Area 8

Consistent with previous findings, available groundwater data from monitoring wells in Study Area 8 indicate there does not appear to be a groundwater transport pathway between the surface water sources identified on the western slope of EVO and Elk River valley bottom. The 2017 RGMP Update identified a gap near the Goddard Sedimentation Pond; this gap will be addressed with a new monitoring well which is scheduled for installation in 2020.

11.2.9 Study Area 9

A down-valley groundwater pathway was identified where concentrations of CI in groundwater in the Michel Creek valley bottom were above the surface water concentrations and secondary screening criteria. Concentrations of sulphate, nitrate-N and dissolved selenium generally decrease along the groundwater flow path from the highest concentrations measured at EV_RCgw to EV_SPR1A/B/C. This could be due to attenuation or mixing with groundwater along the flow path and/or groundwater-surface water interactions. Exceptions to this pattern were identified at supply wells EV_WH50gw and EV_HW1 (where pumping occurs) and at EV_MW_MC2B.

Continuous groundwater elevation data from wells in the Michel Creek valley bottom and the Sparwood Area indicate a seasonal response with highest groundwater levels in the spring. This response approximately follows the same response as Michel Creek suggesting a strong hydraulic connection between groundwater and surface water. Groundwater flow directions and vertical gradients indicate that the up-valley reaches of Michel Creek within Study Area 9 may be losing to groundwater and recharging surface water in Michel Creek. Farther down-valley at EV_MW_MC2A gradients suggests that groundwater may be discharging to Michel Creek in this area; additional groundwater monitoring at this location is required to understand whether groundwater is contributing CI to surface water in Michel Creek in this area. The surface water elevation in Michel Creek (at EV_MC2) is greater than groundwater elevation at wells in the Sparwood Area suggesting Michel Creek is losing to ground in the Sparwood Area.

Spatial delineation of dissolved selenium appears to be achieved in the Michel Creek valley bottom in 2019, with the exception of EV_MW_SPR1C which was slightly above the screening criteria in Q1 of 2019. Michel Creek appears to be losing in this area which may be the cause of the elevated dissolved selenium in the Sparwood Area. Downgradient well EV_MCgwS does not exhibit mine influence, however it is installed in a lower permeability formation. Based on the general decrease in concentrations of sulphate, nitrate-N and dissolved selenium along the groundwater flow path, is it expected that the concentrations of selenium will continue to attenuate along the shallow groundwater flow path within Study Area 9.

11.2.10 Study Area 10

Groundwater quality in EV_ECgw was below all primary screening criteria for the CI in 2019; therefore, groundwater transport of CI in the Erickson drainage appears to be negligible. Mine influence on groundwater is likely to be the result of infiltration of impacted surface water rather than upland/tributary groundwater transport. In addition to Erickson Creek, there is potentially loading of CI to Study Area 10 from South Pit Creek Sediment Pond Decant (EV_SP1) and the Milligan Creek Sediment Pond Decant (EV_MG1), located in the valley bottom within Study Area 10. Relatively high CI concentrations exist in surface water at EV_SP1 and EV_MG1 compared to groundwater concentrations and there is no groundwater monitoring well downgradient of this area and as such groundwater quality in Study Area 10 is unknown. There is currently no groundwater monitoring location within the Study Area 10 boundaries to characterize groundwater conditions. This was identified as a gap in the 2017 RGMP Update. A monitoring well for this Study Area is planned for installation in 2020.

11.2.11 Study Area 11

Increasing trends were identified for sulphate and dissolved cadmium at CM_MW1-OB. Concentrations of both constituents remained below primary screening criteria in 2019. The transport pathway to this well may be within the valley-bottom sediment rather than infiltration of surface water from Michel Creek. Monitoring data from new wells CM_MW9 and CM_MW10 may support refinement of the transport pathway interpretation, once available.

11.2.12 Study Area 12

Infiltration of surface water is interpreted to be the dominant pathway for elevated Cl in groundwater in Study Area 12. A clear seasonal trend exists in groundwater at EV_ER1gwS/D which is due to the effects of dilution in a freshet dominated regime.

From 2016 to 2019, groundwater quality in the deeper aquifer at municipal well RG_DW-03-04 (Sparwood Well #3) generally reflected Elk River surface water quality. However, dissolved selenium concentrations were above the concentrations measured in Elk River surface water during the fall of 2015 and 2016, as well as in Q1 of 2019 suggesting an influence of Michel Creek surface water. The 2017 RGMP Update identified a data gap in the Elk River valley bottom upgradient of RG_DW-03-04 where the groundwater flow path and surface water influence is poorly understood. This gap is planned to be filled in 2020 with installation of a new monitoring well. On March 4, 2020, Teck was notified that Sparwood Well #4 was operational and RG_DW-03-04 is no longer used for drinking water. RG_DW-03-04 may be decommissioned, following installation of the new Sparwood Well #4. Following installation of the monitoring well in Study Area 12, it is recommended RG_DW-03-04 no longer be sampled and the replacement monitoring well be monitored and sampled instead.

The extent of mined influenced groundwater in the Elk River valley-bottom aquifer downgradient of Study Area 12 is unknown. However, because groundwater quality in Study Area 12 appears to reflect the Elk River and potentially Michel Creek surface water quality, surface water infiltration rather than a valley-bottom groundwater pathway appears to be the source of concentrations above screening criteria measured at this location. Accordingly, groundwater farther down the Elk Valley should continue to reflect surface water quality.

SNC·LAVALIN

12 Recommendations

Recommendations identified in the SSGMP for FRO, GHO, LCO, EVO and CMO and the RGMP are presented below.

Table OOO: Summary of Recommendations from SSGMPs and RGMP

SSGMP/RGMP	Recommendation
SSGMP	
FRO	› Install a nested well in the Henretta Creek Valley upgradient of the confluence of the Fording River and Henretta Creek. This location is proposed to monitor a possible groundwater pathway from the backfilled pits in the Henretta Creek Valley to the Fording River Valley. Once a nested well is installed, monitoring at HMW1S/D may be reduced or even eliminated. › Install a nested well in the Henretta Creek Valley upgradient of mining operations to replace FR_HMW5 and cease monitoring FR_HMW5. › Install dataloggers in FR_POTWELLS, FR_MW-1B, FR_09-04-A/B, FR_09-01-A/B, FR_09-02-A/B, and FR_GH_WELL4. › Install a flow meter to monitor pumping rate in FR_GH_WELL4.
GHO	› Replace the data loggers in supply wells GH_POTW09 and GH_POTW17 and set to process continuous water level data and survey to the groundwater datum. › Discontinue monitoring GH_MW-RLP-1D as part of the SSGMP based on recommendations in the 2018 SSGMP Update. › Discontinue monitoring GH_GA-MW-1 as part of the SSGMP. › Reduce monitoring frequency at GH_MW-UTC-A/B to bi-annual (Q2 and Q4 only); › Investigate into the significance and representativeness of higher dissolved selenium relative to total selenium concentrations at select wells. › Review results from select wells installed in support of GHO CPX2, GHO TSF Permitting and Mass Balance Investigation programs for possible inclusion in the 2020 SSGMP annual report.
LCO	› The current monitoring program should continue in coordination with the RGMP and West Line Creek AWTF program. The recommended frequency and type of monitoring for 2020 is consistent with that of 2019, although adjustments to the program may be considered based on review of suggestions made in the 2018 SSGMP Update. › A reduction in sampling frequency from quarterly to bi-annual should be considered as seasonal trends become characterized, with sampling occurring during freshet (between March and June) when water levels are highest and during winter (November to February) when water levels are lowest. Newly installed wells should be sampled quarterly for at least two years to evaluate seasonality and establish baseline conditions.
EVO	› Survey elevations of surface water monitoring stations at Harmer Creek (EV_HC1), Lindsay Creek (EV_LC1), Goddard Creek (EV_GC2), Erickson Creek (EV_EC1) Gate Creek (EV_GT1) and Bodie Creek (EV_BC1) so level data can be corrected to masl and compared to groundwater elevations.

SNC·LAVALIN

Table OOO (Cont'd): Summary of Recommendations from SSGMPs and RGMP

SSGMP/RGMP	Recommendation
EVO (Cont'd)	› Install instrumentation in supply wells EV_HW1, EV_MR2, EV_RCgw and EV_WH50gw. › Install a pressure transducer at EV_MW_MC1B. › Remove EV_MW_MC3 from the EVO SSGMP as one year of monitoring indicates no mine-influence from EVO. Data from EV_MW_MC3 will be reviewed as part of the 2020 RGMP Update. › Future reports should explore whether upgradient water treatment (including the Saturated Rock Fill) have resulted in a reduction in the levels of Cl in groundwater at EV_BCgw.
CMO	› Complete well development for CM_MW9 once water column length is sufficient and commence quarterly sampling once development is complete. › As specified in the 2018 CMO SSGMP Update Ministry Assessment Report, complete a flow/load accretion analysis for Michel Creek adjacent to CMO (4 monitoring events now completed), identify new monitoring well locations if required, and complete the installations. › Pressure transducers should be installed at monitoring wells CM_MW1-OB and CM_MW1-SH in 2020. Two new pressure transducer deployments are recommended because the water levels in wells with existing pressure transducers (CM_MW5-SH and DP) may be influenced by pumping at the nearby light vehicle wash station supply well. These additional deployments would also serve to refine characterization of groundwater-surface water interaction in the Michel Creek Valley in the central flow path convergence area downgradient of CMO (RGMP Study Area 11). › The pressure transducers installed at CM_MW5-SH and CM_MW5-DP are approaching the end of their service lives and should be replaced by the end of 2020. Pressure transducer water level data should continue to be collected at these locations for continuity of the dataset. › Incorporate new monitoring wells CM_MW9 and CM_MW10 into the CSM for the 2021 SSGMP Update.
RGMP	
Background	› The background well network will be reassessed in the 2020 RGMP Update. New background wells are planned for installation in 2020 as part of the RGMP and wells installed as part of other programs such as the Castle and CPX2 Expansion Projects (Castle and CPX2 Baseline Programs, respectively) and the Mass Balance Investigation will be assessed for inclusion into the background network. Some of the existing wells that may be candidates for inclusion from Castle and CPX2 Baseline Programs are wells installed in Study Areas 1 and 4 (Drawings 6 and 7; SNC-Lavalin, 2019k). Wells drilled to support of the Castle Program, FR_MW_FRRD1, FR_MW_CASW6-A/B, and FR_MW_CH1-A/B, installed on the eastern side of the Fording River Valley adjacent to Castle Mountain (SNC-Lavalin, 2019k). Three nested wells, GH_MW-Willow-1S/D, GH_MW-Willow-2S/D, and GH_MW-Willow-3S/D, near Willow Creek drilled in support of the CPX2 Project (SNC-Lavalin, 2019k). Two nested wells, GH_MW-Wolf-1S/D and GH_MW-Wolf-2S/D, near Wolf Creek drilled to support the CPX2 Project (SNC-Lavalin, 2019k). › Once an adequate groundwater data set (two years of quarterly sampling) from these wells is available, these wells will be further assessed for suitability.

Table OOO (Cont'd): Summary of Recommendations from SSGMPs and RGMP

SSGMP/RGMP	Recommendation
Study Area 1	› Develop an updated conceptual model of Study Area 1, that includes studies completed in the Swift, Cataract, and Kilmarnock drainages. › Results of the ongoing Mass Balance Investigation should be included in subsequent reporting to improve the understanding of groundwater quality downgradient of Study Area 1. › Monitoring wells are scheduled to be installed as part of the Mass Balance Investigation and select wells should be incorporated as appropriate in the RGMP. › Preliminary results suggest that the Study Area boundary should extend north to encompass FR_09-01-A/B and south to the confluence of the Fording River with Chauncey Creek.
Study Area 2	› There are no recommendations at this time.
Study Area 3	› Replace the data loggers in supply wells GH_POTW10 and GH_POTW15 and set to process continuous water level data and survey to the groundwater datum.
Study Area 4	› Results of the ongoing CPX2 and Mass Balance Investigation should be reviewed for possible inclusion in subsequent reporting to improve the understanding of groundwater quality downgradient of Study Area 4. › Monitoring wells are scheduled to be installed as part of the Mass Balance Investigation and select wells should be incorporated as appropriate in the RGMP. › A monitoring well is scheduled to be installed in 2020 within the aquifer providing drinking water supply to multiple users within the Study Area to support the development and implementation of groundwater triggers.
Study Area 5/6	› A nested monitoring well is scheduled to be installed in 2020 adjacent to surface water station EV_ER4 to provide groundwater data in the Elk River valley-bottom aquifer downgradient of LCO.
Study Area 7	› A flow and load accretion study is scheduled to be conducted over the Grave Creek alluvial fan at the confluence with the Elk River.
Study Area 8	› A monitoring well is scheduled to be installed in 2020 in the drinking water aquifer in between Study Areas 7 and 8 to support the development and implementation of groundwater triggers. › Add District of Sparwood Well #4 to the RDW program. › A monitoring well is scheduled to be installed in 2020 to replace EV_TW-1 and EV_TW-2. The nested monitoring well will be downgradient of the Goddard Creek Sedimentation Pond adjacent to EV_GC2.
Study Area 9	› Survey the top of casing elevation at EV_BRgw. › Install instrumentation in supply wells EV_HW1, EV_MR2, EV_RCgw and EV_WH50gw. This is planned for 2020, pending the ability to instrument these wells around existing infrastructure. › Remove RG_DW-03-01 from the RGMP and RDW program as it is no longer being used for drinking water. › A nested monitoring well is scheduled for installation in 2020 to replace EV_MCgwS/D that are not representative of the aquifer.
Study Area 10	› A nested monitoring well is scheduled for installation in 2020 in the Michel Creek valley-bottom aquifer downgradient of Erickson Creek and the South Pit decant Pond to monitor groundwater quality.

Table OOO (Cont'd): Summary of Recommendations from SSGMPs and RGMP

SSGMP/RGMP	Recommendation
Study Area 11	› Data collected from new monitoring wells CM_MW9 and CM_MW10 should be included in the 2020 RGMP Update to assess whether these wells provide new information to close the previously identified gap for RGMP Study Area 11 (potentially mine affected groundwater bypassing CM_MW1 via the Rail Loop). An additional new monitoring well is planned for installation in 2020 to address this data gap. › Deployment of pressure transducers at monitoring wells CM_MW1-OB and SH has been recommended under the CMO SSGMP, and these deployments would also serve to refine characterization of groundwater-surface water interaction in Study Area 11.
Study Area 12	› Survey elevation of water level measurement at Environment Canada hydrometric station 08NK016. › Sample from monitoring well (once installed) and discontinue sampling from RG_DW-03-04. › Decommission RG_DW-03-04 following installation of the monitoring well. › A monitoring well is scheduled to be installed in 2020 in the drinking water aquifer in this Study Area to support the development and implementation of groundwater triggers.

13 References

AMEC. 2011. *West Fork Tailings Management System Water Quality Review*. Prepared for Teck Coal Limited, Elkview Operations. Dated September 2011.

Aziz, J.J., Ling, M., Rifai, H.S., Newell, C.J., and Gonzales, J.R., 2003. *MAROS: A Decision Support System for Optimizing Monitoring Plans.* Groundwater. *41(3)*, 355-367 pp.

British Columbia Ministry of Environment and Climate Change Strategy. 2015. Technical Guidance 6 on Contaminated Sites: *Assessment of Hydraulic Properties for Water Use Determinations*. Version 3.0 Draft 10. December 2015.

British Columbia Ministry of Environment and Climate Change Strategy. 2017. Technical Guidance 15 on Contaminated Sites. *Concentration Limits for the Protection of Aquatic Receiving Environments*. Version 2.0 November 1, 2017.

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. 196/2017. January 24, 2019.

British Columbia Ministry of Environment and Climate Change Strategy. 2019b. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Summary Report.* August 2019.

District of Sparwood. 2019. Personal communication with Danny Dwyer, Director of Engineering. September 26, 2019.

Environment Canada, 2019. Historical Hydrometric Data. Available at: http://climate.weather.gc.ca/historical_data/search_historic_data_e.html. Last Accessed February 2019.

Fluor Tetra Tech Inc, 2015. *Sub-Surface Flow Investigation – Cataract Creek and Swift Creek Test Pits. Fording River Operations Active Water Treatment Facility – South Project.* Project No. A9TW. Document No. A9TW-0000-210-RP-007 Rev.B. Prepared for Teck Coal Limited. November 30, 2015.

Gilbert, R.O., 1987. *Statistical Methods for Environmental Pollution Monitoring*. New York: Van Norstrand Reinhold.

Golder Associates Ltd. 2013. *Teck Fording River Operations – Site-Wide Groundwater Monitoring Review*. Report submitted to Teck Coal Limited. Dated April 2013.

Golder Associates Ltd. 2014a. *Hydrogeology Interim Deliverable – Monitoring Wells*. Prepared for Teck Coal Limited. Dated July 2014.

Golder Associates Ltd. 2014b. *Hydrogeology Interim Deliverable – Field Reconnaissance Program*. Prepared for Teck Coal Limited. Dated August 2014.

Golder Associates Ltd., 2015a. *2013 Annual Groundwater Monitoring Report. Teck Coal Fording River Henretta Project.* Report submitted to Teck Coal Limited. Dated February 2015.

Golder Associates Ltd. 2015b. *Site-wide Groundwater Monitoring Plan – Teck Coal Ltd. Elkview Operations*. Prepared for Teck Coal Limited. Dated March 2015.

Golder Associates Ltd. 2015c. *Annex D – Hydrogeology Baseline Report.* Prepared for Teck Coal Limited. Dated October 2015.

Golder Associates Ltd. 2015d. *Appendix B2.2.2-1 Groundwater Flow Modelling Report.* Prepared for Teck Coal Limited. Dated November 2015.

Golder Associates Ltd. 2016. *Groundwater Flow Modelling to Evaluate Potential Seepage Bypass – Life of Mine. Teck Coal LCO Phase II: Dry Creek Water Management System*. Report prepared for Teck Coal. Dated September 2016.

Golder Associates Ltd., 2018. *2017 LCO Site Wide Annual Groundwater Monitoring Report*. Prepared for Teck Coal Limited. Dated March 2018.

Golder Associates Ltd. 2019a. *Kilmarnock Groundwater Study in Support of Fording River AWTF South, Construction and Permitting Teck Fording River*. Teck Coal Limited. Dated March 2019.

Golder Associates Ltd., 2019b. *Line Creek Operations Site Specific Groundwater Monitoring: 2018 Annual Report*. Prepared for Teck Coal Limited. Dated March 2019.

Golder Associates Ltd. 2019c. *Teck Coal Elkview Erickson AWTF Drilling Program – Summary of Artesian Boreholes*. Prepared for Teck Coal Limited. Dated May 6, 2019.

Golder Associates Ltd. 2019d. *Elkview Operations AWTF and SRF Phase 2 Project Field Report – Bodie, Gate, South Gate and Erickson Creeks*. Prepared for Teck Coal Limited. Dated August 2, 2019.

Golder Associates Ltd. 2019e. E*lkview Operations Saturated Rock Fill Full Scale Trial Phase 2 – Hydrogeology Drive-Point Piezometer Testing Program Near Erickson Creek Bridge*. Prepared for Teck Coal Limited. Dated September 10, 2019.

Golder Associates Ltd. 2019f. *Line Creek Operations Site Specific Groundwater Monitoring Program 2018 Update*. Prepared for Teck Coal Limited. Dated September 30, 2019.

Golder Associates Ltd., 2020. *Line Creek Operations Site Specific Groundwater Monitoring: 2019 Annual Report*. Prepared for Teck Coal Limited. Dated March 13, 2020.

Health Canada. 2017. *Guidelines for Canadian Drinking Water Quality – Summary Table*. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

Hemmera, Envirochem Inc. 2014. *Greenhills Operations Site Groundwater Monitoring Program*. Prepared for Teck Coal Limited. Dated May 2014.

Hemmera Envirochem Inc. 2017. 2016 *Monitoring Well Installation and Groundwater Sampling Program*. Prepared for Teck Coal Ltd. – Greenhills Operations. File: 577-016.07. Dated March 31, 2017.

Kerr Wood Leidal. 2019. *Fording River Flow Accretion Study February 2019 Flow Accretion Measurement Results.* Prepared for Teck Coal Limited.

Minnow Environmental Inc. 2018. *2017 Greenhills Operation Local Aquatic Effects Monitoring Program (LAEMP) Report*. Prepared for Teck Coal Limited. May 2018.

Minnow Environmental Inc. 2020. Email with SNC-Lavalin Inc. March 2020.

Newell, C.J., Aziz, J.J., and Vanderford, M. 2007. *Monitoring and Remediation Optimization System (MAROS) Version 2.2: Appendix A.2: Statistical Trend Analysis Methods*. Prepared by GSI Environmental Inc. Dated February 2007.

O'Neill Hydro-Geotechnical Engineering. 2018. *Groundwater Seepage Models, Greenhills Operation Tailings Storage Facility*. Prepared for Teck Coal Limited. Dated November 6, 2018.

Ramboll Environ. 2016. Elk Valley Permit 107517: *Section 9.9 Human Health Risk Assessment*. Prepared for Teck Coal Limited. Dated March 30, 2016.

SNC-Lavalin Inc. 2011. *Preliminary Hydrological and Hydrogeological Conceptual Model for Elkview Mine and Assessment for Elkview Mine and Assessment for Cedar North and Baldy Ridge Pits*. Prepared for Teck Coal Limited. April 2011.

SNC-Lavalin Inc. 2014. *Summary of Elk Valley Drinking Water Evaluation and Sampling Program*. Prepared for Teck Coal Limited. Dated June 25, 2014.

SNC-Lavalin Inc. 2015a. *Elk Valley Regional Groundwater Monitoring Program.* Prepared for Teck Coal Limited. Dated July 31, 2015.

SNC-Lavalin Inc. 2015b. *Elk Valley Regional Groundwater Synthesis Report*. Prepared for Teck Coal Limited. Dated October 2015.

SNC-Lavalin Inc. 2016. *2015 Annual Report – Regional Groundwater Monitoring Program*. Prepared for Teck Coal Limited. Dated March 31, 2016.

SNC-Lavalin Inc. 2017a. *2016 Annual Report – Regional Groundwater Monitoring Program*. Report prepared for Teck Coal Limited. Dated May 16, 2017.

SNC-Lavalin Inc. 2017b. *Hydrogeological Assessment – Fording River Operations*. Prepared for Teck Coal Limited. Dated September 28, 2017.

SNC-Lavalin Inc. 2017c. *Regional Groundwater Monitoring Program Elk Valley, BC.* Prepared for Teck Coal Limited. Dated September 29, 2017.

SNC-Lavalin Inc. 2017d. *2017 Field Programs Results for Turnbull West Project Hydrogeology Baseline.* Prepared for Teck Coal Limited. Dated December 18, 2017.

SNC-Lavalin Inc. 2018a. *2017 Annual Groundwater Monitoring Report – Fording River Operations*. Prepared for Teck Coal Limited. Dated March 28, 2018.

SNC-Lavalin Inc. 2018b. *2017 Annual Groundwater Monitoring Report – Elkview Operations.* Prepared for Teck Coal Limited. Dated March 28, 2018.

SNC-Lavalin Inc. 2018c. *2017 Annual Report Regional Groundwater Monitoring Program.* Prepared for Teck Coal Limited. Dated May 16, 2018.

SNC-Lavalin Inc. 2019a. *Sparwood Area Groundwater Supporting Study Phase 2.* Report prepared for Teck Coal Limited. Dated February 13, 2019.

SNC-Lavalin Inc. 2019b. *2018 Site-Specific Groundwater Monitoring Report – Fording River Operations*. Prepared for Teck Coal Limited. Dated March 28, 2019.

SNC-Lavalin Inc. 2019c. *2018 Site-Specific Groundwater Monitoring Report – Elkview Operations*. Prepared for Teck Coal Limited. Dated March 28, 2019.

SNC-Lavalin Inc. 2019d. *2018 Site-Specific Groundwater Monitoring Report – Greenhills Operations*. Prepared for Teck Coal Limited. Dated March 28, 2019.

SNC-Lavalin Inc. 2019e. *2018 Regional Groundwater Monitoring Program Annual Report.* Prepared for Teck Coal Limited. Dated May 16, 2019.

SNC-Lavalin Inc. 2019f. *Assessment of Groundwater-Surface Water Interaction for LAEMP West Side of GHO.* Memorandum prepared for Teck Coal Limited. Dated May 30, 2019.

SNC-Lavalin Inc. 2019g. *Fording River Operations Site-Specific Groundwater Monitoring Program 2018 Update*. Prepared for Teck Coal Limited. Dated September 30, 2019.

SNC-Lavalin Inc. 2019h. *Greenhills Operations Site-Specific Groundwater Monitoring Program 2018 Update*. Prepared for Teck Coal Limited. Dated September 30, 2019.

SNC-Lavalin Inc. 2019i. *Elkview Operations Site-Specific Groundwater Monitoring Program 2018 Update*. Prepared for Teck Coal Limited. Dated September 30, 2019.

SNC-Lavalin Inc. 2019j. *2019 Sparwood Area and Study Area 9 Drilling Program Results.* Report prepared for Teck Coal Limited. Dated October 22, 2019.

SNC-Lavalin Inc. 2019k. *Evaluation of CPX2 Expansion Program, Castle Expansion Program, and Existing Monitoring Wells to Fill Gaps in the RGMP*. Memorandum: Prepared for Teck Coal Limited. Dated October 24, 2019.

SNC-Lavalin Inc., 2019l. *2018 Field Program Results for GHO CPX2 Baseline Hydrogeology.* Prepared for Teck Coal Limited. Dated December 5, 2019.

SNC-Lavalin Inc. 2019m. *South Kilmarnock Settling Pond Phase 2 Infiltration Rates Assessment to Support FRO Castle Water Management Plan*. Prepared for Teck Coal Limited. Dated October 23, 2019.

SRK Consulting (Canada) Inc. 2004. *Evaluation of Selenium Geochemistry Elkview Coal Mine. Prepared for Teck Coal Limited*. Dated November 2004.

SRK Consulting (Canada) Inc. 2013. *34 Pit Hydrogeological Containment Evaluation. Prepared for Teck Coal Limited – Coal Mountain Operations*. SRK Project No. 1CT017.033. Dated March 20, 2013.

SRK Consulting (Canada) Inc. 2014a. *Coal Mountain Operation: Water Balance.* Prepared for Teck Coal Limited – Coal Mountain Operations. SRK Project No. 1CT008.038. Dated April 2014.

SRK Consulting (Canada) Inc. 2014b. *Review of Existing Water Quality Data for Coal Mountain Operations.* Prepared for Teck Coal Limited – Coal Mountain Operations. SRK Project No. 1CT017.047. Dated January 2014.

SRK Consulting (Canada) Inc. 2015a. *Coal Mountain Operations Load Balance Model*. Prepared for Teck Coal Limited – Coal Mountain Operations. SRK Project No. 1CT017.047. Dated June 2015.

SRK Consulting (Canada) Inc. 2015b. *Coal Mountain Operations Phase 1 Groundwater Monitoring Well Installation Report*. Prepared for Teck Coal Limited – Coal Mountain Operations. SRK Project No. 1CT017.098. Dated October 2015.

SRK Consulting (Canada) Inc. 2016a. *Coal Mountain Operations 2016 Water and Load Balance Revision.* Prepared for Teck Coal Limited – Coal Mountain Operations. SRK Project No. 1CT017.125. Dated December 2016.

SRK Consulting (Canada) Inc. 2016b. *Coal Mountain Operations Phase 2 Groundwater Monitoring Well Installation Report.* Prepared for Teck Coal Limited – Coal Mountain Operations. SRK Project No. 1CT017.114. Dated June 2016.

SRK Consulting Inc., 2018a. *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. Dated May 14, 2018.

SRK Consulting (Canada) Inc. 2018b. *Recommendations for Specialty Sampling of Teck's Groundwater Monitoring Wells to Support Assessment of Selenium and Nitrate Reduction in Groundwater for the Instream Sinks Program – DRAFT*. Memorandum prepared for Teck Coal Limited, dated September 11, 2018.

SRK Consulting (Canada) Inc. 2018c. *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., 2019a. *Regional Seep Monitoring Plan: Phase 2 and 3*. Prepared for Teck Coal Limited. Dated March 2019.

SRK Consulting (Canada) Inc. 2019b. *2018 Site Specific Groundwater Monitoring Annual Report: Coal Mountain Operations.* Prepared for Teck Coal Limited. SRK Project No. 1CT017.215. Dated March 27, 2019.

Teck Coal Limited. 2014. *Elk Valley Water Quality Plan*. Submitted to the British Columbia Ministry of Environment for approval on July 22, 2014.

Teck Coal Limited. 2016a. *Adaptive Management Plan for the Elk Valley Water Quality Plan.* Submitted to the British Columbia Ministry of Environment for approval on February 29, 2016.

Teck Coal Limited. 2016b. *2015 Groundwater Monitoring Report: Coal Mountain Operations*. Dated March 2016.

Teck Coal Limited. 2016c. *Background on Selenium in the District of Sparwood Municipal Water Wells*. Memorandum dated May 3, 2016.

Teck Coal Limited. 2017. *2016 Groundwater Monitoring Report: Coal Mountain Operations*. Dated March 2017.

Teck Coal Limited. 2018a. *GHO – Pit Drainage and Pumping Management Plan*. Dated February 15, 2018.

Teck Coal Limited. 2018b. *2017 Groundwater Monitoring Report: Coal Mountain Operations.* Dated March 2018.

Teck Coal Limited. 2018c. *Water Quality Adaptive Management Plan for Teck Coal Operations in the Elk Valley*. Dated December 21, 2018.

Teck Coal Limited. 2018d. *Presentation: Modelling Nitrate release in the Elk Valley*. Dated November 28, 2018.

14 Notice to Reader

This report has been prepared and the work referred to in this report have been undertaken by SNC-Lavalin Inc. (SNC-Lavalin) for the exclusive use of Teck Coal Limited (Teck), who has been party to the development of the scope of work and understands its limitations. The methodology, findings, conclusions and recommendations in this report are based solely upon the scope of work and subject to the time and budgetary considerations described in the proposal and/or contract pursuant to which this report was issued. Any use, reliance on, or decision made by a third party based on this report is the sole responsibility of such third party. SNC-Lavalin accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report. Should this report be submitted to the BC Ministry of Environment & Climate Change Strategy (ENV) by Teck, the ENV is authorized to rely on the results in the report, subject to the limitations set out herein, for the sole purpose of determining whether Teck has fulfilled its obligations with respect to meeting the regulatory requirements of the ENV.

The findings, conclusions and recommendations in this report (i) have been developed in a manner consistent with the level of skill normally exercised by professionals currently practicing under similar conditions in the area, and (ii) reflect SNC-Lavalin's best judgment based on information available at the time of preparation of this report. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our original contract and included in this report. The findings and conclusions contained in this report are valid only as of the date of this report and may be based, in part, upon information provided by others. If any of the information is inaccurate, new information is discovered, site conditions change or standards are amended, modifications to this report may be necessary. The results of this assessment should in no way be construed as a warranty that the subject site is free from any and all environmental impact.

Any soil and rock descriptions in this report and associated logs have been made with the intent of providing general information on the subsurface conditions of the site. This information should not be used as geotechnical data for any purpose unless specifically addressed in the text of this report. Groundwater conditions described in this report refer only to those observed at the location and time of observation noted in the report.

This report must be read as a whole, as sections taken out of context may be misleading. If discrepancies occur between the preliminary (draft) and final version of this report, it is the final version that takes precedence. Nothing in this report is intended to constitute or provide a legal opinion.

The contents of this report are confidential and proprietary. Other than by Teck, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of Teck and SNC-Lavalin.

Figures

Figure FR-1: Fording River Surface Water Levels and Fording River Valley Precipitation Data

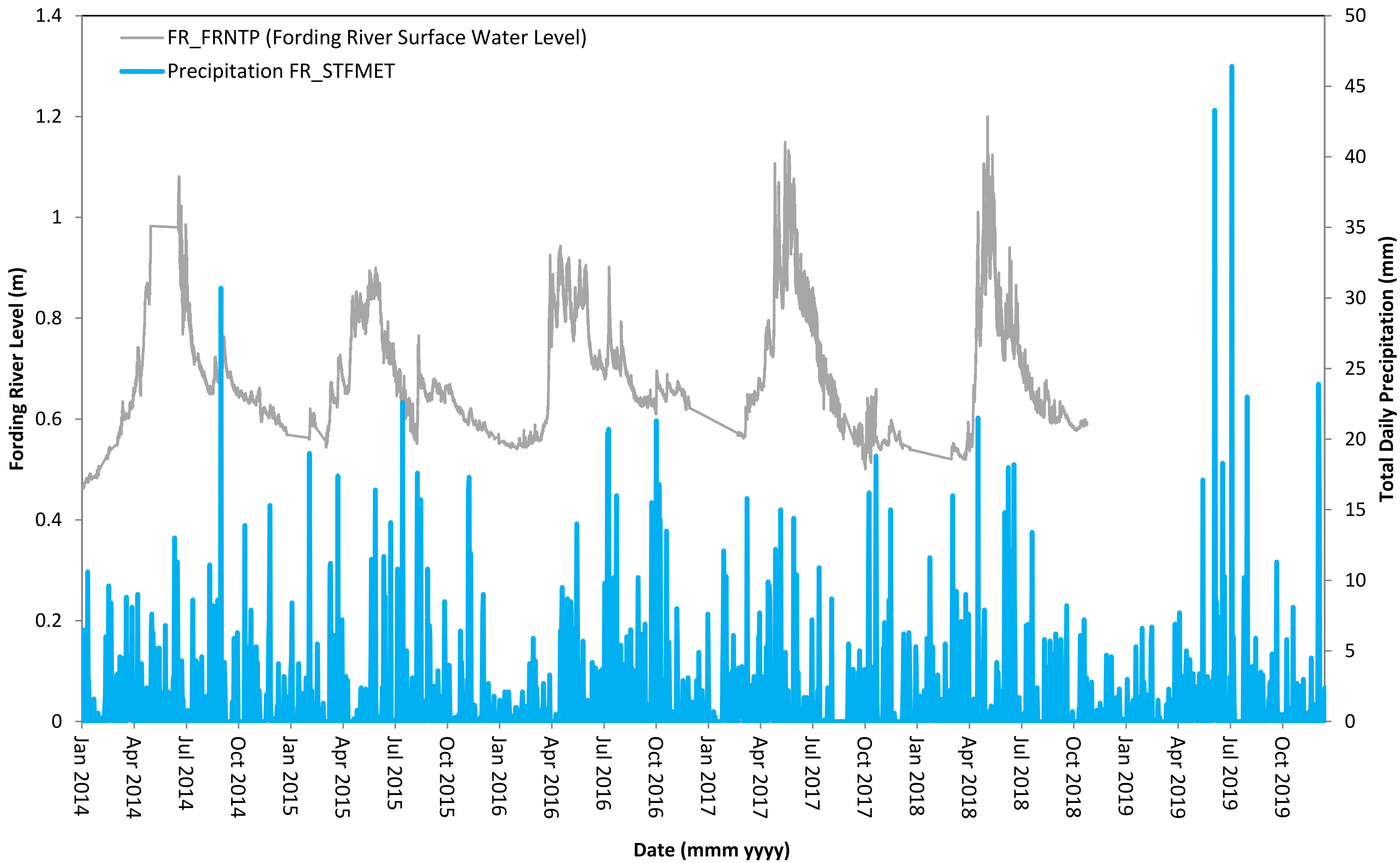
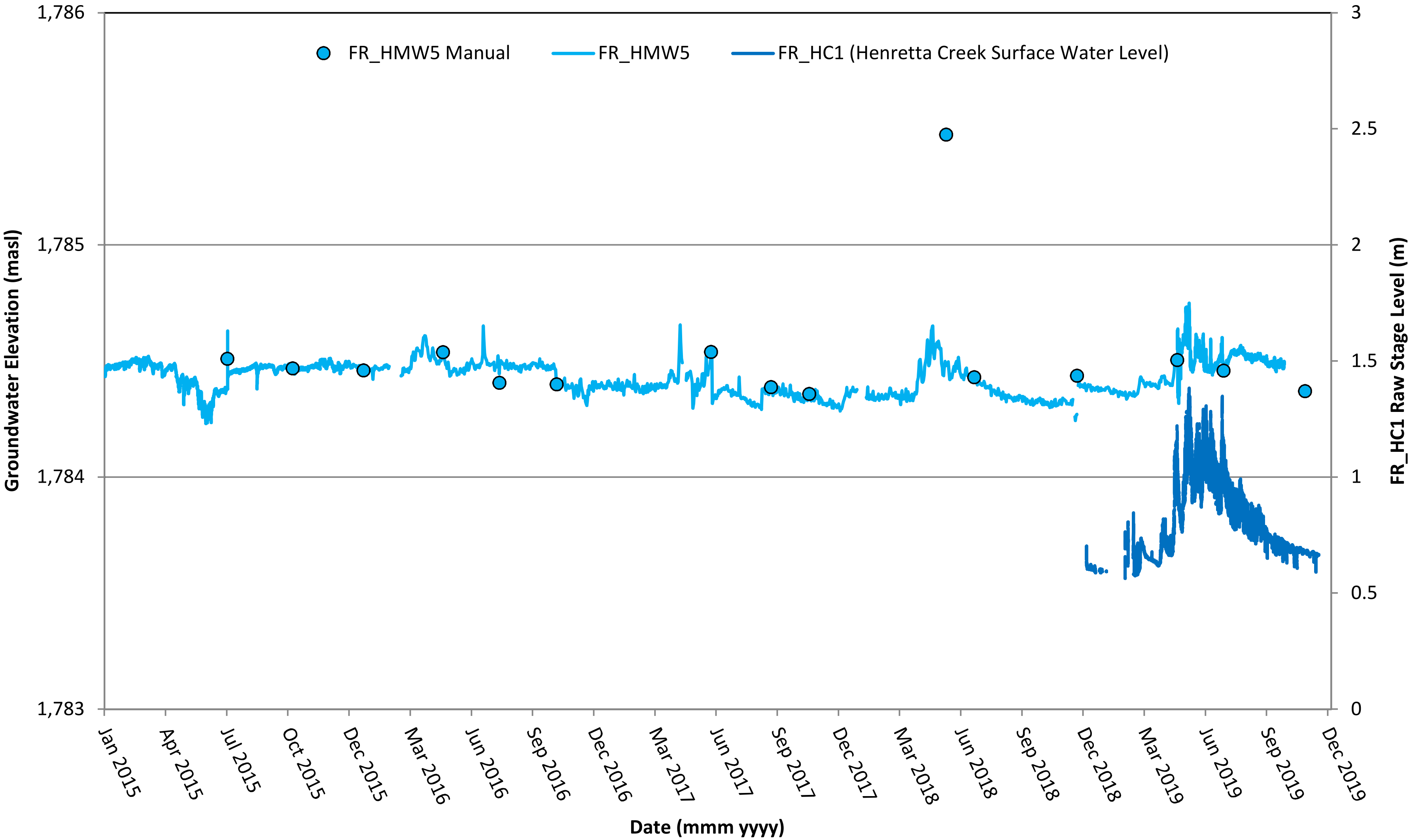
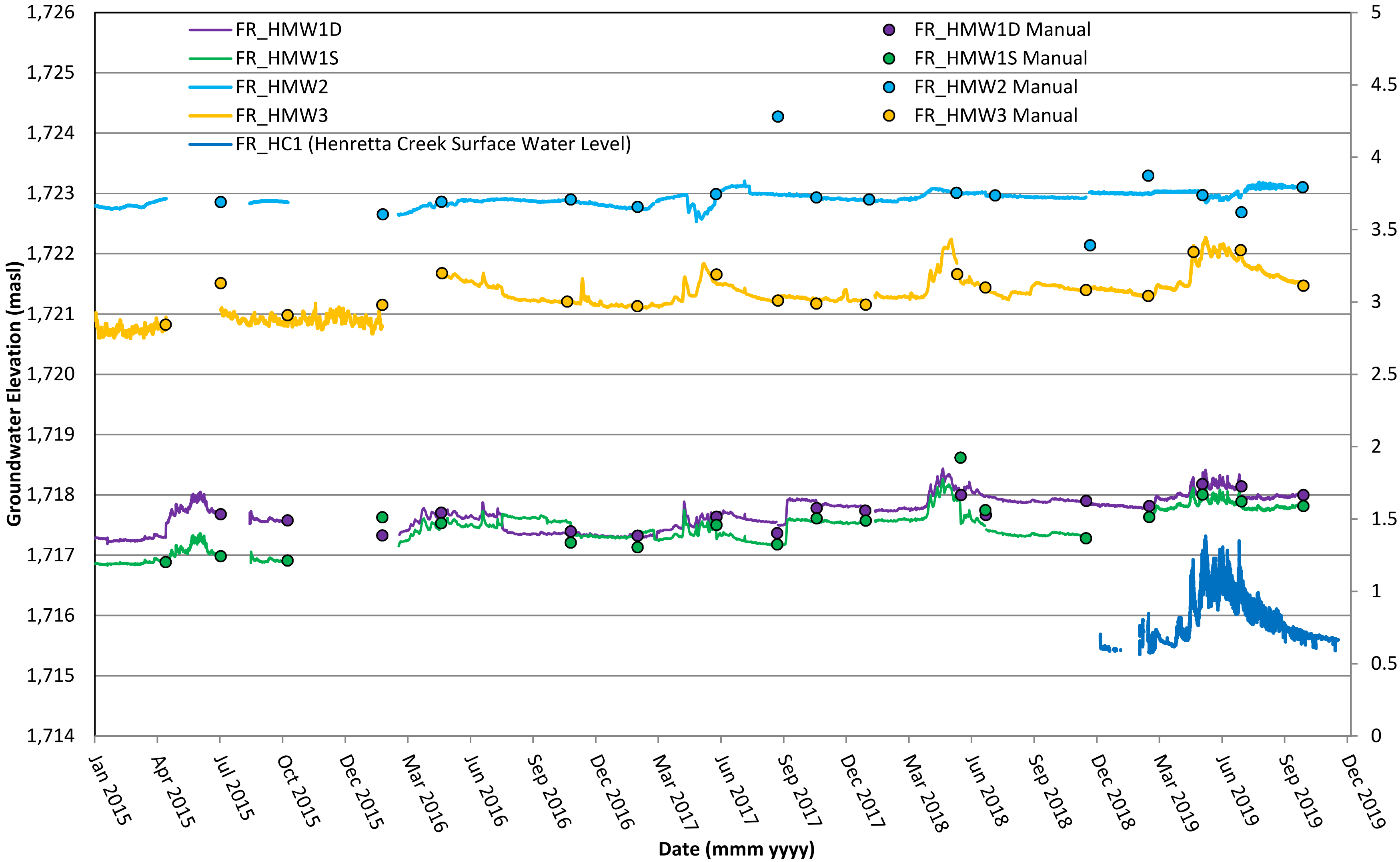


Figure FR-2: Henretta Creek Valley Reference Hydrograph



Notes: Discrepancy between manual water level measurements and datalogger data. Water levels were taken daily after May 2016 as opposed to hourly measurements prior to February 2016. Discrepency between manual and datalogger water levels on June 6, 2018 is probably due to a transcription error.

Figure FR-3: Henretta Creek Valley Hydrograph



Notes: Discrepancy between manual water level measurements and datalogger data.
Water levels for FR_HMW1D/S, FR_HMW2 and FR_HMW3 were taken daily after May 2016 as opposed to hourly measurements prior to February 2016.

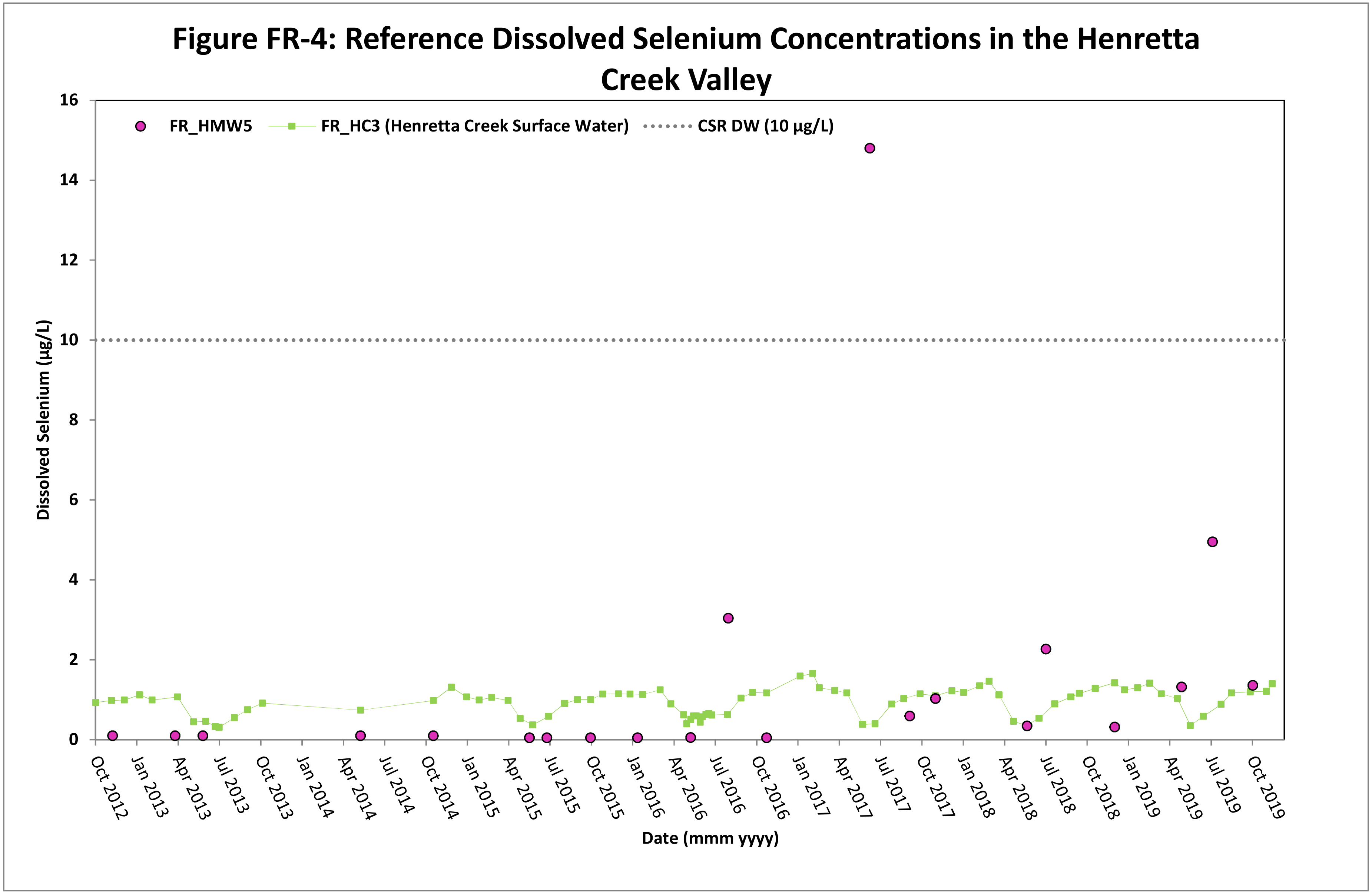


Figure FR-4: Reference Dissolved Selenium Concentrations in the Henretta Creek Valley
FR_HMW5
FR_HC3 (Henretta Creek Surface Water)
CSR DW (10 µg/L)
Dissolved Selenium (µg/L)
Date (mmm yyyy)
0
2
4
6
8
10
12
14
16
Oct 2012
Jan 2013
Apr 2013
Jul 2013
Oct 2013
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019

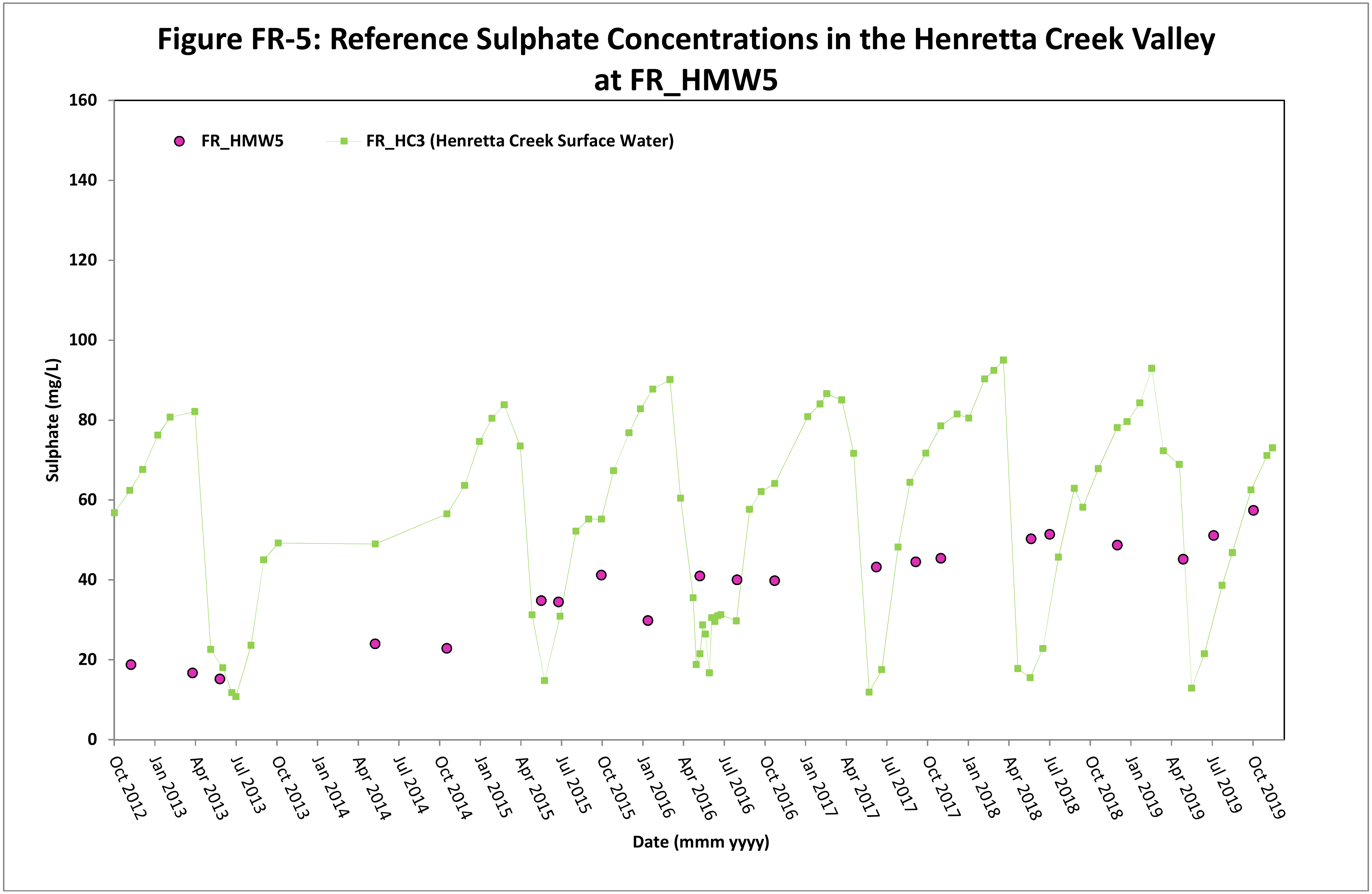
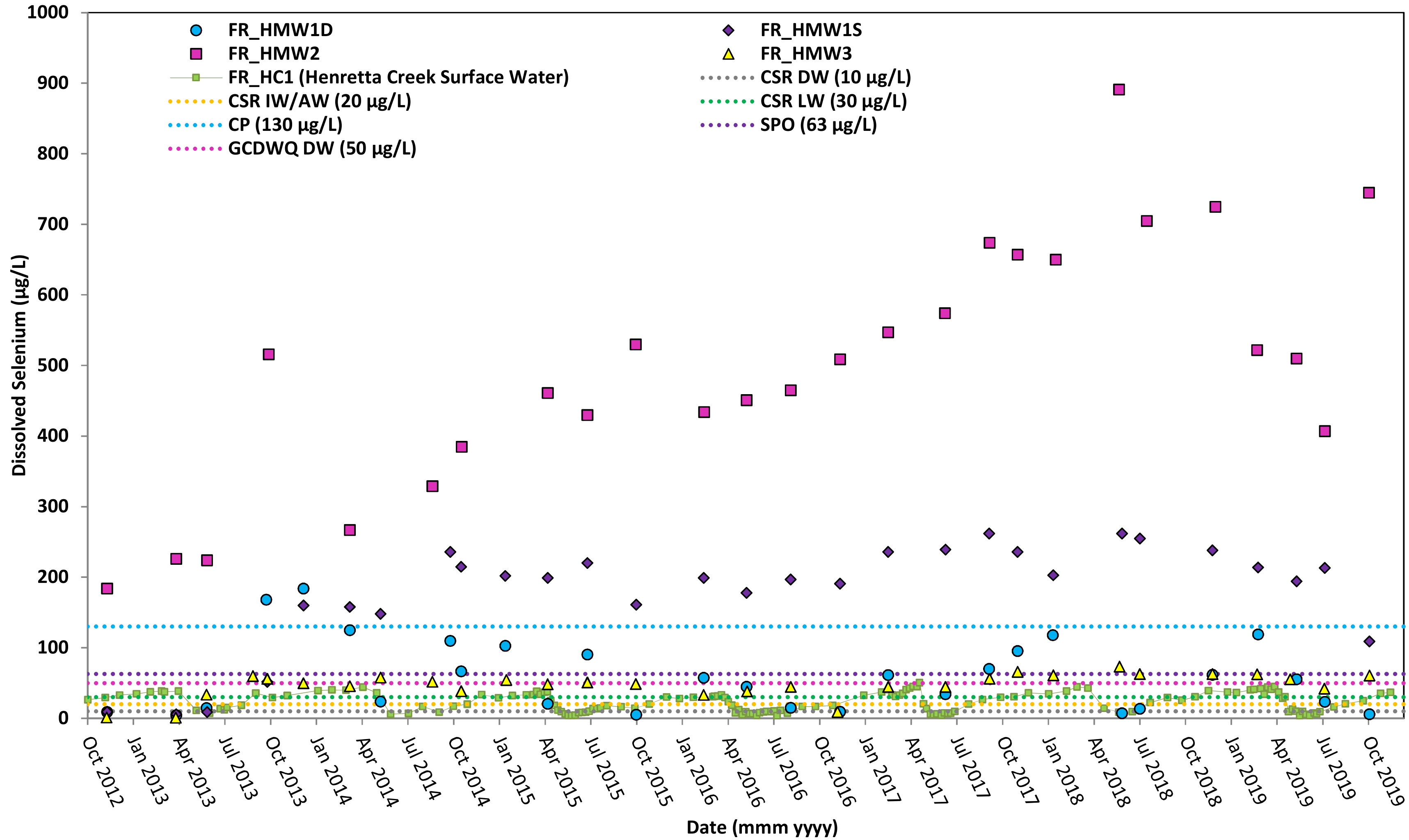


Figure FR-5: Reference Sulphate Concentrations in the Henretta Creek Valley at FR_HMW5
FR_HMW5
FR_HC3 (Henretta Creek Surface Water)
Sulphate (mg/L)
0
20
40
60
80
100
120
140
160
Oct 2012
Jan 2013
Apr 2013
Jul 2013
Oct 2013
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Date (mmm yyyy)

Figure FR-6: Dissolved Selenium Concentrations in Henretta Creek Valley



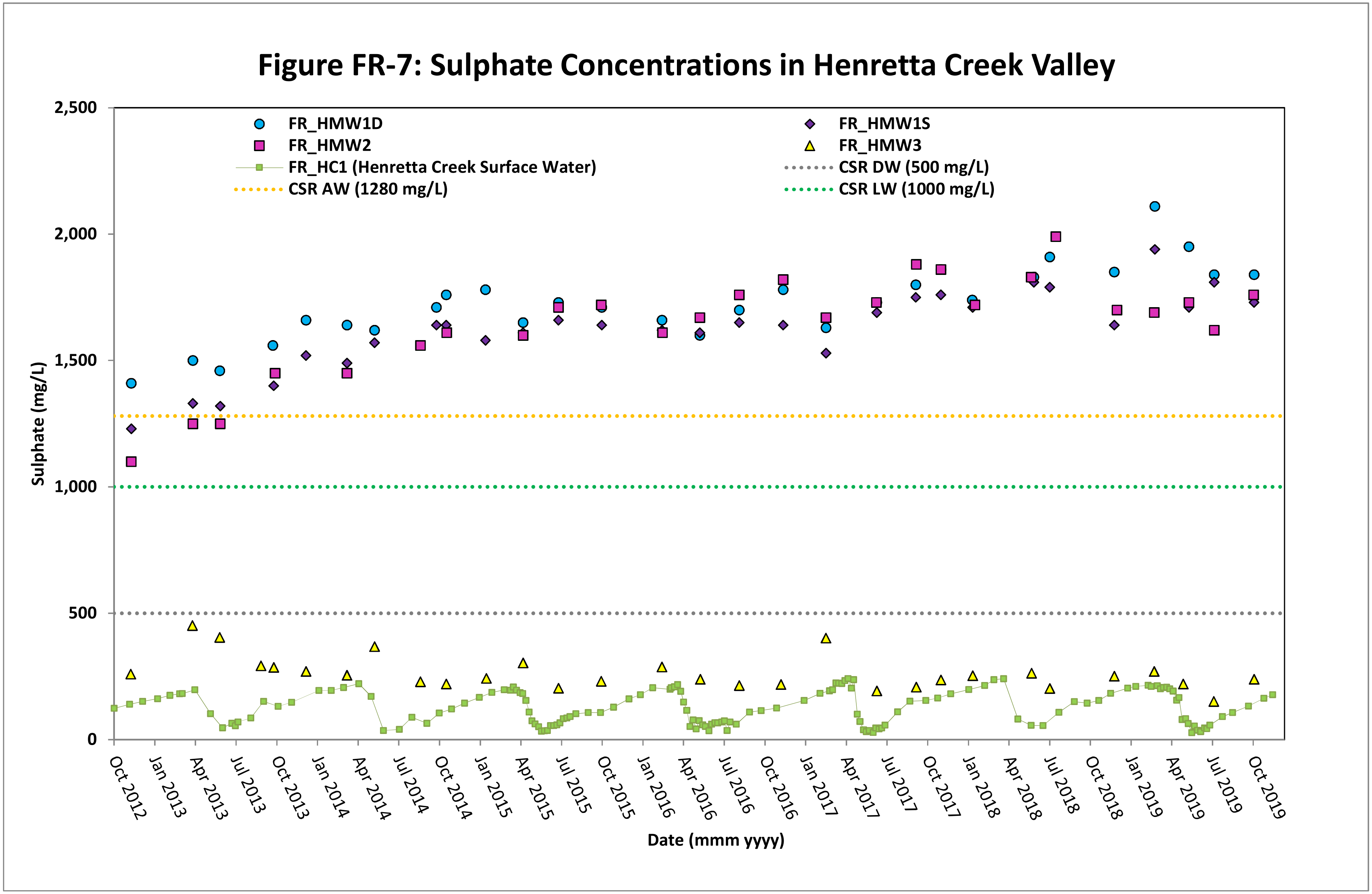


Figure FR-7: Sulphate Concentrations in Henretta Creek Valley
FR_HMW1D
FR_HMW2
FR_HC1 (Henretta Creek Surface Water)
CSR AW (1280 mg/L)
FR_HMW1S
FR_HMW3
CSR DW (500 mg/L)
CSR LW (1000 mg/L)
Sulphate (mg/L)
2,500
2,000
1,500
1,000
500
0
Oct 2012
Jan 2013
Apr 2013
Jul 2013
Oct 2013
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Date (mmm yyyy)

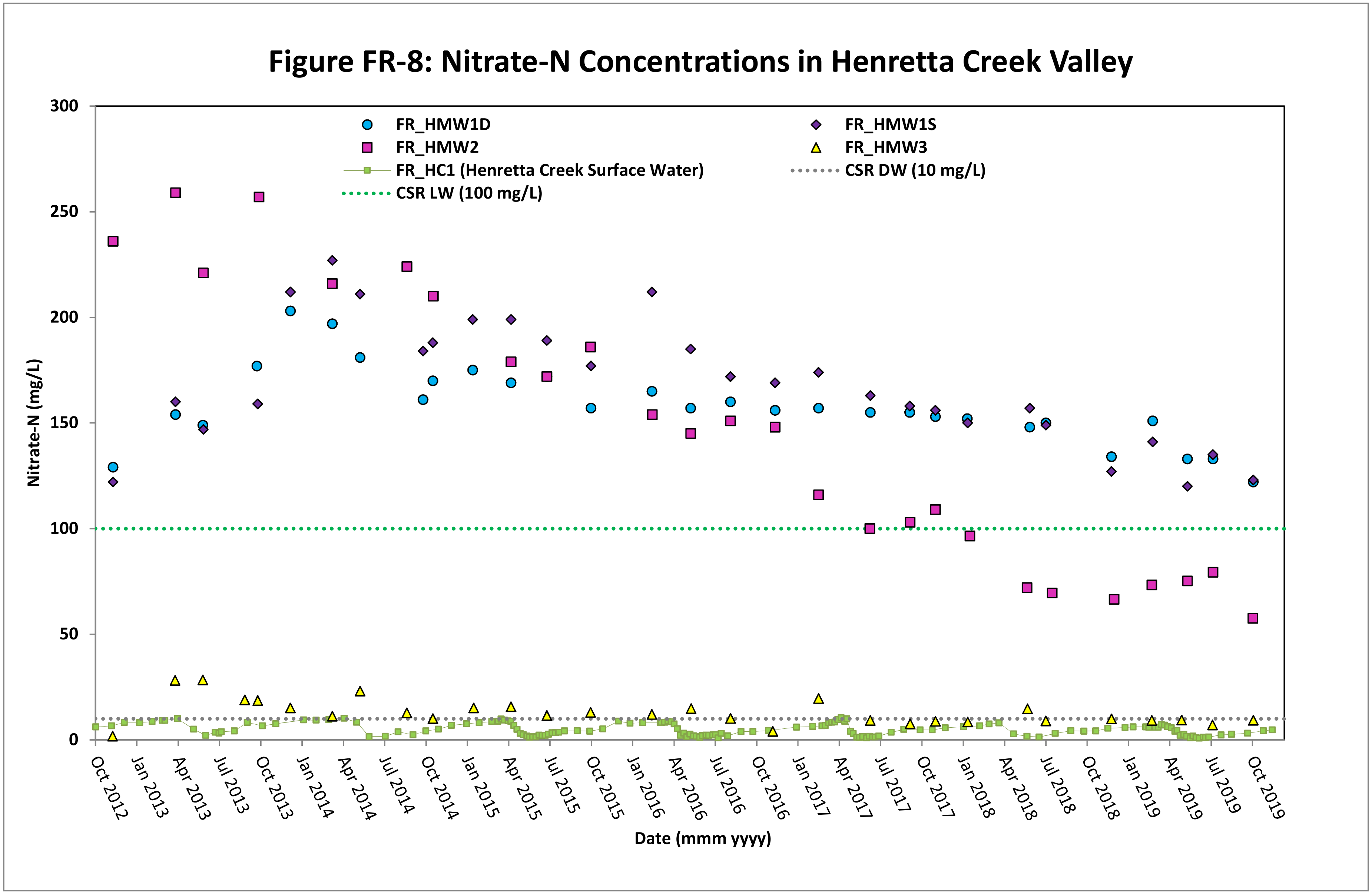


Figure FR-8: Nitrate-N Concentrations in Henretta Creek Valley
Nitrate-N (mg/L)
300
250
200
150
100
50
0
FR_HMW1D
FR_HMW1S
FR_HMW2
FR_HMW3
FR_HC1 (Henretta Creek Surface Water)
CSR DW (10 mg/L)
CSR LW (100 mg/L)
Oct 2012
Jan 2013
Apr 2013
Jul 2013
Oct 2013
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Date (mmm yyyy)

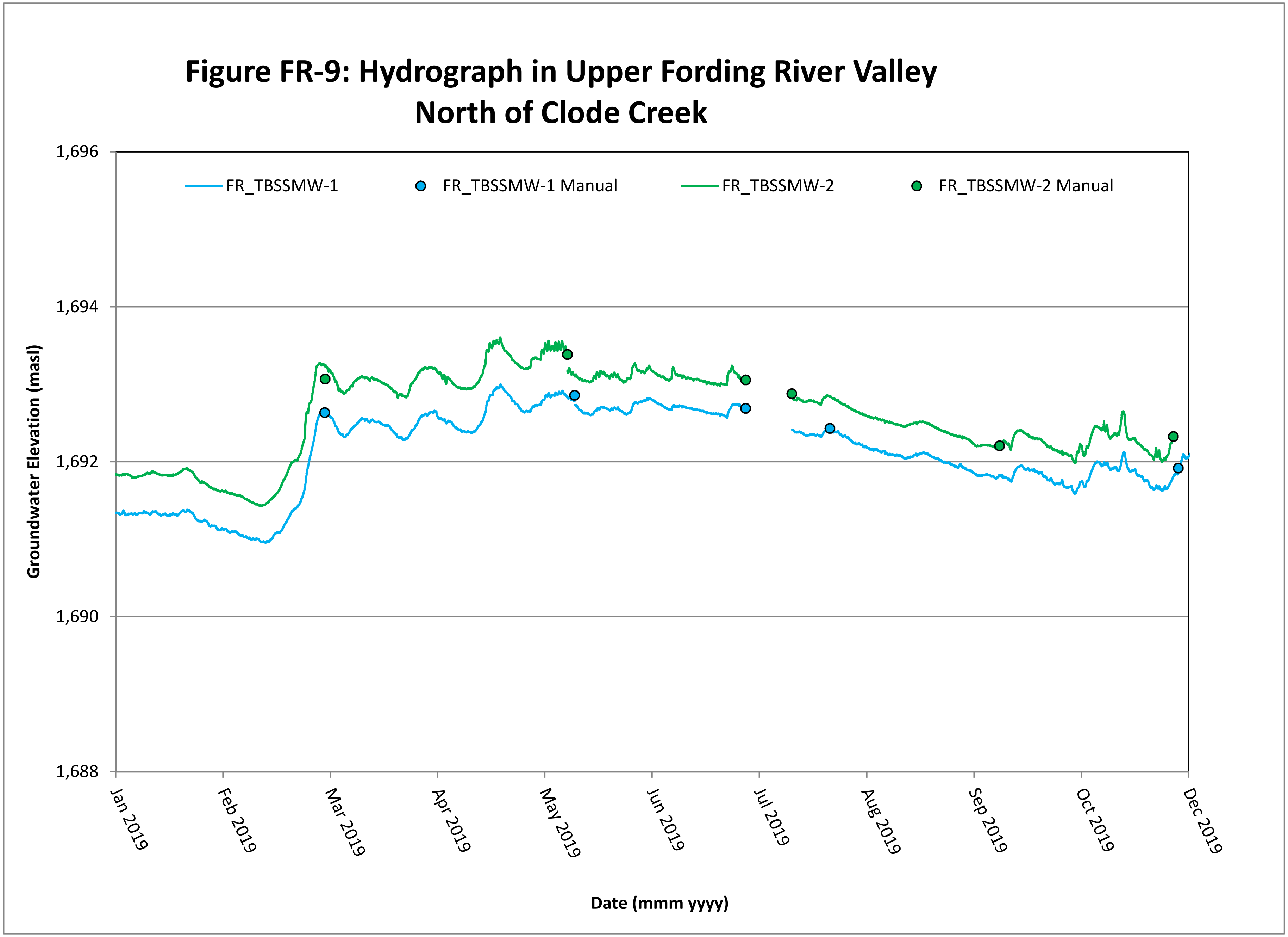


Figure FR-9: Hydrograph in Upper Fording River Valley
North of Clode Creek
FR_TBSSMW-1
FR_TBSSMW-1 Manual
FR_TBSSMW-2
FR_TBSSMW-2 Manual
Groundwater Elevation (masl)
1,696
1,694
1,692
1,690
1,688
Jan 2019
Feb 2019
Mar 2019
Apr 2019
May 2019
Jun 2019
Jul 2019
Aug 2019
Sep 2019
Oct 2019
Dec 2019
Date (mmm yyyy)

Figure FR-10: Pumping Rates for FR_POTWELLS

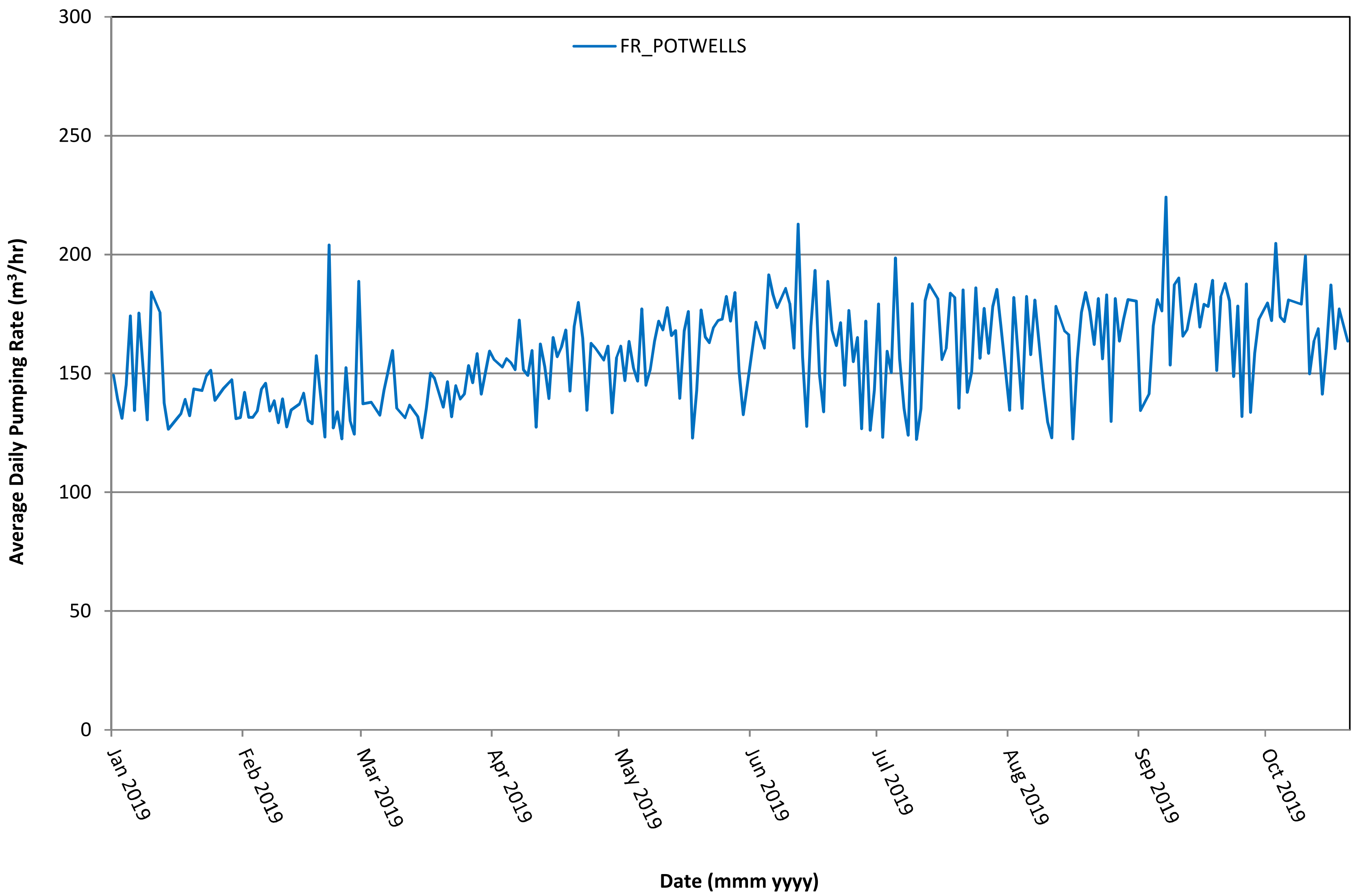


Figure FR-11: Hydrograph in the Fording River Valley North of the STP

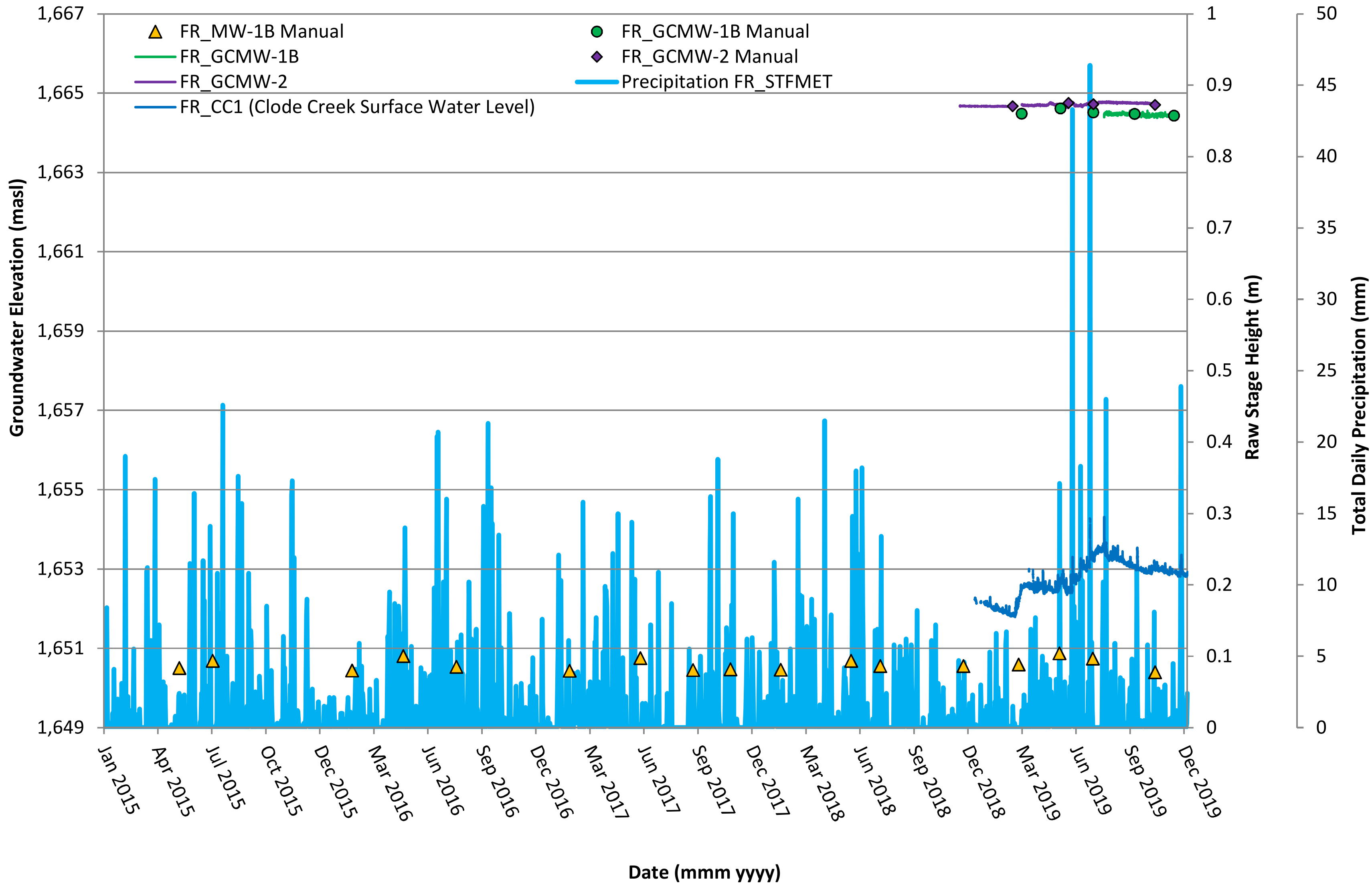


Figure FR-12: Hydrograph in the Fording River Valley directly South of the STP

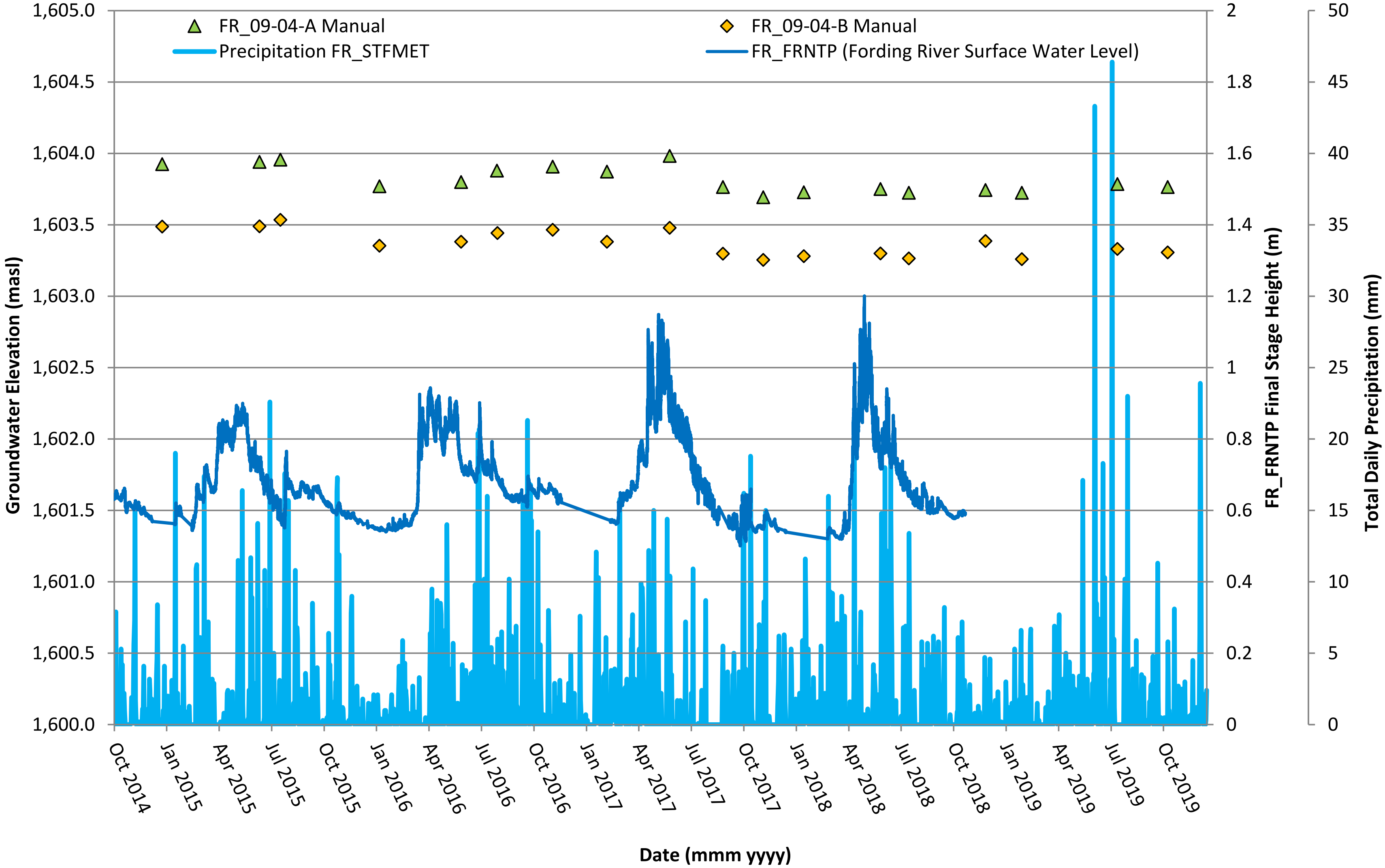
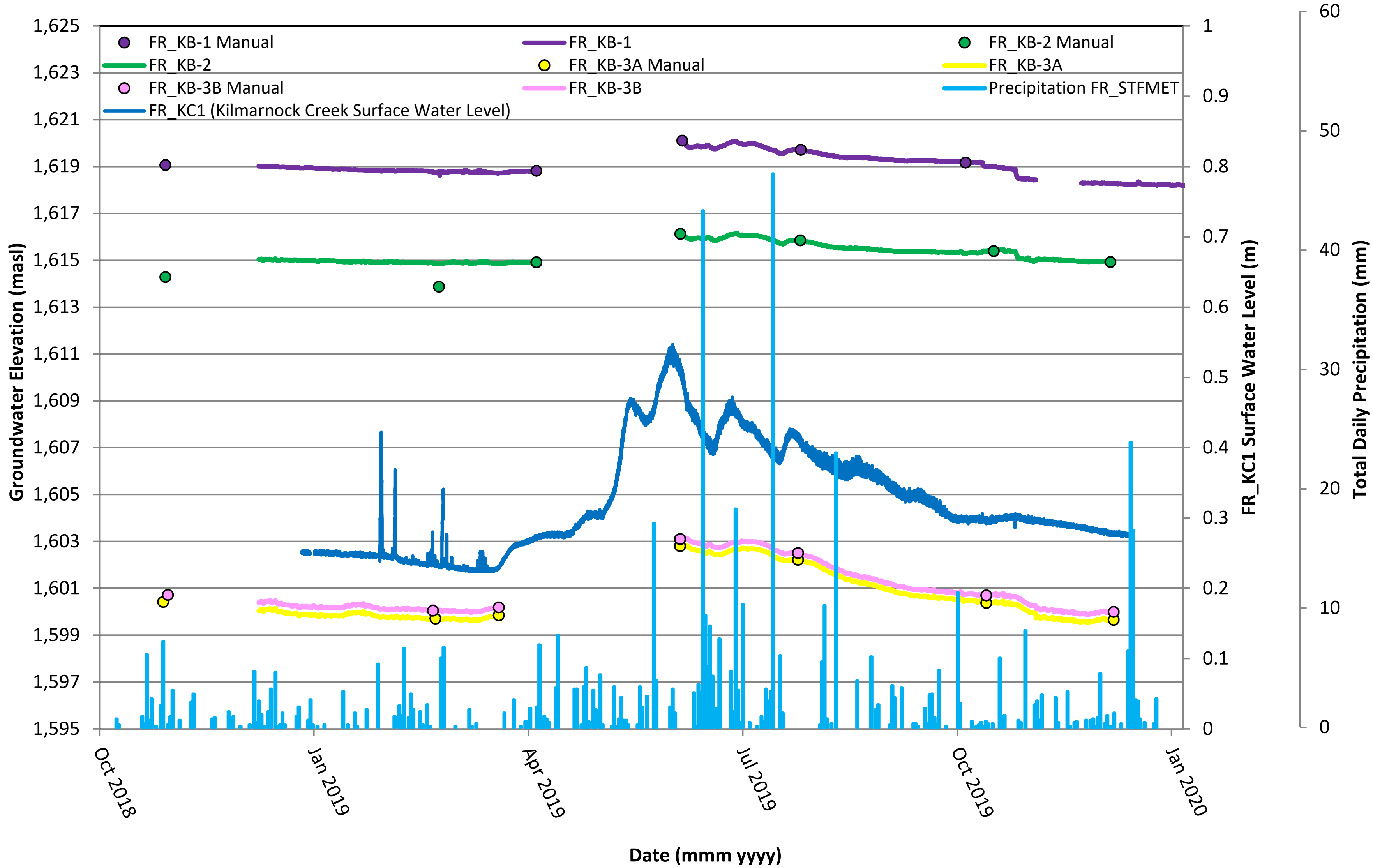


Figure FR-13: Hydrograph in Fording River Valley South of the STP in the Kilmarnock Alluvial Fan



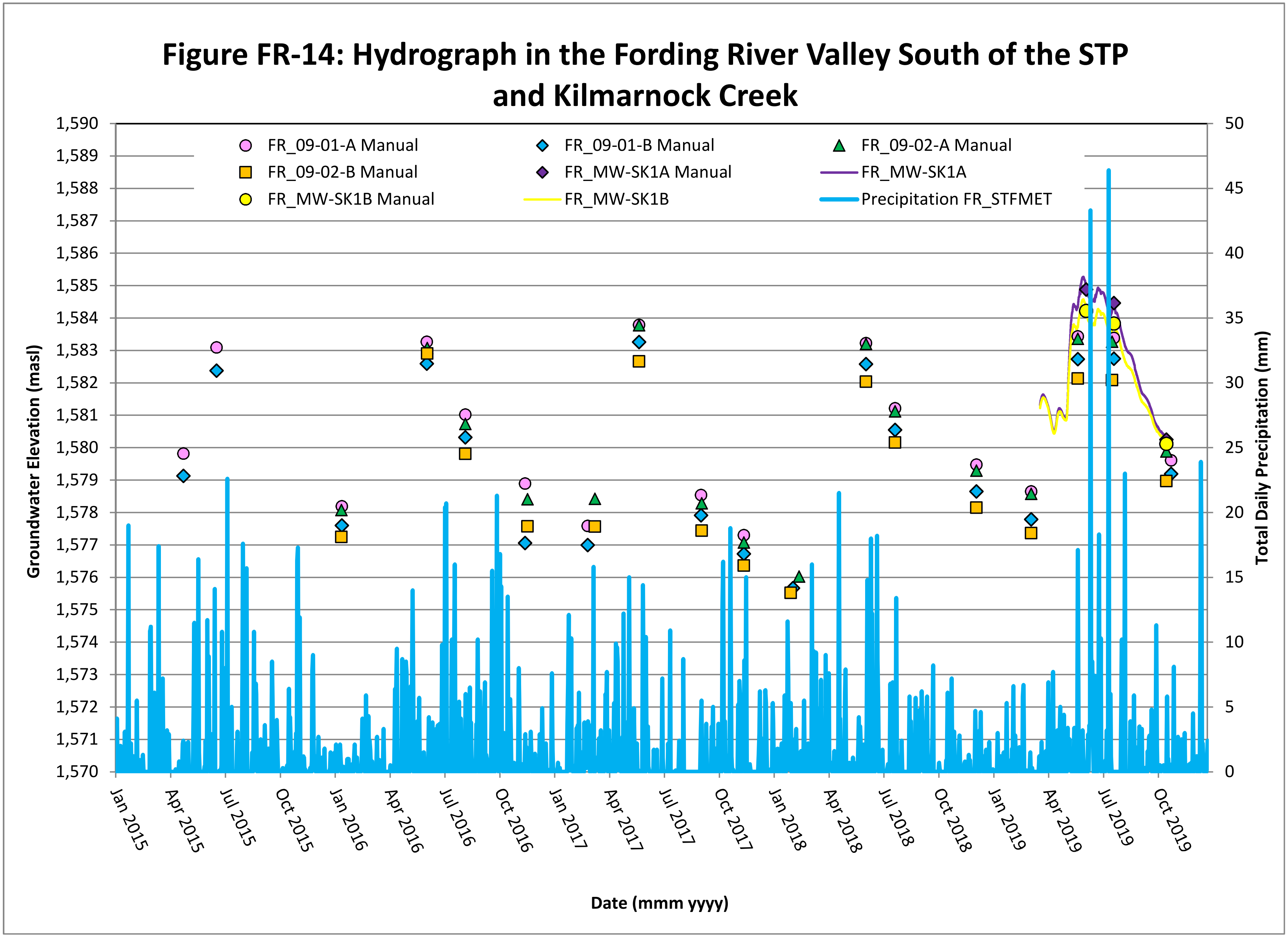


Figure FR-14: Hydrograph in the Fording River Valley South of the STP and Kilmarnock Creek
FR_09-01-A Manual
FR_09-01-B Manual
FR_09-02-A Manual
FR_09-02-B Manual
FR_MW-SK1A Manual
FR_MW-SK1A
FR_MW-SK1B Manual
FR_MW-SK1B
Precipitation FR_STFMET
Groundwater Elevation (masl)
Total Daily Precipitation (mm)
Date (mmm yyyy)
1,590
1,589
1,588
1,587
1,586
1,585
1,584
1,583
1,582
1,581
1,580
1,579
1,578
1,577
1,576
1,575
1,574
1,573
1,572
1,571
1,570
50
45
40
35
30
25
20
15
10
5
0
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019

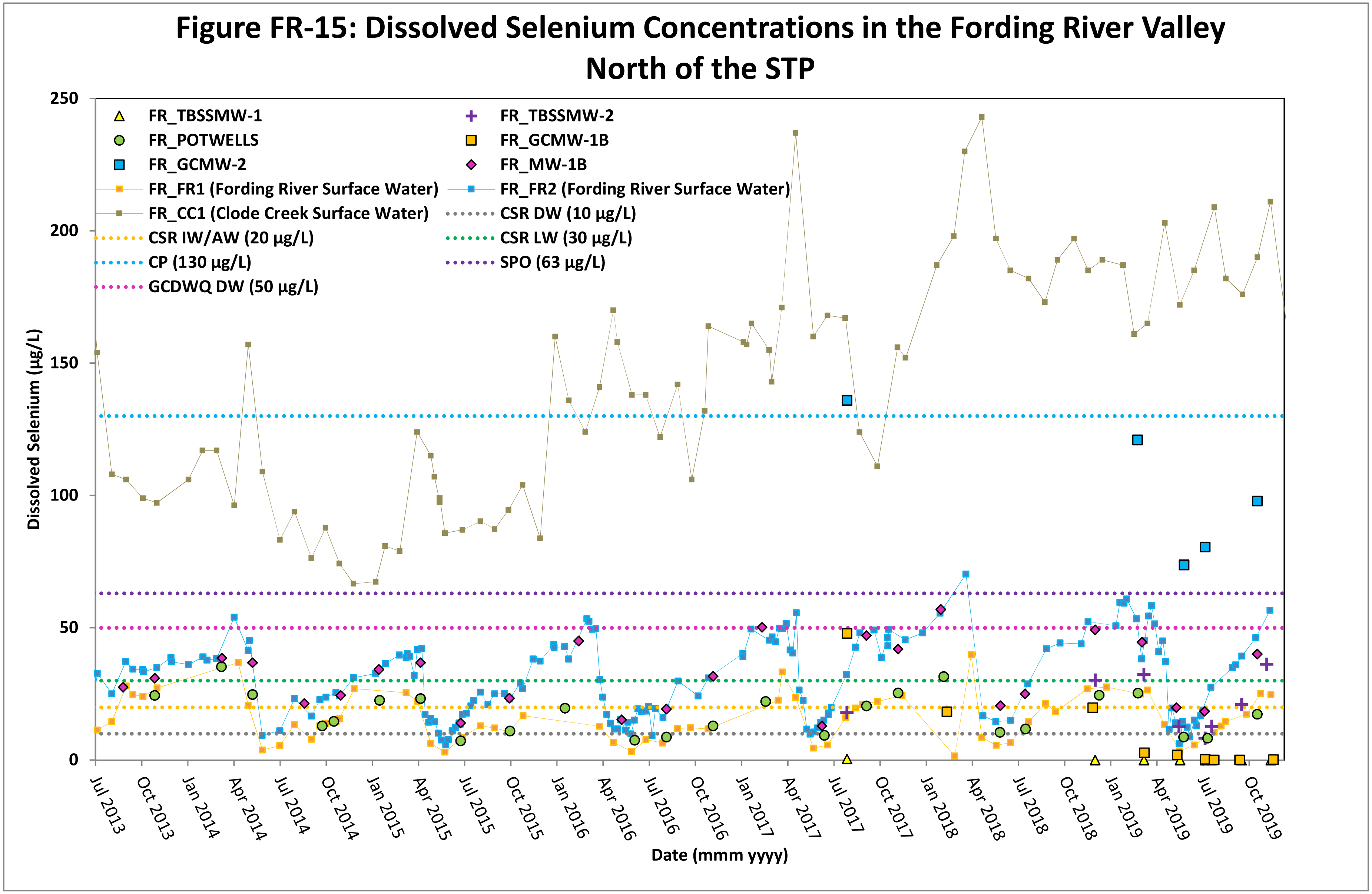
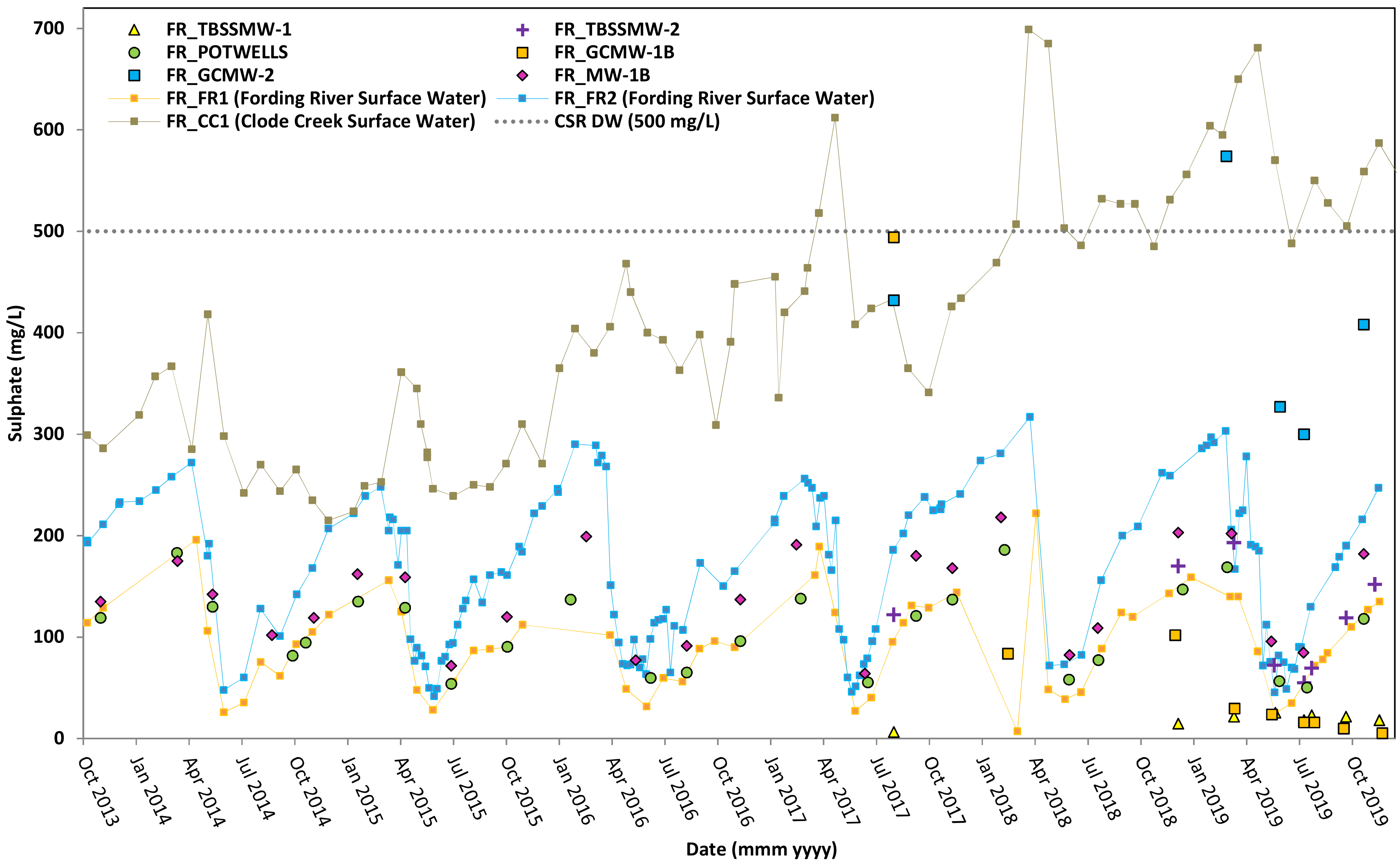


Figure FR-15: Dissolved Selenium Concentrations in the Fording River Valley North of the STP
FR_TBSSMW-1
FR_TBSSMW-2
FR_POTWELLS
FR_GCMW-1B
FR_GCMW-2
FR_MW-1B
FR_FR1 (Fording River Surface Water)
FR_FR2 (Fording River Surface Water)
FR_CC1 (Clode Creek Surface Water)
CSR DW (10 µg/L)
CSR IW/AW (20 µg/L)
CSR LW (30 µg/L)
CP (130 µg/L)
SPO (63 µg/L)
GCDWQ DW (50 µg/L)
Dissolved Selenium (µg/L)
250
200
150
100
50
0
Jul 2013
Oct 2013
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Date (mmm yyyy)

Figure FR-16: Sulphate Concentrations in the Fording River Valley North of the STP



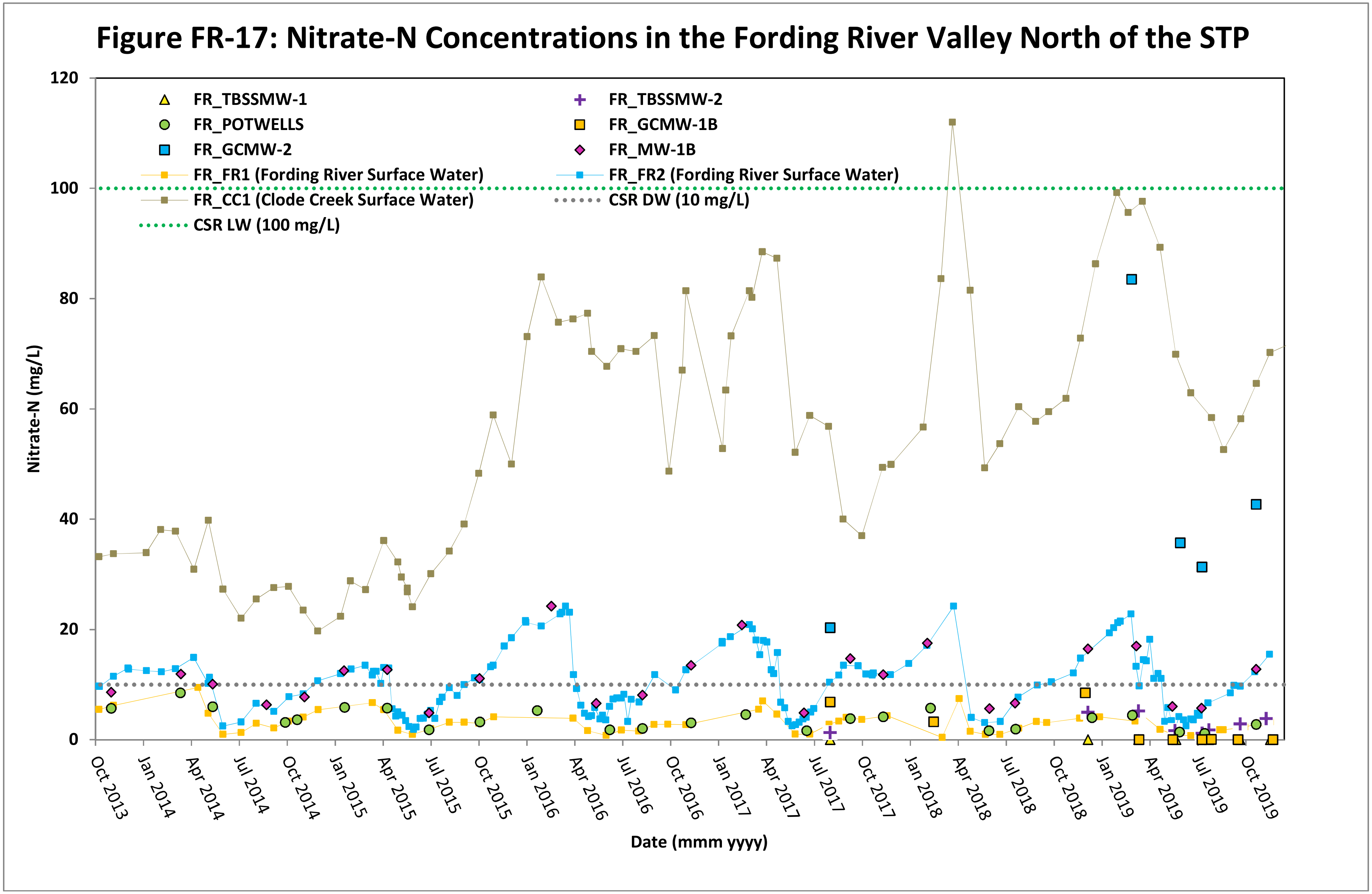


Figure FR-17: Nitrate-N Concentrations in the Fording River Valley North of the STP
Nitrate-N (mg/L)
Date (mmm yyyy)
FR_TBSSMW-1
FR_TBSSMW-2
FR_POTWELLS
FR_GCMW-1B
FR_GCMW-2
FR_MW-1B
FR_FR1 (Fording River Surface Water)
FR_FR2 (Fording River Surface Water)
FR_CC1 (Clode Creek Surface Water)
CSR DW (10 mg/L)
CSR LW (100 mg/L)
0
20
40
60
80
100
120
Oct 2013
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019

Figure FR-18: Dissolved Selenium Concentrations in the Fording River Valley South of the STP

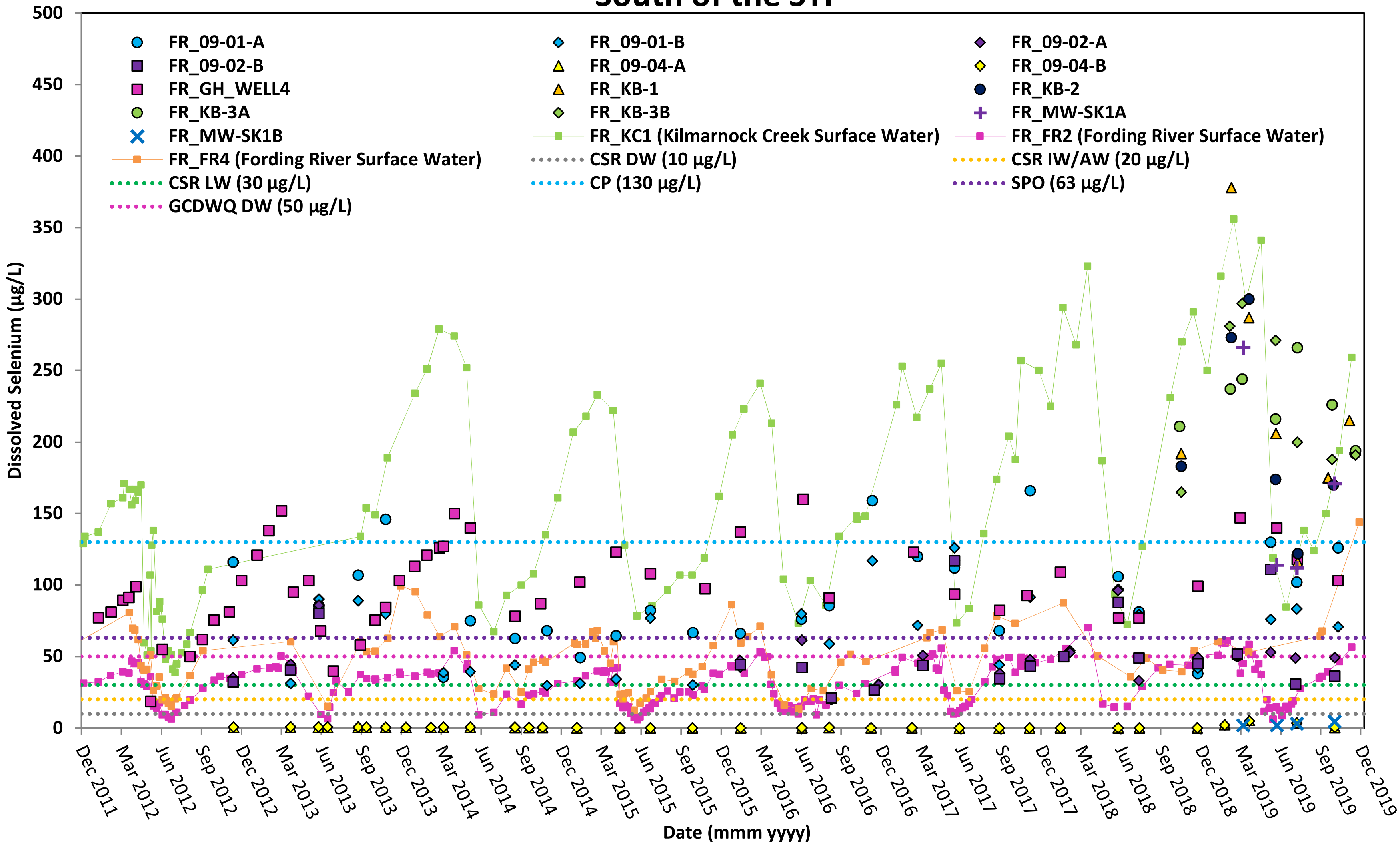
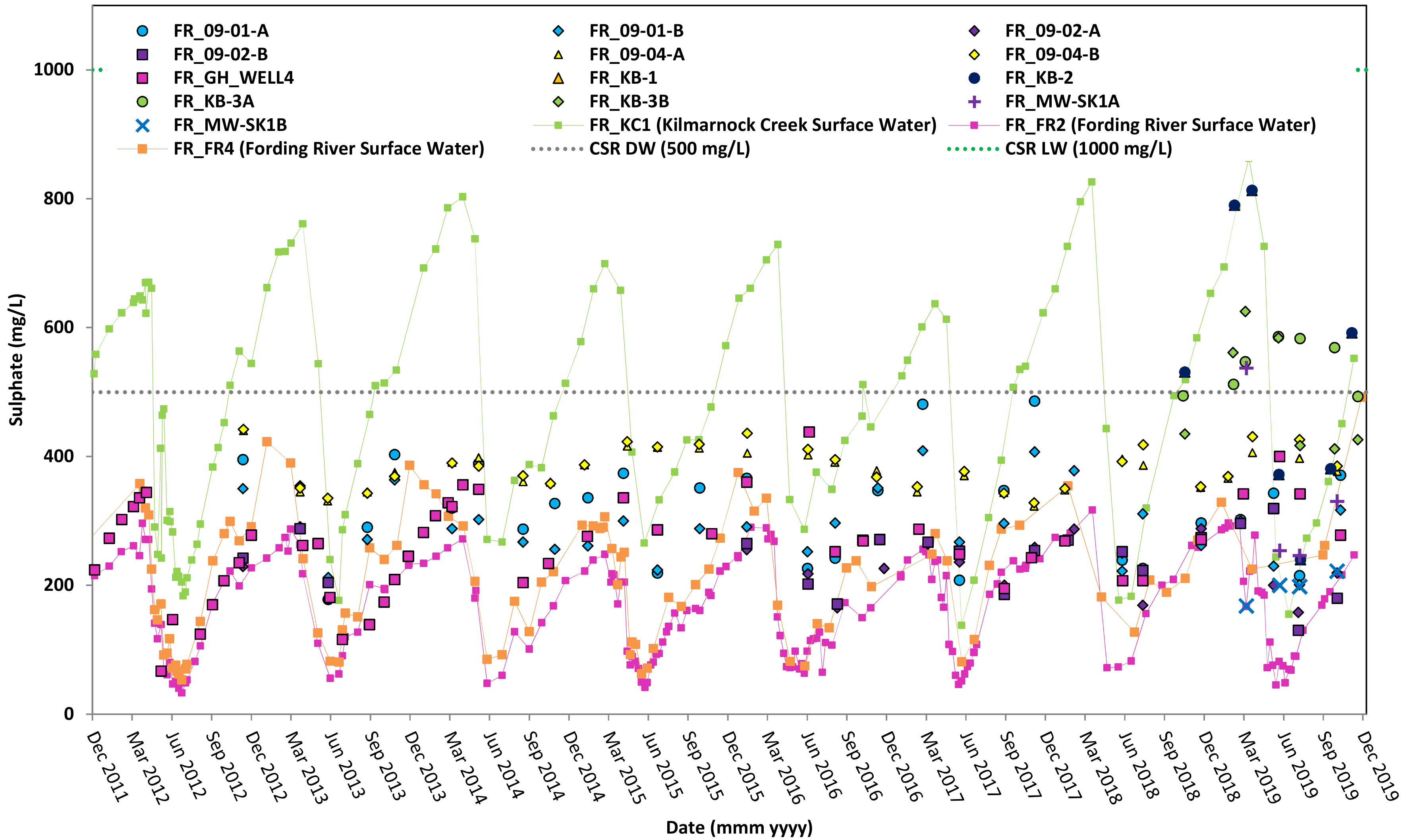


Figure FR-19: Sulphate Concentrations in the Fording River Valley South of the STP



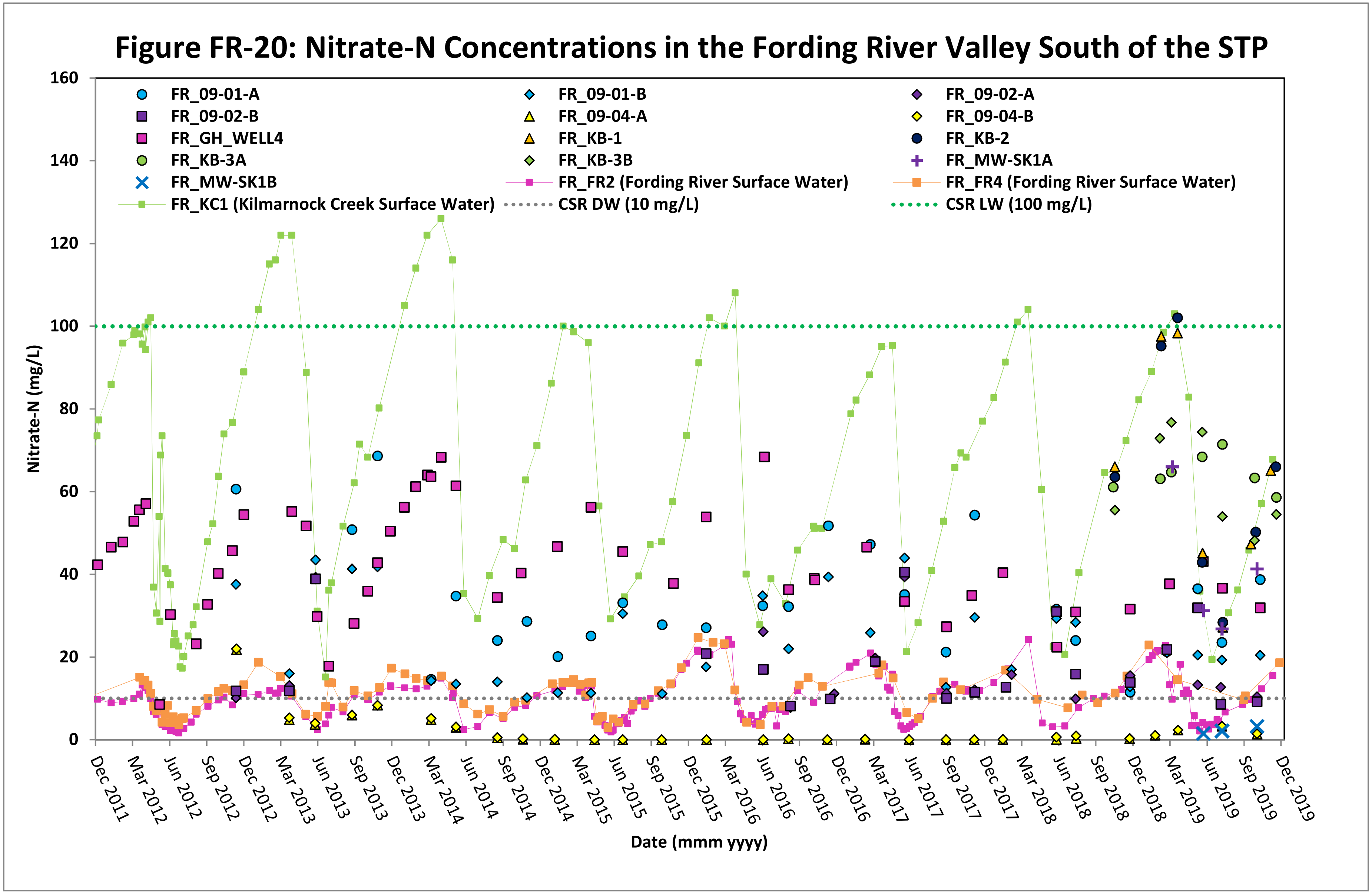
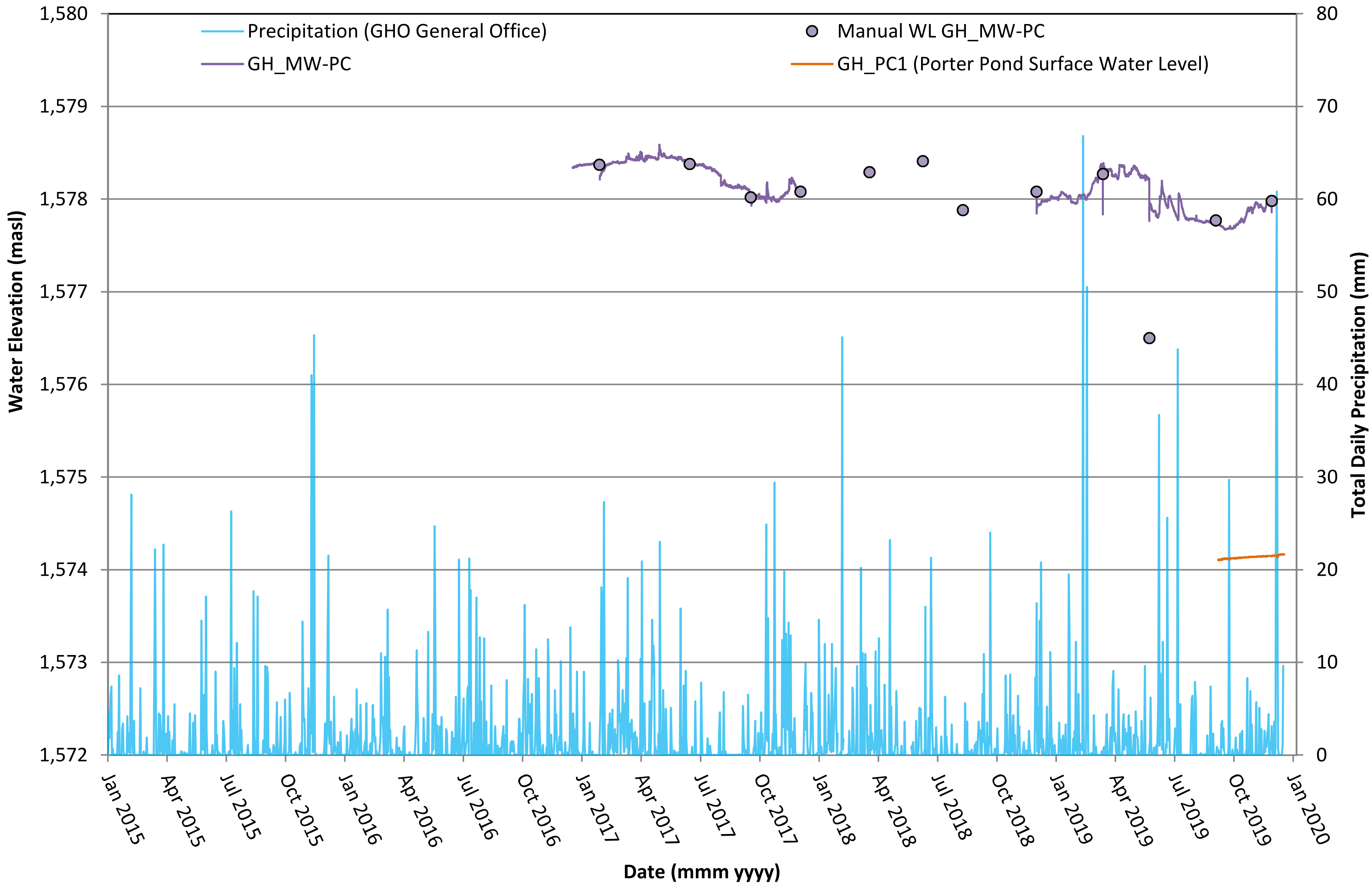


Figure FR-20: Nitrate-N Concentrations in the Fording River Valley South of the STP
Nitrate-N (mg/L)
160
140
120
100
80
60
40
20
0
FR_09-01-A
FR_09-01-B
FR_09-02-A
FR_09-02-B
FR_09-04-A
FR_09-04-B
FR_GH_WELL4
FR_KB-1
FR_KB-2
FR_KB-3A
FR_KB-3B
FR_MW-SK1A
FR_MW-SK1B
FR_FR2 (Fording River Surface Water)
FR_FR4 (Fording River Surface Water)
FR_KC1 (Kilmarnock Creek Surface Water)
CSR DW (10 mg/L)
CSR LW (100 mg/L)
Dec 2011
Mar 2012
Jun 2012
Sep 2012
Dec 2012
Mar 2013
Jun 2013
Sep 2013
Dec 2013
Mar 2014
Jun 2014
Sep 2014
Dec 2014
Mar 2015
Jun 2015
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Dec 2019
Date (mmm yyyy)

Figure GH-1: Hydrograph in Porter Creek Watershed and Precipitation Data Fording River Valley



Note: Data was removed where suspected datalogger removal occured.
Precipitation data recorded on February 8, 17 and 18, 2018 have been removed as the data is inferred to be anomalous.

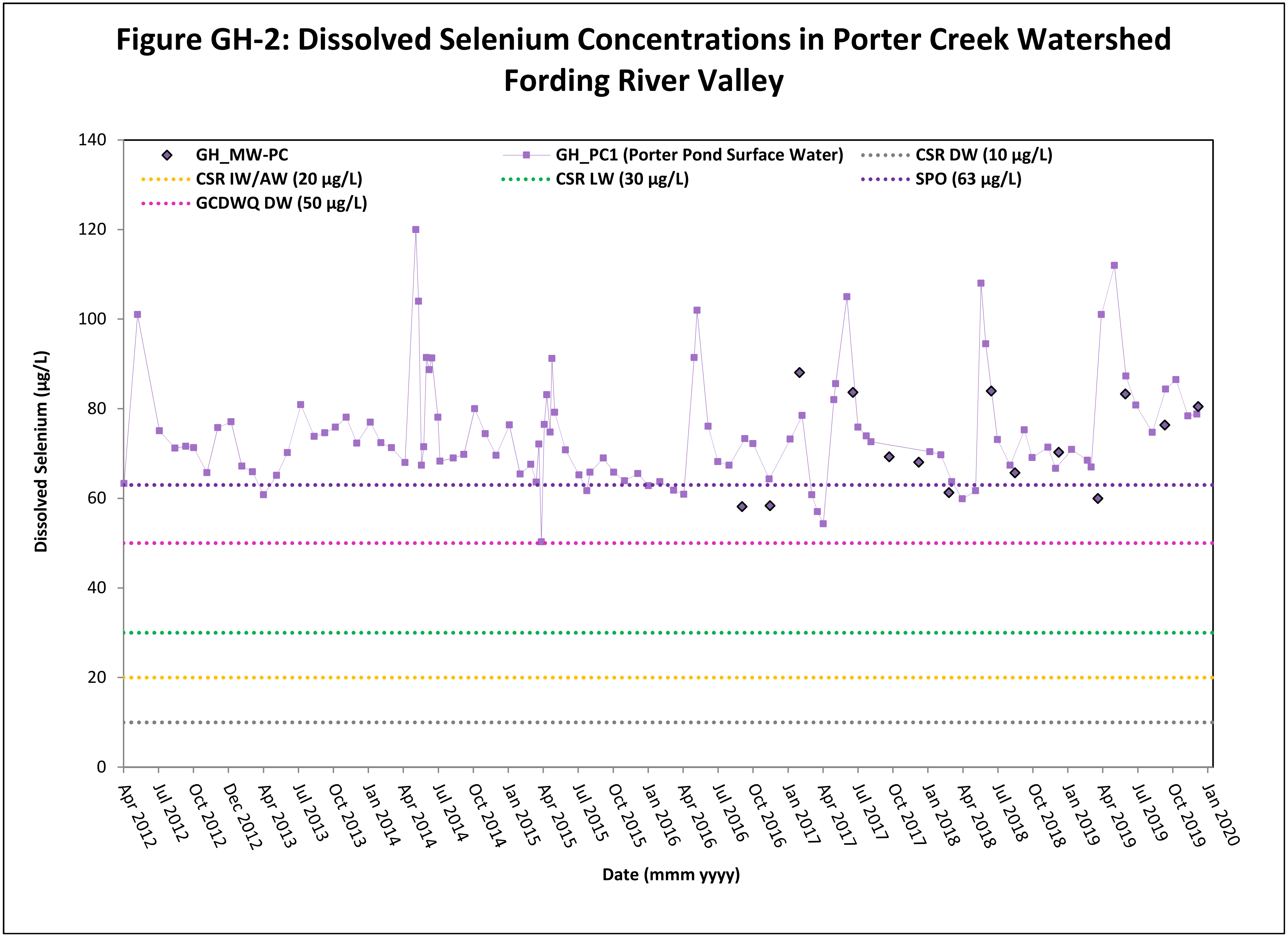
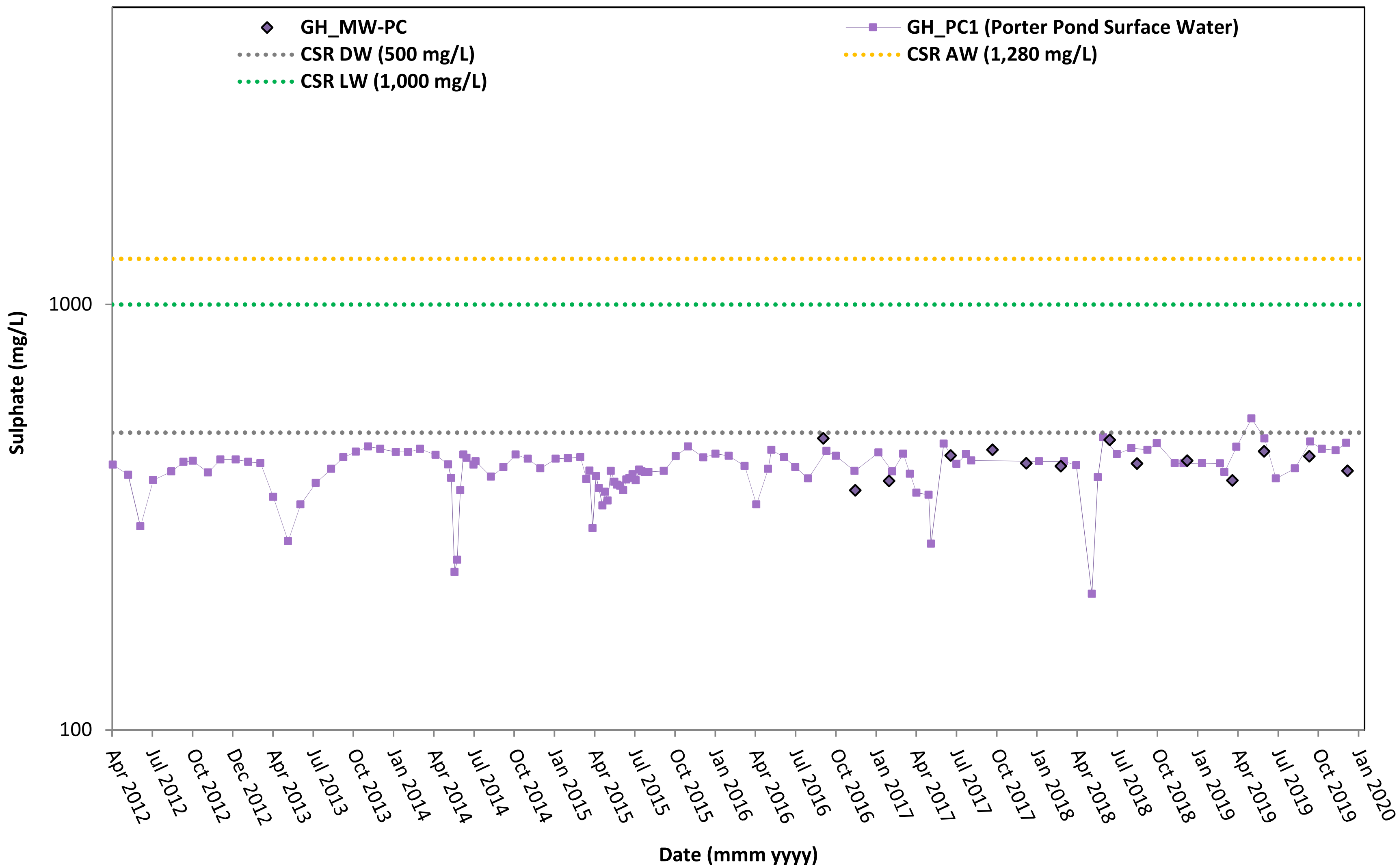
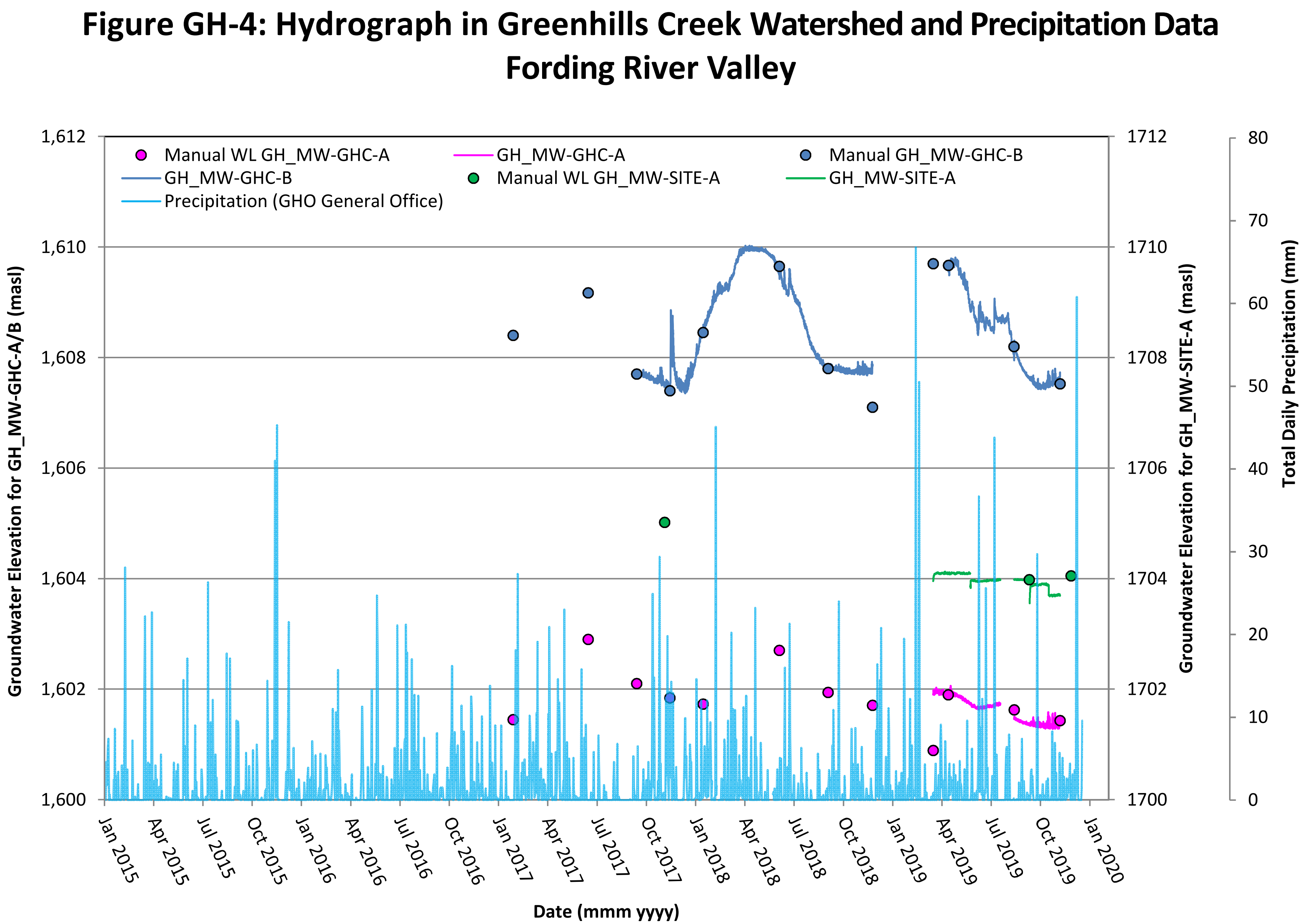


Figure GH-2: Dissolved Selenium Concentrations in Porter Creek Watershed
Fording River Valley
GH_MW-PC
GH_PC1 (Porter Pond Surface Water)
CSR DW (10 µg/L)
CSR IW/AW (20 µg/L)
CSR LW (30 µg/L)
SPO (63 µg/L)
GCDWQ DW (50 µg/L)
Dissolved Selenium (µg/L)
0
20
40
60
80
100
120
140
Apr 2012
Jul 2012
Oct 2012
Dec 2012
Apr 2013
Jul 2013
Oct 2013
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Jan 2020
Date (mmm yyyy)

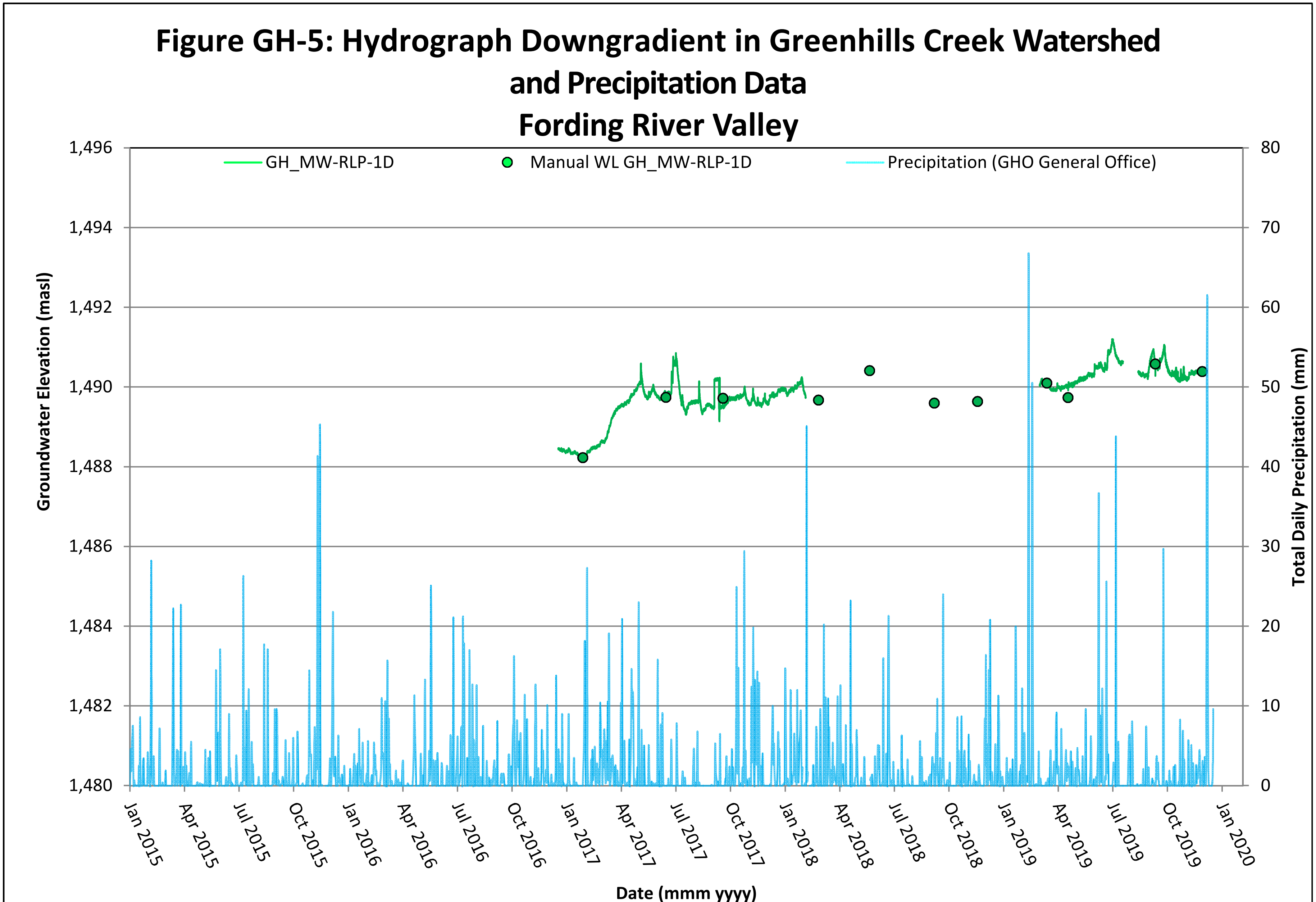
Figure GH-3: Sulphate Concentrations in Porter Creek Watershed
Fording River Valley



Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.



Note: Data was removed where suspected datalogger removal occured.
Precipitation data recorded on February 8, 17 and 18, 2018 have been removed as the data is inferred to be anomalous.



Note: Data was removed where suspected datalogger removal occured.
Precipitation data recorded on February 8, 17 and 18, 2018 have been removed as the data is inferred to be anomalous.

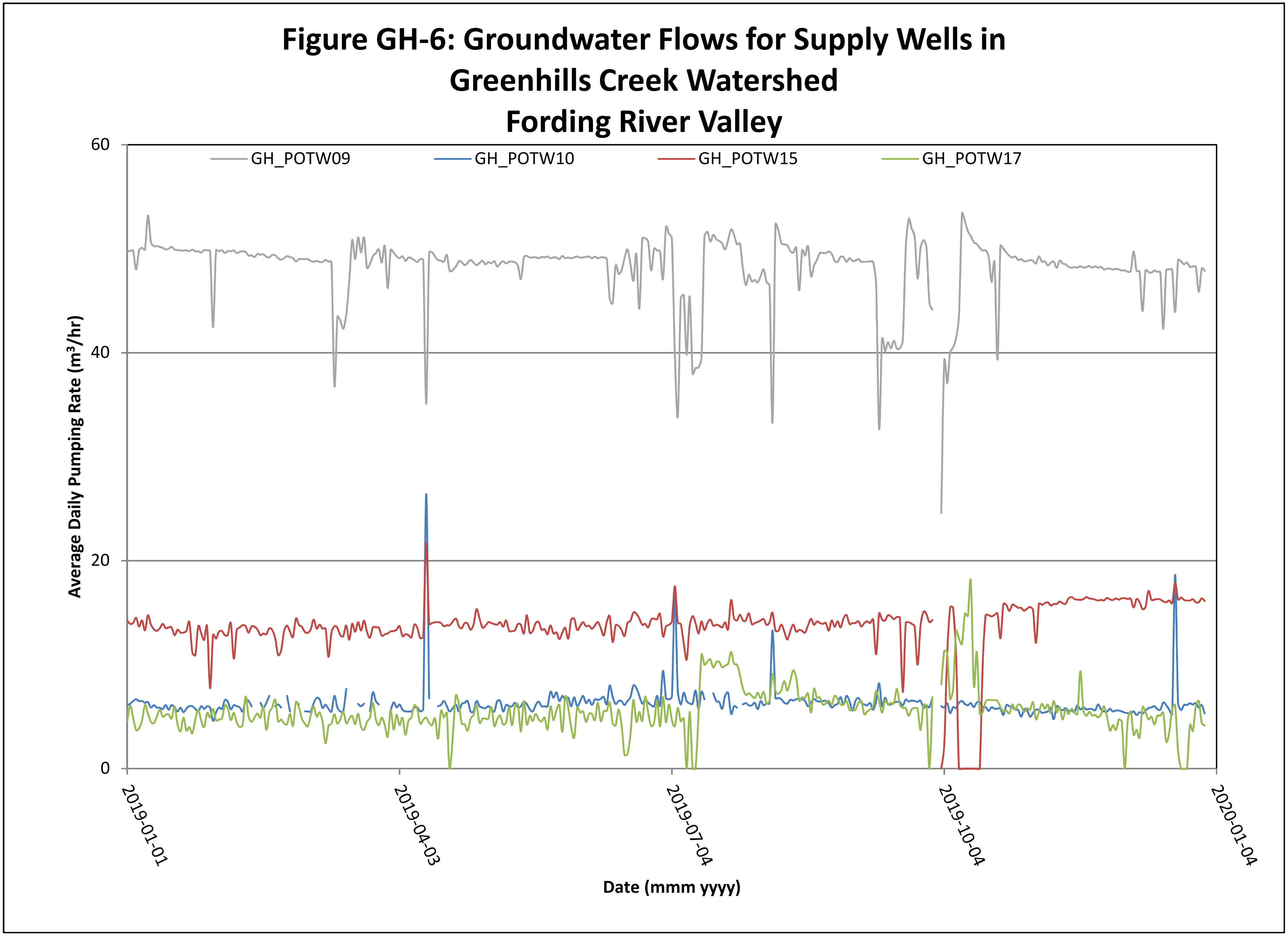
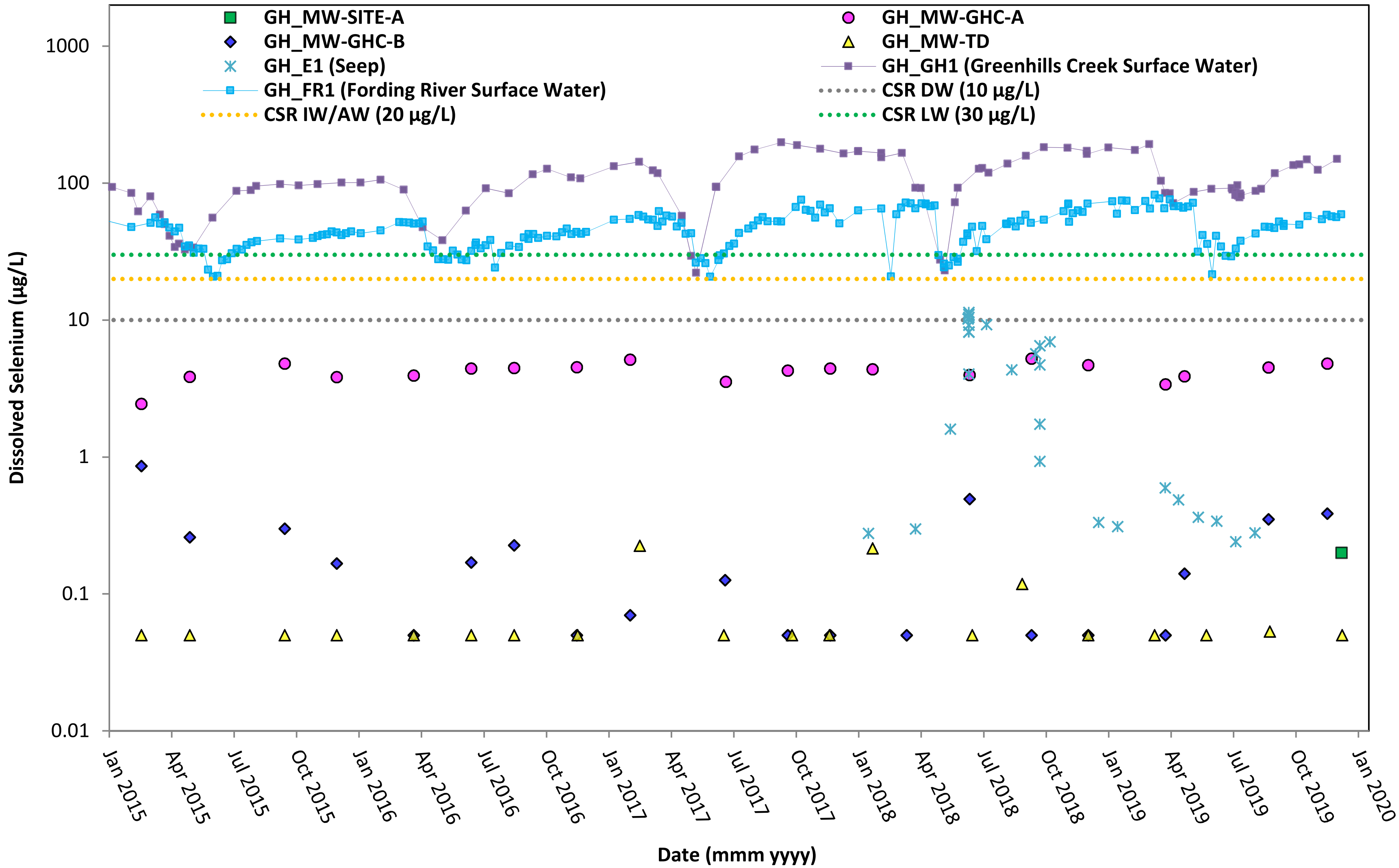


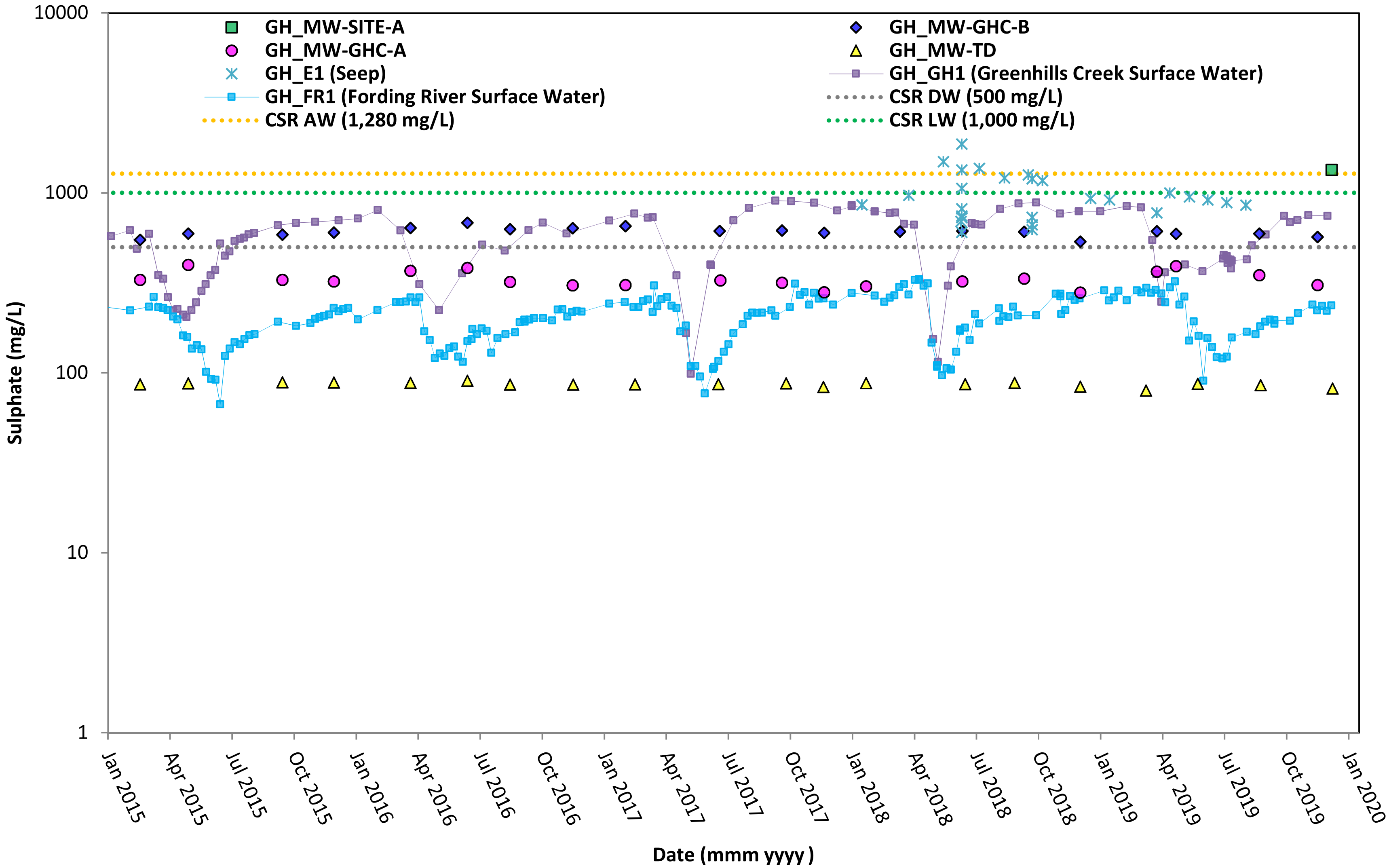
Figure GH-6: Groundwater Flows for Supply Wells in
Greenhills Creek Watershed
Fording River Valley
GH_POTW09
GH_POTW10
GH_POTW15
GH_POTW17
60
40
20
0
Average Daily Pumping Rate (m³/hr)
2019-01-01
2019-04-03
2019-07-04
2019-10-04
2020-01-04
Date (mmm yyyy)

Figure GH-7: Dissolved Selenium Concentrations in Greenhills Creek Watershed Fording River Valley



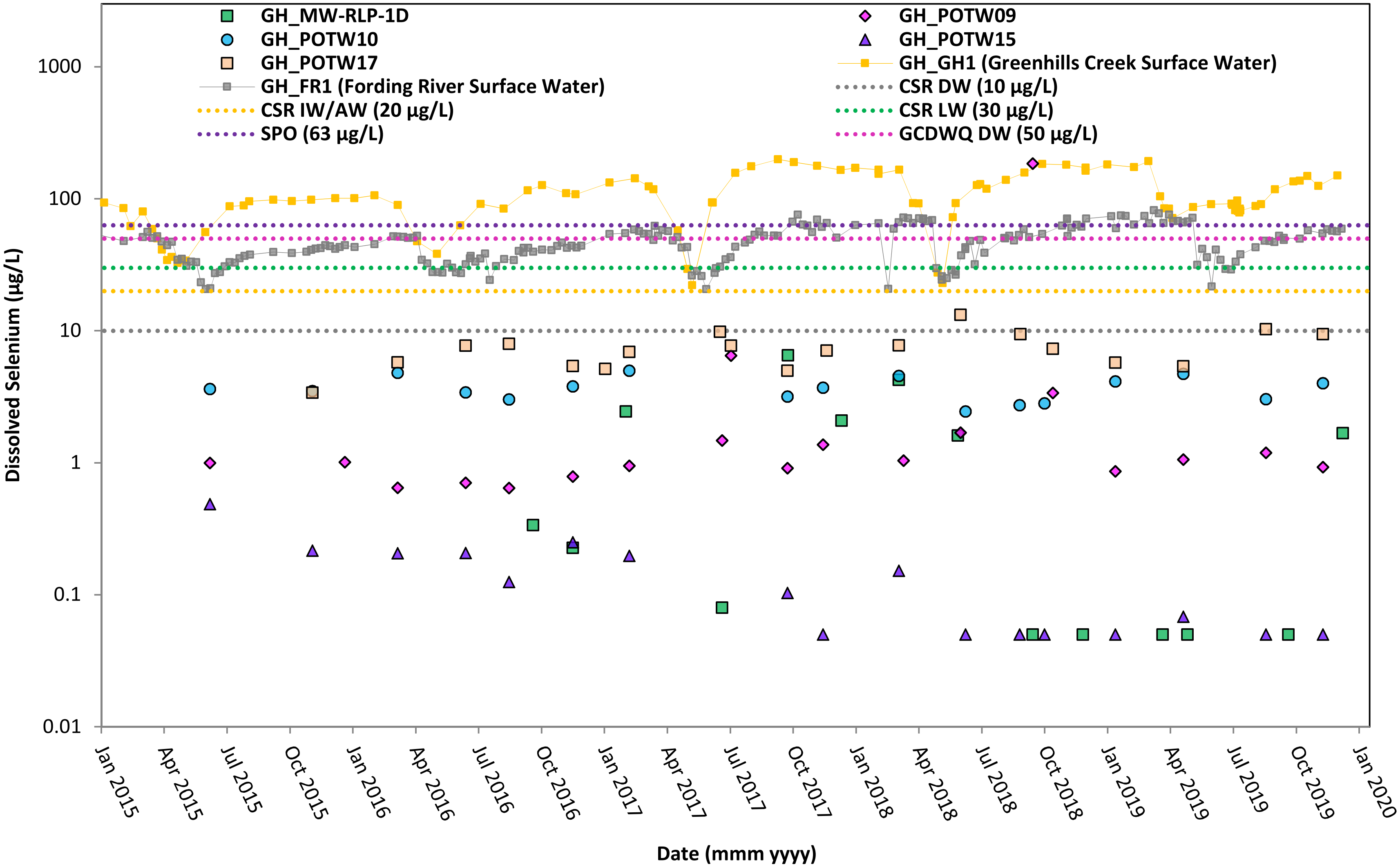
Note: For concentrations measured below the analytical detection limit, the detection limit (0.05 µg/L) was utilized for plotting purposes.
Logaritchmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.

Figure GH-8: Sulphate Concentrations in Greenhills Creek Watershed
Fording River Valley

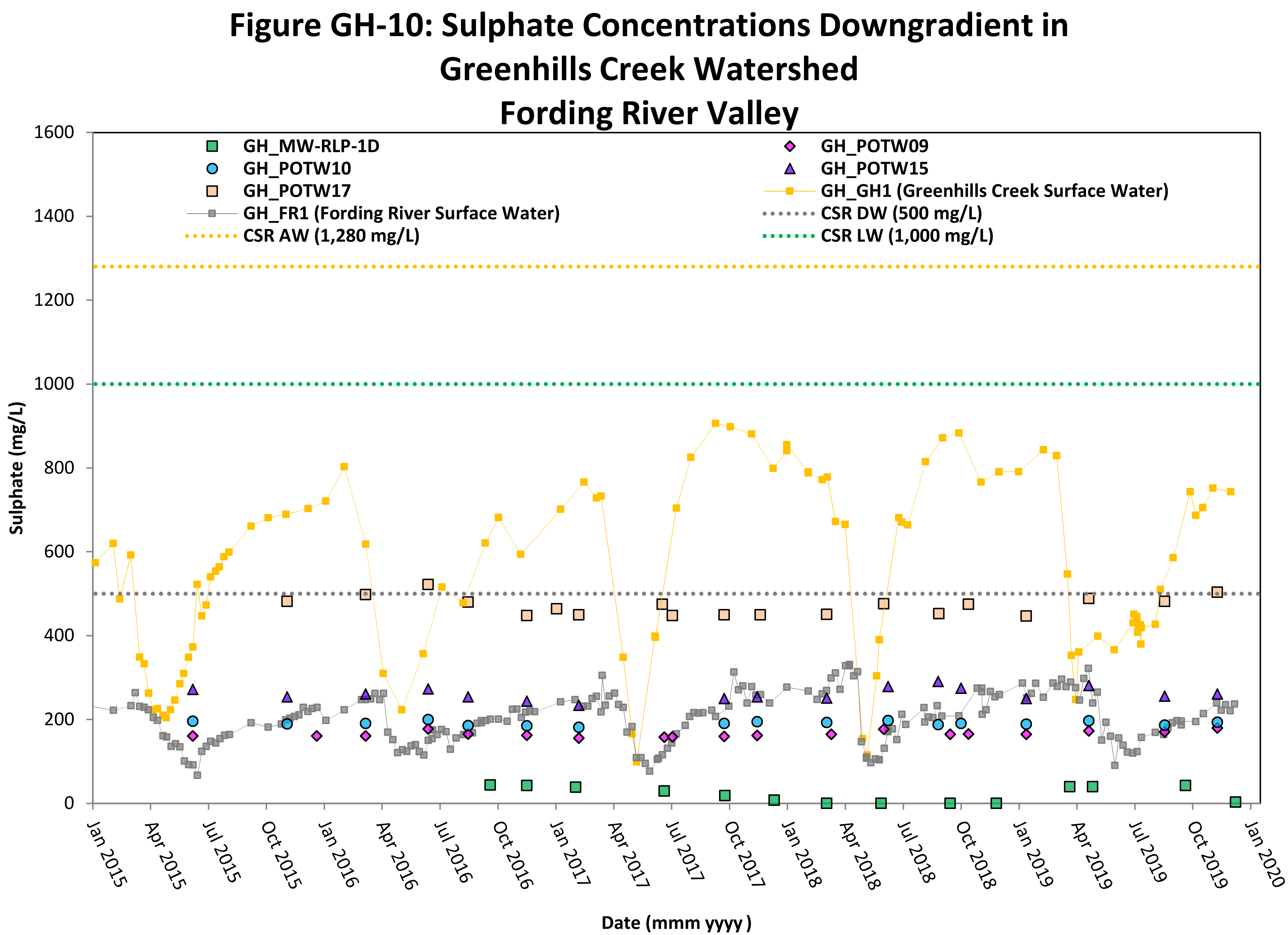


Note: BCWQG has been included for comparision purposes for surface water analytical data.
Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.

Figure GH-9: Dissolved Selenium Concentrations Downgradient in Greenhills Creek Watershed Fording River Valley

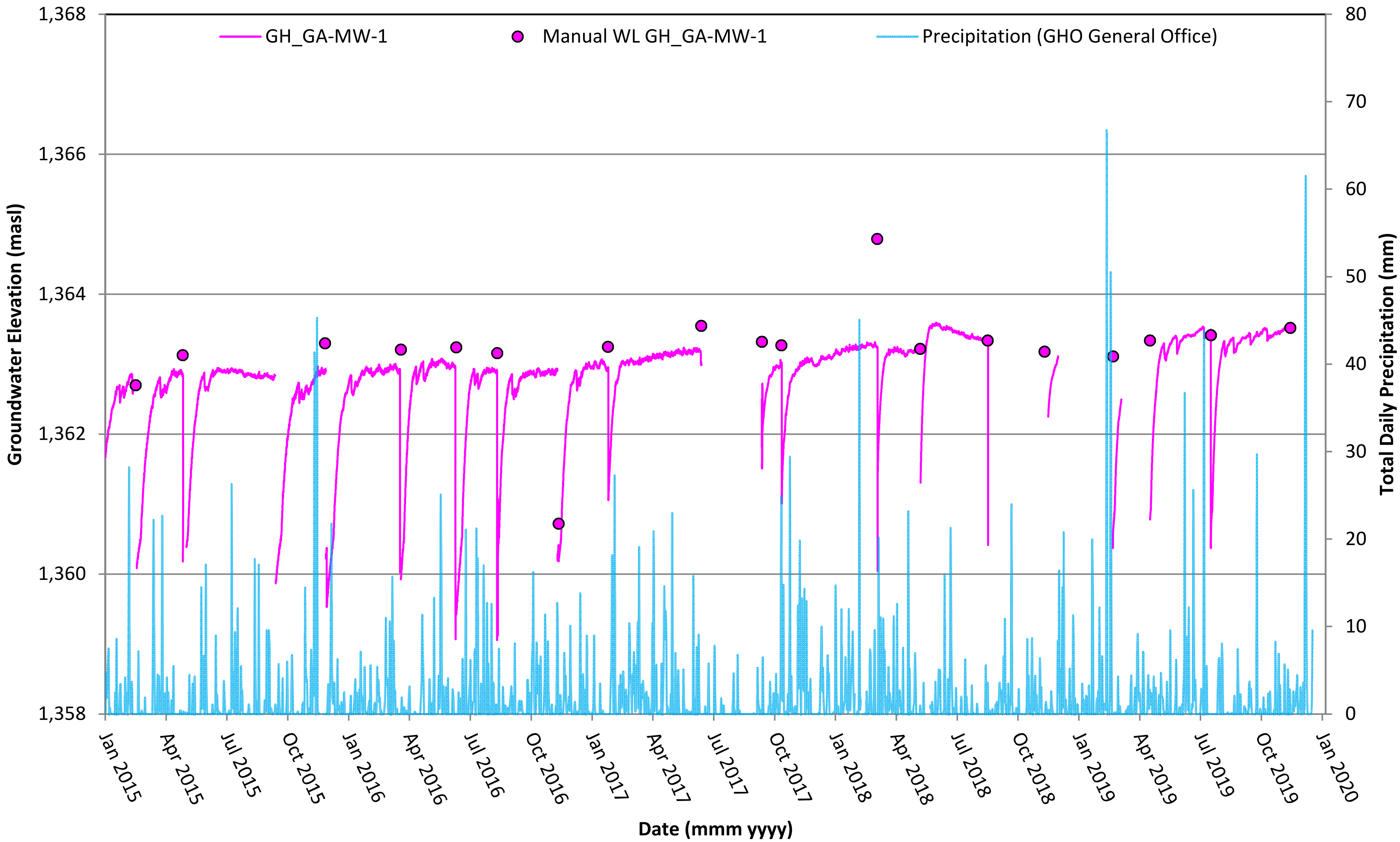


Note: For concentrations measured below the analytical detection limit, the detection limit (0.05 µg/L) was utilized for plotting purposes.
Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.



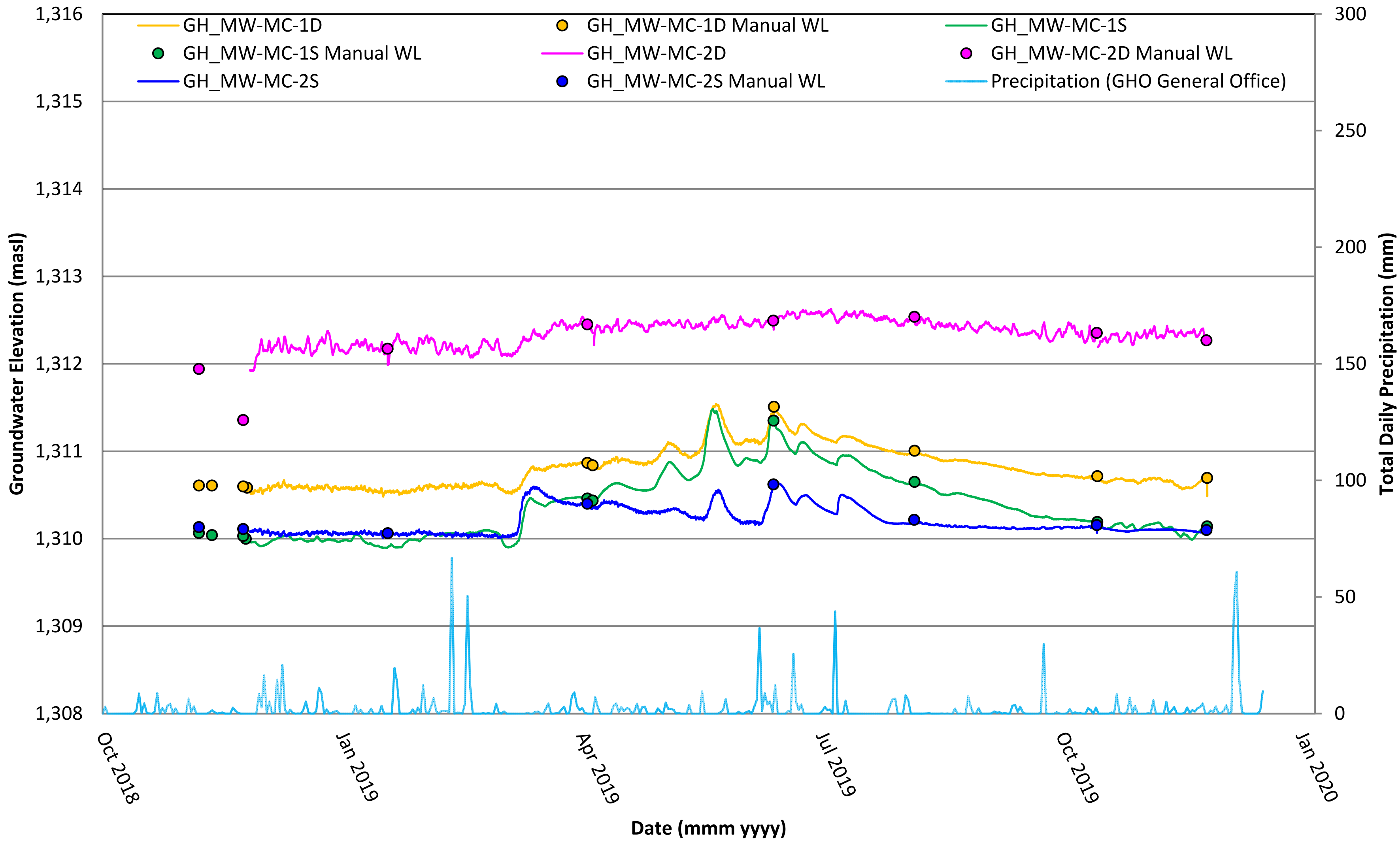
Note: For concentrations measured below the analytical detection limit, the detection limit (0.3 mg/L) was utilized for plotting purposes.

Figure GH-11: Hydrograph in No Name Drainage (Reference) and Precipitation Data
Elk River Valley



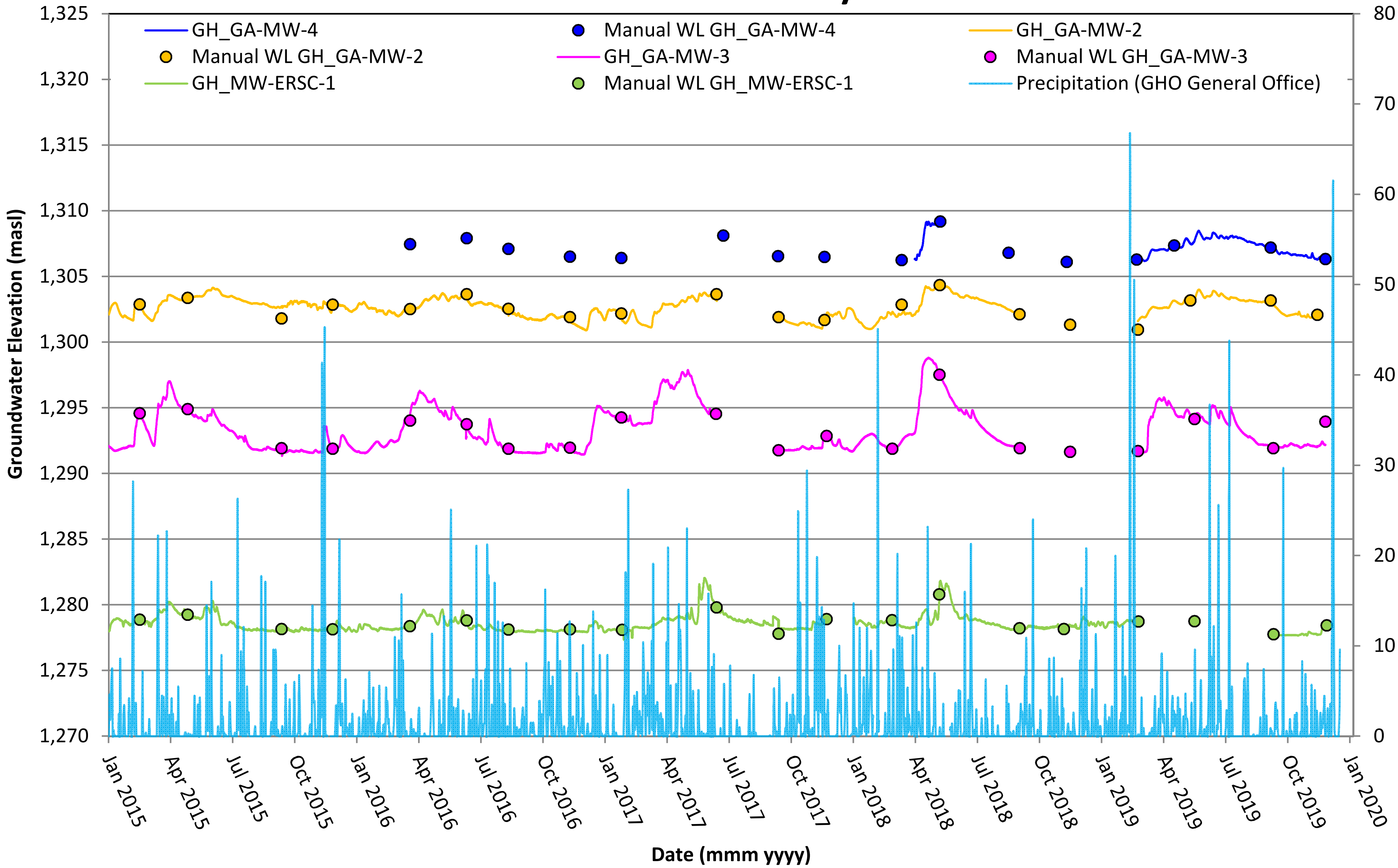
Note: Data was removed where suspected datalogger removal occured. At GH_GA-MW-1, water levels took approximately 30 days to return to static after sampling.
Precipitation data recorded on February 8, 17 and 18, 2018 have been removed as the data is inferred to be anomalous.

Figure GH-12: Hydrograph in Mickelson Drainage and Precipitation Data
Elk River Valley



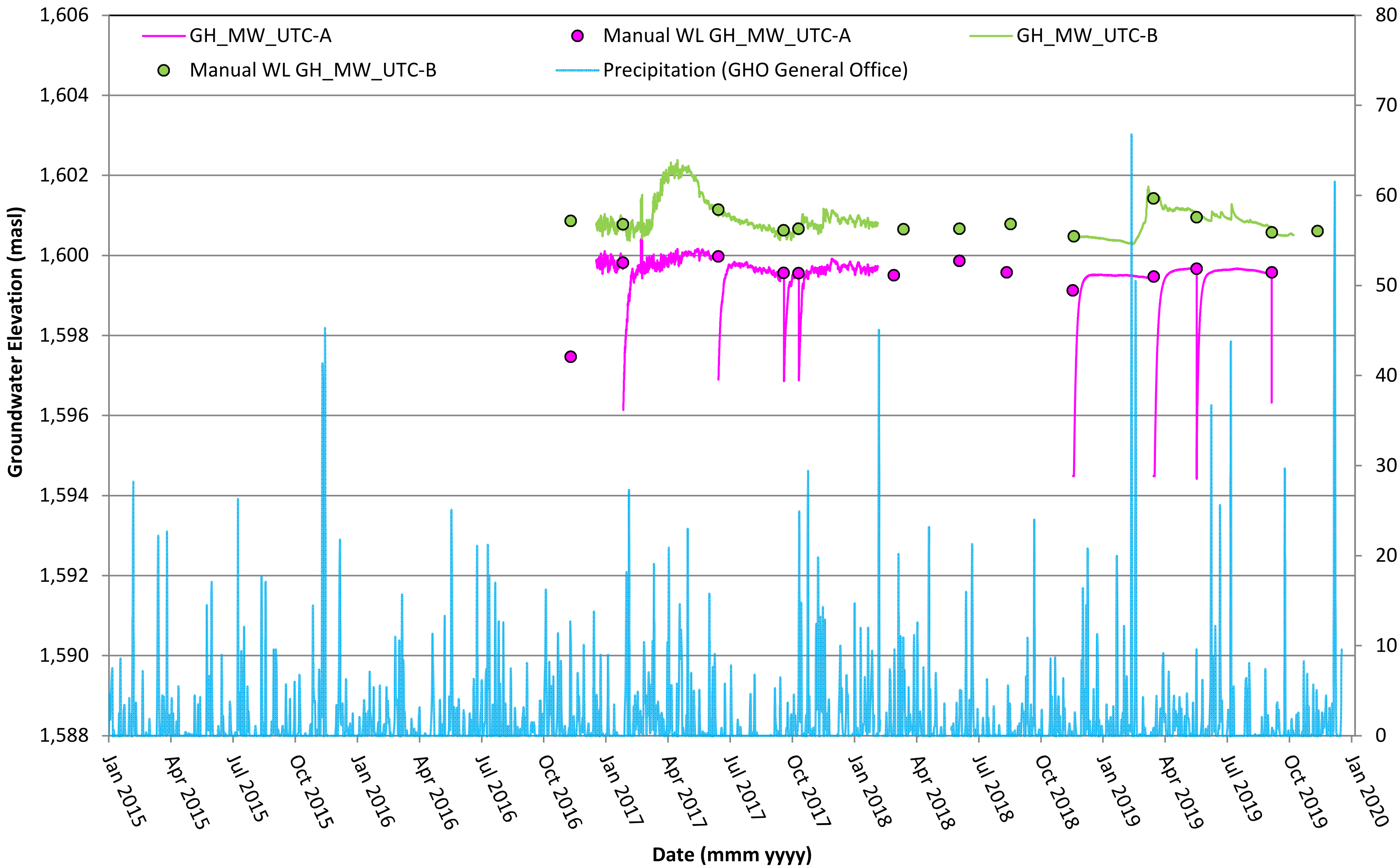
Note: Precipitation data recorded on February 8, 17 and 18, 2018 have been removed as the data is inferred to be anomalous.

Figure GH-13: Hydrograph in Leask, Wolfram, Lower Thompson Drainages and Downgradient and Precipitation Data
Elk River Valley



Note: Data was removed where suspected datalogger removal occured.
Precipitation data recorded on February 8, 17 and 18, 2018 have been removed as the data is inferred to be anomalous.

Figure GH-14: Hydrograph in Upper Thompson Drainage and Precipitation Data
Elk River Valley



Note: Data was removed where suspected datalogger removal occured.
Precipitation data recorded on February 8, 17 and 18, 2018 have been removed as the data is inferred to be anomalous.

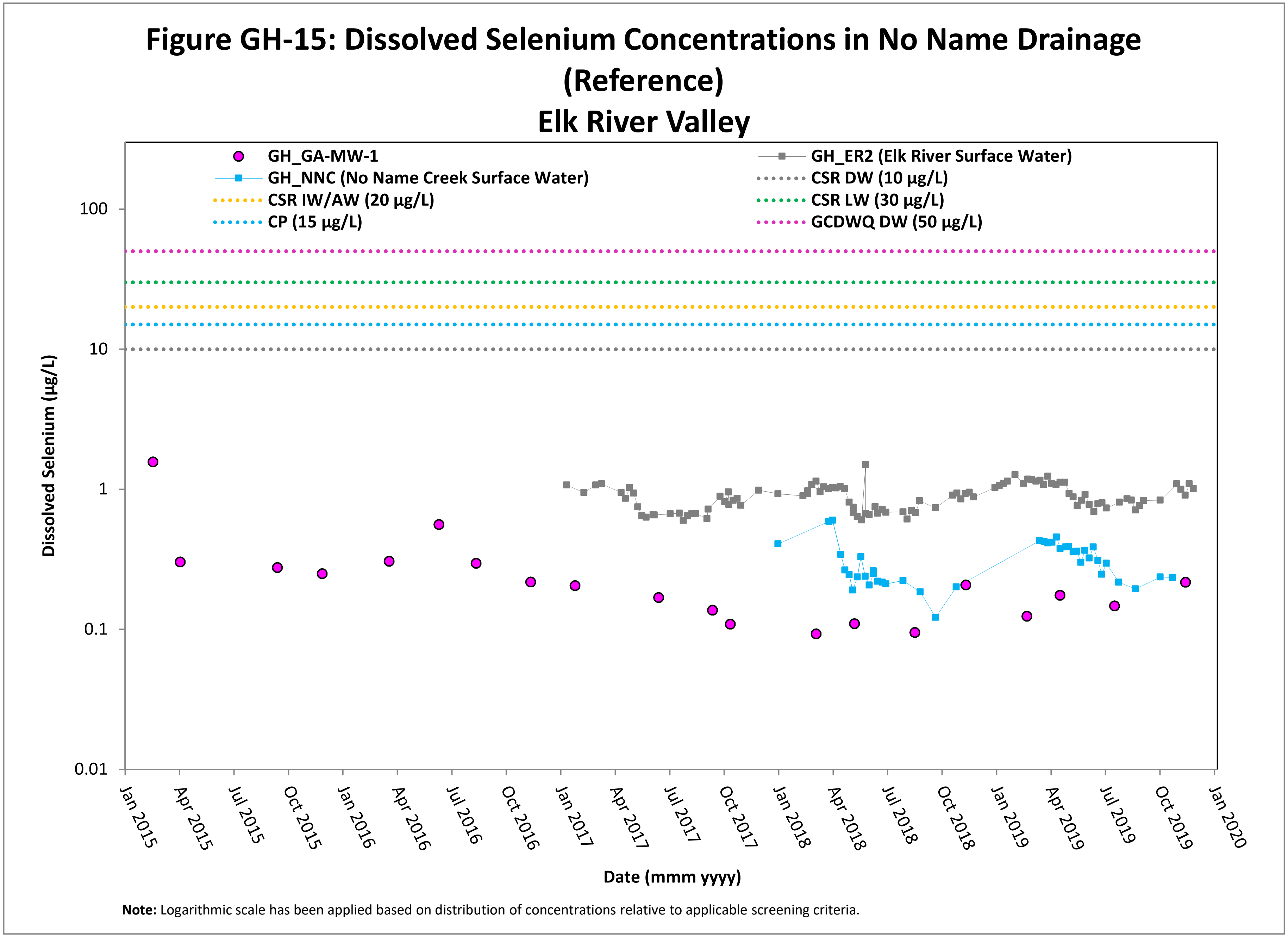
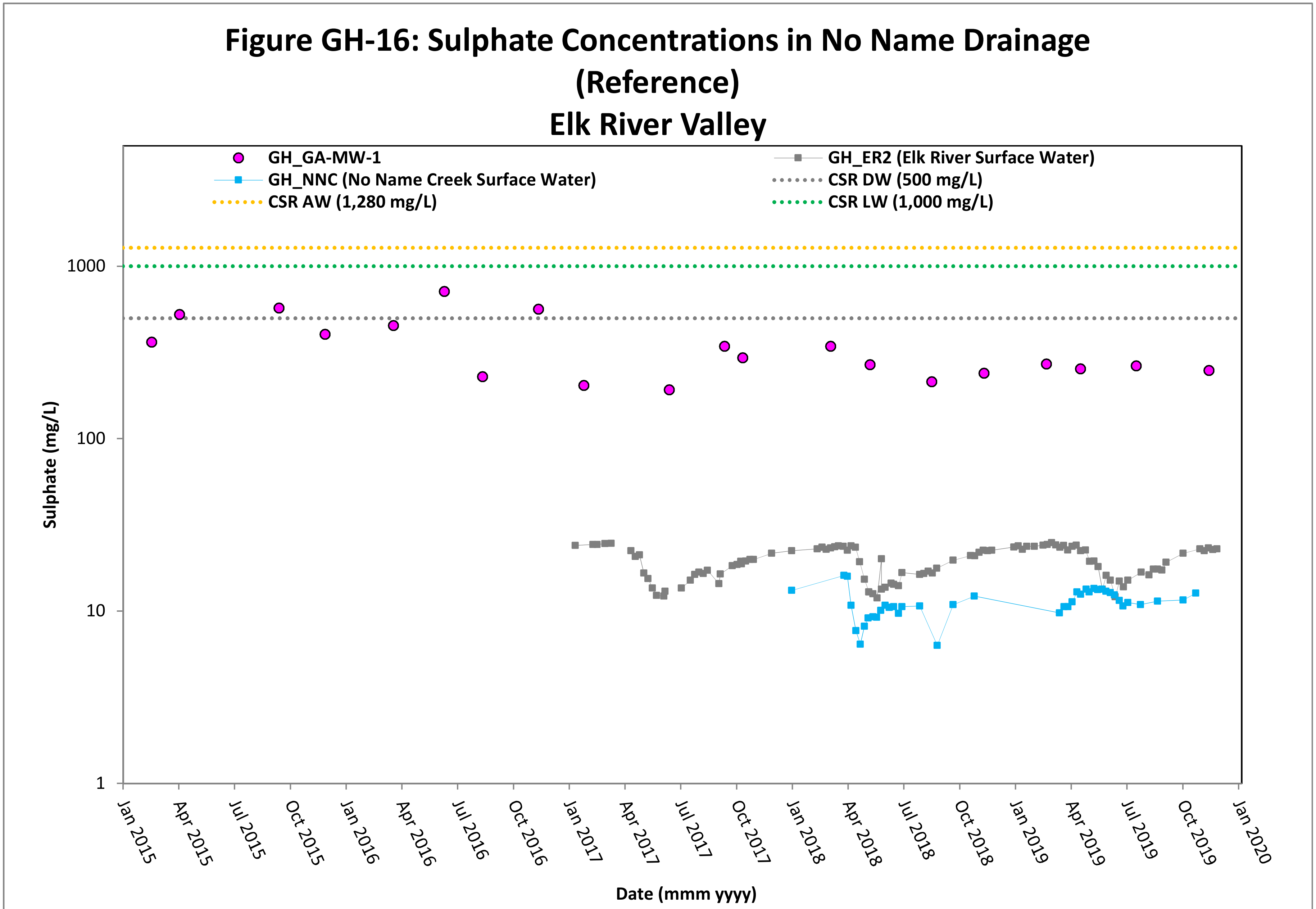
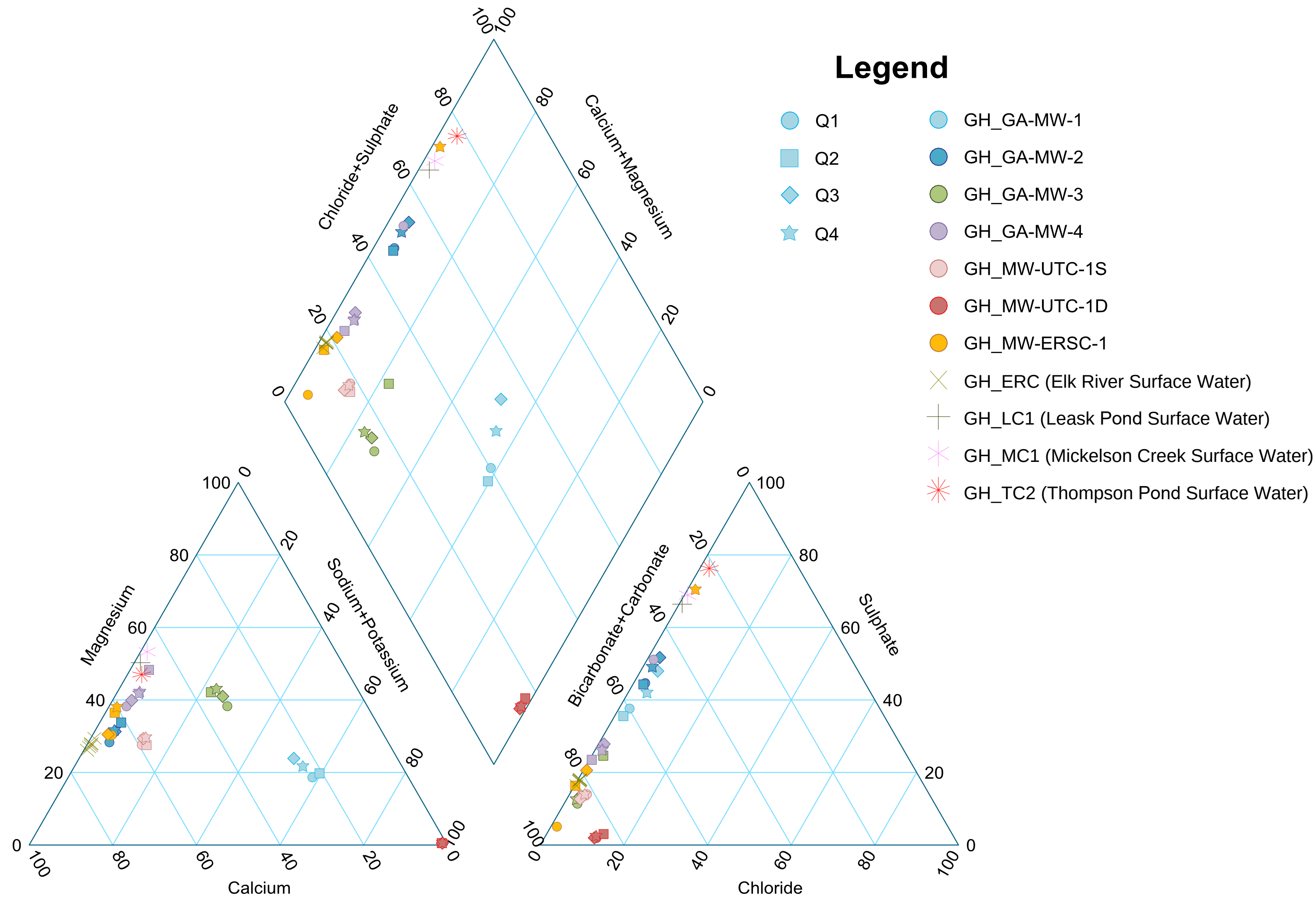


Figure GH-15: Dissolved Selenium Concentrations in No Name Drainage (Reference)
Elk River Valley
GH_GA-MW-1
GH_ER2 (Elk River Surface Water)
GH_NNC (No Name Creek Surface Water)
CSR DW (10 µg/L)
CSR IW/AW (20 µg/L)
CSR LW (30 µg/L)
CP (15 µg/L)
GCDWQ DW (50 µg/L)
Dissolved Selenium (µg/L)
100
10
1
0.1
0.01
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Jan 2020
Date (mmm yyyy)
Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.



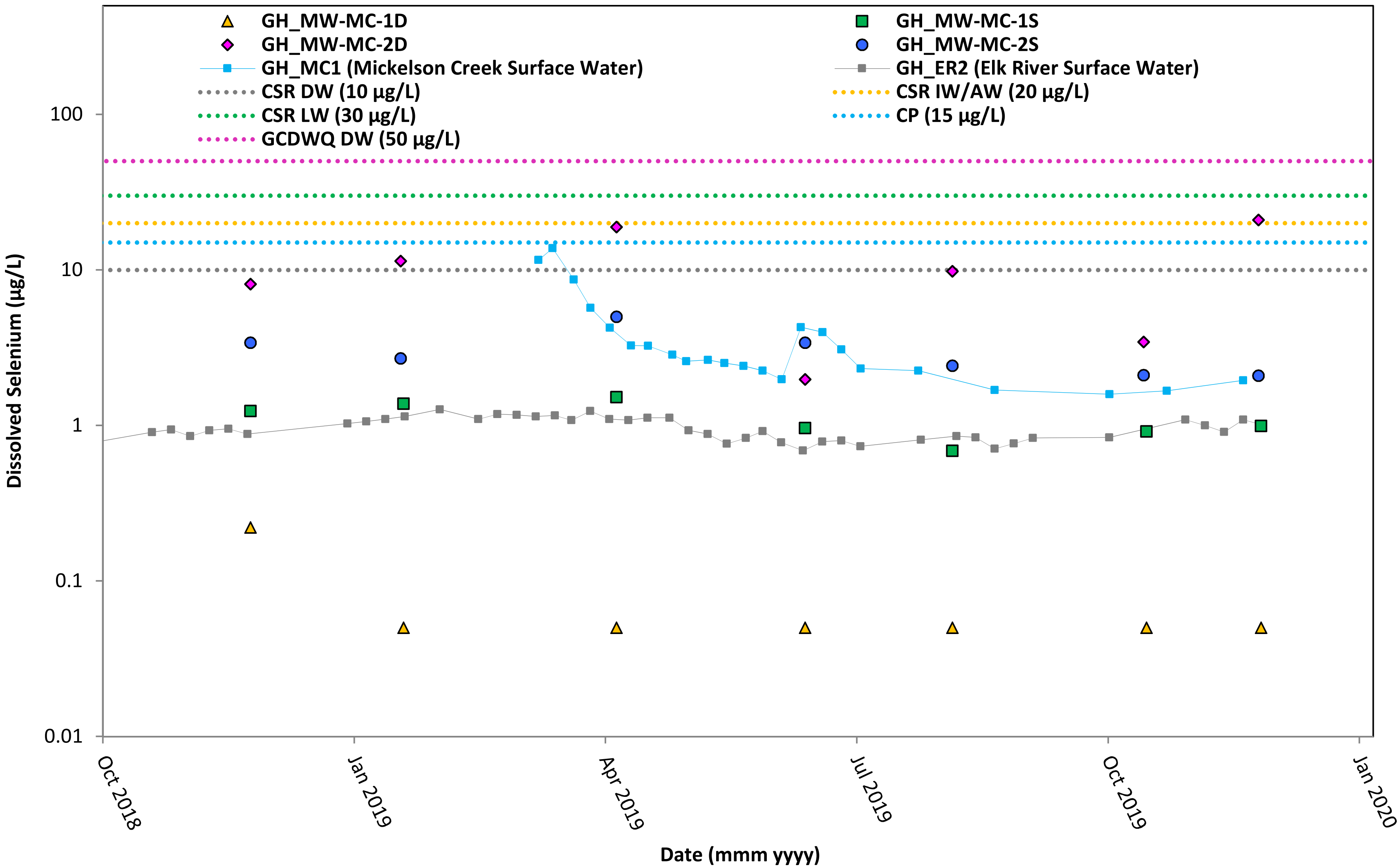
Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.

Figure GH-17: 2017 Piper Plot Elk River Valley (SNC-Lavalin, 2019h)



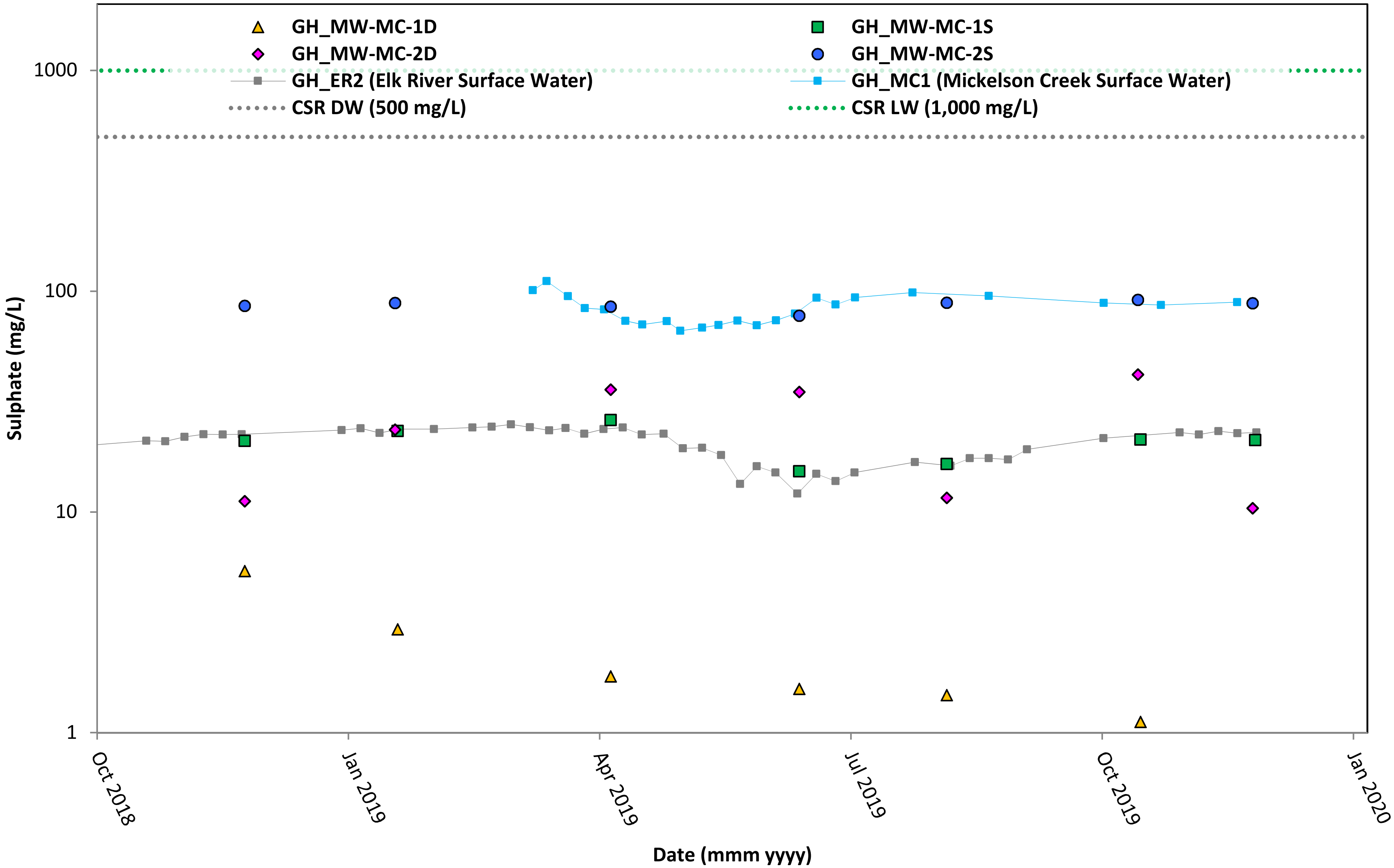
(Appended from Appendix IV, SNC-Lavalin, 2019h)

Figure GH-18: Dissolved Selenium Concentrations in Mickelson Drainage Elk River Valley



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 based on distribution of concentrations relative to applicable screening criteria.

Figure GH-19: Sulphate Concentrations in Mickelson Drainage
Elk River Valley



Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.

Figure GH-20: Piper Plot for Mickelson Drainage
Elk River Valley

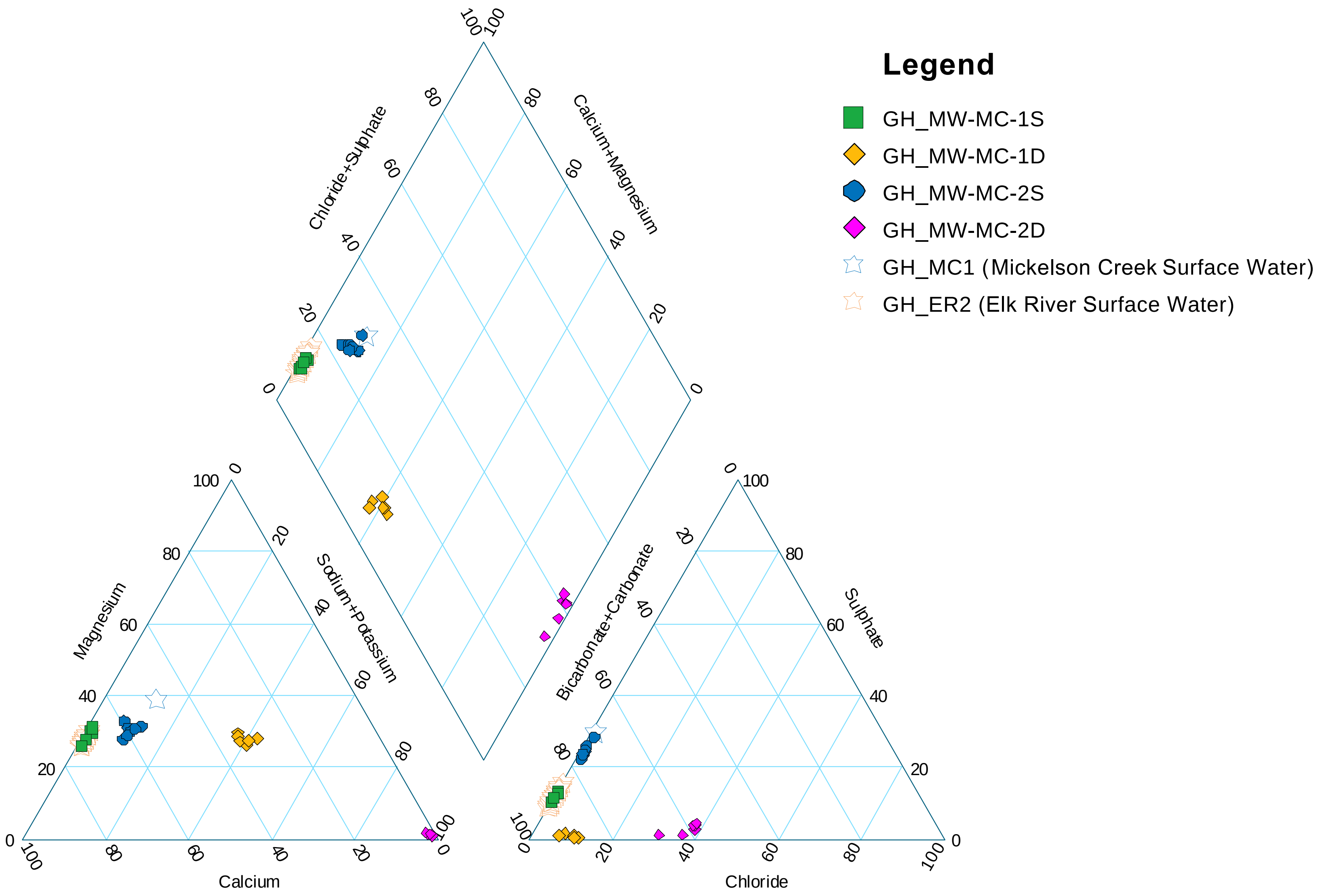
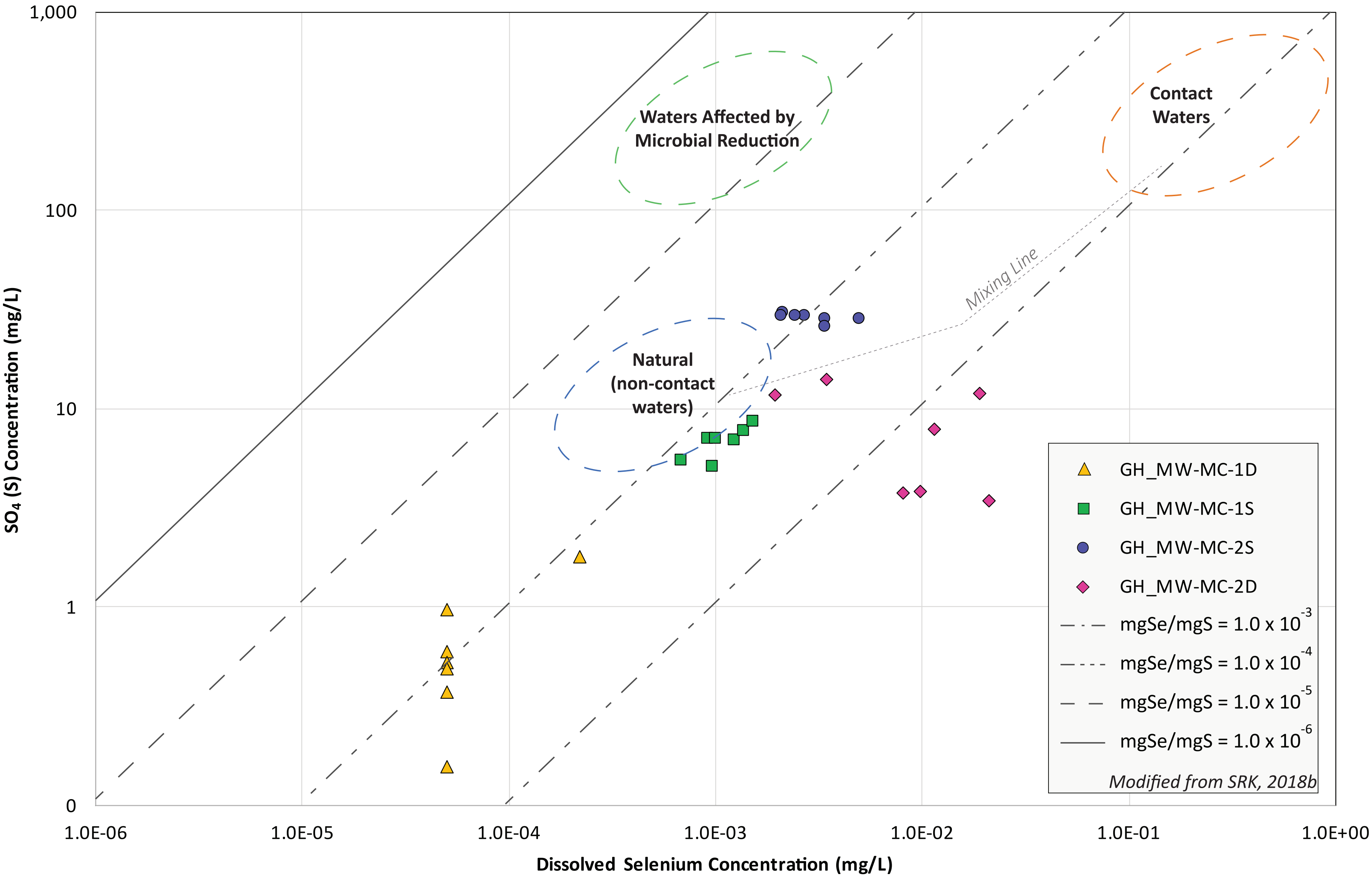
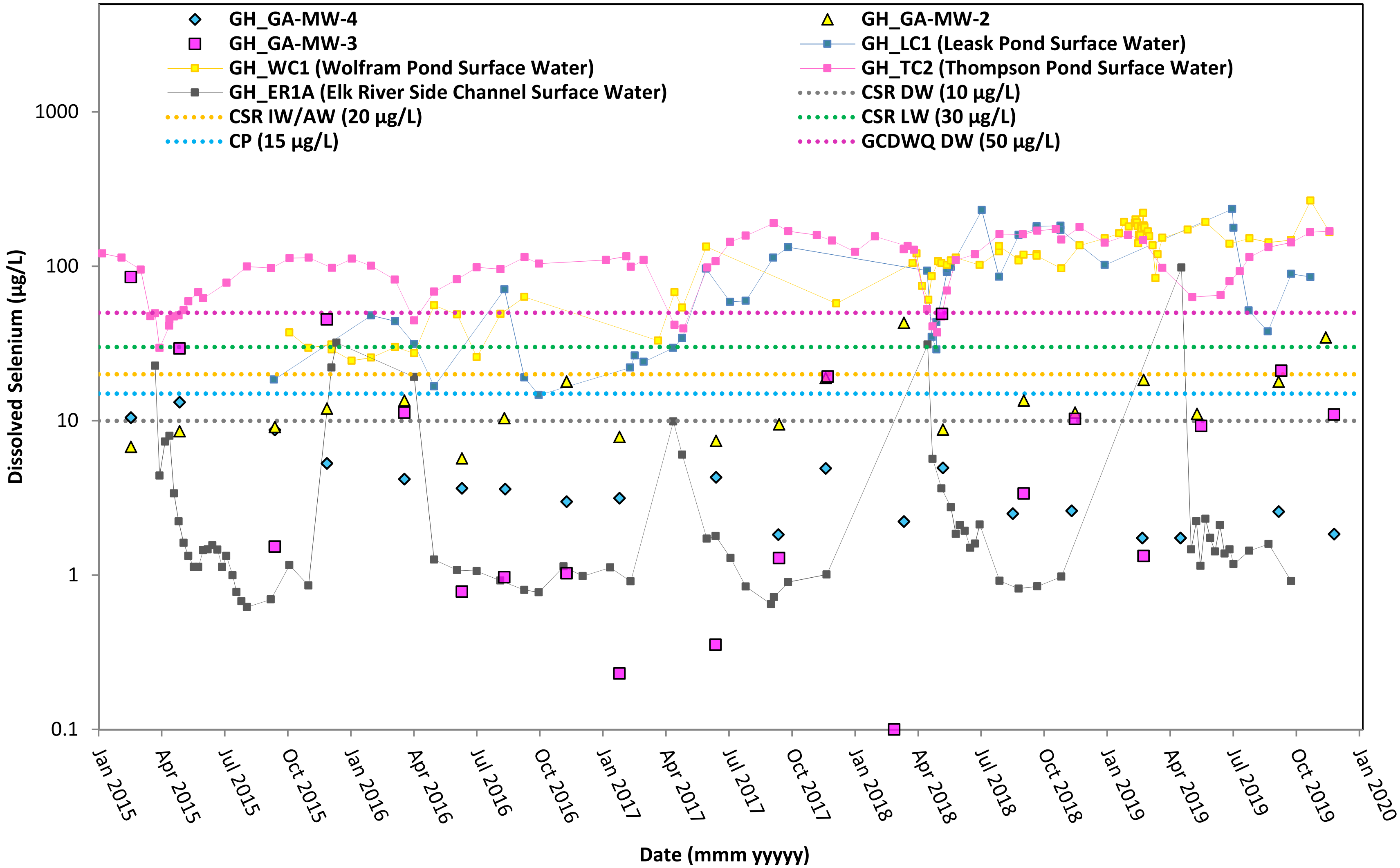


Figure GH-21: Se:SO_4 (S) ratios in Mickelson Drainage
Elk River Valley

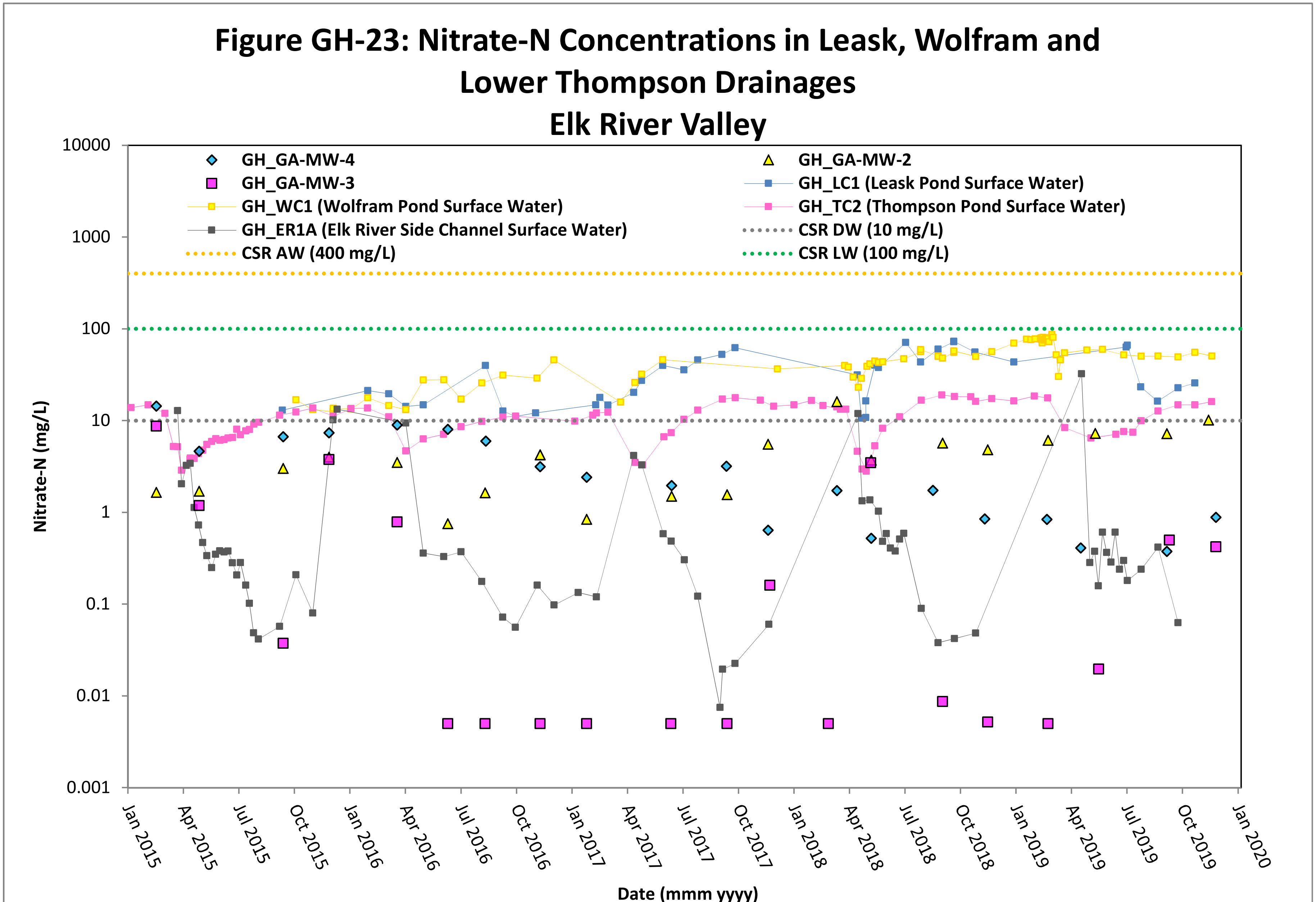


Note: Logarithmic scale has been applied.

Figure GH-22: Dissolved Selenium Concentrations in Leask, Wolfram and Lower Thompson Drainages Elk River Valley

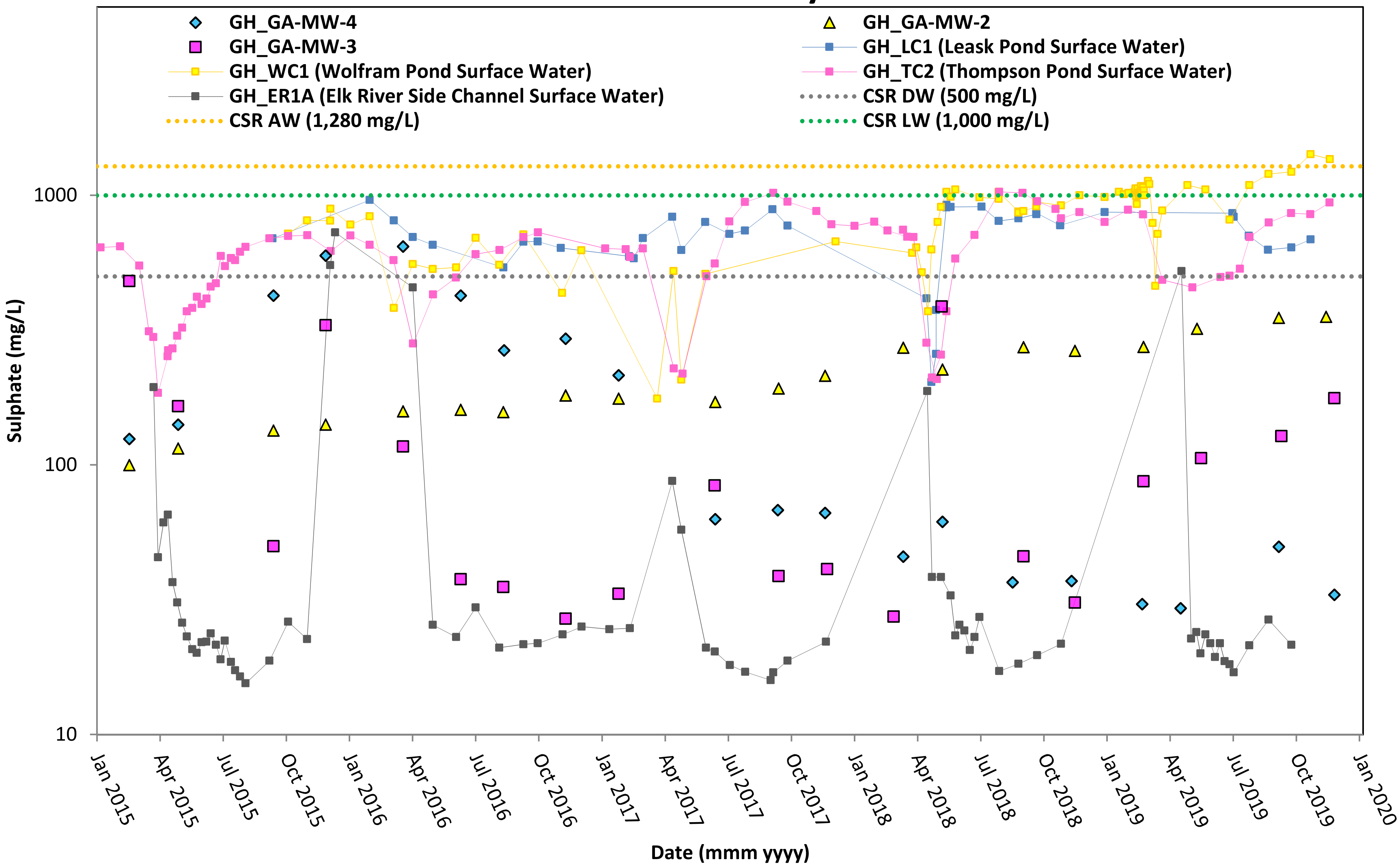


Note: For concentrations measured below the analytical detection limit, the detection limit (0.1 µg/L) was utilized for plotting purposes. Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.



Note: For concentrations measured below the analytical detection limit, the detection limit (0.01 mg/L) was utilized for plotting purposes.
Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.

Figure GH-24: Sulphate Concentrations in Leask, Wolfram and Lower Thompson Drainages Elk River Valley



Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.

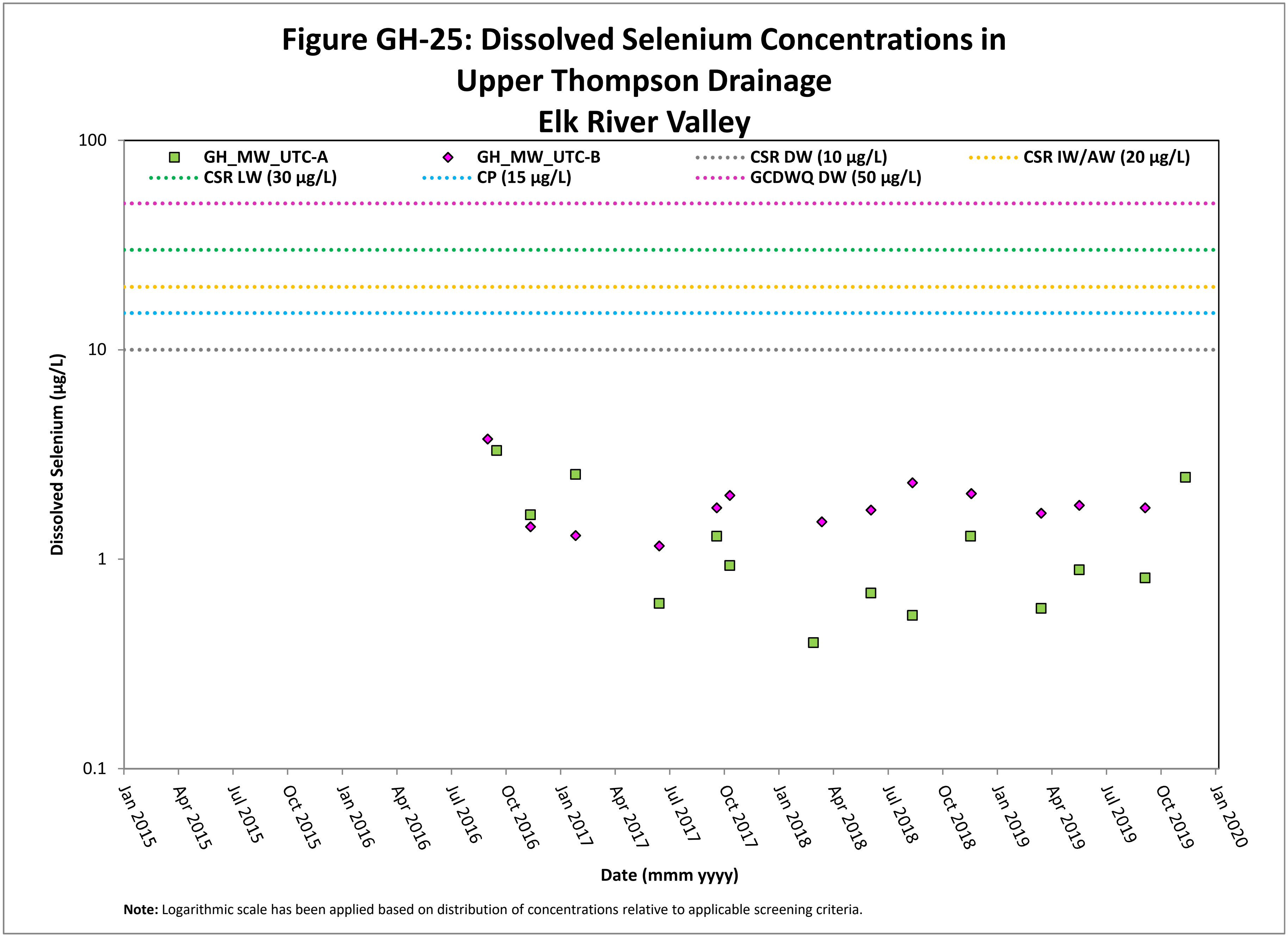
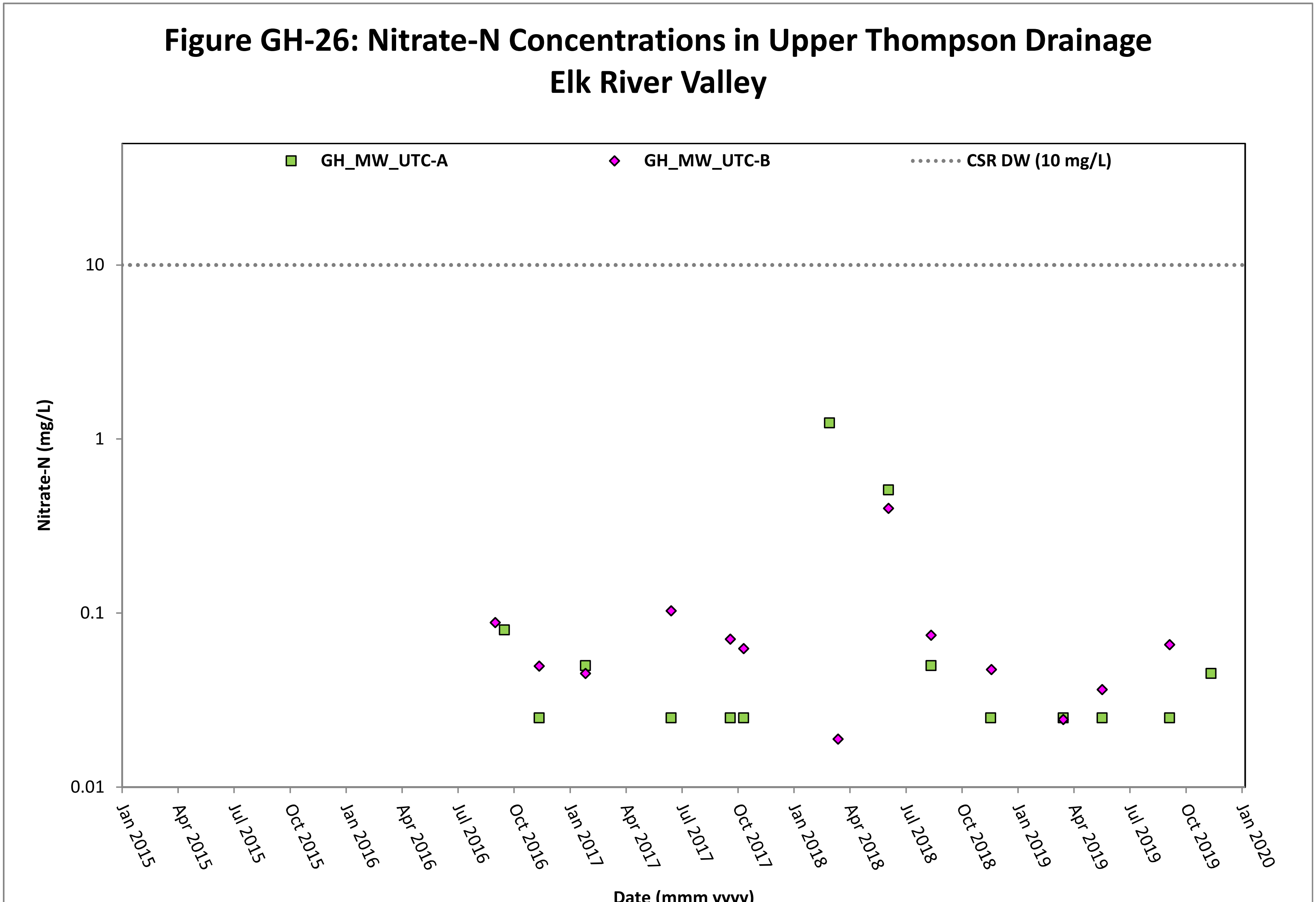
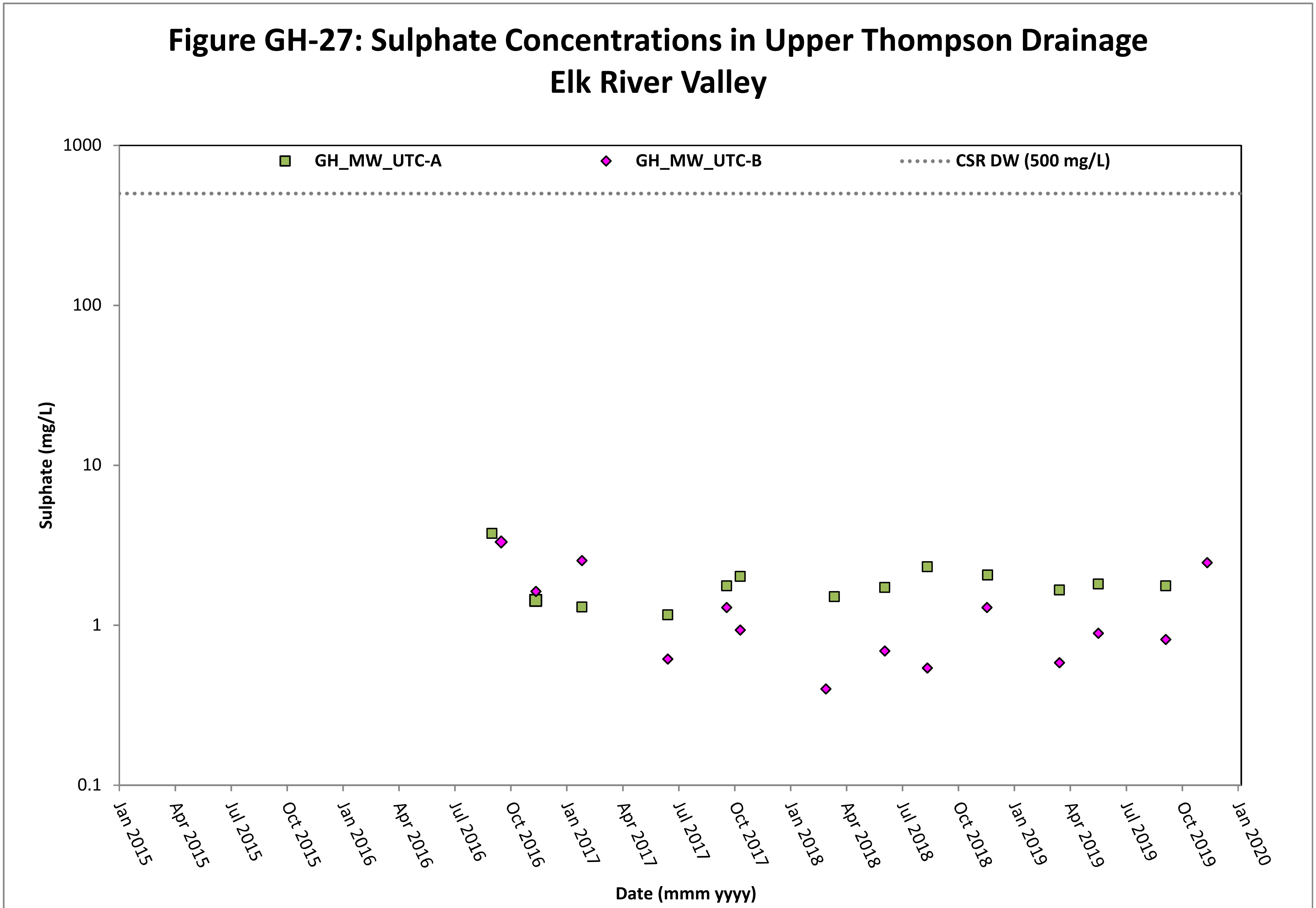


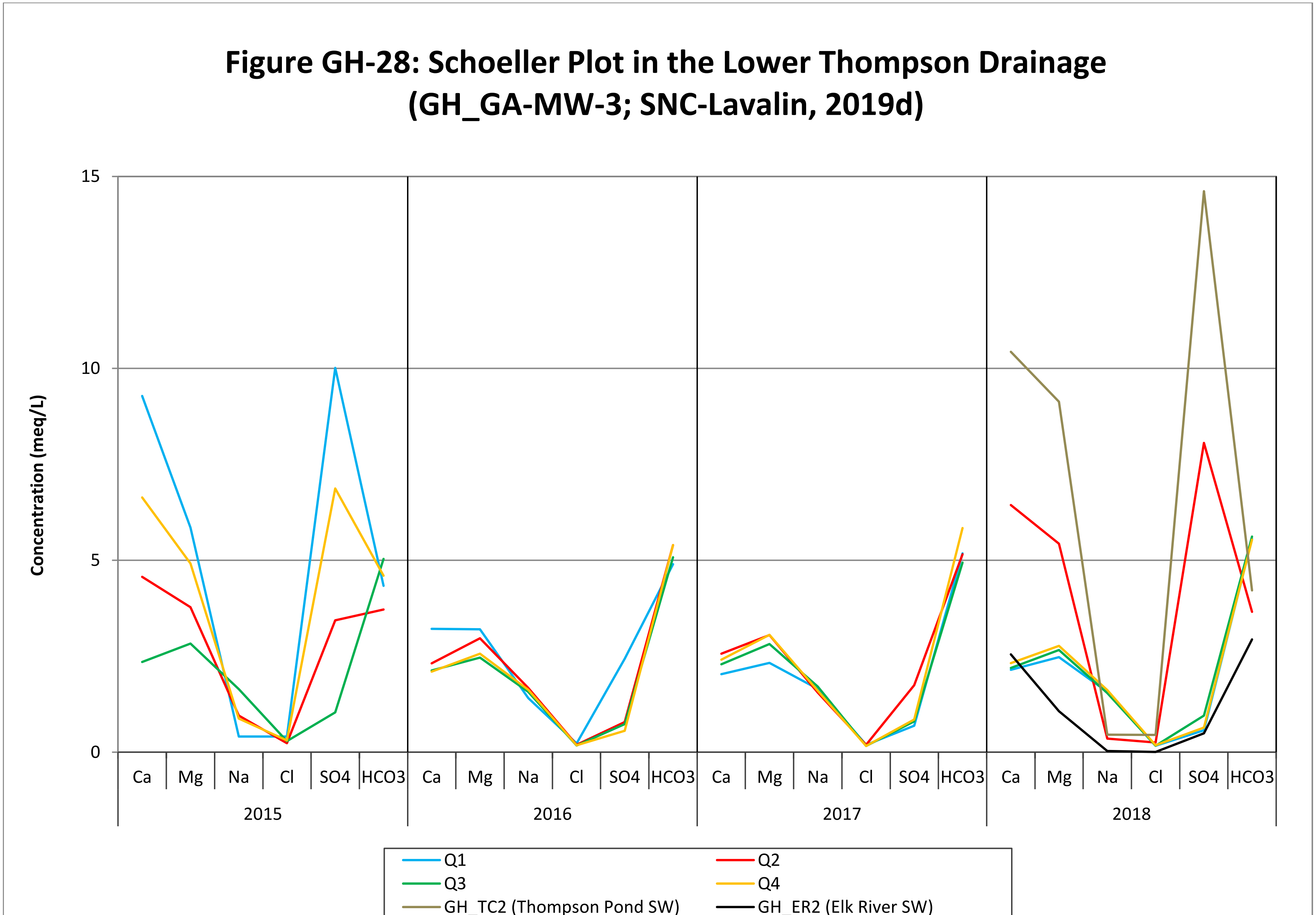
Figure GH-25: Dissolved Selenium Concentrations in
Upper Thompson Drainage
Elk River Valley
GH_MW_UTC-A
GH_MW_UTC-B
CSR DW (10 µg/L)
CSR IW/AW (20 µg/L)
CSR LW (30 µg/L)
CP (15 µg/L)
GCDWQ DW (50 µg/L)
Dissolved Selenium (µg/L)
100
10
1
0.1
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Jan 2020
Date (mmm yyyy)
Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.



Note: For concentrations measured below the analytical detection limit, the detection limit (0.025 mg/L) was utilized for plotting purposes.
Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.



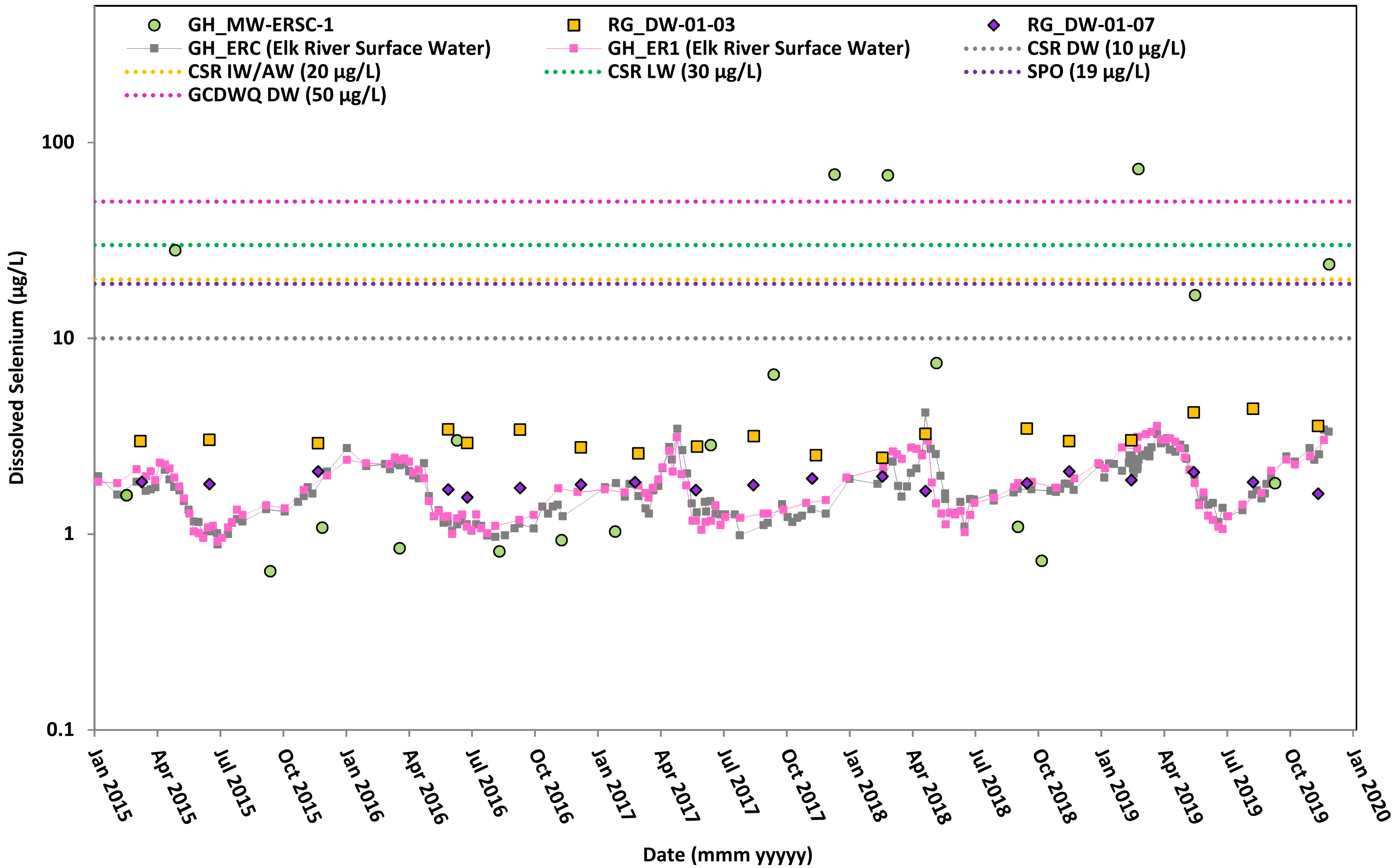
Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.



Note: Analytical data presented for surface water samples are from Q1 2018.

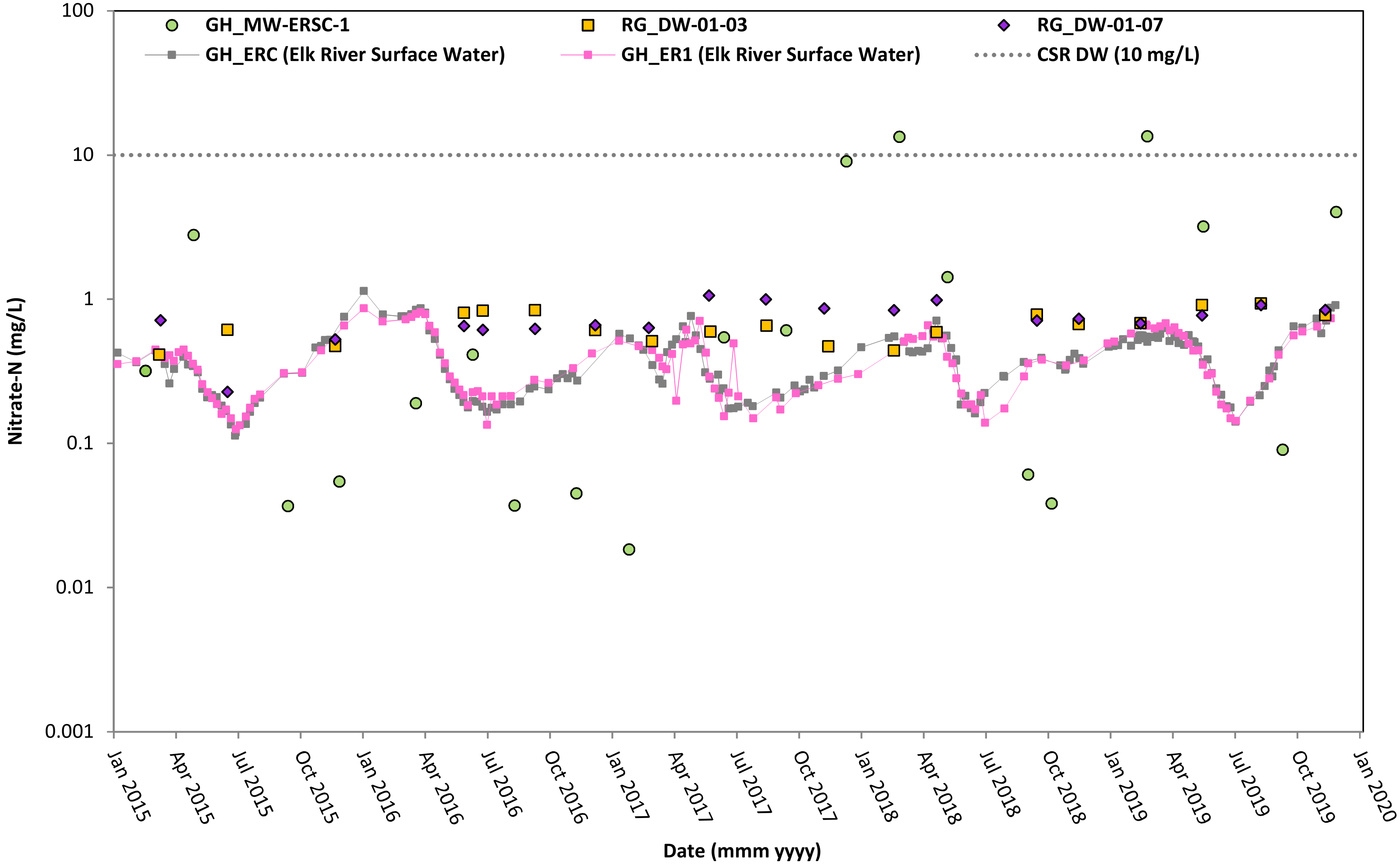
(Appended from Figure 15, SNC-Lavalin, 2019d)

Figure GH-29: Dissolved Selenium Concentrations Downgradient Elk River Valley

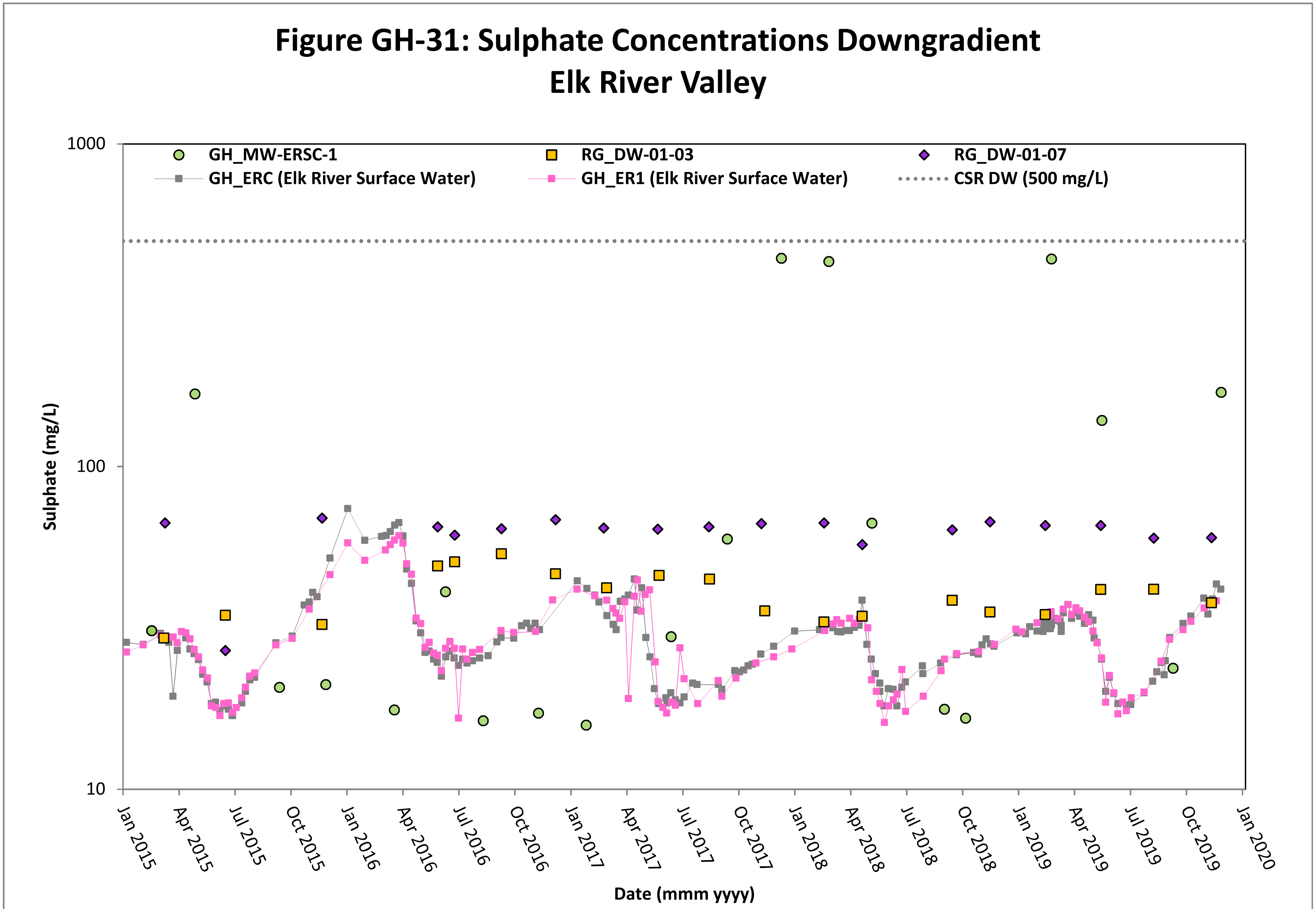


Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.

Figure GH-30: Nitrate-N Concentrations Downgradient Elk River Valley

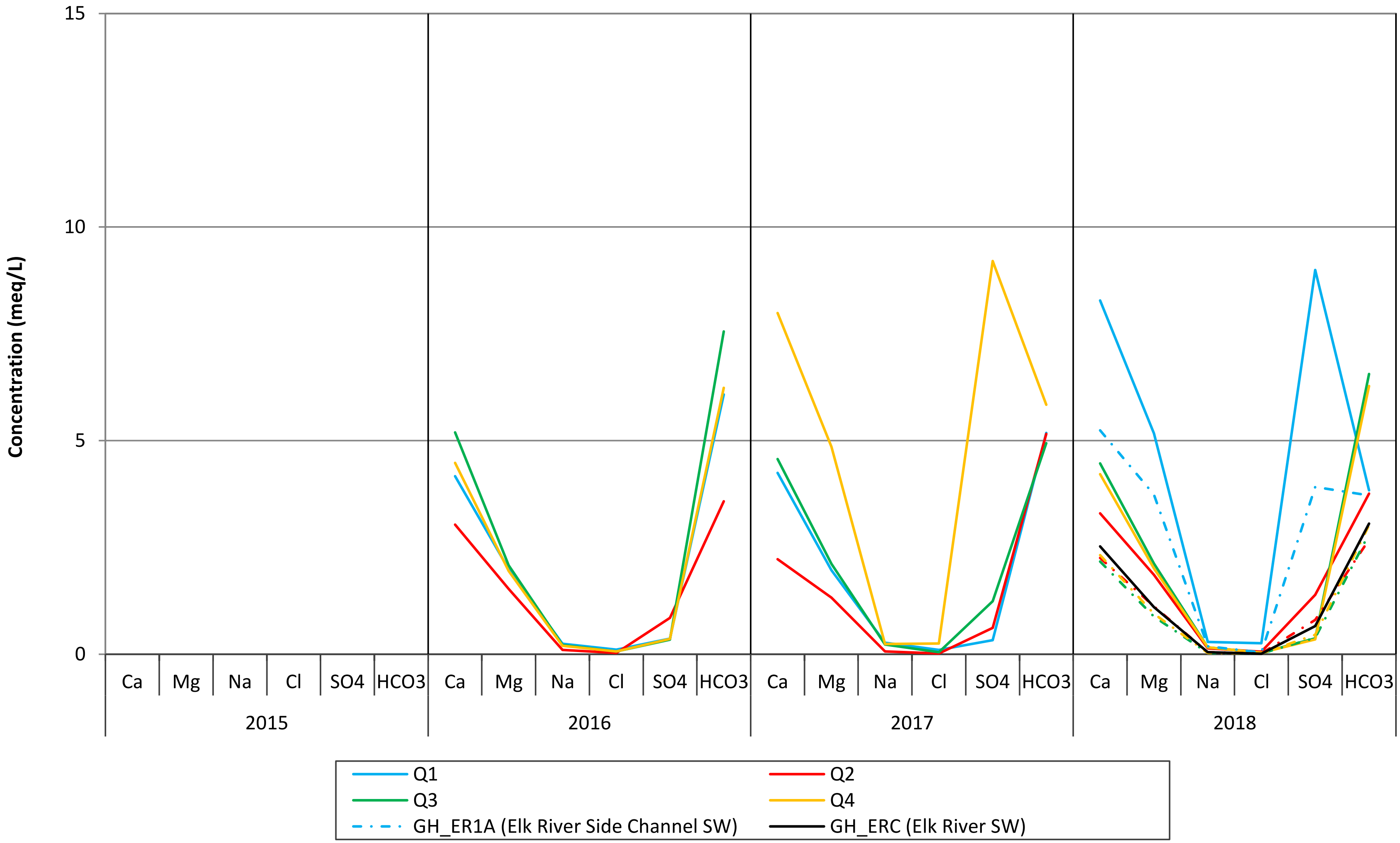


Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.



Note: Logarithmic scale has been applied based on distribution of concentrations relative to applicable screening criteria.

Figure GH-32: Schoeller Plot Downgradient of Thompson Drainage (GH_MW-ERSC-1; SNC-Lavalin, 2019d)



Note: Analytical data for 2016 was not available for review. Analytical data presented for GH_ERC are from Q1 2018.

(Appended from Figure 16, SNC-Lavalin, 2019d)

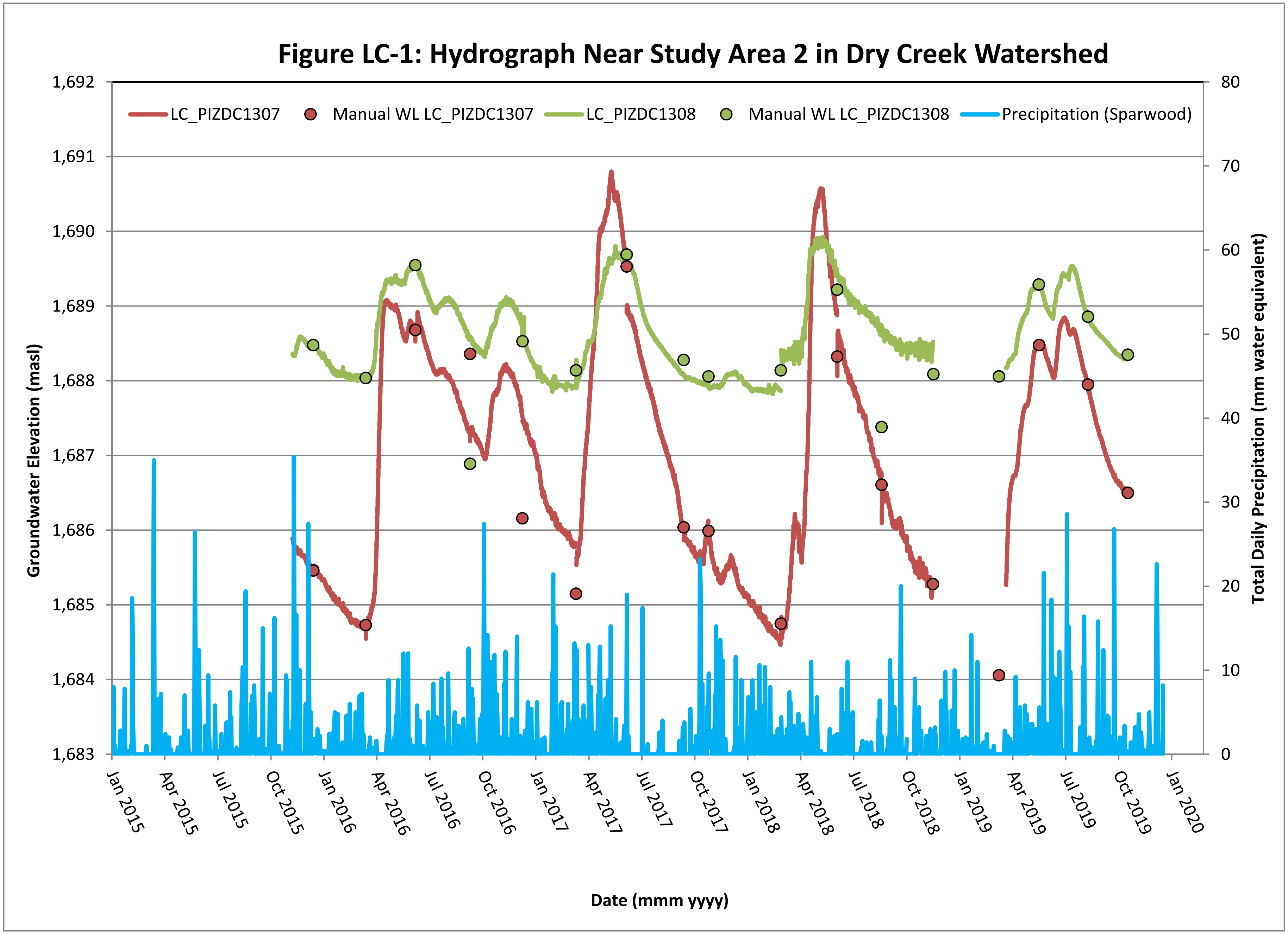


Figure LC-1: Hydrograph Near Study Area 2 in Dry Creek Watershed
LC_PIZDC1307
Manual WL LC_PIZDC1307
LC_PIZDC1308
Manual WL LC_PIZDC1308
Precipitation (Sparwood)
Groundwater Elevation (masl)
Total Daily Precipitation (mm water equivalent)
Date (mmm yyyy)
1,692
1,691
1,690
1,689
1,688
1,687
1,686
1,685
1,684
1,683
80
70
60
50
40
30
20
10
0
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Jan 2020

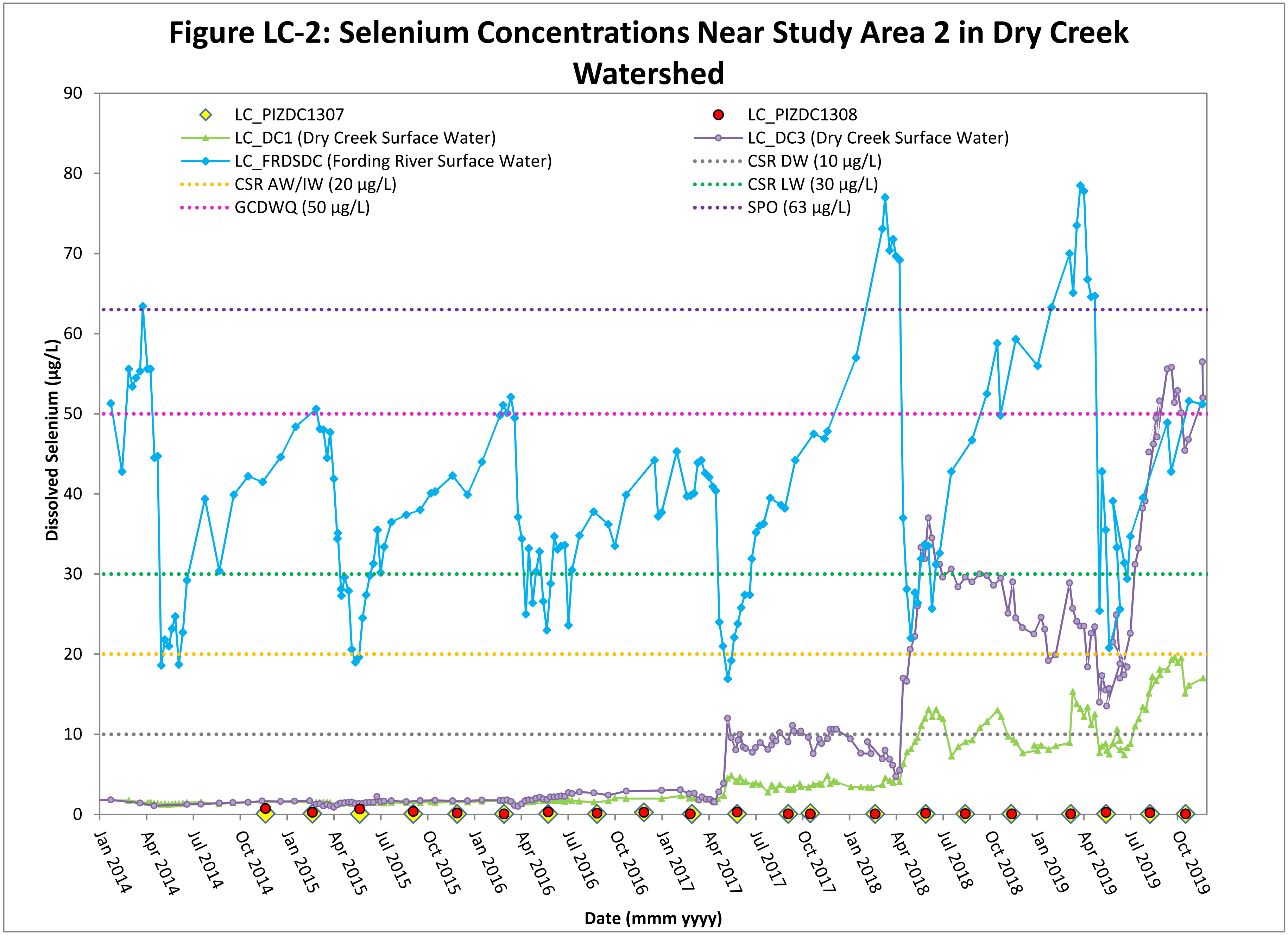


Figure LC-2: Selenium Concentrations Near Study Area 2 in Dry Creek Watershed
LC_PIZDC1307
LC_PIZDC1308
LC_DC1 (Dry Creek Surface Water)
LC_DC3 (Dry Creek Surface Water)
LC_FRDSDC (Fording River Surface Water)
CSR DW (10 µg/L)
CSR AW/IW (20 µg/L)
CSR LW (30 µg/L)
GCDWQ (50 µg/L)
SPO (63 µg/L)
Dissolved Selenium (µg/L)
0
10
20
30
40
50
60
70
80
90
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Date (mmm yyyy)

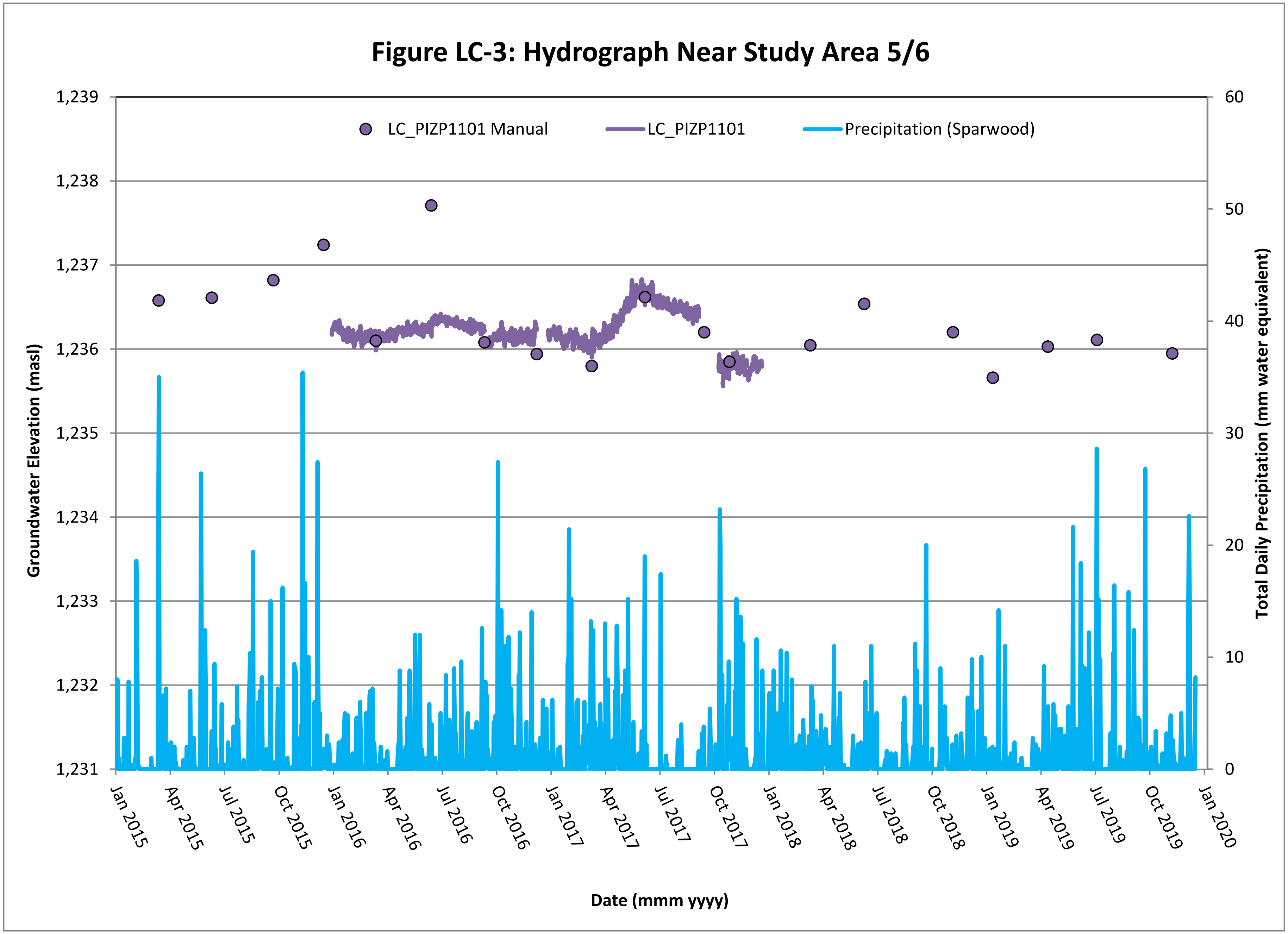


Figure LC-3: Hydrograph Near Study Area 5/6
LC_PIZP1101 Manual
LC_PIZP1101
Precipitation (Sparwood)
Groundwater Elevation (masl)
Total Daily Precipitation (mm water equivalent)
1,239
1,238
1,237
1,236
1,235
1,234
1,233
1,232
1,231
60
50
40
30
20
10
0
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Jan 2020
Date (mmm yyyy)

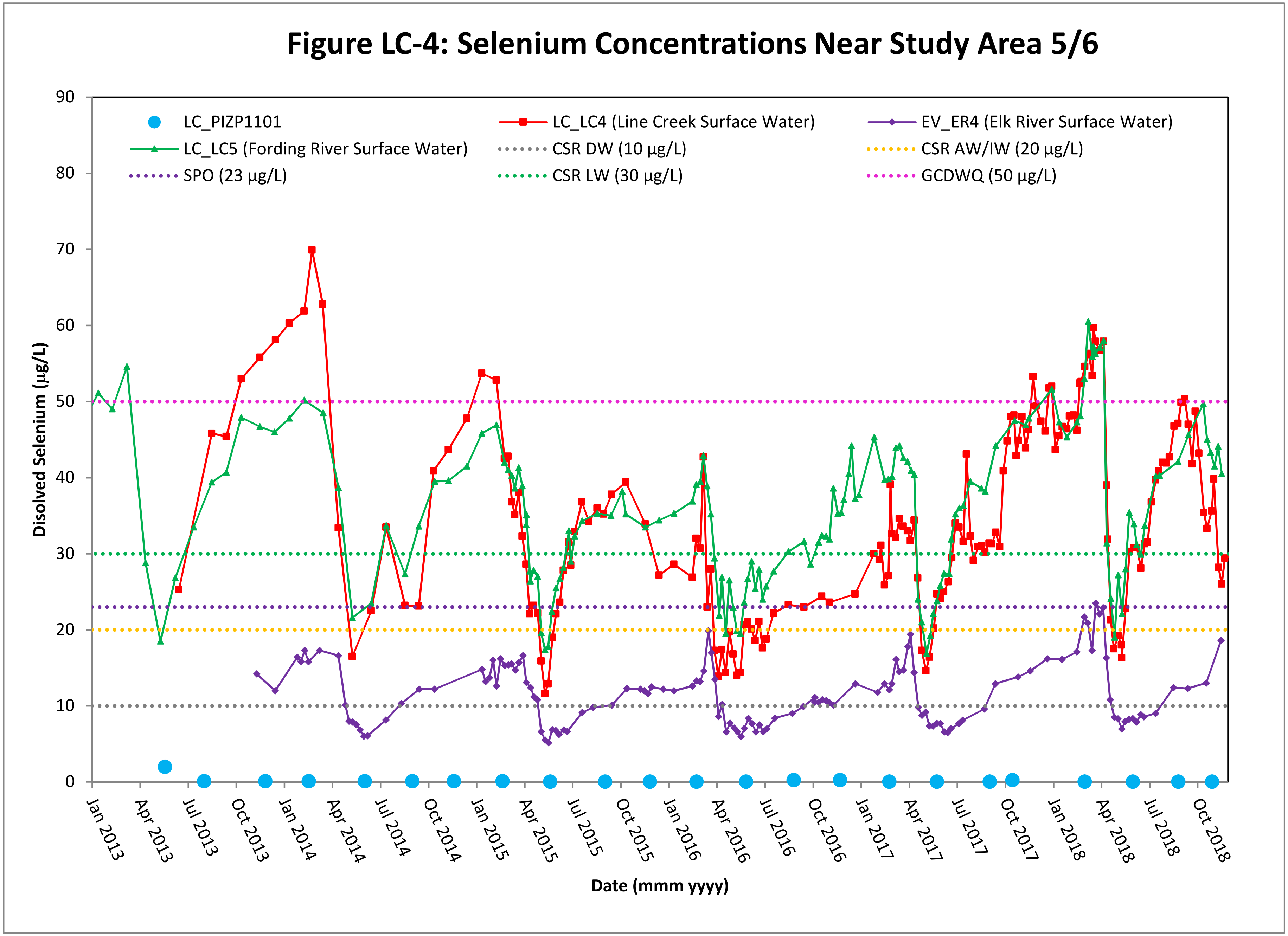
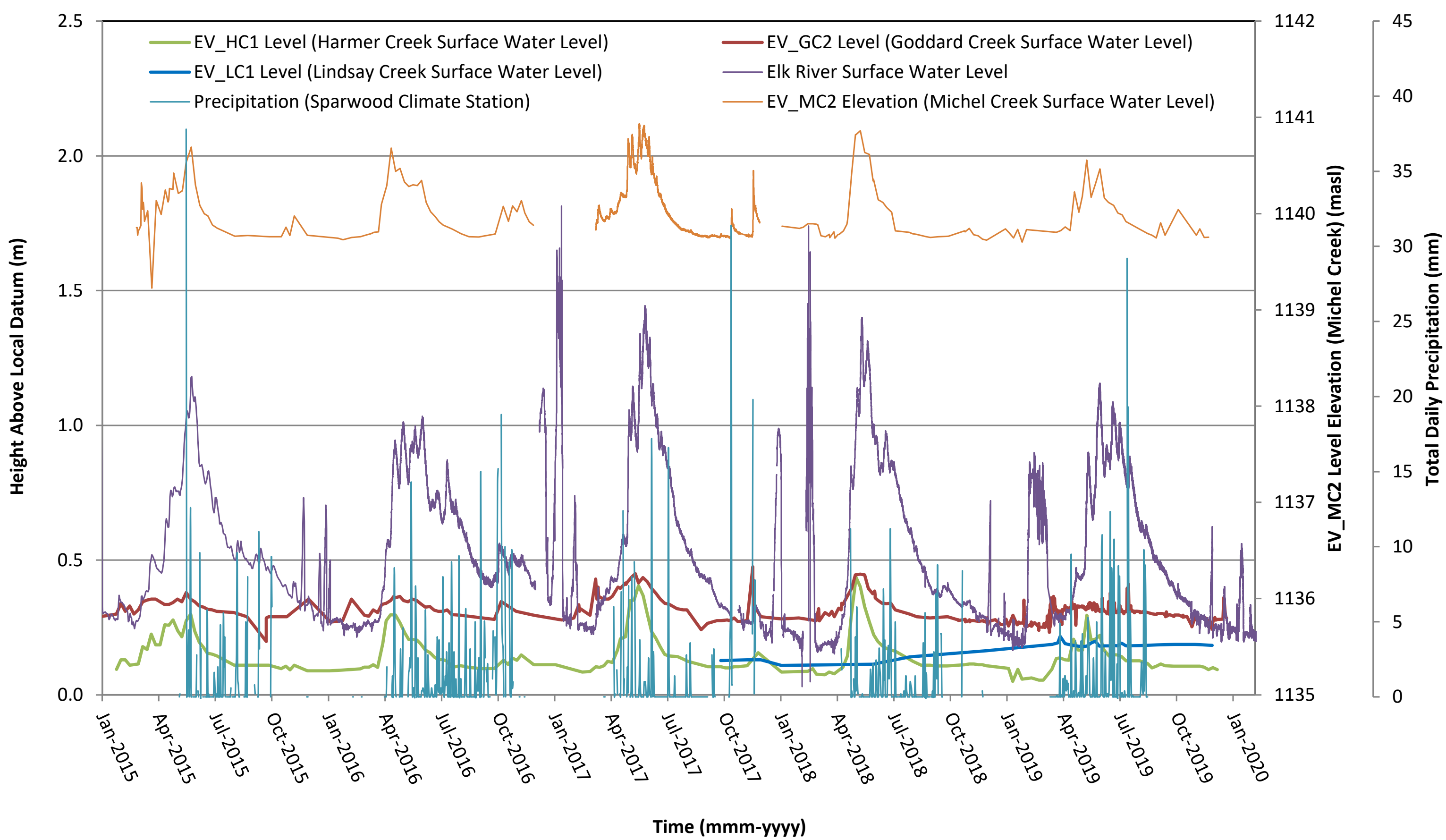


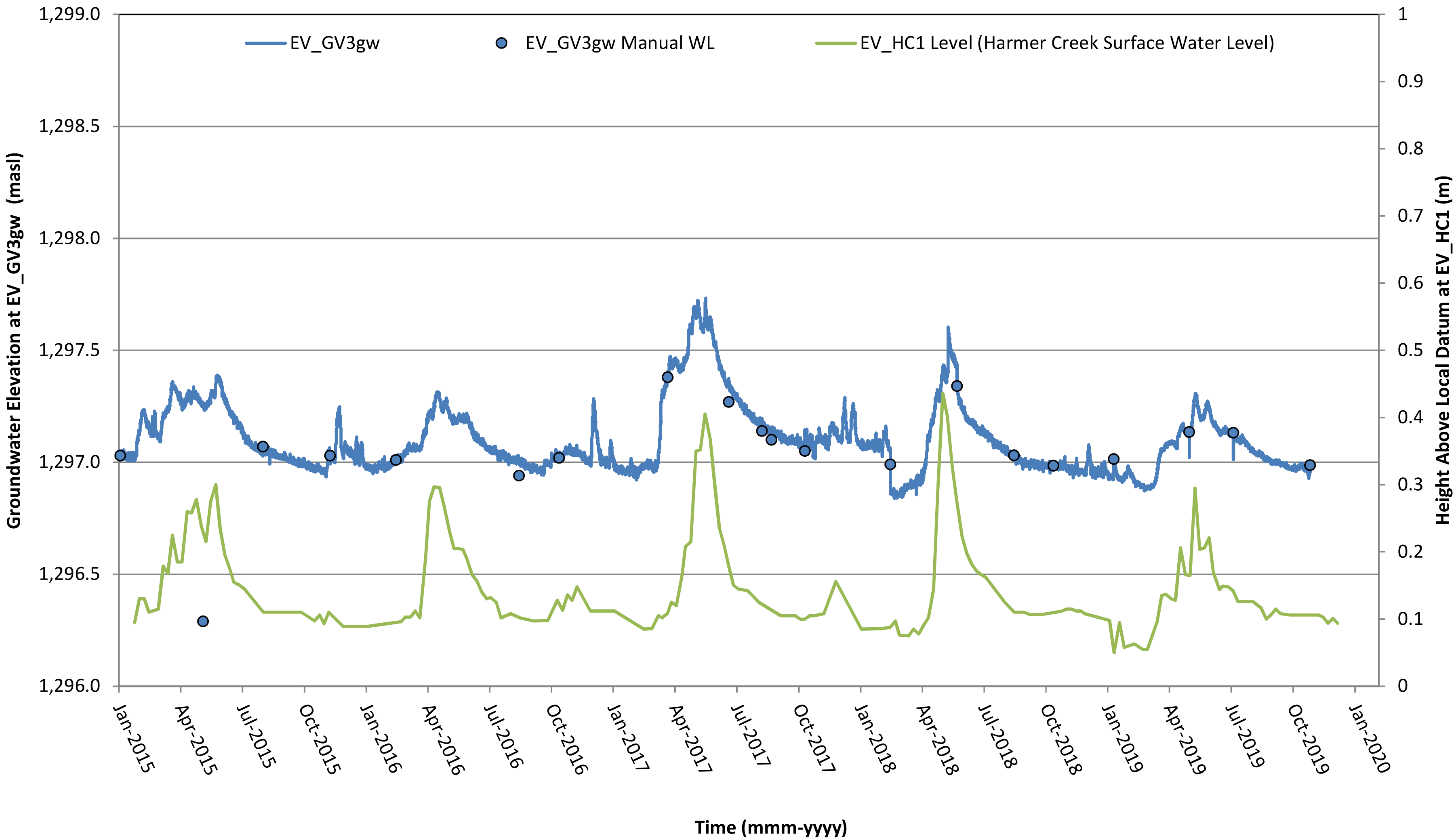
Figure LC-4: Selenium Concentrations Near Study Area 5/6
LC_PIZP1101
LC_LC4 (Line Creek Surface Water)
EV_ER4 (Elk River Surface Water)
LC_LC5 (Fording River Surface Water)
CSR DW (10 µg/L)
CSR AW/IW (20 µg/L)
SPO (23 µg/L)
CSR LW (30 µg/L)
GCDWQ (50 µg/L)
Disolved Selenium (µg/L)
0
10
20
30
40
50
60
70
80
90
Jan 2013
Apr 2013
Jul 2013
Oct 2013
Jan 2014
Apr 2014
Jul 2014
Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Date (mmm yyyy)

Figure EV-1: Surface Water Levels and Precipitation Data



Note: Elk River level data is from Environment Canada Station 08NK016. Select data points were removed in winter months where values were not considered to be representative of actual conditions.

Figure EV-2: Hydrograph for the Grave Creek/Harmer Creek Watershed



Notes: Data was removed where suspected datalogger removal occured. EV_HC1 Level is plotted as height above location datum.

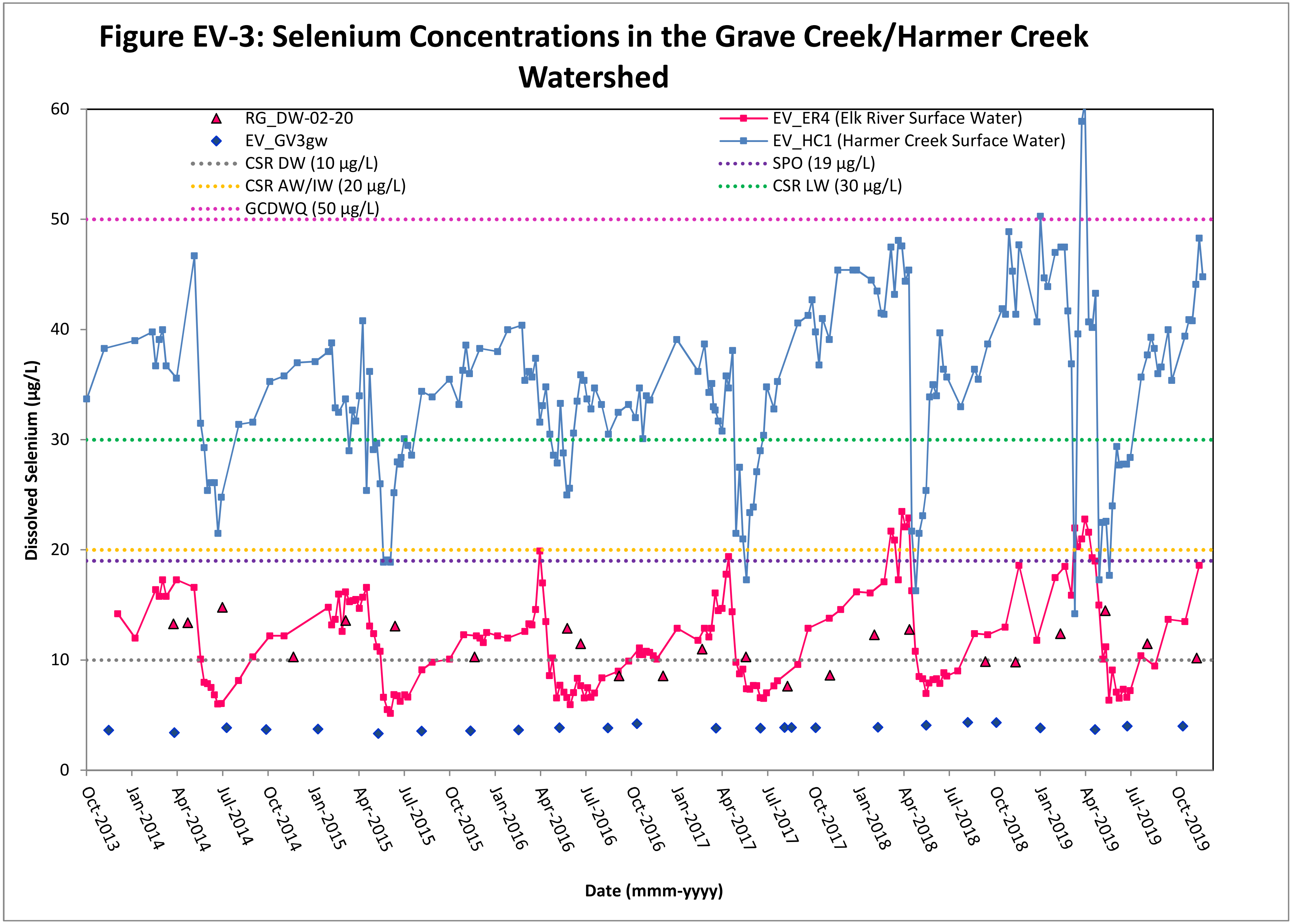


Figure EV-3: Selenium Concentrations in the Grave Creek/Harmer Creek Watershed
RG_DW-02-20
EV_GV3gw
CSR DW (10 µg/L)
CSR AW/IW (20 µg/L)
GCDWQ (50 µg/L)
EV_ER4 (Elk River Surface Water)
EV_HC1 (Harmer Creek Surface Water)
SPO (19 µg/L)
CSR LW (30 µg/L)
Dissolved Selenium (µg/L)
0
10
20
30
40
50
60
Oct-2013
Jan-2014
Apr-2014
Jul-2014
Oct-2014
Jan-2015
Apr-2015
Jul-2015
Oct-2015
Jan-2016
Apr-2016
Jul-2016
Oct-2016
Jan-2017
Apr-2017
Jul-2017
Oct-2017
Jan-2018
Apr-2018
Jul-2018
Oct-2018
Jan-2019
Apr-2019
Jul-2019
Oct-2019
Date (mmm-yyyy)

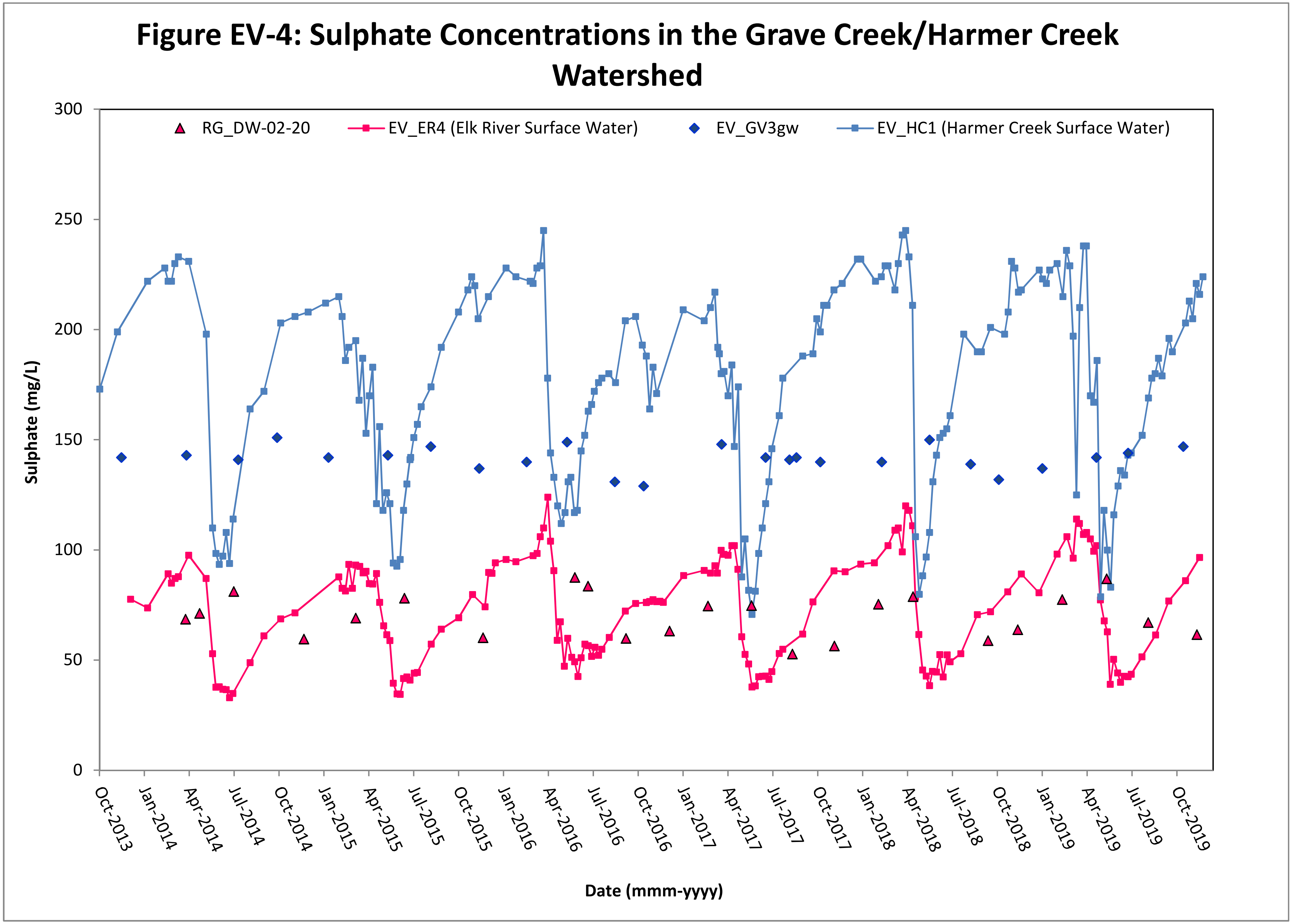
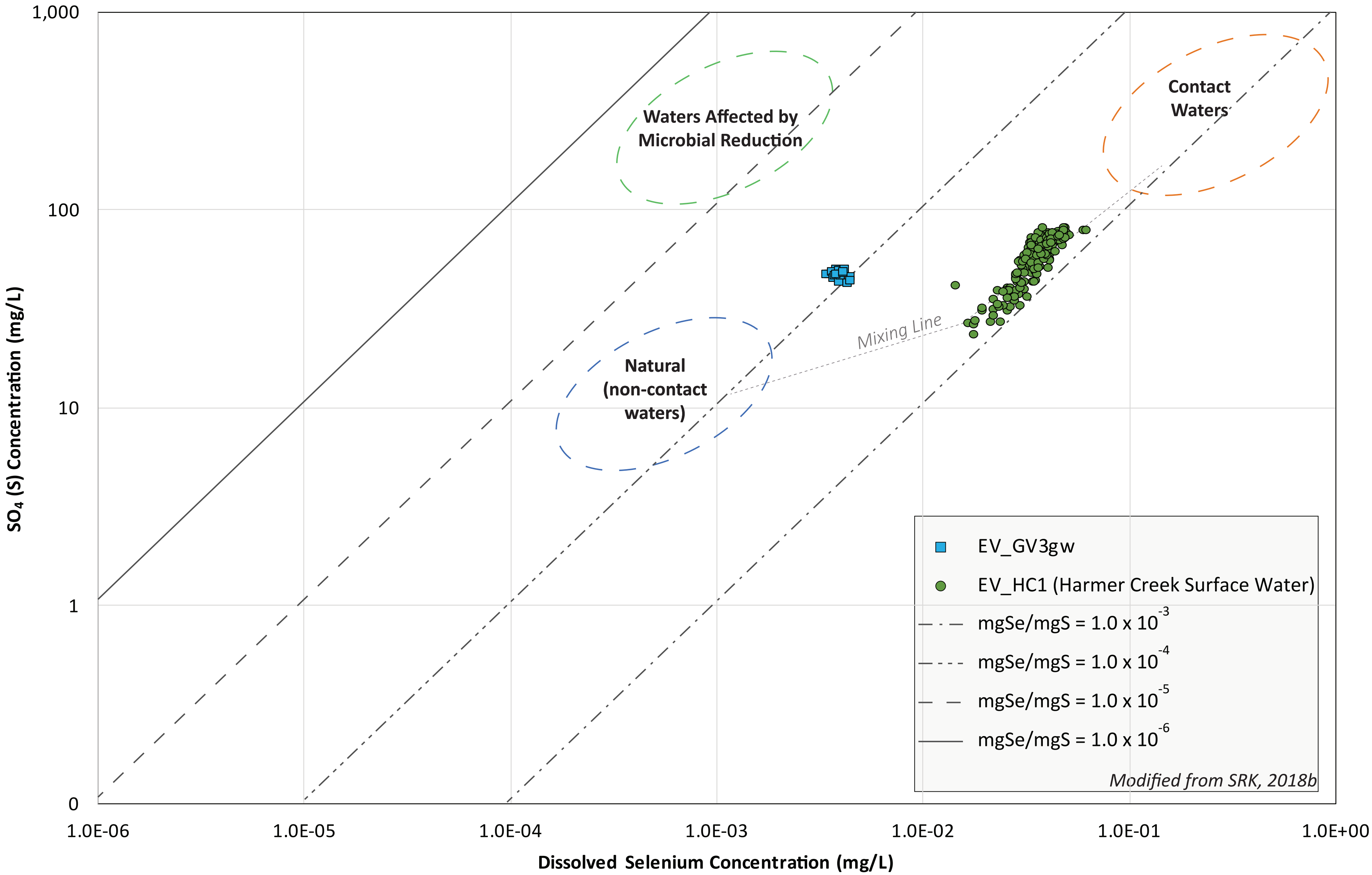
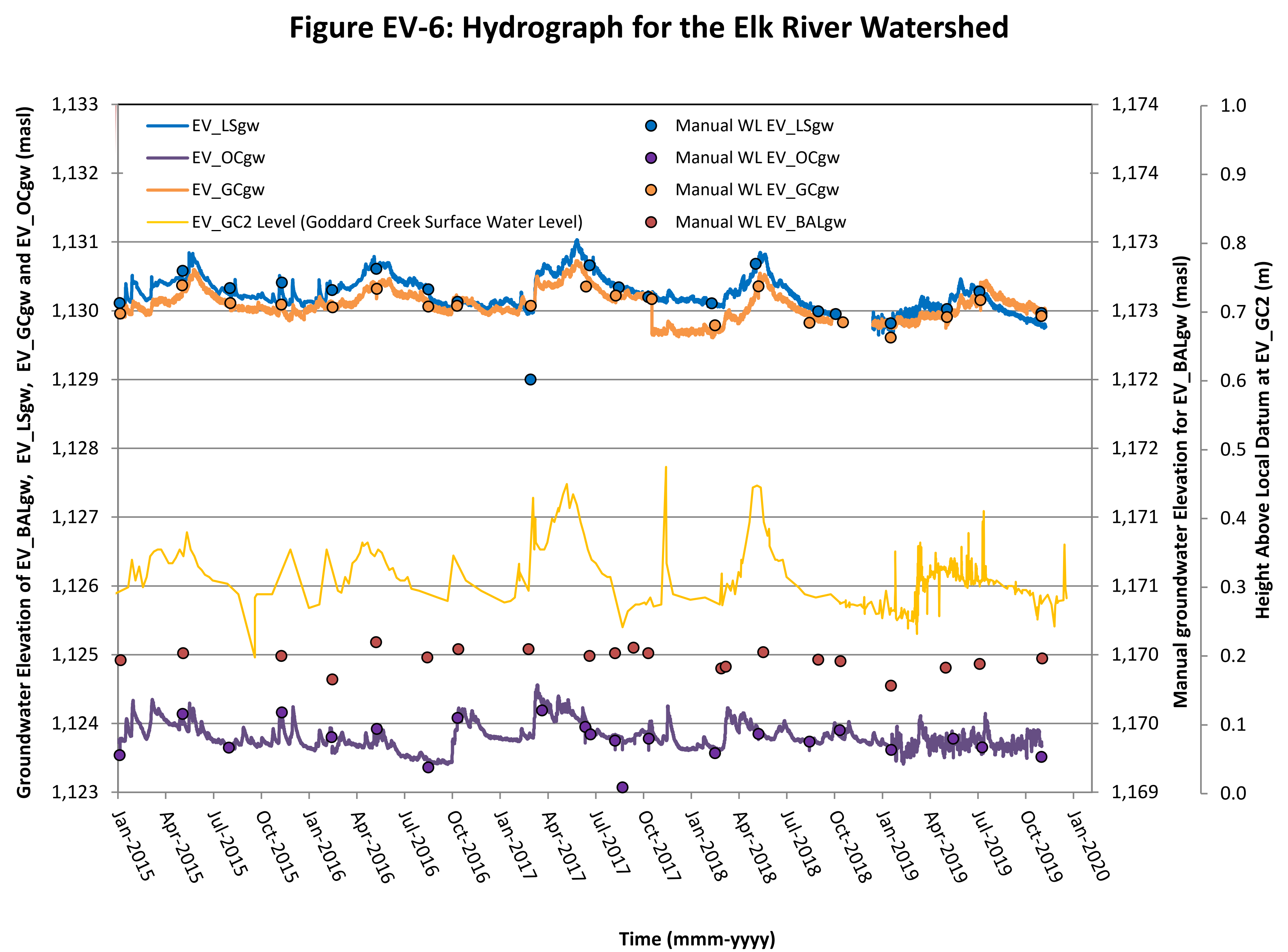


Figure EV-4: Sulphate Concentrations in the Grave Creek/Harmer Creek Watershed
RG_DW-02-20
EV_ER4 (Elk River Surface Water)
EV_GV3gw
EV_HC1 (Harmer Creek Surface Water)
Sulphate (mg/L)
0
50
100
150
200
250
300
Oct-2013
Jan-2014
Apr-2014
Jul-2014
Oct-2014
Jan-2015
Apr-2015
Jul-2015
Oct-2015
Jan-2016
Apr-2016
Jul-2016
Oct-2016
Jan-2017
Apr-2017
Jul-2017
Oct-2017
Jan-2018
Apr-2018
Jul-2018
Oct-2018
Jan-2019
Apr-2019
Jul-2019
Oct-2019
Date (mmm-yyyy)

Figure EV-5: Se:SO_4 (S) ratios in the Harmer/Grave Watershed

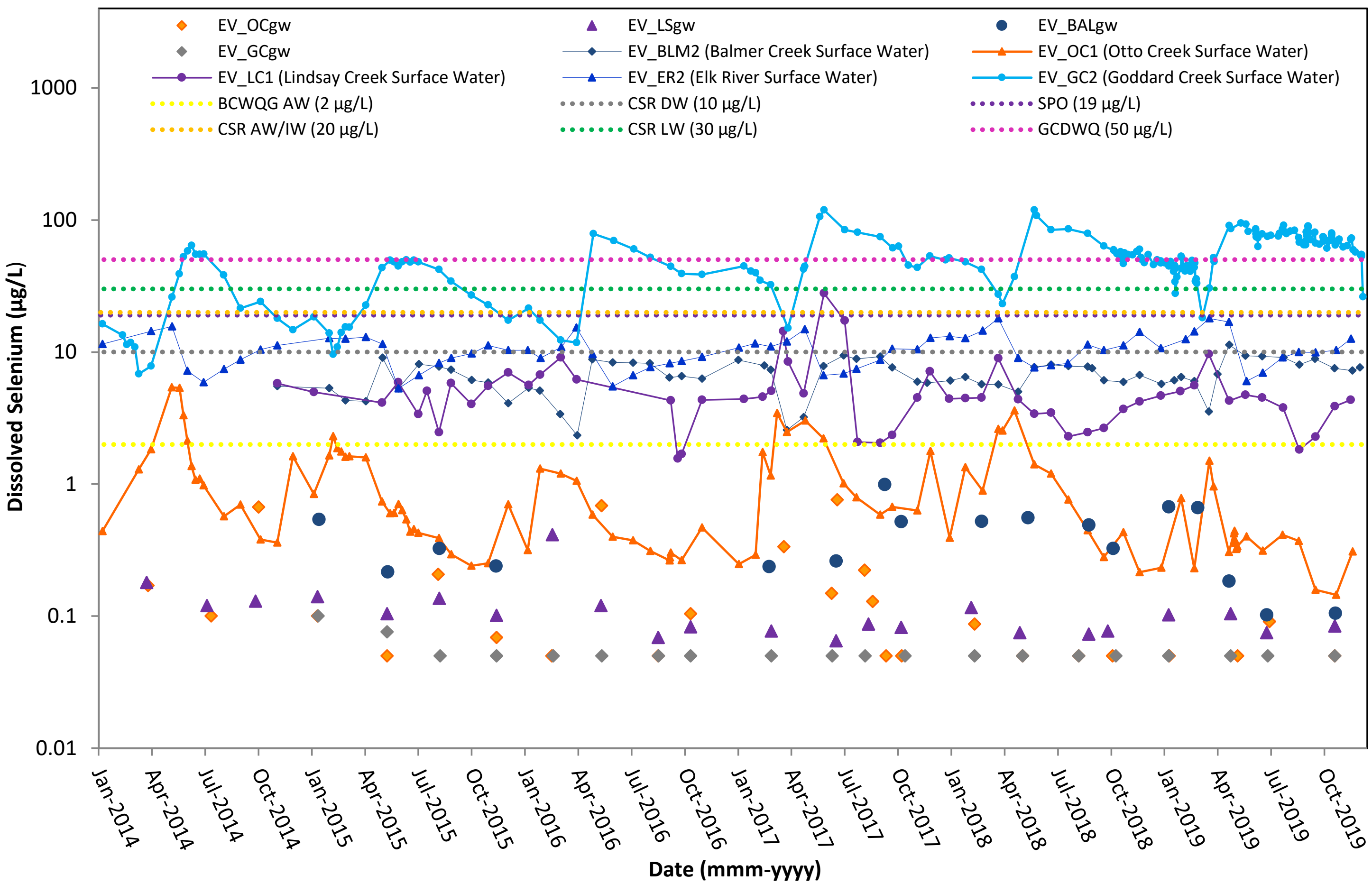


Note: Logarithmic scale has been applied.



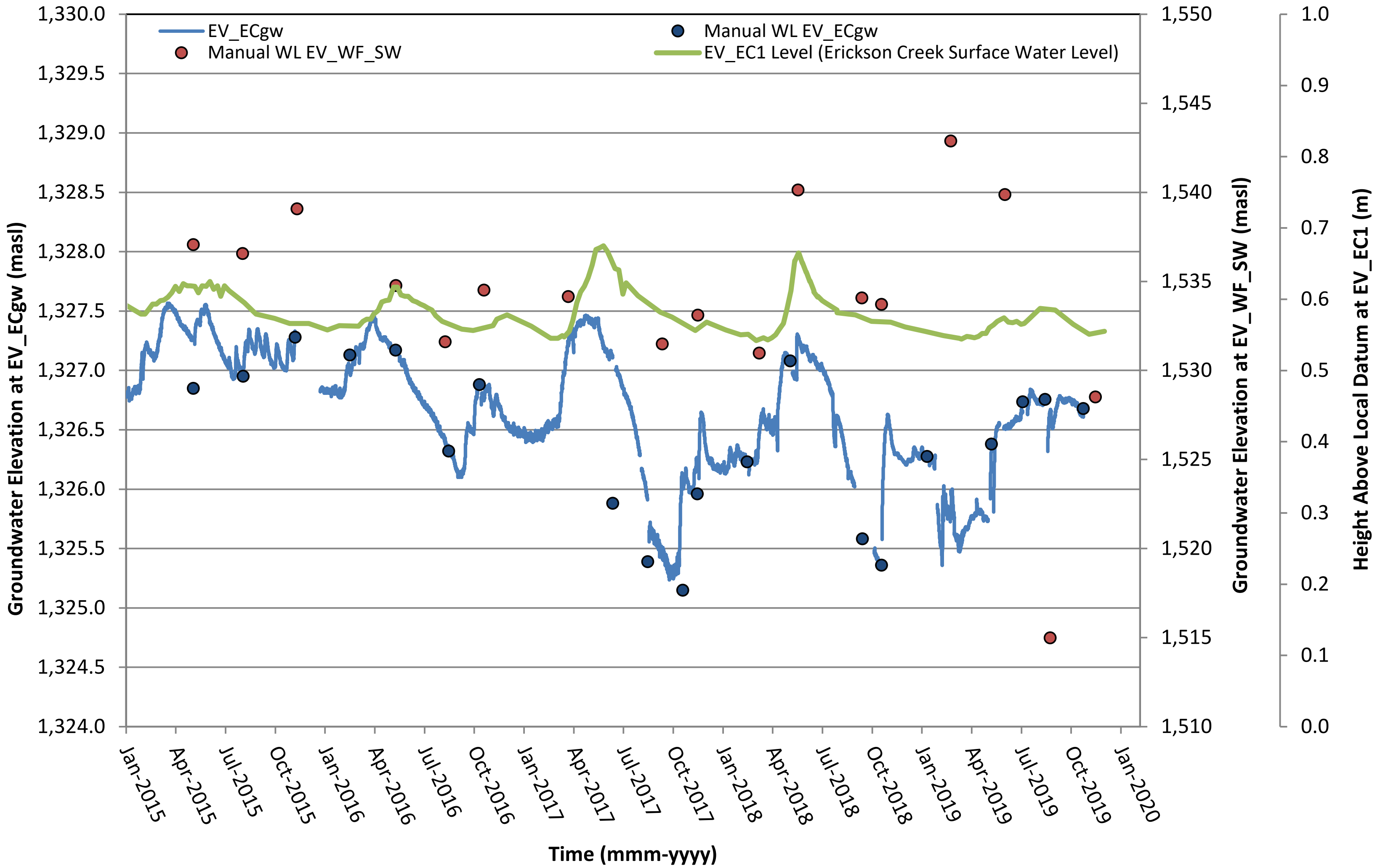
Note: data was removed where suspected datalogger removal occured

Figure EV-7: Selenium Concentrations in the Elk River Watershed



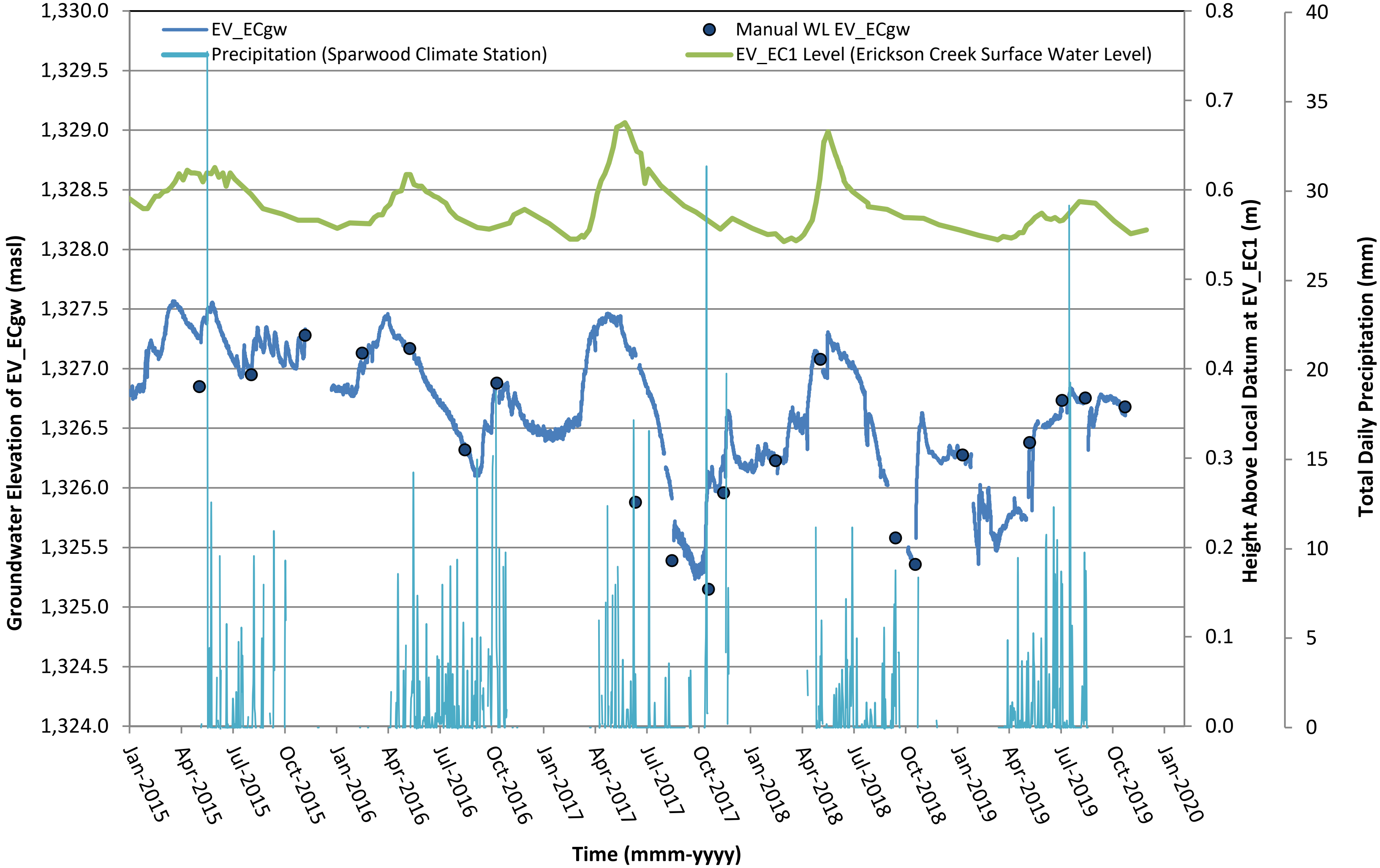
Note: Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.

Figure EV-8: Hydrograph for the Erickson Creek Watershed

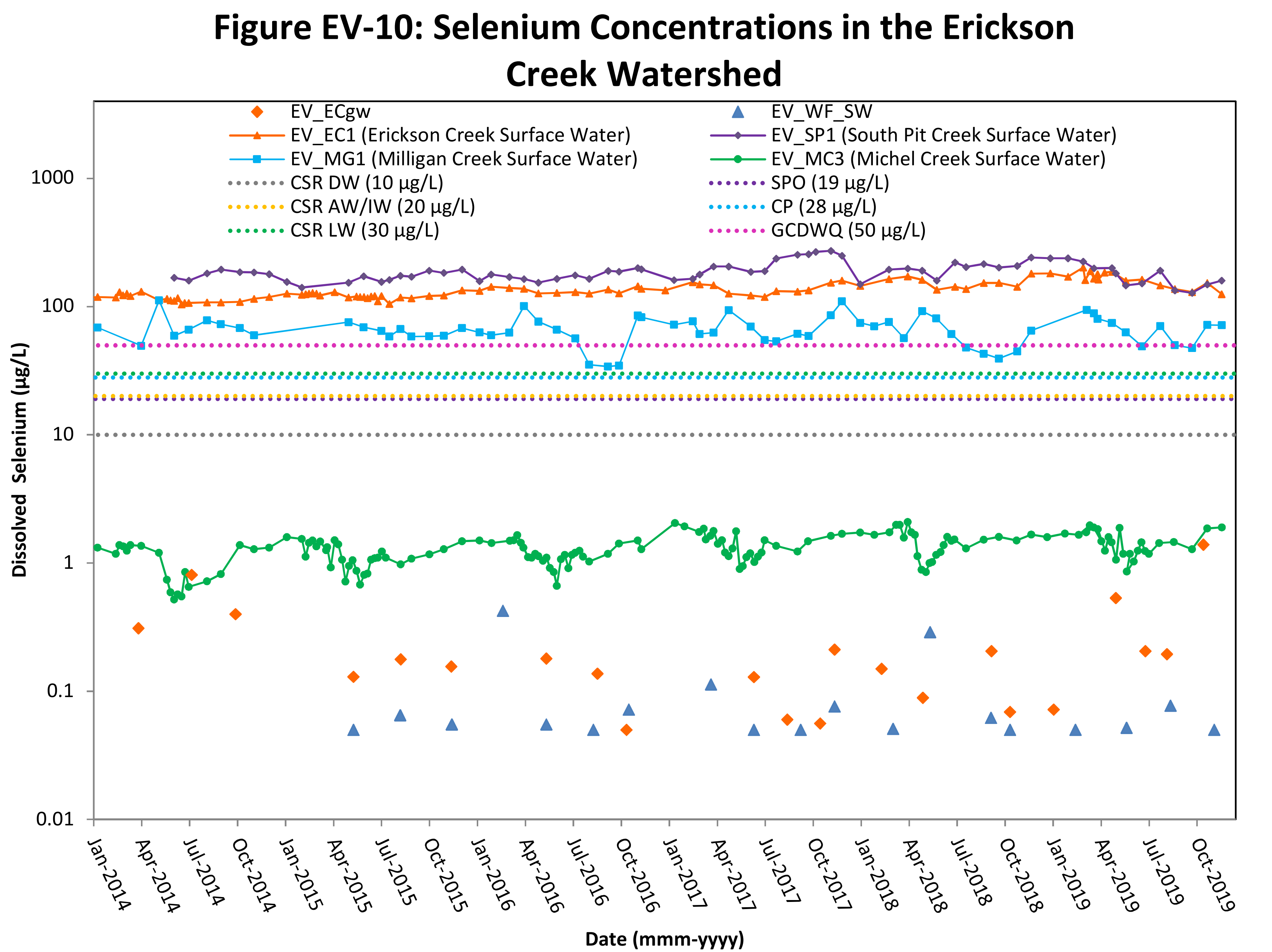


Note: data was removed where suspected datalogger removal occured. EV_EC1 Level data prior to 2016-06-07 was corrected to account for a change in datalogger elevation.

Figure EV-9: Hydrograph for the Erickson Creek Watershed with Precipitation

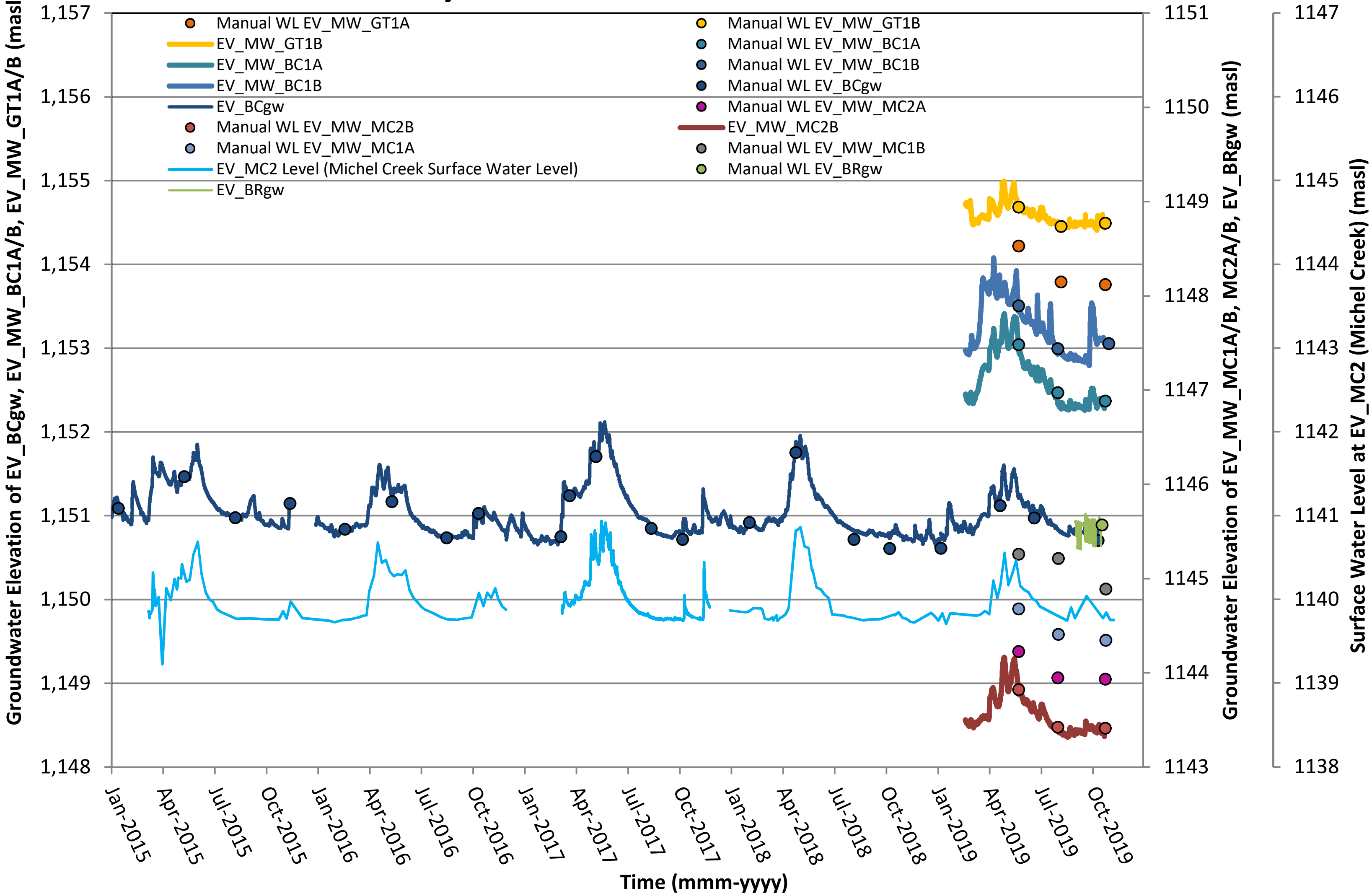


Note: data was removed where suspected datalogger removal occured. EV_EC1 Level data prior to 2016-06-07 was corrected to account for a change in datalogger elevation.



Note: Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.

Figure EV-11: Hydrograph for the Southern Portion of the Michel Creek Valley Bottom and Michel Creek Surface Water



Note: LIDAR ground surface elevation (1149.34 masl) and an assumed stick up of 0.5 m was used to processes EV_BRgw groundwater elevation data as this well has not been surveyed.

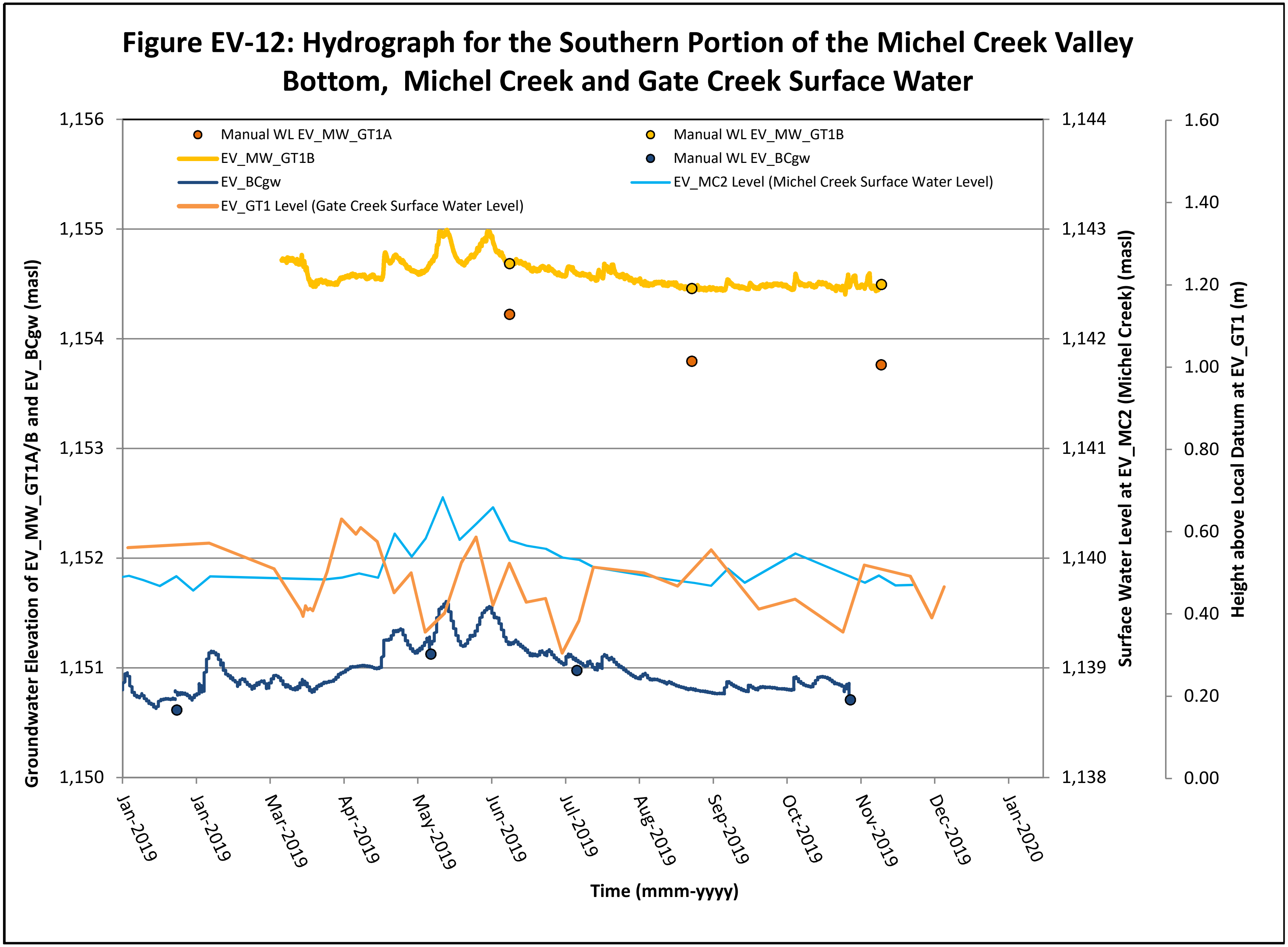


Figure EV-12: Hydrograph for the Southern Portion of the Michel Creek Valley Bottom, Michel Creek and Gate Creek Surface Water
Manual WL EV_MW_GT1A
Manual WL EV_MW_GT1B
EV_MW_GT1B
Manual WL EV_BCgw
EV_BCgw
EV_MC2 Level (Michel Creek Surface Water Level)
EV_GT1 Level (Gate Creek Surface Water Level)
Groundwater Elevation of EV_MW_GT1A/B and EV_BCgw (masl)
Surface Water Level at EV_MC2 (Michel Creek) (masl)
Height above Local Datum at EV_GT1 (m)
Time (mmm-yyyy)
1,156
1,155
1,154
1,153
1,152
1,151
1,150
1,144
1,143
1,142
1,141
1,140
1,139
1,138
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Jan-2019
Jan-2019
Mar-2019
Apr-2019
May-2019
Jun-2019
Jul-2019
Aug-2019
Sep-2019
Oct-2019
Nov-2019
Dec-2019
Jan-2020

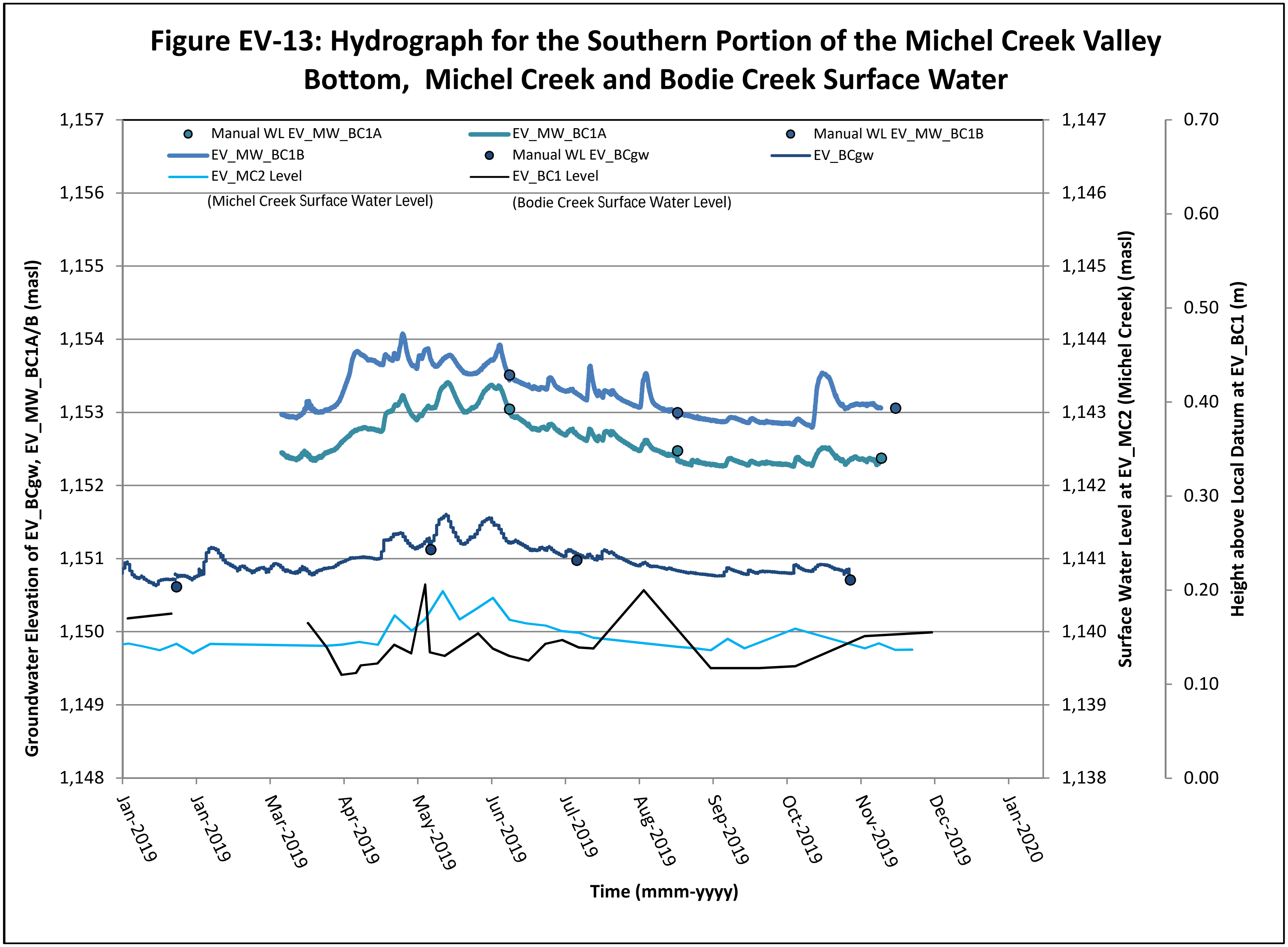


Figure EV-13: Hydrograph for the Southern Portion of the Michel Creek Valley Bottom, Michel Creek and Bodie Creek Surface Water
Manual WL EV_MW_BC1A
EV_MW_BC1A
Manual WL EV_MW_BC1B
EV_MW_BC1B
Manual WL EV_BCgw
EV_BCgw
EV_MC2 Level
EV_BC1 Level
(Michel Creek Surface Water Level)
(Bodie Creek Surface Water Level)
Groundwater Elevation of EV_BCgw, EV_MW_BC1A/B (masl)
Surface Water Level at EV_MC2 (Michel Creek) (masl)
Height above Local Datum at EV_BC1 (m)
1,157
1,156
1,155
1,154
1,153
1,152
1,151
1,150
1,149
1,148
1,147
1,146
1,145
1,144
1,143
1,142
1,141
1,140
1,139
1,138
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Jan-2019
Jan-2019
Mar-2019
Apr-2019
May-2019
Jun-2019
Jul-2019
Aug-2019
Sep-2019
Oct-2019
Nov-2019
Dec-2019
Jan-2020
Time (mmm-yyyy)

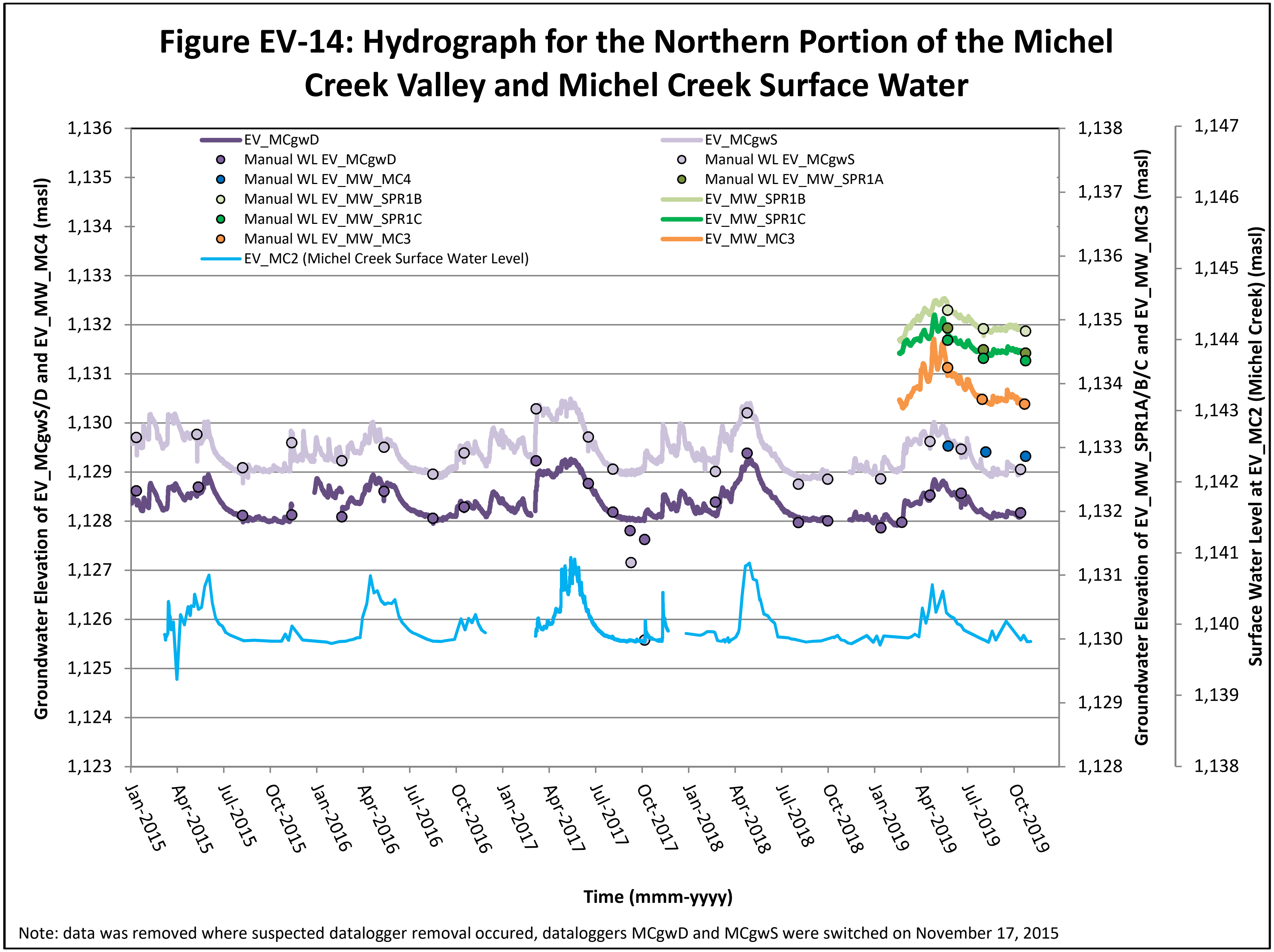
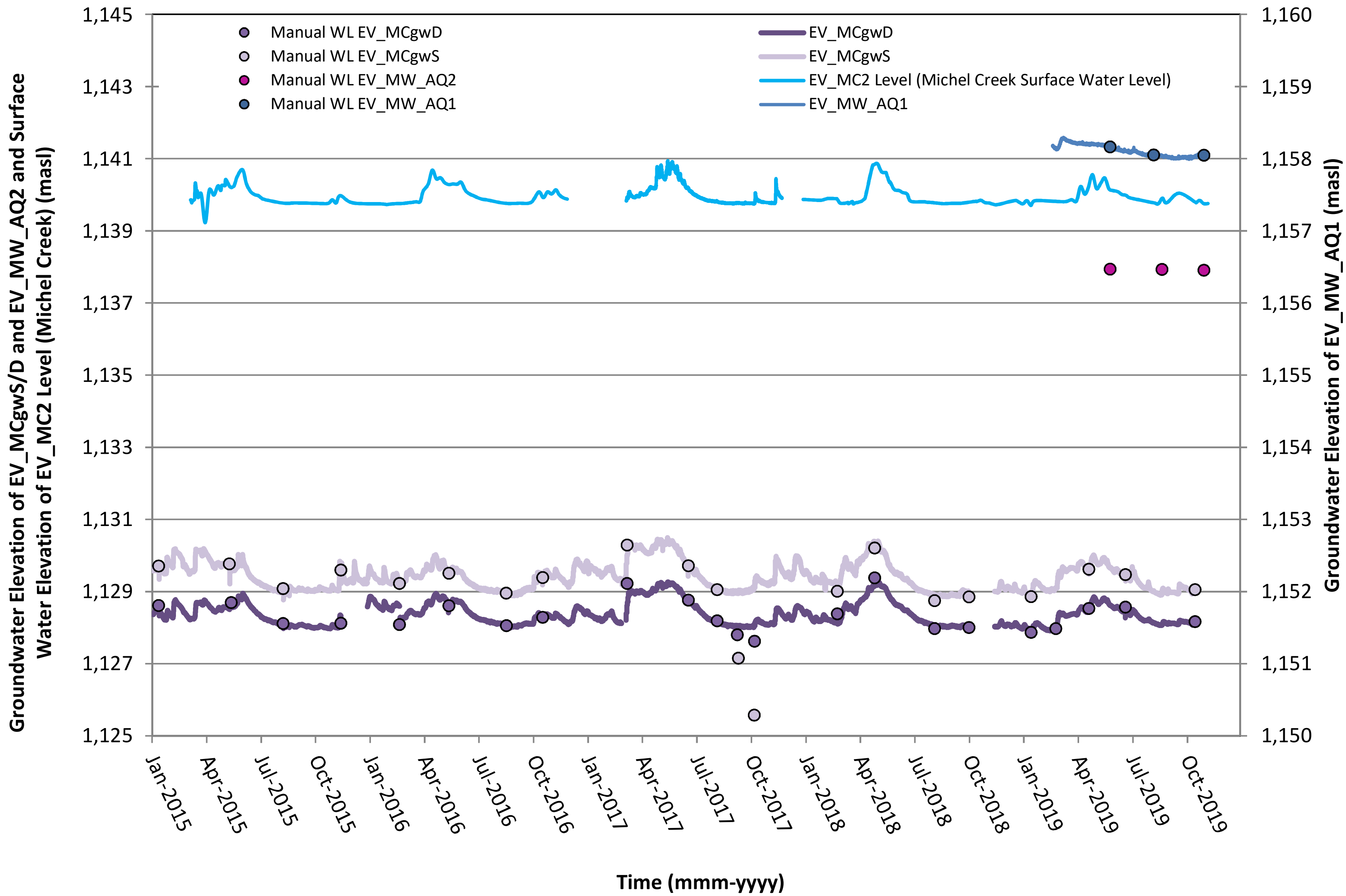


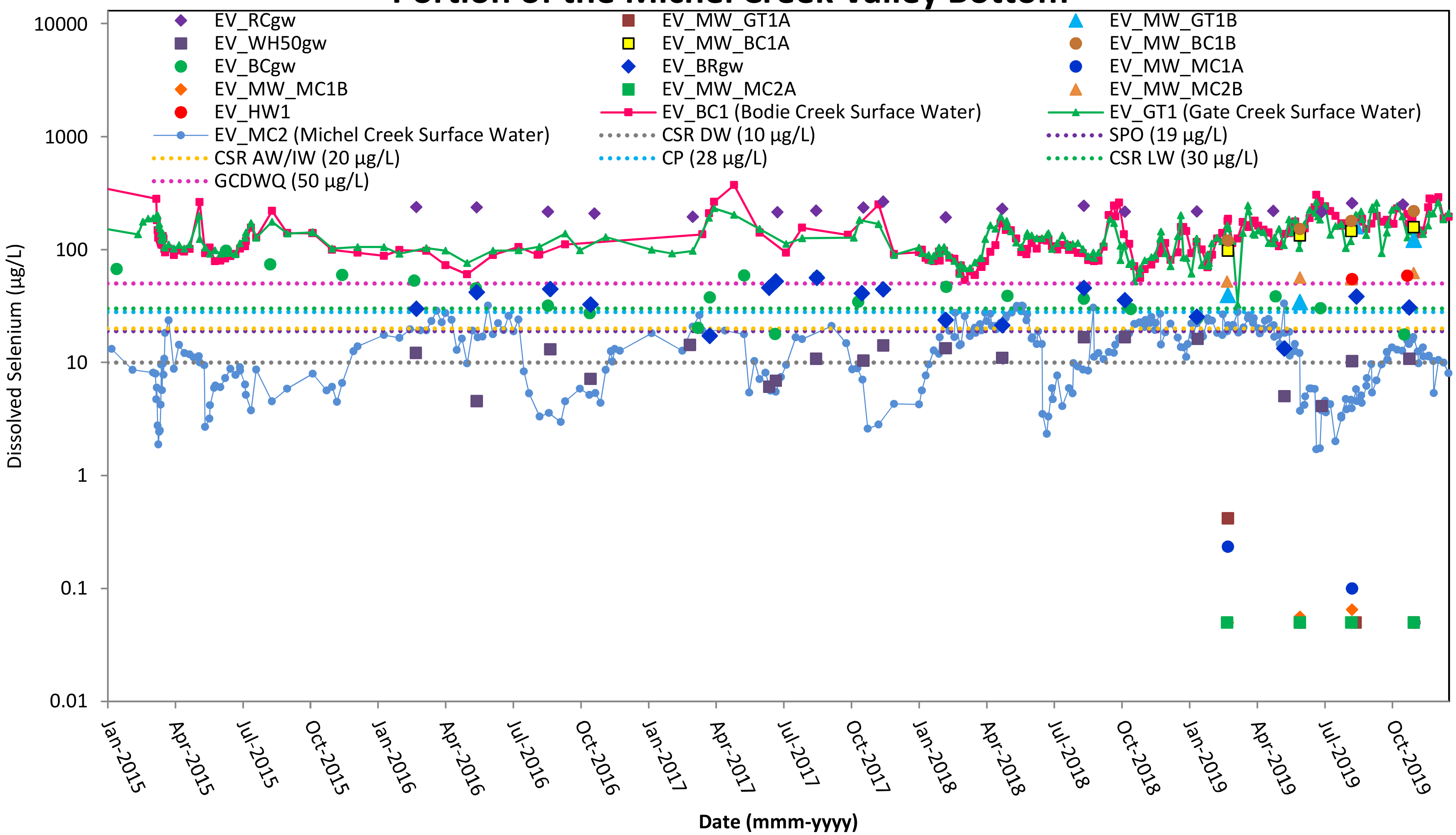
Figure EV-14: Hydrograph for the Northern Portion of the Michel Creek Valley and Michel Creek Surface Water
EV_MCgwD
Manual WL EV_MCgwD
Manual WL EV_MW_MC4
Manual WL EV_MW_SPR1B
Manual WL EV_MW_SPR1C
Manual WL EV_MW_MC3
EV_MC2 (Michel Creek Surface Water Level)
EV_MCgwS
Manual WL EV_MCgwS
Manual WL EV_MW_SPR1A
EV_MW_SPR1B
EV_MW_SPR1C
EV_MW_MC3
Groundwater Elevation of EV_MCgwS/D and EV_MW_MC4 (masl)
Groundwater Elevation of EV_MW_SPR1A/B/C and EV_MW_MC3 (masl)
Surface Water Level at EV_MC2 (Michel Creek) (masl)
1,136
1,135
1,134
1,133
1,132
1,131
1,130
1,129
1,128
1,127
1,126
1,125
1,124
1,123
1,138
1,137
1,136
1,135
1,134
1,133
1,132
1,131
1,130
1,129
1,128
1,147
1,146
1,145
1,144
1,143
1,142
1,141
1,140
1,139
1,138
Jan-2015
Apr-2015
Jul-2015
Oct-2015
Jan-2016
Apr-2016
Jul-2016
Oct-2016
Jan-2017
Apr-2017
Jul-2017
Oct-2017
Jan-2018
Apr-2018
Jul-2018
Oct-2018
Jan-2019
Apr-2019
Jul-2019
Oct-2019
Time (mmm-yyyy)
Note: data was removed where suspected datalogger removal occured, dataloggers MCgwD and MCgwS were switched on November 17, 2015

Figure EV-15: Hydrograph for the Base of Baldy Ridge

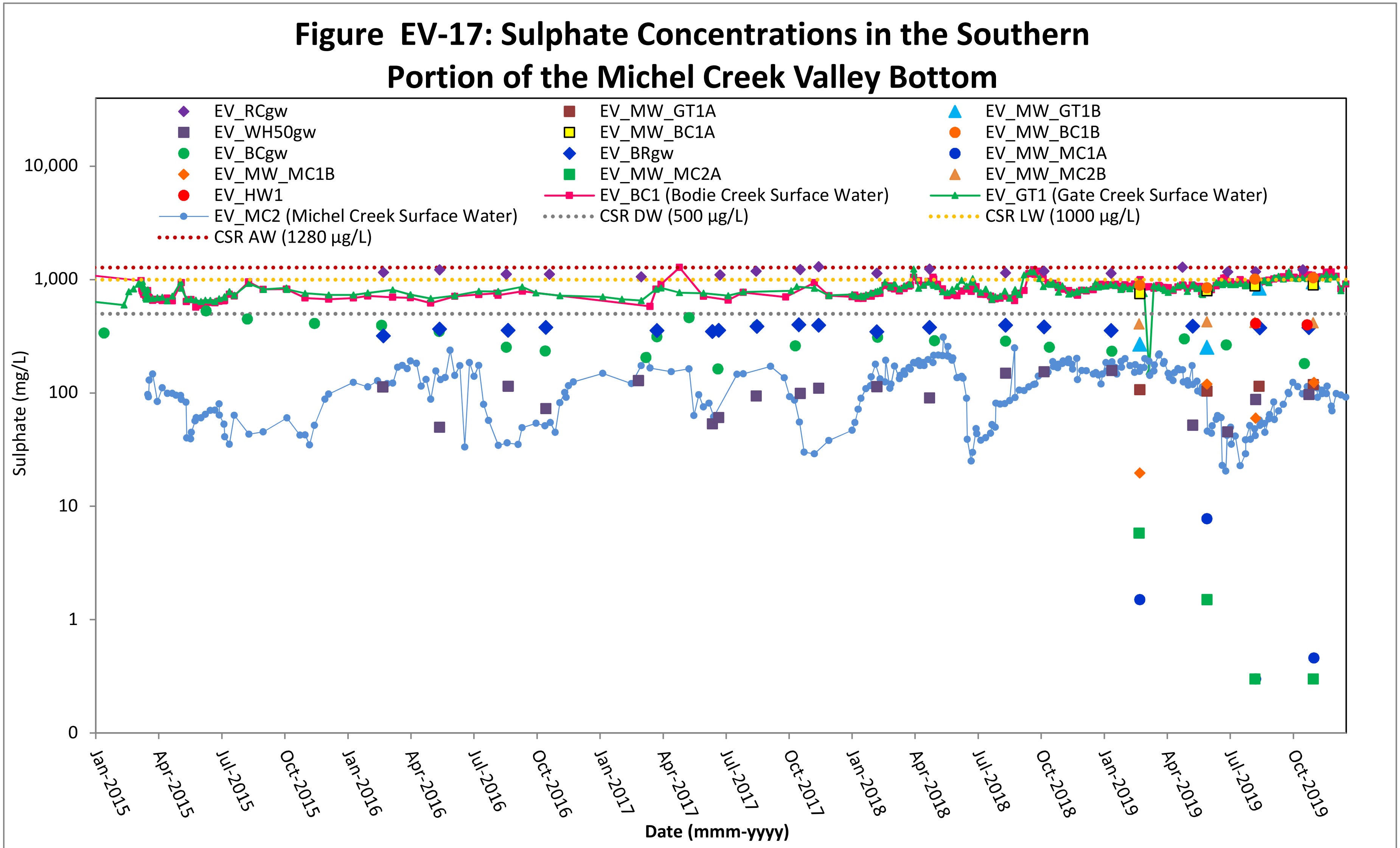


Note: data was removed where suspected datalogger removal occured, dataloggers MCgwD and MCgwS were switched on November 17, 2015

Figure EV-16: Selenium Concentrations in the Southern Portion of the Michel Creek Valley Bottom

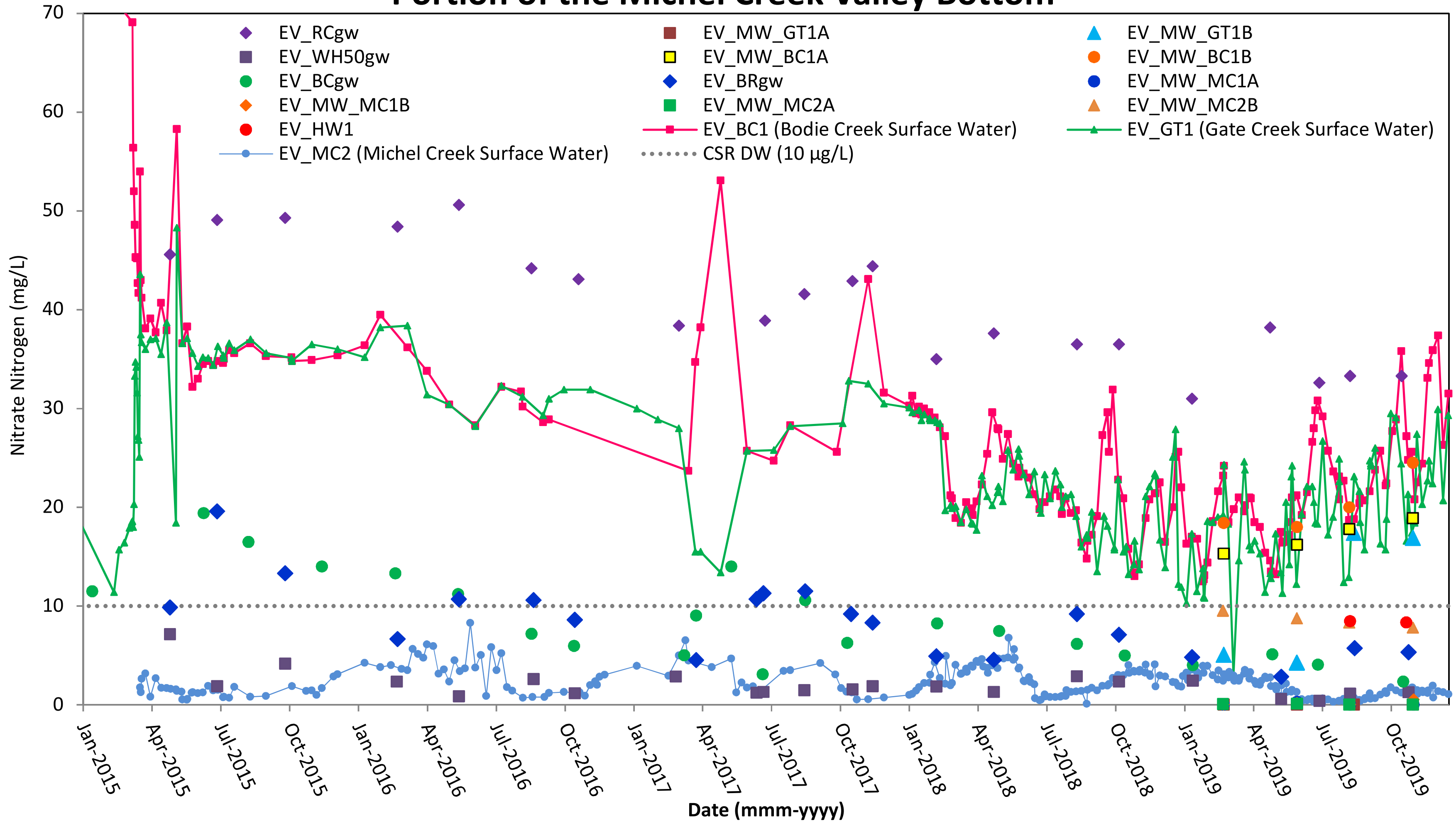


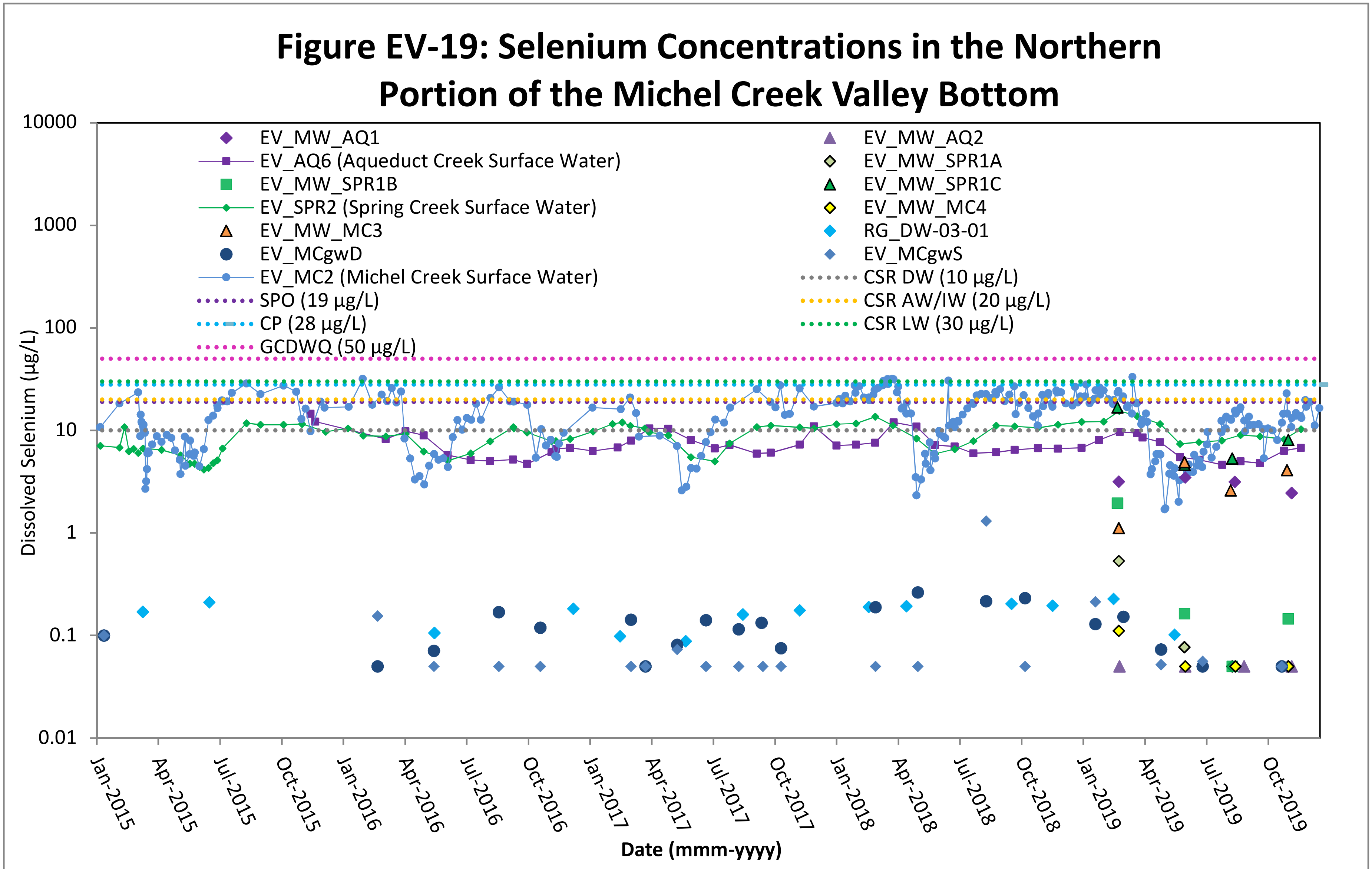
Note: Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.



Note: Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.

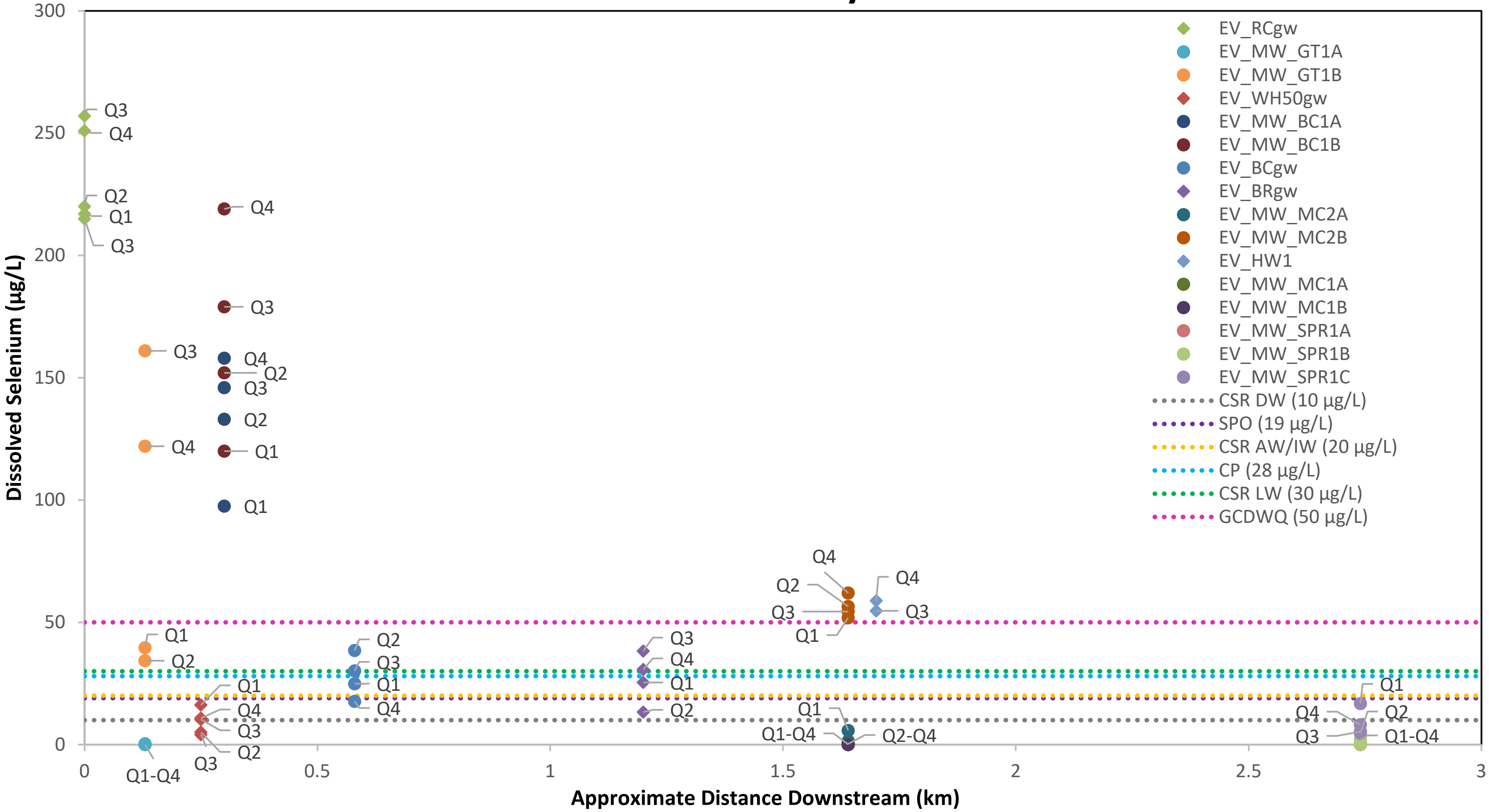
Figure EV-18: Nitrate-N Concentrations in the Southern Portion of the Michel Creek Valley Bottom





Note: Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.

Figure EV-20: Down Valley Selenium Concentrations from 2019 in the Michel Creek Valley Bottom



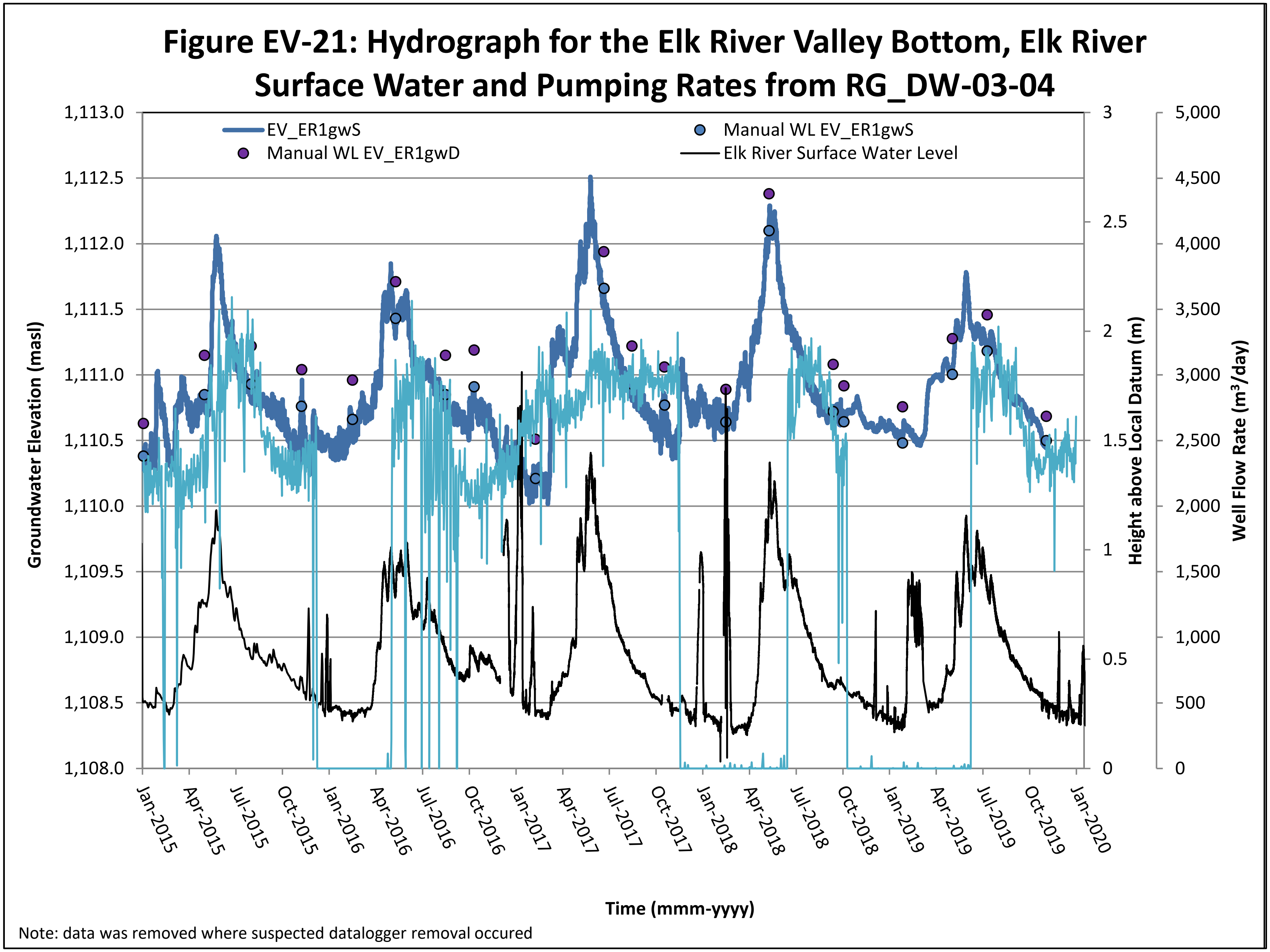
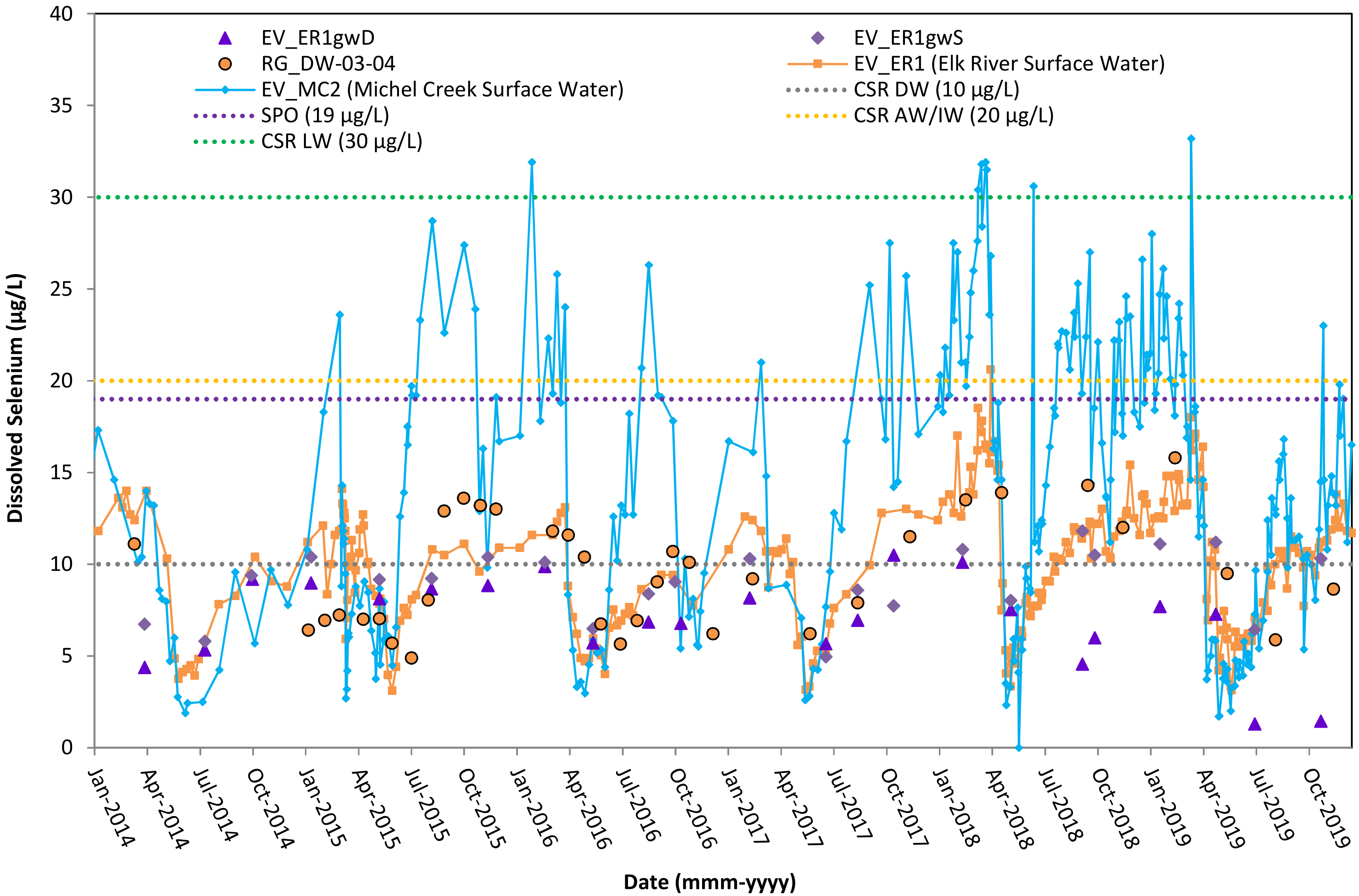
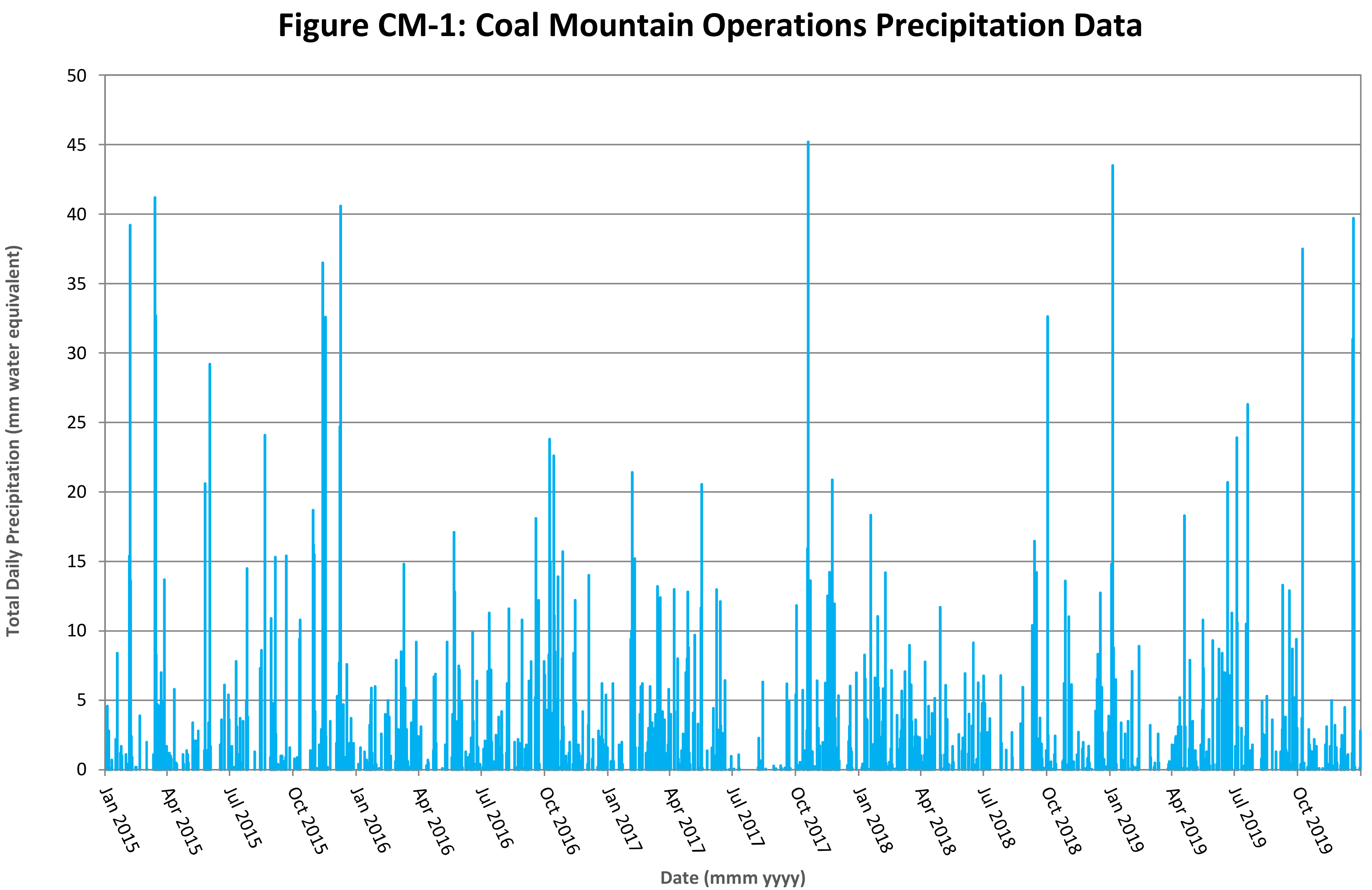


Figure EV-21: Hydrograph for the Elk River Valley Bottom, Elk River Surface Water and Pumping Rates from RG_DW-03-04
EV_ER1gwS
Manual WL EV_ER1gwD
Manual WL EV_ER1gwS
Elk River Surface Water Level
Groundwater Elevation (masl)
Height above Local Datum (m)
Well Flow Rate (m³/day)
1,113.0
1,112.5
1,112.0
1,111.5
1,111.0
1,110.5
1,110.0
1,109.5
1,109.0
1,108.5
1,108.0
3
2.5
2
1.5
1
0.5
0
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-2015
Apr-2015
Jul-2015
Oct-2015
Jan-2016
Apr-2016
Jul-2016
Oct-2016
Jan-2017
Apr-2017
Jul-2017
Oct-2017
Jan-2018
Apr-2018
Jul-2018
Oct-2018
Jan-2019
Apr-2019
Jul-2019
Oct-2019
Jan-2020
Time (mmm-yyyy)
Note: data was removed where suspected datalogger removal occured

Figure EV-22: Selenium Concentrations in Elk River Watershed

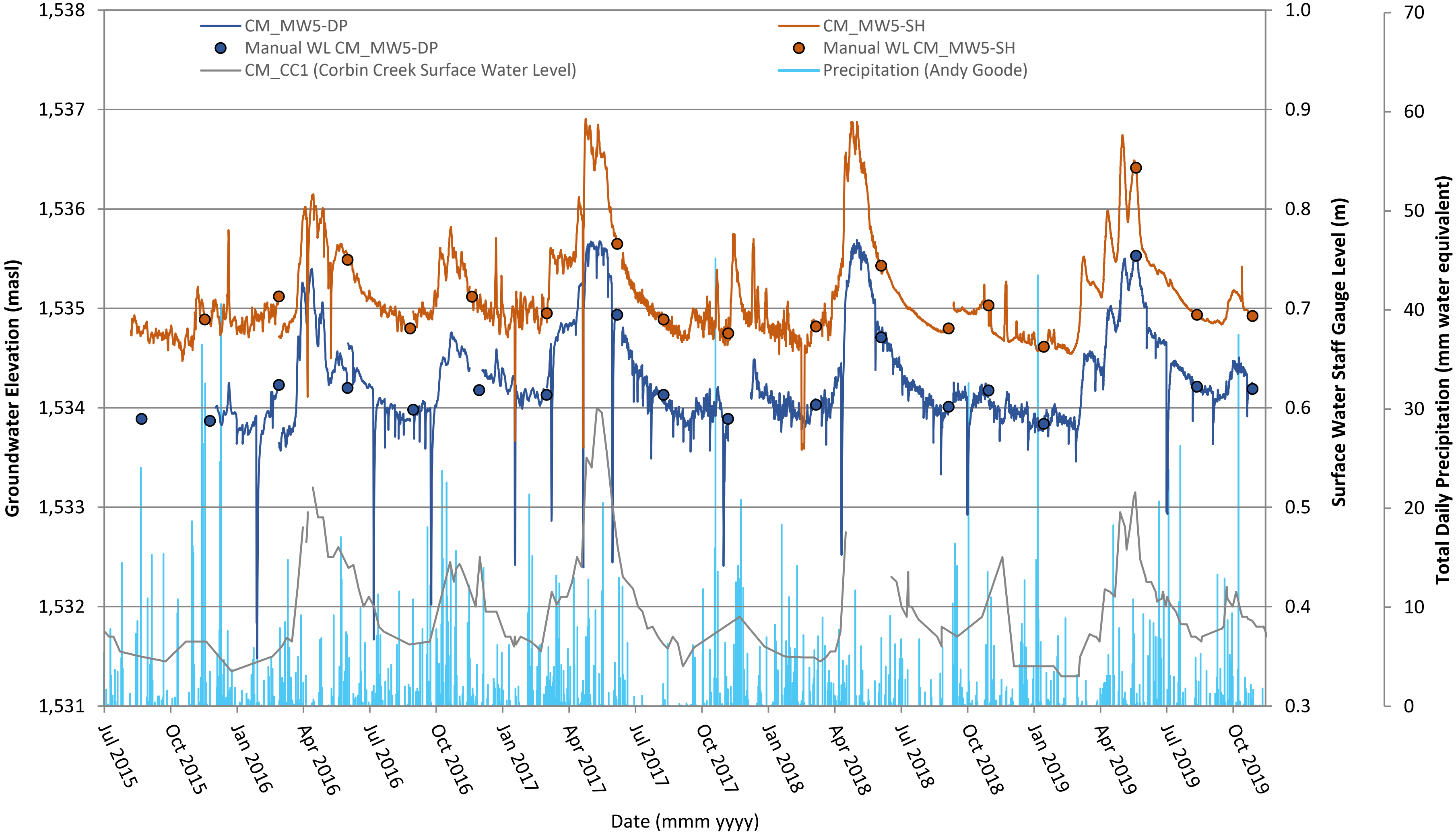


Note: Total selenium concentrations shown at RG_DW-03-04 prior to 2017 02 20.



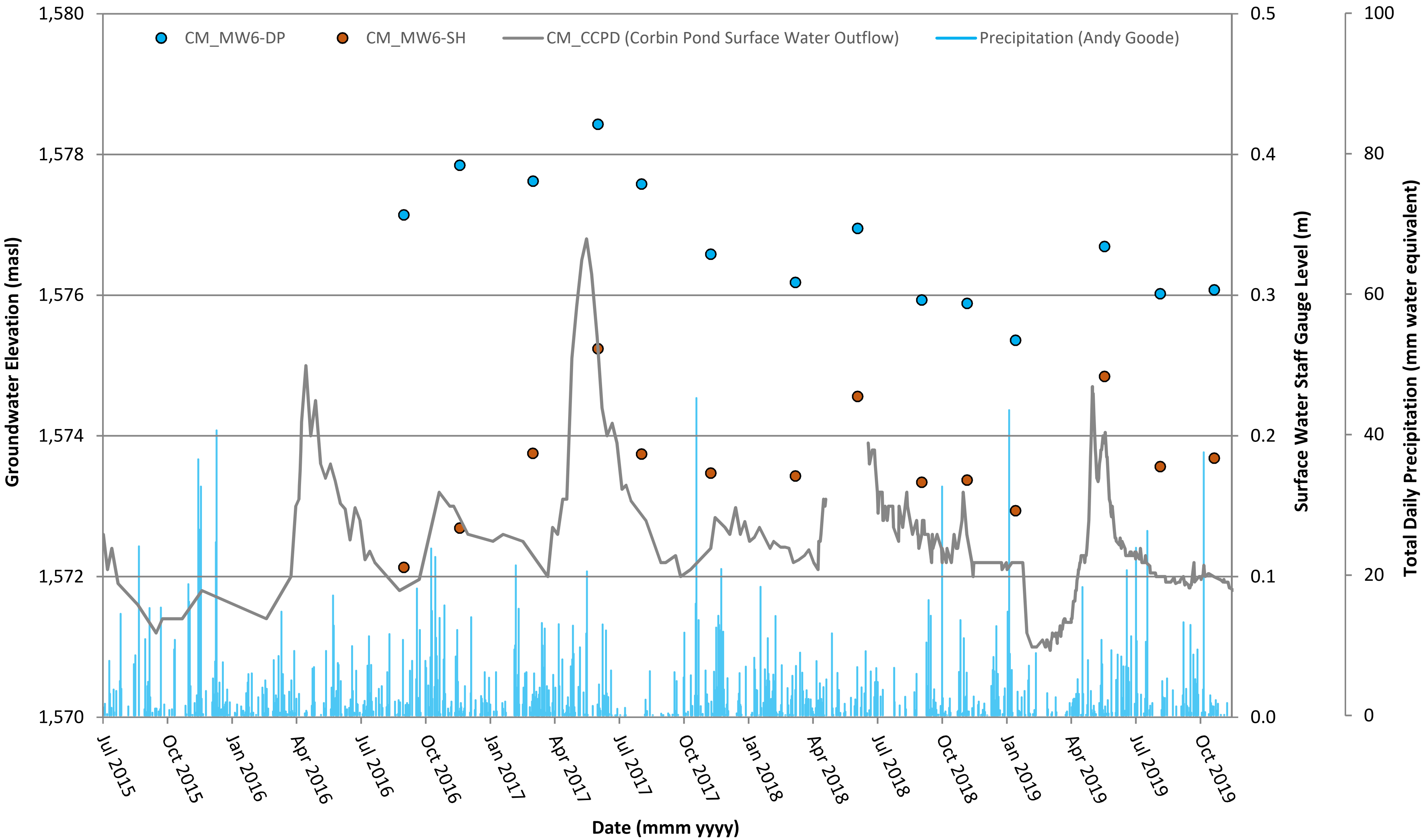
Notes: Daily total water equivalent precipitation data for Andy Goode Meteorology station
Data presented for Environment Canada Sparwood station November 2016 to April 2017

Figure CM-2: Lower Corbin Creek Valley Groundwater and Surface Water Hydrographs

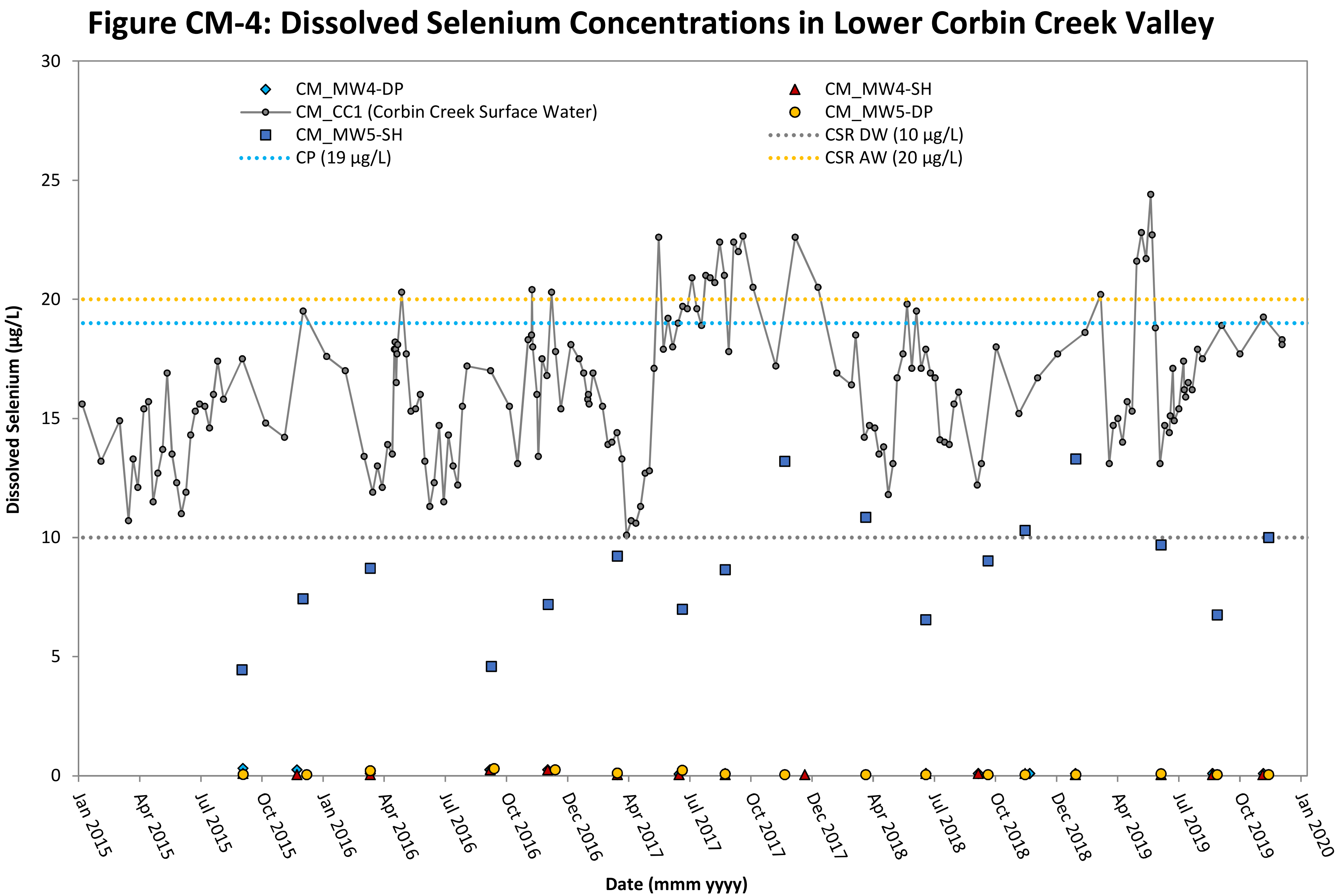


Notes: Pressure transducer data removed where data logger removal occured
Precipitation data presented for Environment Canada Sparwood station November 2016 to April 2017

Figure CM-3: Corbin Pond Groundwater and Surface Water Level Hydrographs

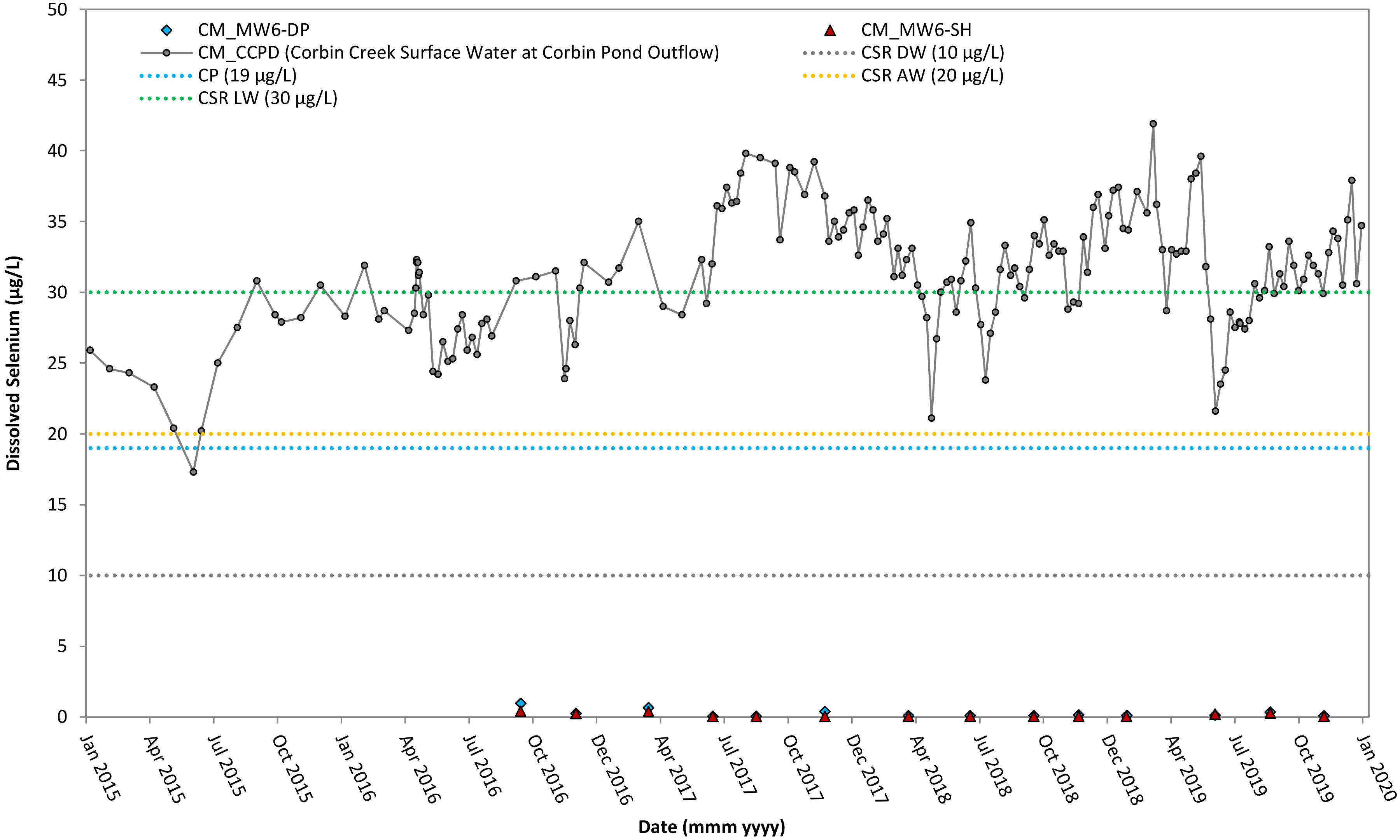


Note: Precipitation data presented for Environment Canada Sparwood station November 2016 to April 2017

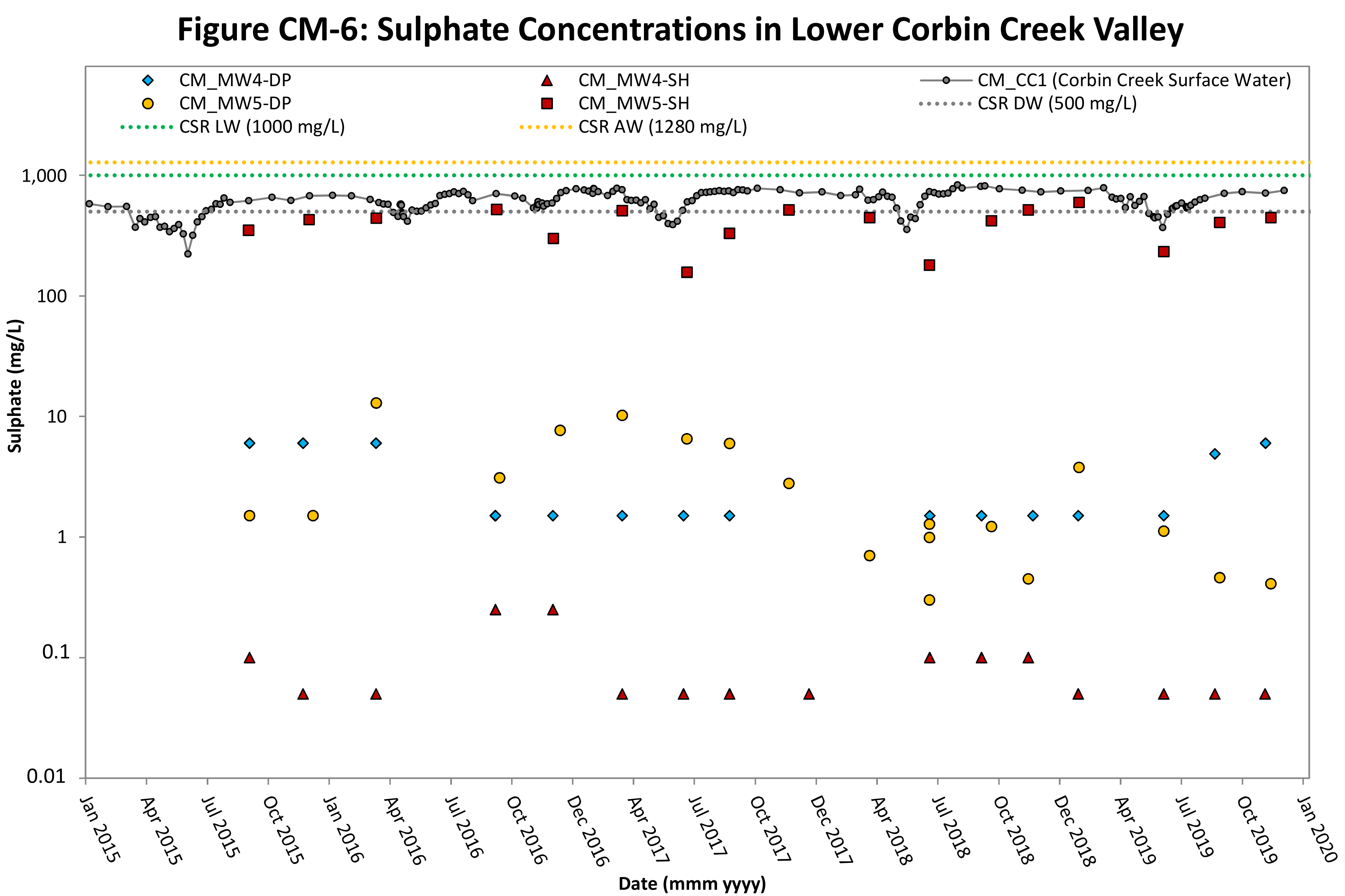


Notes: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.

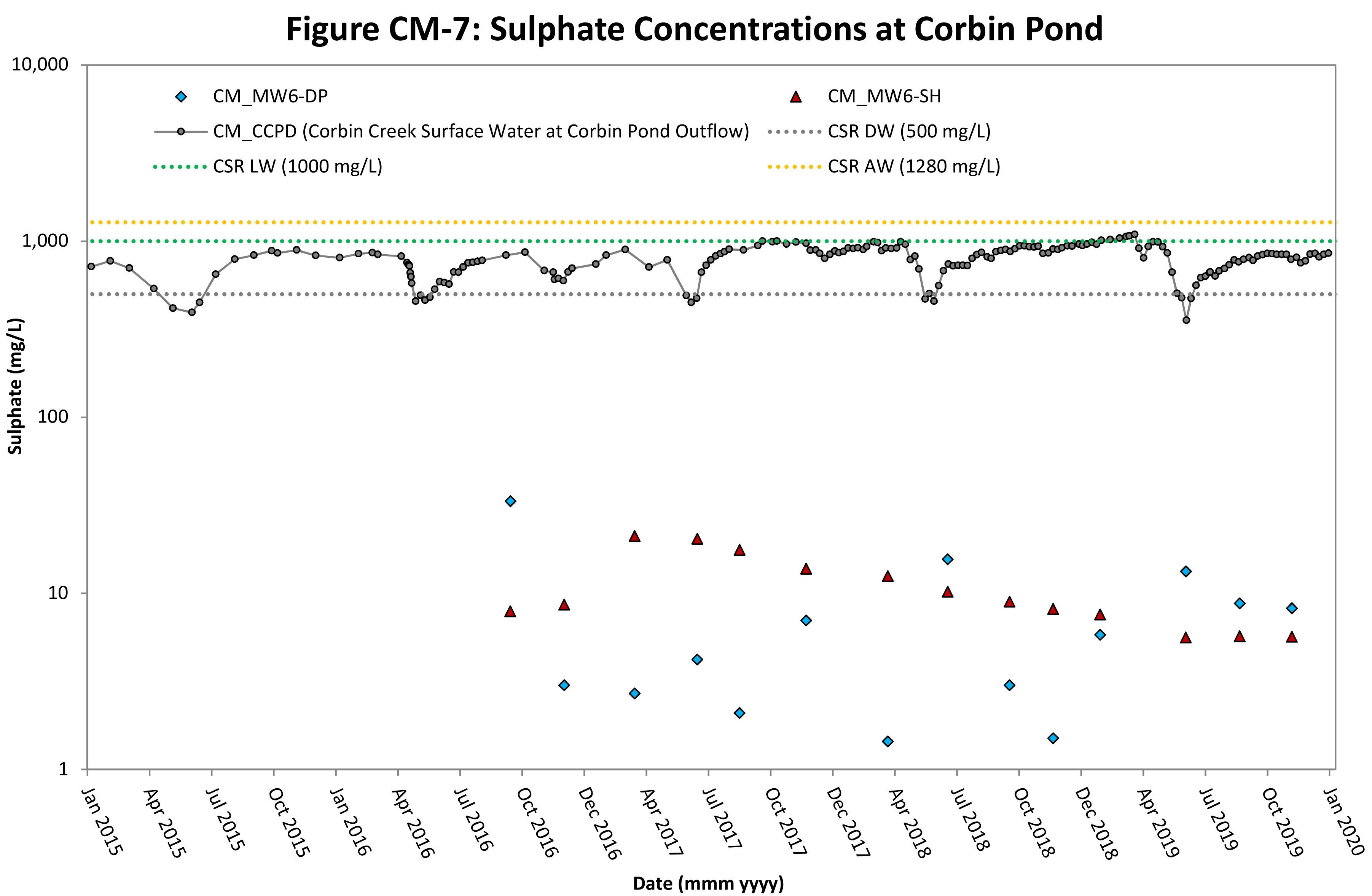
Figure CM-5: Dissolved Selenium Concentrations at Corbin Pond



Notes: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.



Notes: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.
BCWQG for hardness less than 30 mg/L has been included for comparison purposes for surface water analytical data.
Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.



Notes: BCWQG for hardness less than 30 mg/L has been included for comparison purposes for surface water analytical data.
Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.

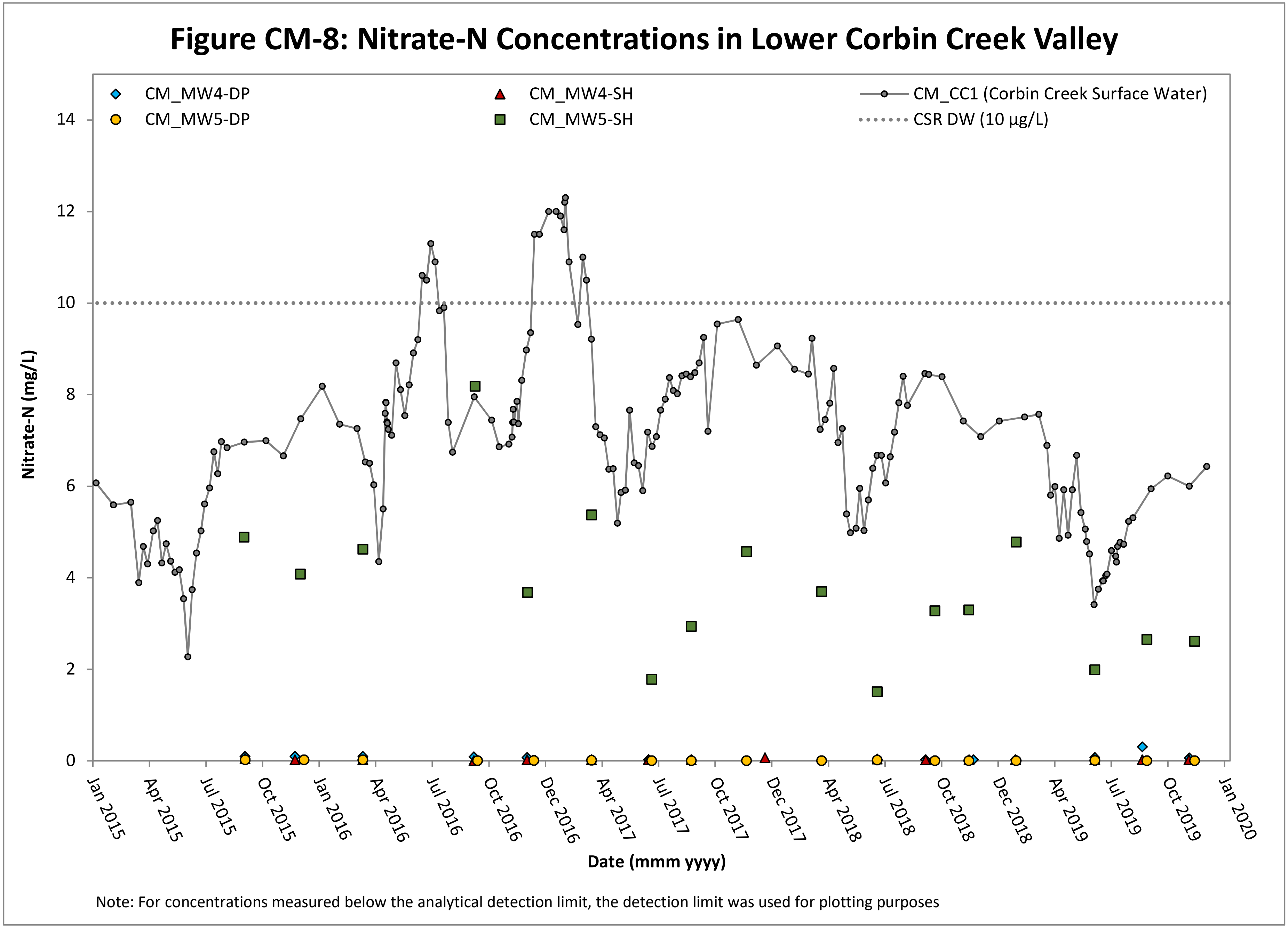
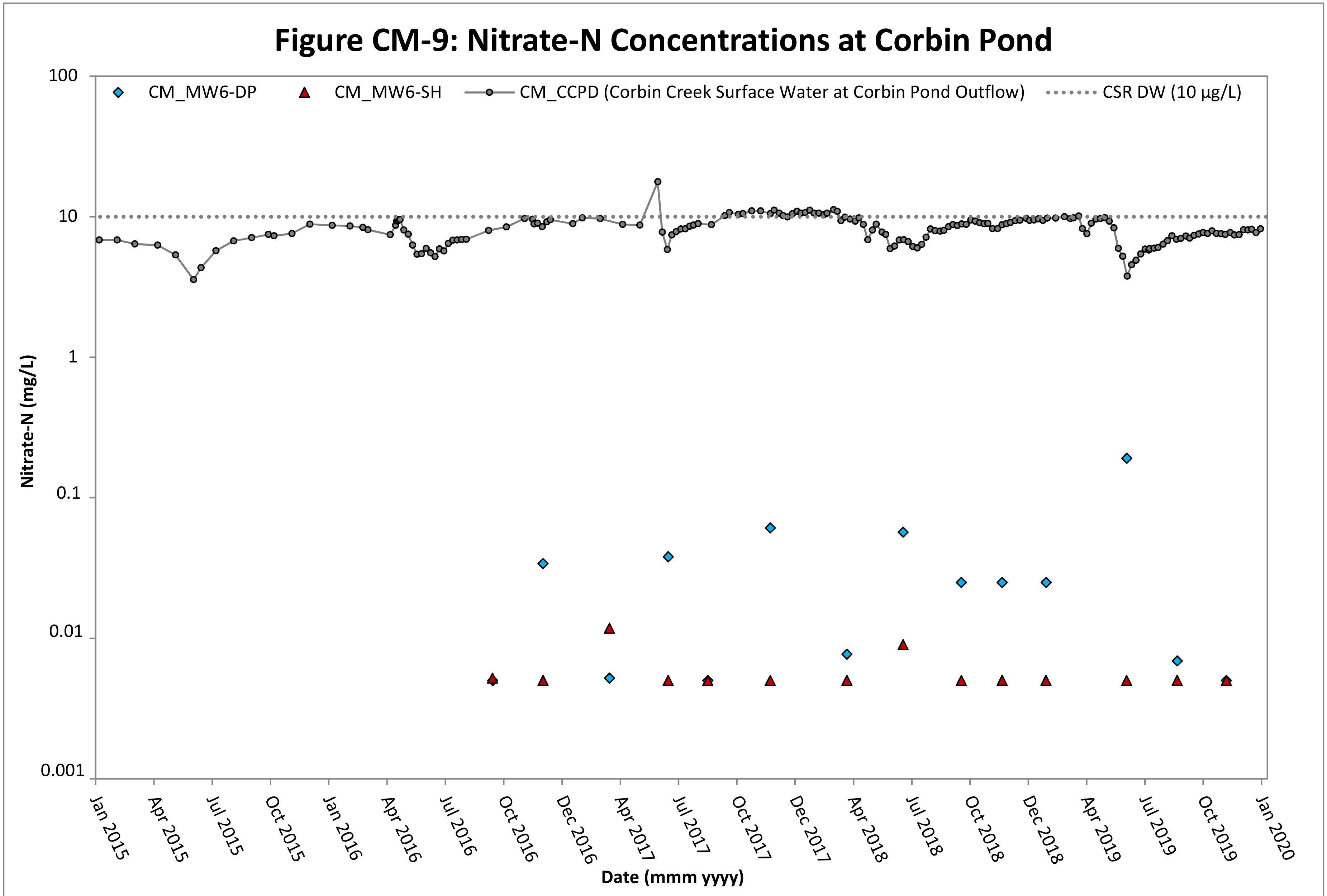
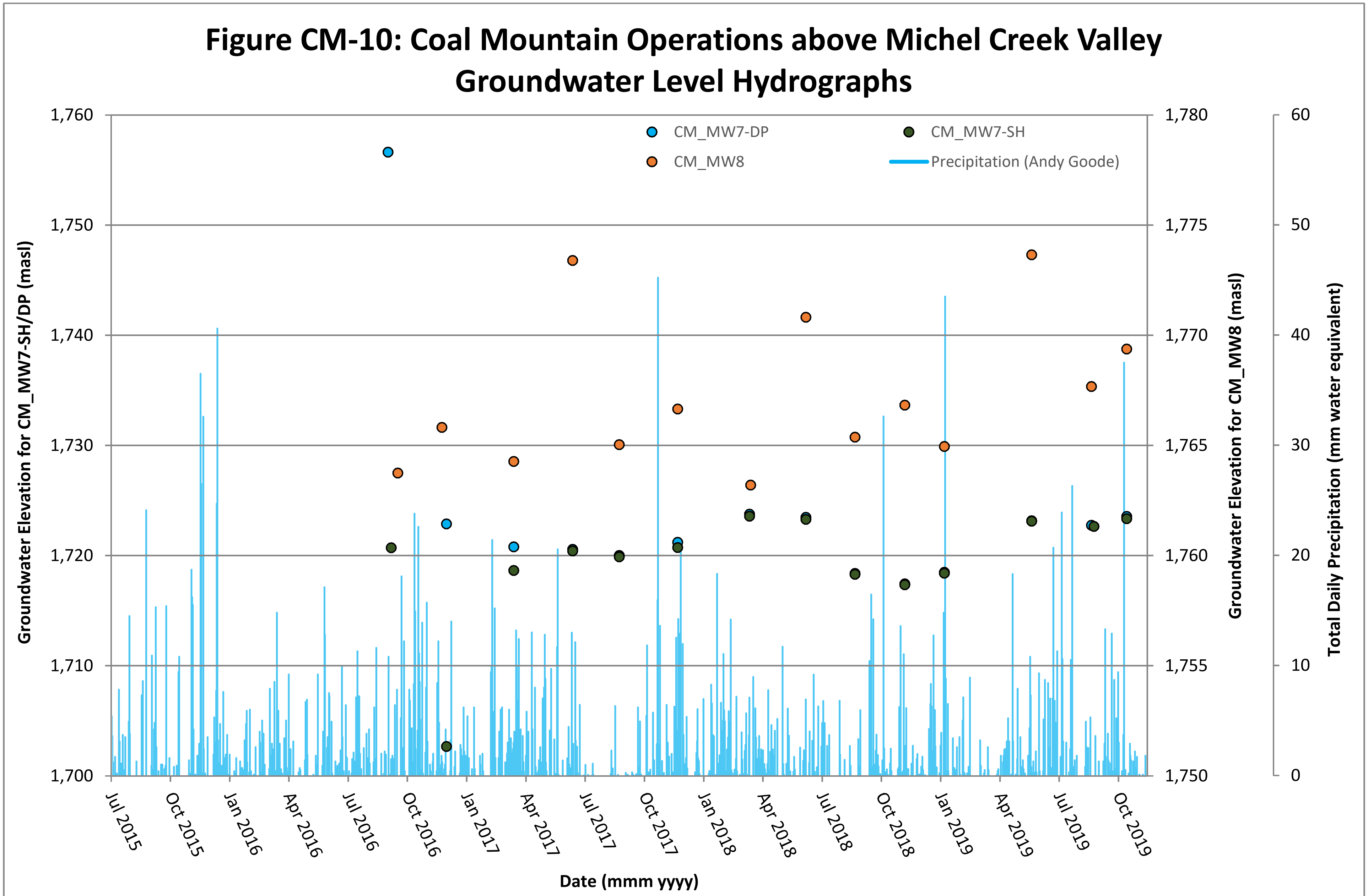


Figure CM-8: Nitrate-N Concentrations in Lower Corbin Creek Valley
CM_MW4-DP
CM_MW5-DP
CM_MW4-SH
CM_MW5-SH
CM_CC1 (Corbin Creek Surface Water)
CSR DW (10 µg/L)
Nitrate-N (mg/L)
14
12
10
8
6
4
2
0
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Dec 2016
Apr 2017
Jul 2017
Oct 2017
Dec 2017
Apr 2018
Jul 2018
Oct 2018
Dec 2018
Apr 2019
Jul 2019
Oct 2019
Jan 2020
Date (mmm yyyy)
Note: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes



Note: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.
Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.



Note: Precipitation data presented for Environment Canada Sparwood station November 2016 to April 2017

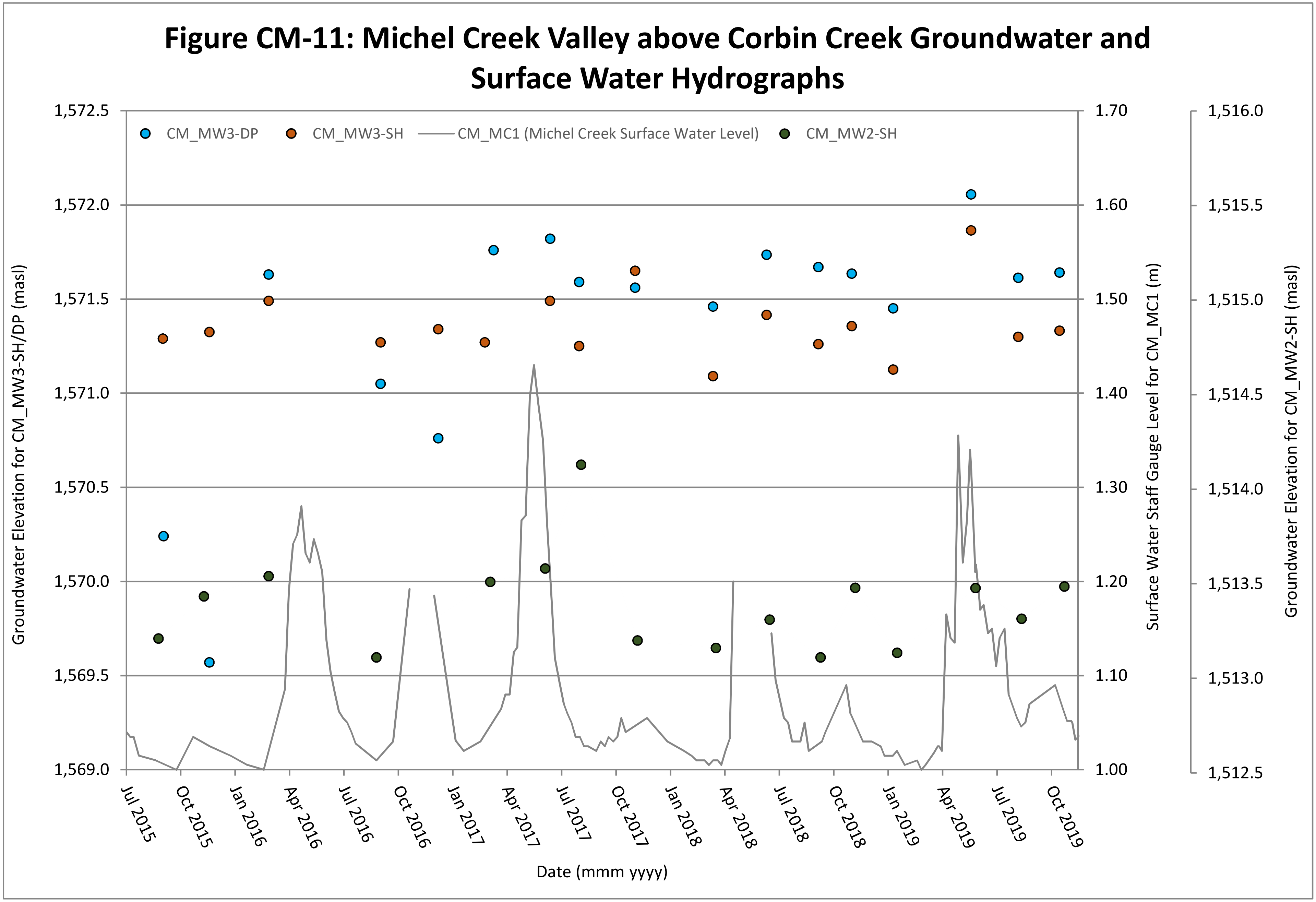


Figure CM-11: Michel Creek Valley above Corbin Creek Groundwater and Surface Water Hydrographs
CM_MW3-DP
CM_MW3-SH
CM_MC1 (Michel Creek Surface Water Level)
CM_MW2-SH
Groundwater Elevation for CM_MW3-SH/DP (masl)
Surface Water Staff Gauge Level for CM_MC1 (m)
Groundwater Elevation for CM_MW2-SH (masl)
Date (mmm yyyy)
1,572.5
1,572.0
1,571.5
1,571.0
1,570.5
1,570.0
1,569.5
1,569.0
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
1,516.0
1,515.5
1,515.0
1,514.5
1,514.0
1,513.5
1,513.0
1,512.5
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019

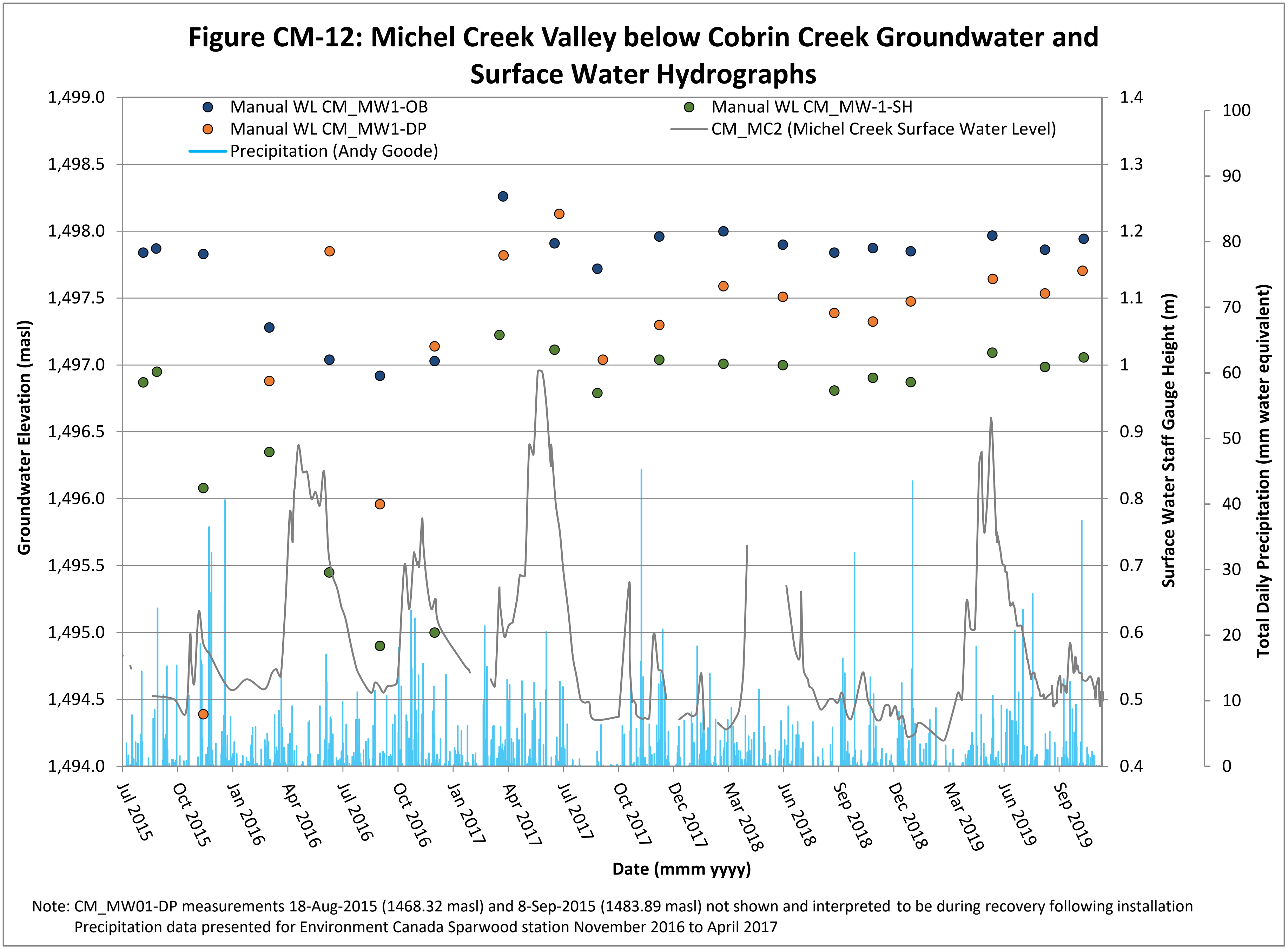
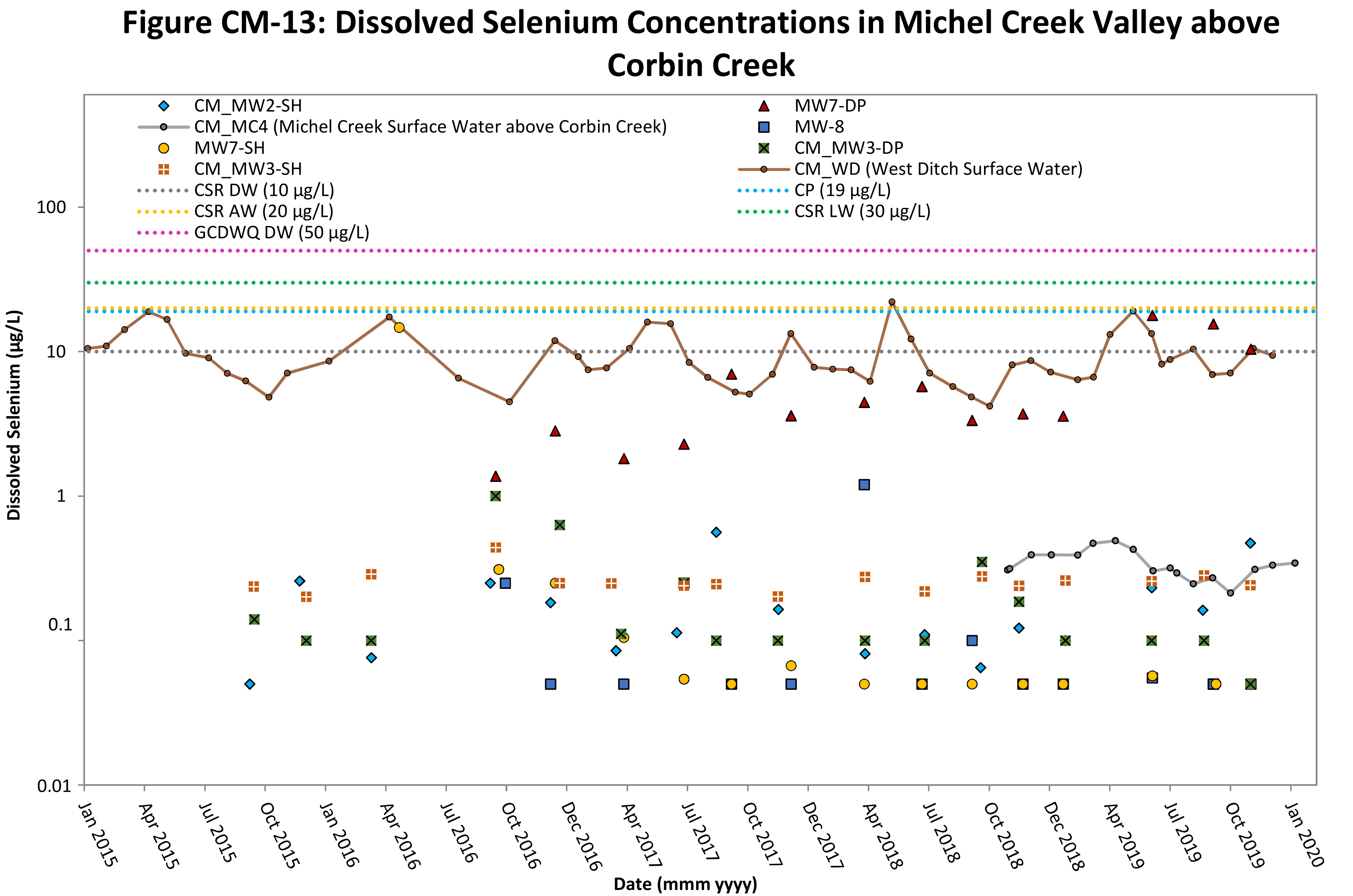
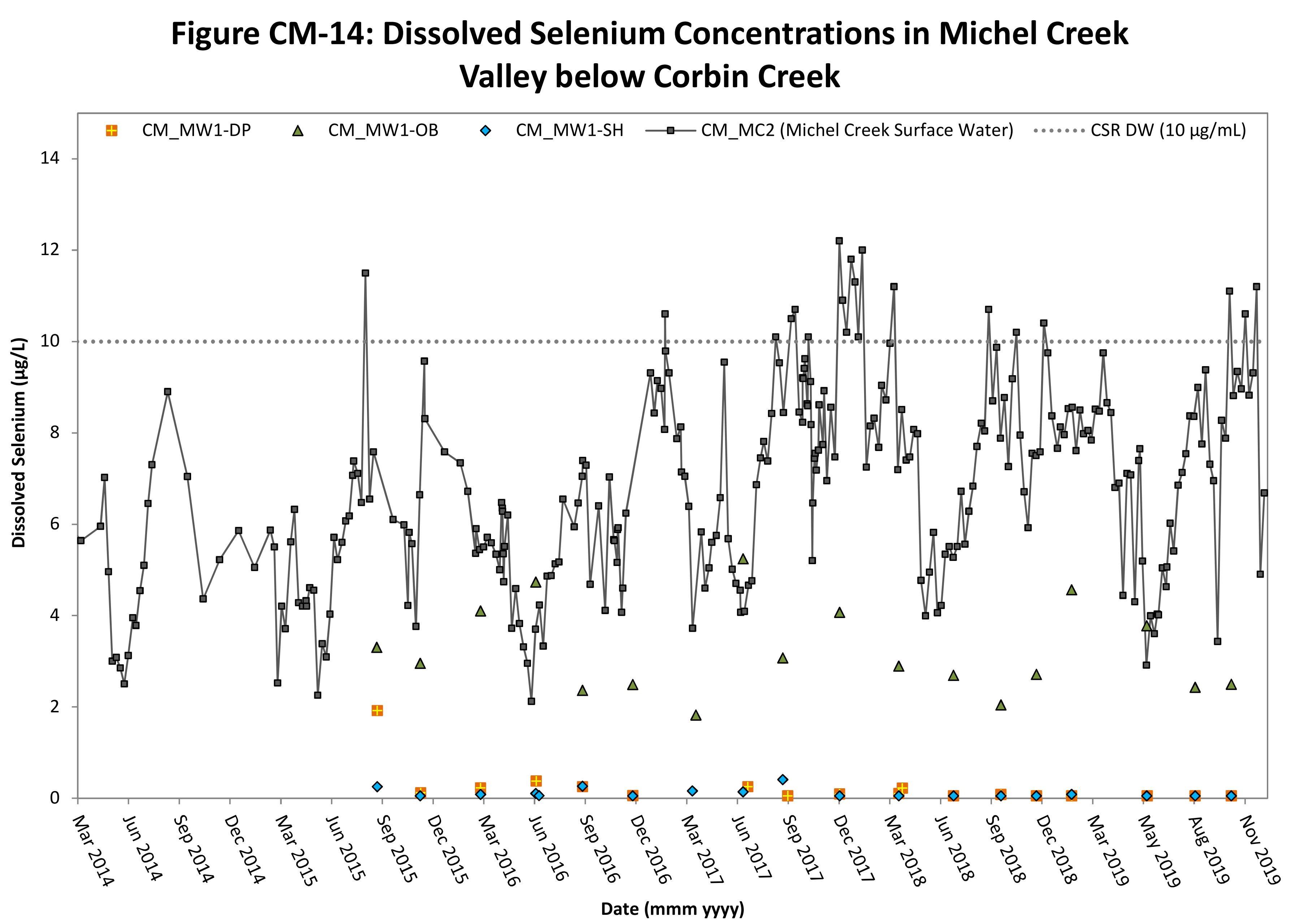


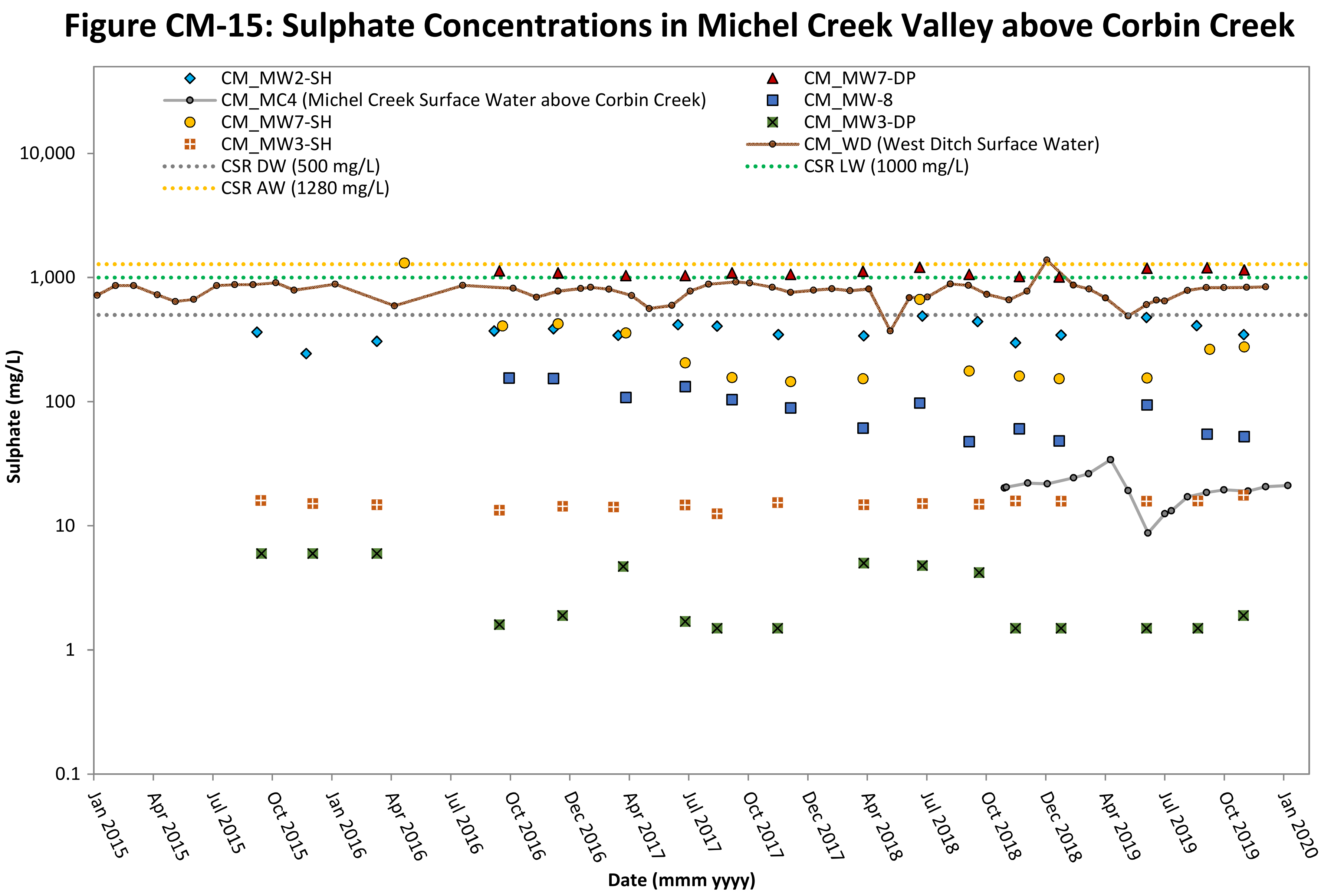
Figure CM-12: Michel Creek Valley below Cobrin Creek Groundwater and Surface Water Hydrographs
Manual WL CM_MW1-OB
Manual WL CM_MW1-DP
Precipitation (Andy Goode)
Manual WL CM_MW-1-SH
CM_MC2 (Michel Creek Surface Water Level)
Groundwater Elevation (masl)
Surface Water Staff Gauge Height (m)
Total Daily Precipitation (mm water equivalent)
Date (mmm yyyy)
1,499.0
1,498.5
1,498.0
1,497.5
1,497.0
1,496.5
1,496.0
1,495.5
1,495.0
1,494.5
1,494.0
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
100
90
80
70
60
50
40
30
20
10
0
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
Jun 2019
Sep 2019
Note: CM_MW01-DP measurements 18-Aug-2015 (1468.32 masl) and 8-Sep-2015 (1483.89 masl) not shown and interpreted to be during recovery following installation
Precipitation data presented for Environment Canada Sparwood station November 2016 to April 2017



Notes: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.
Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.



Notes: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.



Notes: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.
BCWQG for hardness less than 30 mg/L has been included for comparison purposes for surface water analytical data.
Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.

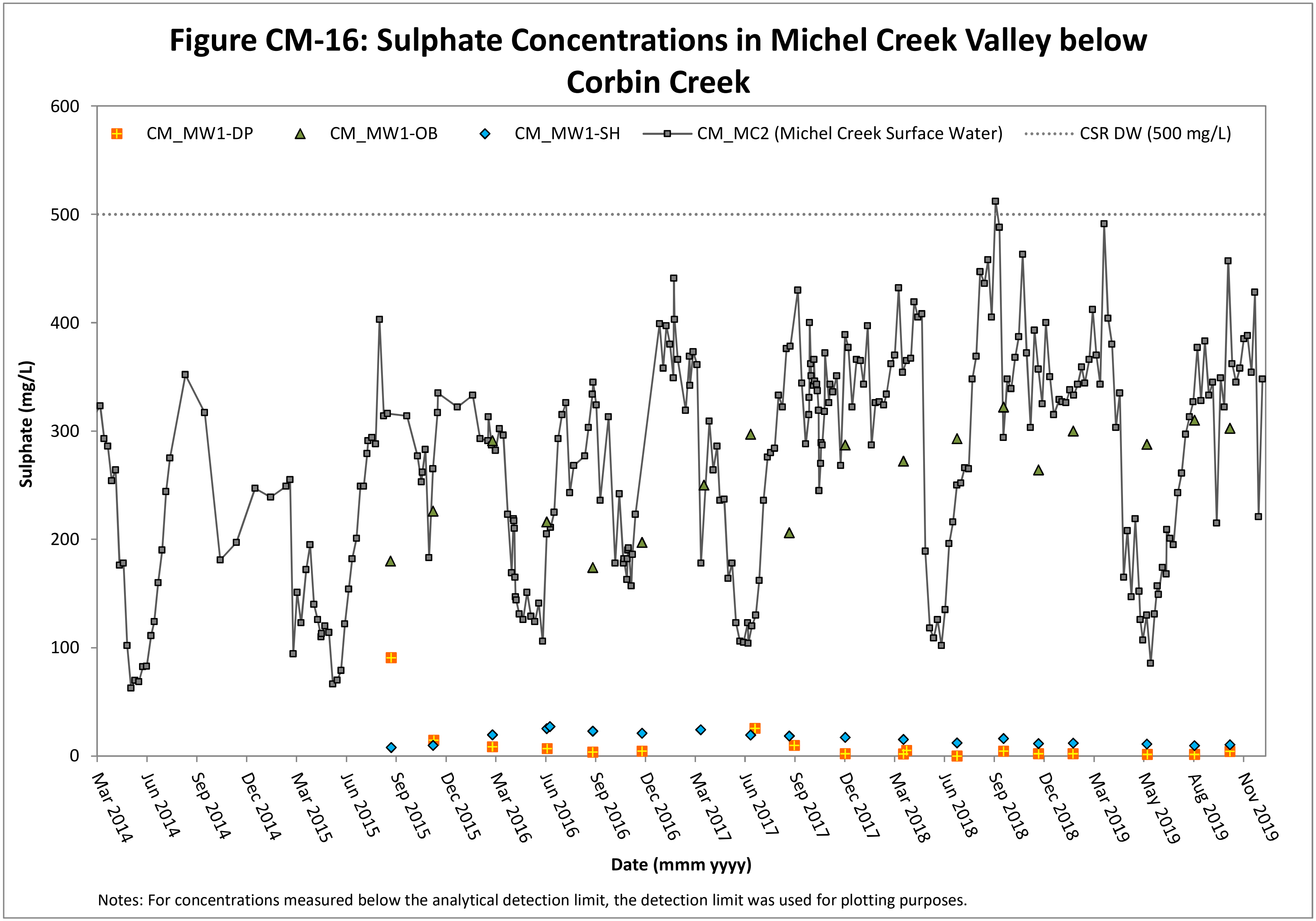
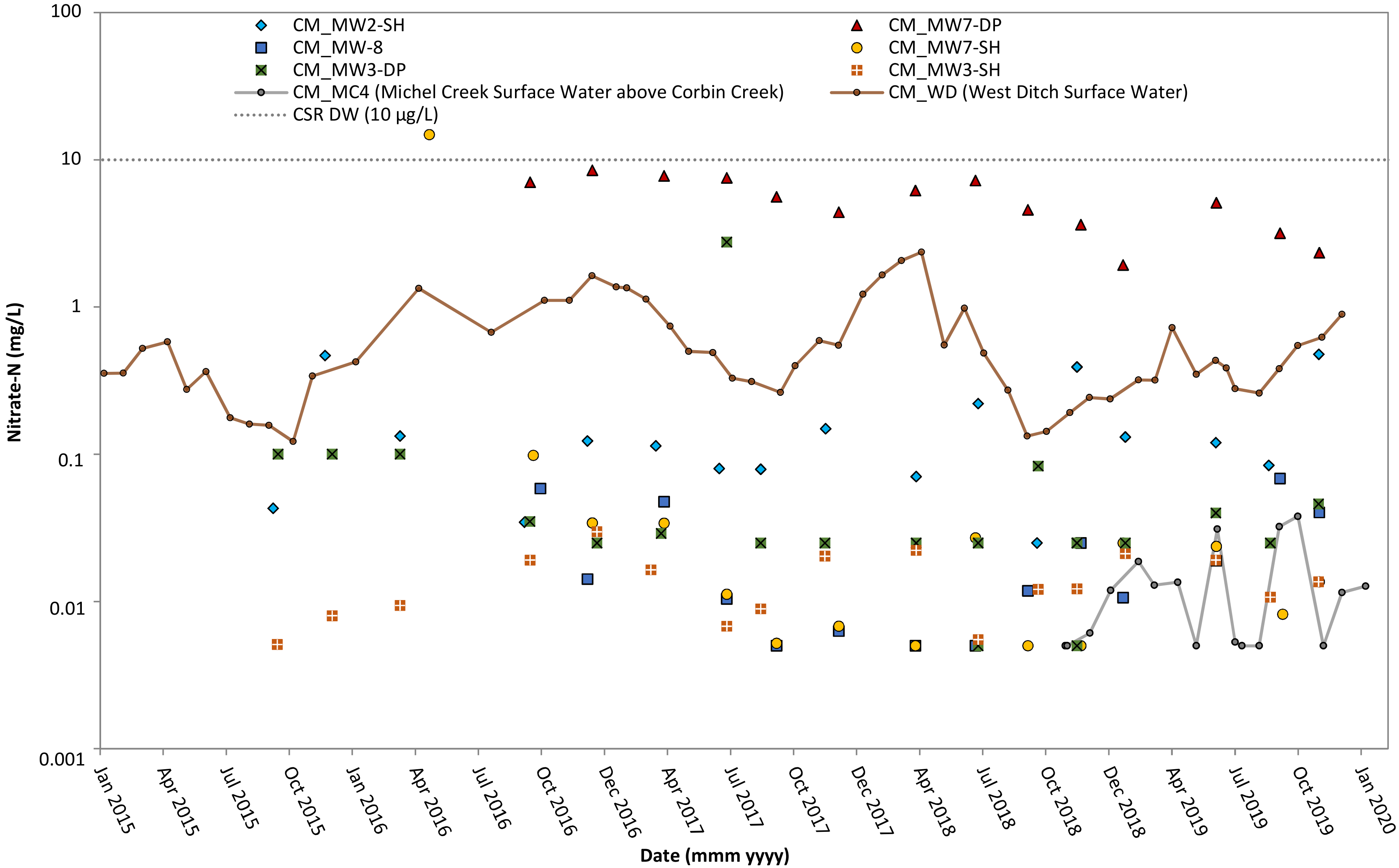


Figure CM-16: Sulphate Concentrations in Michel Creek Valley below Corbin Creek
CM_MW1-DP
CM_MW1-OB
CM_MW1-SH
CM_MC2 (Michel Creek Surface Water)
CSR DW (500 mg/L)
Sulphate (mg/L)
0
100
200
300
400
500
600
Mar 2014
Jun 2014
Sep 2014
Dec 2014
Mar 2015
Jun 2015
Sep 2015
Dec 2015
Mar 2016
Jun 2016
Sep 2016
Dec 2016
Mar 2017
Jun 2017
Sep 2017
Dec 2017
Mar 2018
Jun 2018
Sep 2018
Dec 2018
Mar 2019
May 2019
Aug 2019
Nov 2019
Date (mmm yyyy)
Notes: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.

Figure CM-17: Nitrate-N Concentrations in Michel Creek Valley above Corbin Creek



Note: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.
Logarithmic scale has been applied based on the distribution of concentrations relative to applicable screening criteria.

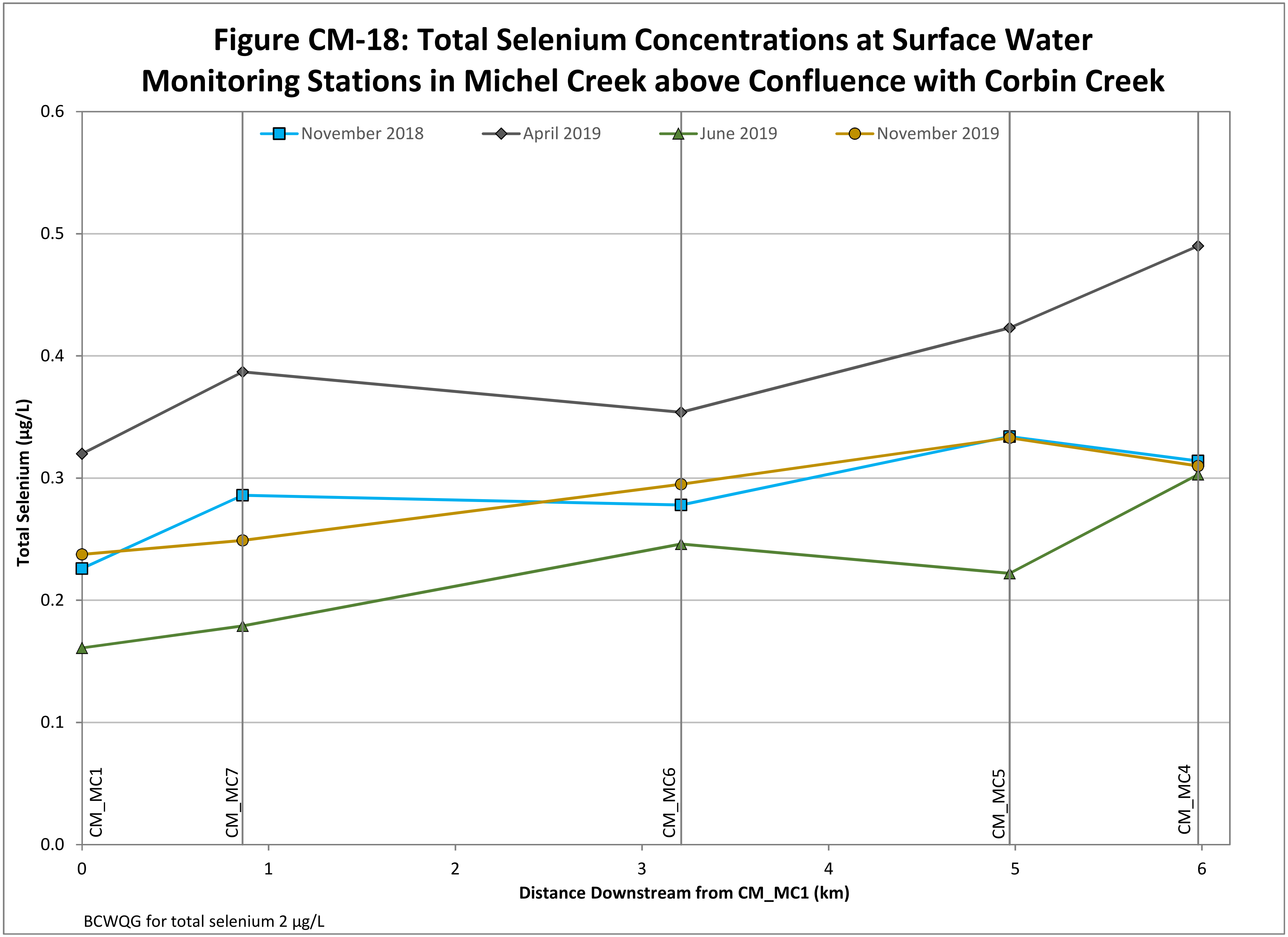


Figure CM-18: Total Selenium Concentrations at Surface Water Monitoring Stations in Michel Creek above Confluence with Corbin Creek
November 2018
April 2019
June 2019
November 2019
Total Selenium (µg/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
CM_MC1
CM_MC7
CM_MC6
CM_MC5
CM_MC4
0
1
2
3
4
5
6
Distance Downstream from CM_MC1 (km)
BCWQG for total selenium 2 µg/L

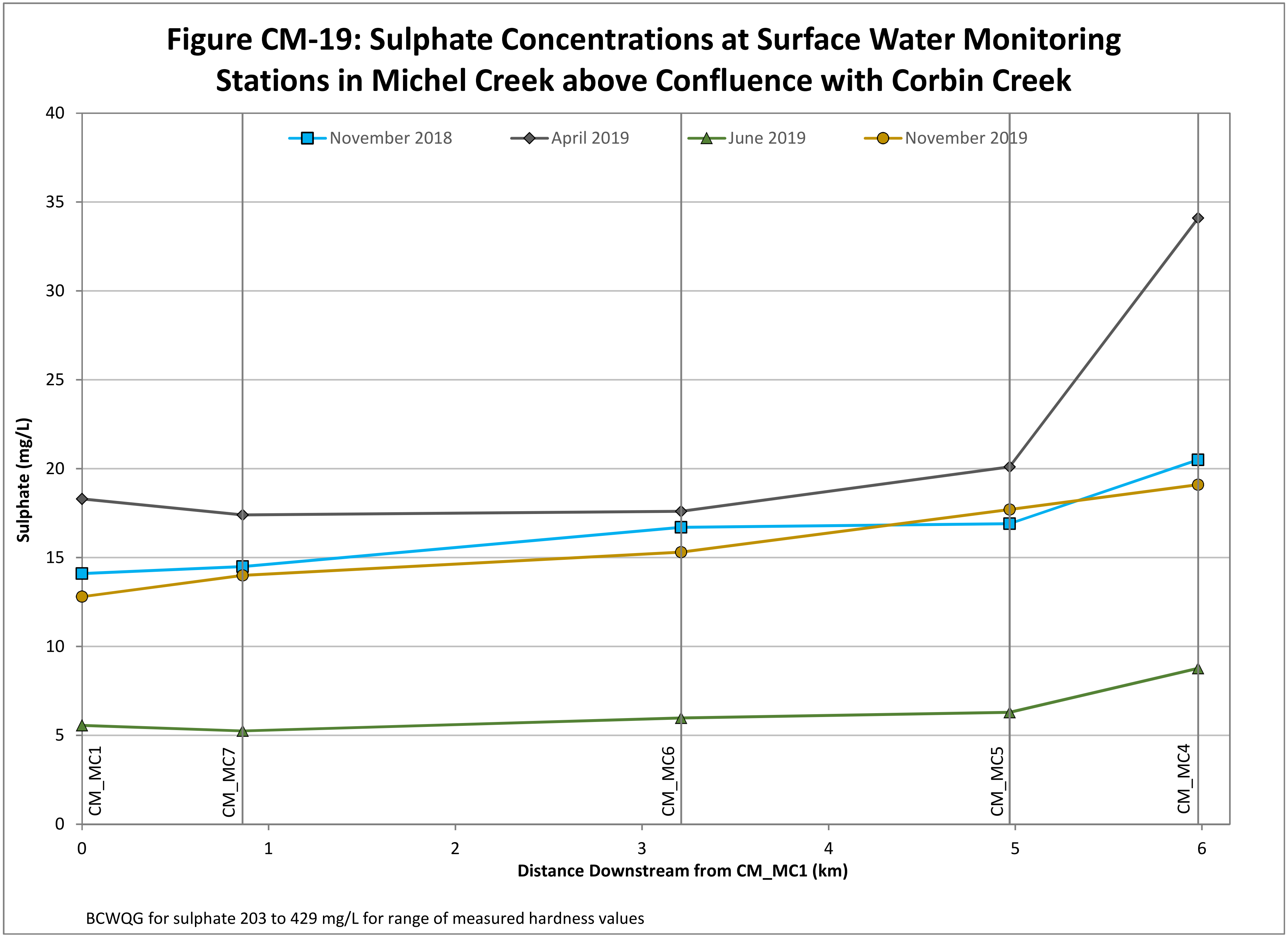
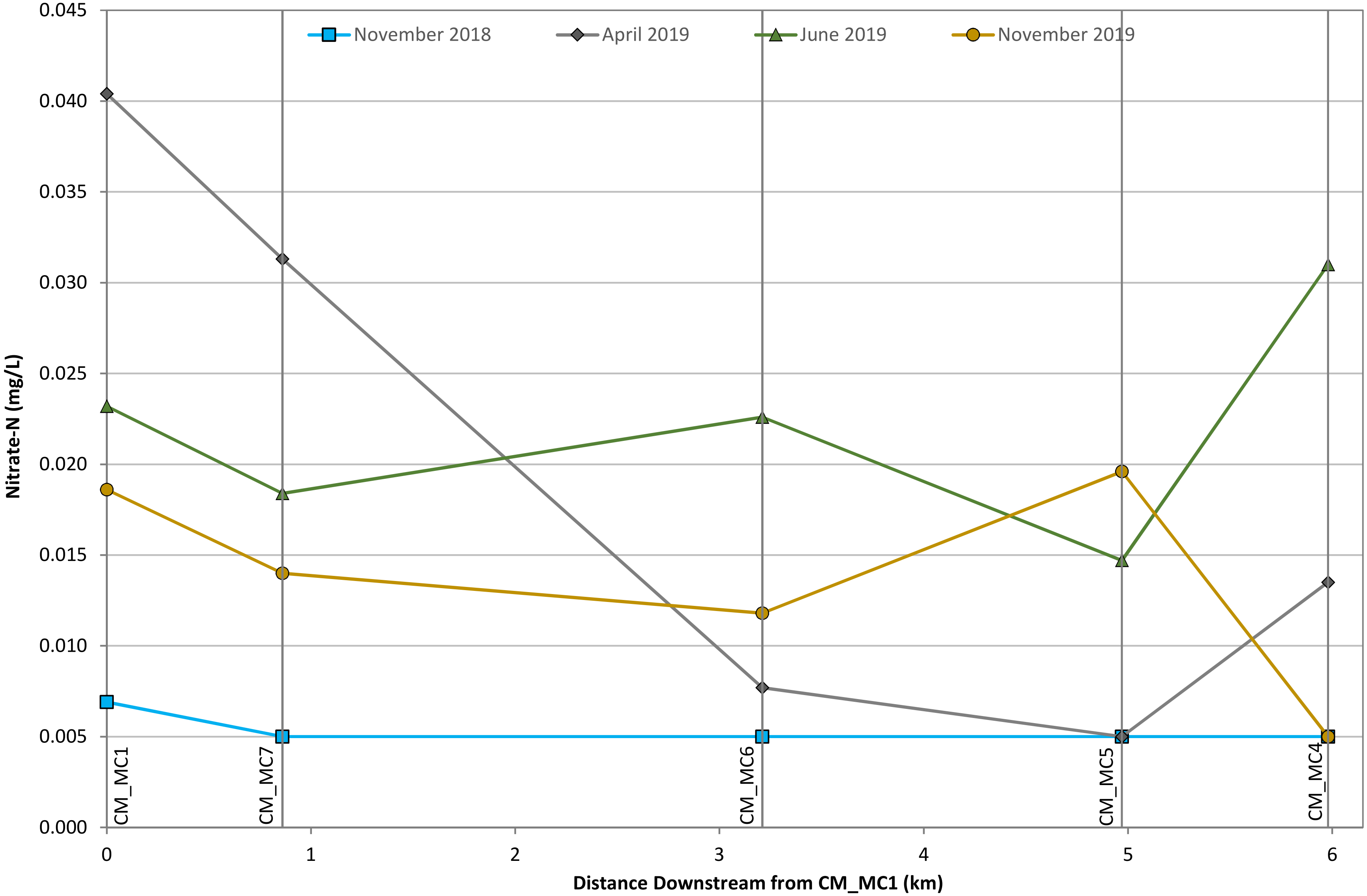


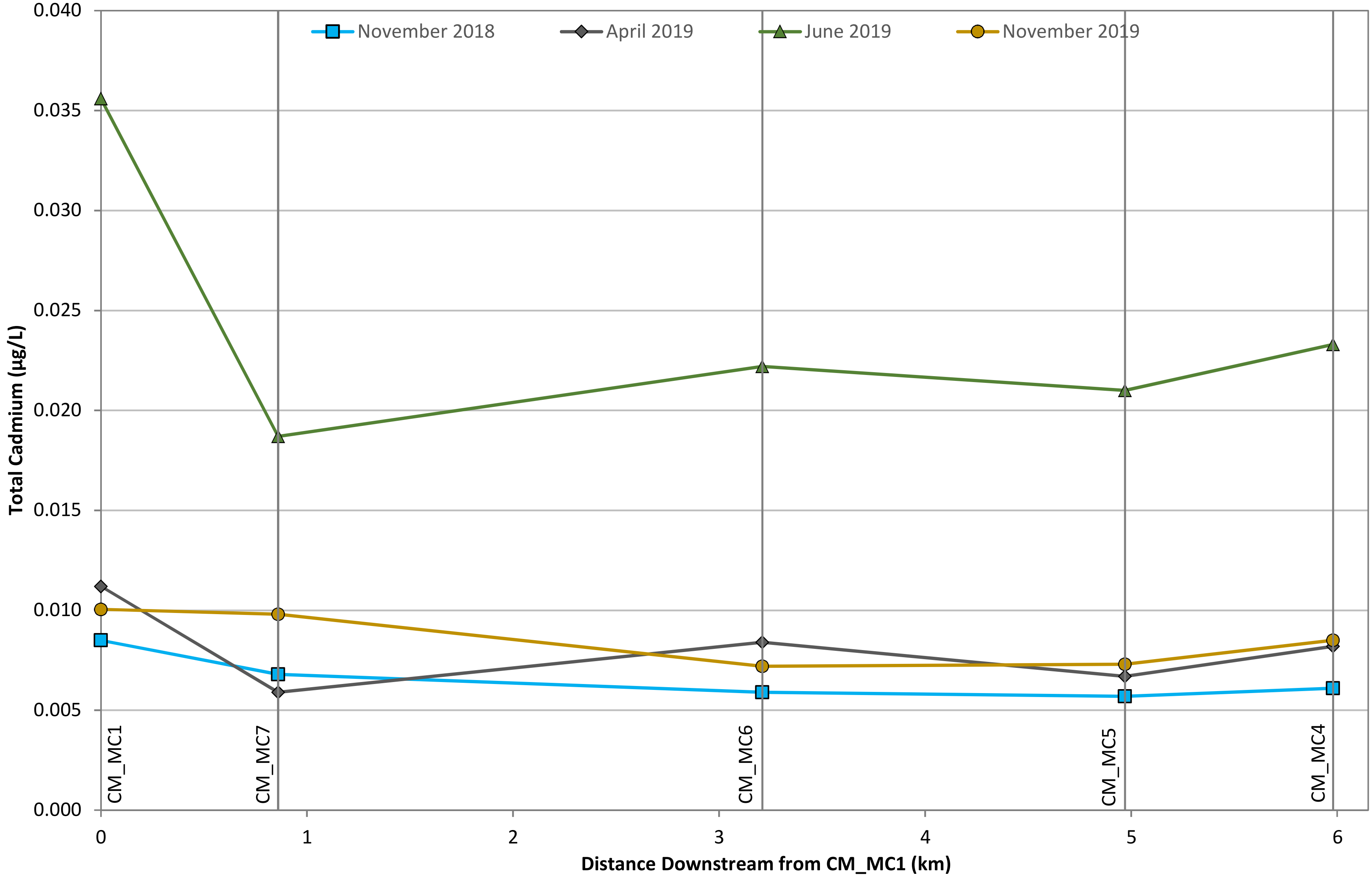
Figure CM-19: Sulphate Concentrations at Surface Water Monitoring Stations in Michel Creek above Confluence with Corbin Creek
November 2018
April 2019
June 2019
November 2019
Sulphate (mg/L)
0
5
10
15
20
25
30
35
40
CM_MC1
CM_MC7
CM_MC6
CM_MC5
CM_MC4
0
1
2
3
4
5
6
Distance Downstream from CM_MC1 (km)
BCWQG for sulphate 203 to 429 mg/L for range of measured hardness values

Figure CM-20: Nitrate-N Concentrations at Surface Water Stations in Michel Creek above Confluence with Corbin Creek

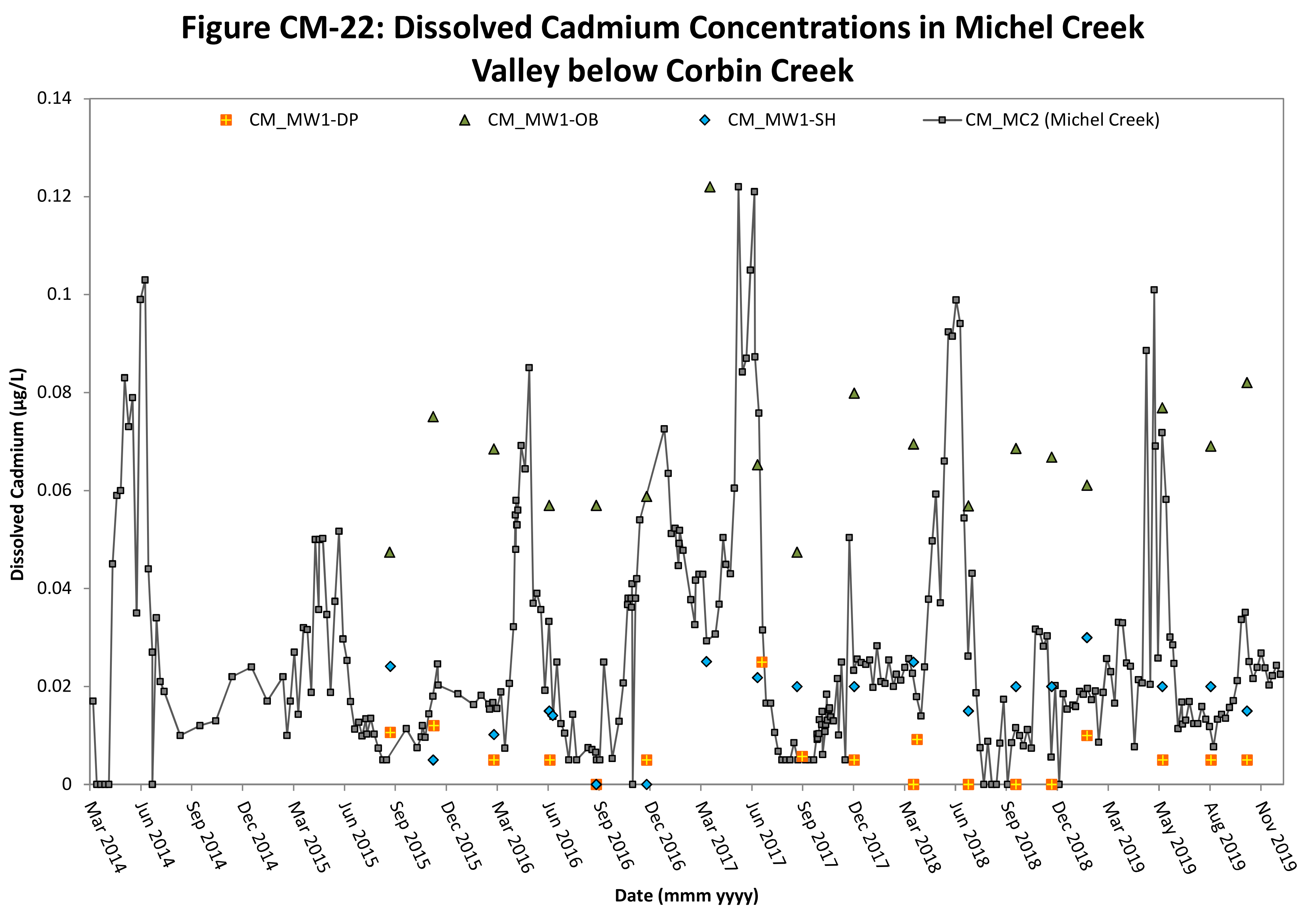


BCWQG nitrate 3 mg/L

Figure CM-21: Total Cadmium Concentrations at Surface Water Stations in Michel Creek above Confluence with Corbin Creek



BCWQG for total cadmium 0.18 to 0.91 µg/L for range of measured



Notes: For concentrations measured below the analytical detection limit, the detection limit was used for plotting purposes.
Lowest primary screening criterion for cadmium is CSR AW: 0.5 to 4 µg/L (hardness-dependent)

Tables

Table 1: Summary of Applicable Primary and Secondary Screening Criteria

Well ID	Monitoring Program[1]	MU	Primary Screening				Secondary Screening (Selenium Only)		
			AW Criteria Applied[2]	DW Criteria Applied	IW Criteria Applied	LW Criteria Applied	Site Performance Objective[3]	Compliance Point[3]	DW Guidelines Applied
Fording River Operations (FRO)									
FR_HMW1S	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_HMW1D	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_HMW2	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_HMW3	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_HMW5	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_POTWELLS	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_MW-1B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_09-04-A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_09-04-B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_09-02-A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_09-02-B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_09-01-A	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_09-01-B	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_GH_WELL4	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
FR_MW-SK1A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_MW-SK1B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_KB-1	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_KB-2	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_KB-3A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_KB-3B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_TBSSMW-1	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_TBSSMW-2	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_GCMW-1B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
FR_GCMW-2	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	FR_FRCP1 (E300071)	GCDWQ
Greenhills Operations (GHO)									
GH_GA-MW-1	SSGMP, RGMP	3	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_MW-MC-1D	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_MW-MC-1S	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_MW-MC-2D	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_MW-MC-2S	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_GA-MW-4	SSGMP, RGMP	3	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_GA-MW-2	SSGMP, RGMP	3	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_GA-MW-3	SSGMP, RGMP	3	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_MW-UTC-A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_MW-UTC-B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	GH_ERC (E300090)	GCDWQ
GH_MW-ERSC-1	SSGMP, RGMP	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	-	GCDWQ
GH_MW-PC	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_MW-SITE-A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_MW-GHC-A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_MW-GHC-B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_MW-TD	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_MW-RLP-1D	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_POTW09	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_POTW10	RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_POTW15	RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
GH_POTW17	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
Line Creek Operations (LCO)									
LC_PIZDC1307	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
LC_PIZDC1308	SSGMP, RGMP	1	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	-	GCDWQ
LC_PIZP1101	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER4 (0200027)	-	GCDWQ
LC_PIZDC1404S	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	LCO Compliance Point[4]	GCDWQ
LC_PIZDC1404D	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	LCO Compliance Point[4]	GCDWQ
LC_PIZDC1306	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	LCO Compliance Point[4]	GCDWQ
LC_PIZDC0901	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	GH_FR1 (0200378)	LCO Compliance Point[4]	GCDWQ
LC_PIZP1103	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER4 (0200027)	LCO Compliance Point[4]	GCDWQ
LC_PIZP1104	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER4 (0200027)	LCO Compliance Point[4]	GCDWQ
LC_PIZP1105	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER4 (0200027)	LCO Compliance Point[4]	GCDWQ
Elkview Operations (EVO)									
EV_GV3gw	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_BALgw	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_LSgw	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_GCgw	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_OCgw	SSGMP, RGMP	4	BCWQG	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_WF_SW	SSGMP	-	BCWQG	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_ECgw	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_RCgw	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_MW_GT1A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_MW_GT1B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_WH50gw	RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_MW_BC1A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_MW_BC1B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_BCgw	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_BRgw	RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ

Notes:

1 SSGMP denotes Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.

2 BCWQG applied for wells located within 10 m from a receiving surface water body.

3 CP and SPO criteria in the main stem rivers differ along the flowpath, and therefore criteria were applied to groundwater wells inferred to be upgradient of the nearest downstream surface water CP or SPO Order Station, except for LCO where the nearest downstream surface water CP and Order Station were applied.

4 Obtained from Golder (2020).

5 EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.

MU denotes Management Unit.

BC CSR denotes BC Contaminated Sites Regulation.

BCWQG denotes BC Water Quality Guideline.

GCDWQ denotes Guidelines for Canadian Drinking Water Quality.

AW, DW, IW, LW denotes Aquatic Life, Drinking Water, Irrigation Watering, and Livestock Watering, respectively.

Table 1: Summary of Applicable Primary and Secondary Screening Criteria

Well ID	Monitoring Program[1]	MU	Primary Screening				Secondary Screening (Selenium Only)		
			AW Criteria Applied[2]	DW Criteria Applied	IW Criteria Applied	LW Criteria Applied	Site Performance Objective[3]	Compliance Point[3]	DW Guidelines Applied
Elkview Operations (EVO)									
EV_MW_MC2A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_MW_MC2B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_HW1[5]	Supplemental Well for RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_MW_MC1A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_MW_MC1B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	EV_MC2 (E300091)	GCDWQ
EV_MW_AQ1	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_MW_AQ2	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_MW_SPR1A	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_MW_SPR1B	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_MW_SPR1C	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_MCgwS	RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_MCgwD	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_MW_MC3	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_MW_MC4	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_ER1gwS	RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
EV_ER1gwD	RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
Coal Mountain Operations (CMO)									
CM_MW4-SH	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW4-DP	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW5-SH	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW5-DP	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW6-SH	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW6-DP	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW9	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW1-OB	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW1-SH	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW1-DP	SSGMP, RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW2-SH	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW7-SH	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW7-DP	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW8	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW3-SH	SSGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW3-DP	SSGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
CM_MW10	SSGMP	-	BC CSR	BC CSR	BC CSR	BC CSR	-	CM_MC2 (E258937)	GCDWQ
Regional Drinking Water (RDW)									
RG_DW-01-03	RGMP	3	BC CSR	BC CSR	BC CSR	BC CSR	GH_ER1 (E206661)	-	GCDWQ
RG_DW-01-07	RGMP	3	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER4 (0200027)	-	GCDWQ
RG_DW-02-20	RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
RG_DW-03-01	RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ
RG_DW-03-04	RGMP	4	BC CSR	BC CSR	BC CSR	BC CSR	EV_ER1 (0200393)	-	GCDWQ

Notes:

1 SSGMP denotes Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.

2 BCWQG applied for wells located within 10 m from a receiving surface water body.

3 CP and SPO criteria in the main stem rivers differ along the flowpath, and therefore criteria were applied to groundwater wells inferred to be upgradient of the nearest downstream surface water CP or SPO Order Station, except for LCO where the nearest downstream surface water CP and Order Station were applied.

4 Obtained from Golder (2020).

5 EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.

MU denotes Management Unit.

BC CSR denotes BC Contaminated Sites Regulation.

BCWQG denotes BC Water Quality Guideline.

GCDWQ denotes Guidelines for Canadian Drinking Water Quality.

AW, DW, IW, LW denotes Aquatic Life, Drinking Water, Irrigation Watering, and Livestock Watering, respectively.

Table 2a: Summary of Groundwater Monitoring Program Locations, Well Installation Details and Hydrogeological Information (FRO)

Area	Well ID	Monitoring Program [a]	Well Type	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
Henretta Valley	FR_HMW1D	SSGMP	Monitoring	652437	5566516	1732.20	1732.97	0.77	54.3	51	51.2	54.3	Gravel / Coal / Bedrock	53.9	1.0E-04
	FR_HMW1S	SSGMP	Monitoring	652441	5566518	1732.30	1733.02	0.72	33.5	51	29.9	32.5	Gravel	33.5	-
	FR_HMW2	SSGMP	Monitoring	652666	5566634	1767.30	1768.04	0.74	48.8	51	43.3	46.3	Spoils	47.7	3.0E-03
	FR_HMW3	SSGMP	Monitoring	652810	5566540	1728.20	1729.01	0.81	22.6	51	16.7	19.7	Silty Gravel	22.6	7.0E-04
	FR_HMW5	SSGMP, RGMP	Monitoring	655476	5567514	1785.20	1786.03	0.83	12.6	51	7.30	10.40	Gravel	10.7	8.0E-03
															9.0E-05
Fording River Valley	FR_TBSSMW-1[d]	SSGMP	Monitoring	651603	5565868	1697.04	1697.98	0.94	25.5	50.8	20.87	22.37	Silty Gravel with sand, containing cobbles and boulders	22.5	1.0E-05
	FR_TBSSMW-2[d]	SSGMP	Monitoring	651605	5565866	1697.03	1697.95	0.92	9.0	50.8	6.81	8.31	Gravel with sand	-	1.5E-03
	FR_POTWELLS[b]	SSGMP	Supply	651152	5565133	-	-	-	-	-	-	-	-	-	-
	FR_GCMW-1B[d]	SSGMP	Monitoring	650966	5563998	1671.29	1671.29	0.65	24.1	50.8	14.39	15.89	Cobbles and Boulders with a silty gravel matrix	-	1.6E-06
	FR_GCMW-2[d]	SSGMP	Monitoring	650965	5564000	1671.34	1671.34	0.90	11.0	50.8	7.64	9.136	Sandy Gravel	-	3.0E-04
	FR_MW-1B	SSGMP	Monitoring	650966	5563112	1652.00	1652.67	0.67	8.2	51	5.2	8.2	Clay / Bedrock	7.3	4.0E-04
	FR_09-04-A	SSGMP	Monitoring	652033	5560000	1604.98	1605.89	0.91	5.0	51	1.14	4.66	Sandy Gravel	-	3.0E-03
	FR_09-04-B	SSGMP	Monitoring	652033	5560000	1605.03	1605.57	0.54	7.0	51	5.10	6.62	Gravel	6.5	9.6E-05
	FR-KB-1[d]	SSGMP	Monitoring	652722	5559851	1622.37	1623.36	0.99	8.2	50.8	8.20	5.20	Silty Gravel/Gravel Sand	8.2	3.E-04
	FR-KB-2[d]	SSGMP	Monitoring	652743	5559721	1625.48	1626.64	1.16	16.8	50.8	13.10	16.20	Silty Sand/bedrock	15.5	6.E-06
	FR-KB-3A[d]	SSGMP	Monitoring	652600	5559641	1616.11	1617.07	0.96	41.5	50.8	35.40	38.4	Sand	39.3	3.E-04
	FR-KB-3B[d]	SSGMP	Monitoring	652597	5559641	1616.13	1617.08	0.95	21.3	50.8	18.30	21.3	Gravel	-	3.E-04
	FR_MW-SK1A[d]	SSGMP	Monitoring	652681	5558635	1586.48	1587.429	0.95	16.8	50.8	15.00	16.5	Sand and Gravel	-	9.3E-04
	FR_MW-SK1B[d]	SSGMP	Monitoring	652681	5558637	1586.48	1587.54	1.06	69.3	50.8	65.50	67.00	Sand and Gravel, Silty	68.0	4.4E-05
	FR_09-01-A	SSGMP, RGMP	Monitoring	652601	5558300	1584.10	1584.95	0.85	8.4	51	3.83	6.88	Sandy Gravel	-	1.0E-03
	FR_09-01-B	SSGMP, RGMP	Monitoring	652601	5558300	1584.10	1584.86	0.76	29.0	51	17.15	18.67	Gravel	-	1.5E-04
	FR_09-02-A	SSGMP	Monitoring	652482	5558261	1584.69	1585.51	0.82	11.5	51	8.30	11.35	Sandy Gravel	-	1.0E-03
	FR_09-02-B	SSGMP	Monitoring	652842	5558261	1584.73	1585.40	0.67	30.0	51	20.81	22.33	Gravel	-	9.9E-05
	FR_GH_WELL4[c]	SSGMP, RGMP	Supply	653150	5557337	1575.80	-	-	29.0	-	25.90	28.95	Sand and Gravel	-	-

Notes:

[a] SSGMP denotes FRO Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.

[b] FR_POTWELLS consists of six wells (FR_PW91, FR_PW92, FR_PW93, FR_PW94, FR_PW95, FR_PW96). Details for for FR_PW91 are provided above.

[c] As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017. Details for FR_GH_WELL4 are provided above.

[d] Included in the SSGMP Program based on the 2018 SSGMP Update.

masl denotes metres above sea level.

mbgs denotes metres below ground surface.

TOC denotes top of pipe casing.

"-" denotes data not available.

Table 2b: Groundwater Level and Sampling Information (FRO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy/mm/dd	mbtoc	masl		m/m	Direction	Quarter	
Henretta Valley	FR_HMW1D	1732.20	1732.97	0.77	2019-03-13	15.155	1717.815				Q1, Q2, Q3, Q4	Waterra
					2019-05-29	14.79	1718.18					
					2019-07-25	14.827	1718.143					
					2019-10-23	14.972	1717.998					
	FR_HMW1S	1732.30	1733.02	0.72	2019-03-13	15.384	1717.636	FR_HMW1S and FR_HMW1D[c]	0.008	Upward	Q2, Q3, Q4	Waterra
					2019-05-29	15.013	1718.007		0.008	Upward		
					2019-07-25	15.129	1717.891		0.012	Upward		
					2019-10-23	15.205	1717.815		0.008	Upward		
	FR_HMW2	1767.30	1768.04	0.74	2019-03-11	44.74	1723.296				Q1, Q2, Q3, Q4	Waterra
					2019-05-29	45.07	1722.973					
					2019-07-25	45.35	1722.69					
					2019-10-22	44.94	1723.097					
	FR_HMW3	1728.20	1729.01	0.81	2019-03-11	7.708	1721.302				Q1, Q2, Q3, Q4	Waterra
					2019-05-16	6.977	1722.033					
					2019-07-24	6.951	1722.059					
					2019-10-23	7.541	1721.469					
	FR_HMW5	1785.20	1786.03	0.83	2019-03-18	Frozen	Frozen				Q1, Q2, Q3, Q4	Low Flow
					2019-05-16	1.526	1784.504					
					2019-07-24	1.571	1784.459					
					2019-11-22	1.66	1784.37					
Fording River Valley	FR_TBSSMW-1	1697.04	1697.98	0.94	2019-03-26	5.346	1611.73				Q1, Q2, Q4	Bladder Pump/ Peristaltic
					2019-06-06	5.122	1611.96					
					2019-07-26	5.289	1692.691					
					2019-08-19	5.55	1692.430					
					2019-11-28	6.06	1691.920					
					2019-12-04	5.933	1692.047					
	FR_TBSSMW-2	1697.03	1697.95	0.92	2019-03-26	4.882	1693.068				Q1, Q2, Q4	Peristaltic
					2019-06-04	4.565	1693.385					
					2019-07-26	4.892	1693.058					
					2019-08-08	5.07	1692.880					
					2019-10-07	5.744	1692.206					
					2019-11-26	5.624	1692.326					
	FR_POTWELLS[a]	-	-	-	-	-	-				-	Distribution Point
	FR_GCMW-1B	1670.64	1671.29	0.65	2019-03-27	6.809	1664.481				Q1, Q4	Bladder Pump/ Peristaltic
					2019-05-31	6.678	1664.612					
					2019-07-26	6.78	1664.51					
					2019-10-03	6.817	1664.473					
					2019-12-09	6.862	1664.43					
	FR_GCMW-2	1670.44	1671.34	0.90	2019-03-13	6.668	1664.67				Q1, Q2, Q3, Q4	Low Flow
					2019-06-14	6.588	1664.75					
					2019-07-26	6.619	1664.72					
					2019-11-07	6.637	1664.70					
	FR_MW-1B	1652.00	1652.67	0.67	2019-03-22	2.085	1650.585				-	Low Flow
					2019-05-30	1.801	1650.869					
					2019-07-25	1.932	1650.738					
					2019-11-07	2.281	1650.389					
	FR_09-04-A	1604.98	1605.89	0.91	2019-02-13	2.17	1603.725	FR_09-04-A and FR_09-04-B	0.160	Downward	-	Low Flow
					2019-04-11	-	-		N/A	N/A		
					2019-07-29	2.11	1603.785		0.156	Downward		
					2019-10-24	2.13	1603.764		0.157	Downward		
	FR_09-04-B	1605.03	1605.57	0.54	2019-02-13	2.311	1603.259				-	Low Flow
					2019-04-11	-	-					
					2019-07-29	2.24	1603.330					
					2019-10-24	2.264	1603.306					

Notes:

[a] FR_POTWELLS consists of six wells (FR_PW91, FR_PW92, FR_PW93, FR_PW94, FR_PW95, FR_PW96). Details for for FR_PW91 are provided above.

[b] As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017. Details for FR_GH_WELL4 are provided above.

* Recorded SWL measurement probably incorrect.

masl denotes metres above sea level.

mbtoc denotes metres below top of casing.

TOC denotes top of pipe casing.

"-" denotes data not available.

Quarter is represented as Q1, Q2, Q3, Q4.

Table 2b: Groundwater Level and Sampling Information (FRO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy/mm/dd	mbtoc	masl		m/m	Direction	Quarter	
Fording River Valley	FR-KB-1	1622.37	1623.36	0.99	2019-04-10	4.535	1618.83				Q1, Q3	Peristaltic
					2019-06-11	3.247	1620.11					
					2019-07-31	3.638	1619.72					
					2019-10-09	4.181	1619.18					
	FR-KB-2	1625.48	1626.64	1.16	2019-02-28	12.76	1613.88				Q1, Q3	Bladder Pump
					2019-04-10*	11.714	1614.93					
					2019-06-10	10.503	1616.14					
					2019-07-31	10.778	1615.86					
					2019-10-21	11.242	1615.40					
					2019-12-10	11.705	1614.94					
	FR-KB-3A	1616.11	1617.07	0.96	2019-02-26	17.359	1599.71	FR-KB-3A and FR-KB-3B	0.020	Downward	Q1, Q3, Q4	Bladder Pump
					2019-03-25	17.217	1599.85		0.020	Downward		
					2019-06-10	14.26	1602.81		0.017	Downward		
					2019-07-30	14.841	1602.23		0.017	Downward		
					2019-10-18	16.687	1600.38		0.019	Downward		
					2019-12-11	17.409	1599.66		0.020	Downward		
	FR-KB-3B	1616.13	1617.08	0.95	2019-02-25	17.019	1600.06				Q1, Q3, Q4	Bladder Pump
					2019-03-25	16.88	1600.20					
					2019-06-10	13.973	1603.11					
					2019-07-30	14.565	1602.52					
					2019-10-18	16.376	1600.70					
					2019-12-11	17.082	1600.00					
	FR_MW-SK1A	1586.48	1587.429	0.95	2019-03-28	6.2	1581.229	FR_MW-SK1A and FR_MW-SK1B	-	-	Q2, Q3, Q4	Low Flow
					2019-06-13	2.543	1584.886		0.008	Upward		
					2019-07-29	2.965	1584.464		0.01	Upward		
					2019-10-24	7.176	1580.253		0.02	Upward		
	FR_MW-SK1B	1586.48	1587.54	1.06	2019-06-13	2.257	1585.283				Q2, Q3, Q4	Low Flow
					2019-07-29	2.645	1584.895					
					2019-10-24	6.355	1581.185					
	FR_09-01-A	1584.10	1584.95	0.85	2019-03-14	6.298	1578.652	FR_09-01-A and FR_09-01-B	0.069	Downward	-	Low Flow
					2019-05-30	1.515	1583.435		0.056	Downward		
					2019-07-29	1.561	1583.389		0.051	Downward		
					2019-11-01	5.34	1579.610		0.033	Downward		
	FR_09-01-B	1584.10	1584.86	0.76	2019-03-14	7.069	1577.791				-	Waterra
					2019-05-30	2.126	1582.734					
					2019-07-29	2.111	1582.749					
					2019-11-01	5.664	1579.196					
	FR_09-02-A	1584.69	1585.51	0.82	2019-03-14	6.936	1578.574	FR_09-02-A and FR_09-02-B[c]	0.103	Downward	-	Waterra
					2019-05-30	2.152	1583.358		0.104	Downward		
					2019-07-26	2.24	1583.270		0.101	Downward		
					2019-10-24	5.623	1579.887		0.078	Downward		
	FR_09-02-B	1584.73	1585.40	0.67	2019-03-14	8.035	1577.365				-	Waterra
					2019-05-30	3.265	1582.135					
					2019-07-26	3.31	1582.090					
					2019-10-24	6.429	1578.971					
	FR_GH_WELL4[b]	1575.80	-	-	-	-	-				-	Distribution Point

Notes:

[a] FR_POTWELLS consists of six wells (FR_PW91, FR_PW92, FR_PW93, FR_PW94, FR_PW95, FR_PW96). Details for for FR_PW91 are provided above.

[b] As a recommendation of the hydrogeological assessment, monitoring of a dedicated well from FR_GHHW (FR_GH_WELL4) began in Q4 2017. Details for FR_GH_WELL4 are provided above.

* Recorded SWL measurement probably incorrect.

masl denotes metres above sea level.

mbtoc denotes metres below top of casing.

TOC denotes top of pipe casing.

"-" denotes data not available.

Quarter is represented as Q1, Q2, Q3, Q4.

Table 2c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (FRO)

			Field Parameters					Physical Parameters						Dissolved Inorganics											Nutrients						Organics	
Sample Location	Sample ID	Sample Date	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Dissolved Solids	Total Suspended Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulfate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Total Organic Carbon	Dissolved Organic Carbon
Location	ID	(yyyy mm dd)	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	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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Henretta Creek Valley (^ denotes well part of Background)																																
FR_HMW1D	FR_HMW1D_QTR_2019-01-07_N	2019 03 13	3.6	6.91	0.35	3,383	243.4	7.43	2,600	3,890	4,090	4.0	0.79	411	411	< 1.0	< 1.0	-	-	-	< 0.50	< 5.0	< 0.20	2,110	0.217	151	< 0.010	< 0.050	0.0034	0.0039	0.87	0.86
	FR_HMW1D_QTR_2019-04-01_N	2019 05 29	9.9	6.88	0.16	3,484	288.8	7.89	2,790	3,990	3,840	4.2	0.68	396	396	< 1.0	< 1.0	-	-	-	< 0.50	< 5.0	0.28	1,950	0.208	133	0.047	< 0.050	0.0026	< 0.0020	1.84	1.29
	FR_HMW1D_QTR_2019-07-01_N	2019 07 25	4.8	6.93	2.53	3,233	198.4	8.00	2,710	3,930	3,880	3.4	0.85	393	393	< 1.0	< 1.0	-	-	-	< 0.50	< 5.0	0.32	1,840	0.121	133	0.019	< 0.25	0.0034	0.0035	0.76	0.69
	FR_HMW1D_QTR_2019-10-07_N	2019 10 23	4	7.01	0.96	3,820	73	7.85	2,570	3,340	3,810	6.2	0.80	426	426	< 1.0	< 1.0	-	-	-	< 0.25	2.6	0.22	1,840	0.0757	122	0.0175	< 0.050	0.0048	0.0042	1.02	0.89
	FR_DC1_QTR_2019-10-07_N	Duplicate	-	-	-	-	-	7.85	2,500	3,230	3,970	4.4	0.92	430	430	< 1.0	< 1.0	-	-	-	< 0.25	2.5	0.22	1,830	0.0510	122	0.0154	< 0.050	0.0046	0.0043	0.78	0.94
	QA/QC RPD%		-	-	-	-	-	0	3	3	4	*	14	1	1	*	*	-	-	-	*	4	0	1	39	0	13	*	*	*	*	*
FR_HMW1S	FR_HMW1S_QTR_2019-01-07_N	2019 03 13	3.4	7.07	4.86	3,313	253.0	7.35	2,560	3,840	3,820	3.2	0.28	411	411	< 1.0	< 1.0	-	-	-	< 0.50	< 5.0	< 0.20	1,940	0.938	141	< 0.010	0.145	< 0.0010	< 0.0020	1.06	0.81
	FR_HMW1S_QTR_2019-04-01_N	2019 05 29	6.1	6.89	0.21	3,431	279.7	7.93	2,750	3,890	3,790	6.4	0.30	369	369	< 1.0	< 1.0	-	-	-	< 0.25	2.7	0.24	1,710	0.780	120	0.0053	0.726	< 0.0010	< 0.0020	1.41	1.37
	FR_HMW1S_QTR_2019-07-01_N	2019 07 25	6.1	7.02	4.49	3,237	187.9	7.94	2,670	3,890	4,050	3.4	0.20	396	396	< 1.0	< 1.0	-	-	-	< 0.50	< 5.0	0.31	1,810	0.823	135	< 0.010	< 0.25	< 0.0010	< 0.0020	1.03	1.56
	FR_HMW1S_QTR_2019-10-07_N	2019 10 23	3.5	7.02	0.2	3,688	130.2	7.94	2,460	3,140	3,700	3.2	0.38	416	416	< 1.0	< 1.0	-	-	-	< 0.50	< 5.0	0.27	1,730	0.807	123	< 0.010	< 0.050	< 0.0010	< 0.0020	0.80	0.76
FR_HMW2	FR_HMW2_QTR_2019-01-07_N	2019 03 11	1.9	6.88	7.07	2,766	224.7	7.17	2,330	3,350	3,360	18.7	19.4	410	410	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.11	1,690	0.109	73.3	0.0127	< 0.050	0.0086	0.0139	1.13	0.70
	FR_HMW2_QTR_2019-04-01_N	2019 05 29	4.9	6.96	8.29	3,035	262.5	7.89	2,370	3,380	3,200	29.0	18.5	381	381	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.20	1,730	0.0091	75.2	0.0164	< 0.050	0.0094	0.0366	2.12	0.87
	FR_HMW2_QTR_2019-07-01_N	2019 07 25	4.9	7.04	9.65	2,655	173.8	7.94	2,280	3,300	3,190	69.2	49.3	398	398	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.22	1,620	0.0125	79.3	0.0106	< 0.050	0.0098	0.0702	5.56	1.96
	FR_HMW2_QTR_2019-10-07_N	2019 10 22	3.6	6.97	9.93	3,427	57.7	7.92	2,300	2,730	3,220	26.4	11.9	358	358	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.25	1,760	< 0.0050	57.5	< 0.0050	< 0.050	0.0169	0.0302	1.02	0.60
FR_HMW3	FR_HMW3_QTR_2019-01-07_N	2019 03 11	1.8	7.46	6.45	722.3	32.4	7.70	482	878	630	1.6	3.61	186	186	< 1.0	< 1.0	-	-	-	< 0.050	0.54	0.290	270	0.207	9.13	0.0073	0.098	< 0.0010	0.0037	< 0.50	< 0.50
	FR_DC1_QTR_2019-01-07_N	Duplicate	-	-	-	-	-	7.59	479	890	673	2.4	2.82	191	191	< 1.0	< 1.0	-	-	-	< 0.050	0.54	0.289	270	0.186	9.08	0.0068	0.280	0.0010	0.0032	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	1	1	1	7	*	25	3	3	*	*	-	-	-	*	*	0	0	11	1	7	*	*	*	*	*
	FR_HMW3_QTR_2019-04-01_N	2019 05 16	2.5	7.45	9.93	678.6	-19.7	8.35	487	800	538	3.5	4.61	176	173	2.6	< 1.0	-	-	-	< 0.050	< 0.50	0.287	220	0.0753	9.36	0.0024	0.273	< 0.0010	0.0090	< 0.50	< 0.50
	FR_DC2_QTR_2019-04-01_N	Duplicate	-	-	-	-	-	8.36	446	807	557	4.1	4.03	179	176	2.8	< 1.0	-	-	-	< 0.050	< 0.50	0.288	220	0.0743	9.38	0.0023	< 0.050	< 0.0010	0.0104	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	9	1	3	*	13	2	2	*	*	-	-	-	*	*	0	0	1	0	*	*	*	*	*	*
	FR_HMW3_QTR_2019-07-01_N	2019 07 24	4.4	7.52	6.06	564.6	-14.3	8.16	347	677	469	4.4	5.29	182	182	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.302	151	0.134	7.02	0.0019	< 0.050	< 0.0010	0.0109	0.73	< 0.50
	FR_HMW3_QTR_2019-10-07_N	2019 10 23	5	7.56	11.2	819	-28.7	8.20	466	781	608	6.4	6.97	192	192	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.275	239	0.113	9.25	0.0087	0.155	< 0.0010	0.0089	0.59	0.55
	FR_DC2_QTR_2019-10-07_N	Duplicate	-	-	-	-	-	8.16	462	775	606	8.2	7.57	197	197	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.277	240	0.156	9.33	0.0080	0.069	< 0.0010	0.0119	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	1	0	25	8	3	3	*	*	-	-	-	*	*	1	0	32	1	8	*	*	*	*	*
FR_HMW5^	FR_HMW5_QTR_2019-04-01_N	2019 05 16	3.1	8.26	7.45	329.4	-159.0	8.15	178	394	223	< 1.0	0.56	156	156	< 1.0	< 1.0	-	-	-	< 0.050	1.33	0.589	45.2	0.063	< 0.0050	< 0.0010	0.055	0.0182	0.0173	< 2.5	< 2.5
	FR_HMW5_QTR_2019-07-01_N	2019 07 24	3.8	8.2	0.25	324.2	-198.9	8.32	173	386	233	< 1.0	< 0.10	153	150	2.8	< 1.0	-	-	-	< 0.050	0.90	0.546	51.1	0.0547	< 0.0050	< 0.0010	< 0.10	0.0186	0.019	< 0.50	< 0.50
	FR_HMW5_QTR_2019-10-07_N	2019 10 22	3.6	8.04	6.21	385.2	-126.8	8.27	182	339	230	1.6	1.17	138	138	< 1.0	< 1.0	-	-	-	< 0.050	0.61	0.429	57.4	0.0605	0.0081	< 0.0010	0.075	0.0184	0.0155	< 0.50	0.57

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 2c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (FRO)

			Field Parameters					Physical Parameters						Dissolved Inorganics											Nutrients						Organics	
Sample Location	Sample ID	Sample Date	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Dissolved Solids	Total Suspended Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulfate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Total Organic Carbon	Dissolved Organic Carbon
Location	ID	(yyyy mm dd)	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	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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Fording River Valley (+ denotes well part of Study Area 1)																																
FR_TBSSMW-1	FR_TBSSMW-1_2019-03-26	2019 03 26	2.09	7.7	0.53	303.2	-87.8	8.26	148	361	181	21.1	24.9	176	176	< 1.0	< 1.0	-	-	-	< 0.050	0.70	0.433	21.4	2.57	< 0.0050	< 0.0010	2.96	0.0025	0.0279	1.75	0.88
	FR_TBSSMW-1_2019_06_06_NP	2019 06 06	9.44	8.33	0.12	363	-134.7	8.49	132	362	194	15.6	6.84	188	188	< 1.0	< 1.0	-	-	-	< 0.050	0.86	0.380	25.3	2.73	0.0083	< 0.0010	2.93	0.0013	0.0162	2.50	1.20
	FR_TBSSMW-1_QTR_2019-07-01_N	2019 07 26	5.6	8.2	0.1	312.4	-178.3	8.42	151	373	199	4.2	1.98	192	186	5.4	< 1.0	-	-	-	< 0.050	0.55	0.377	18.0	0.345	< 0.0050	< 0.0010	3.11	0.0020	0.0065	0.88	0.63
	FR_TBSSMW-1_2019-08-08	2019 08 08	11.4	8.2	0.16	352.8	-164.80	8.41	145	365	171	< 1.0	1.0	180	175	5.4	< 1.0	-	-	-	< 0.050	0.71	0.407	22.9	2.83	< 0.0050	< 0.0010	3.44	0.0022	0.0036	1.71	1.28
	FR_DC2-2019-08-08	Duplicate	-	-	-	-	-	8.41	147	365	189	< 1.0	0.95	175	169	5.8	< 1.0	-	-	-	< 0.050	0.70	0.412	22.9	2.79	< 0.0050	< 0.0010	2.86	0.0021	0.0043	1.30	1.09
	QA/QC RPD%		-	-	-	-	-	0	1	0	10	*	5	3	3	7	*	-	-	-	*	*	1	0	1	*	*	18	*	*	*	*
	FR_TBSSMW1-2019_10_07	2019 10 07	6.72	8	0.26	361.2	-151.6	8.45	146	335	173	1.2	1.06	185	165	20.6	< 1.0	-	-	-	< 0.050	0.64	0.431	21.6	2.98	0.0072	< 0.0010	2.78	0.0013	0.0045	1.16	1.10
	FR_DC3-2019_10_07	Duplicate	-	-	-	-	-	8.46	145	343	177	< 1.0	1.06	175	137	37.4	< 1.0	-	-	-	< 0.050	0.70	0.441	22.1	2.94	0.0073	< 0.0010	2.74	0.0021	0.0051	1.38	1.38
	QA/QC RPD%		-	-	-	-	-	0	1	2	2	*	0	6	19	58	*	-	-	-	*	*	2	2	1	*	*	1	*	*	*	*
	FR_TBSSMW-1-2019-12-04	2019 12 04	2.1	8.35	0.55	358.3	-160.1	8.28	146	340	186	1.8	1.10	159	159	< 1.0	< 1.0	-	-	-	< 0.050	0.52	0.300	18.2	2.39	< 0.0050	< 0.0010	3.27	0.0020	0.0051	1.52	1.67
FR_TBSSMW-2	FR_TBSSMW-2_2019-03-26	2019 03 26	2.04	7.63	10.81	561.7	55.8	8.08	354	658	457	< 1.0	0.94	140	140	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.229	193	0.0119	5.25	< 0.0010	0.357	0.0016	0.0023	1.11	1.44
	FR_TBSSMW-2_2019-06-04	2019 06 04	10.39	8.14	8.98	401.6	41.3	8.33	189	401	226	1.6	0.60	133	128	4.6	< 1.0	-	-	-	< 0.050	< 0.50	0.283	72.4	0.0107	1.66	< 0.0010	0.275	0.0013	0.0025	0.98	0.70
	FR_TBSSMW-2_QTR_2019-07-01_N	2019 07 26	6.4	7.93	11.06	300.4	20.8	8.29	178	357	228	2.3	0.52	131	131	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.277	55.0	0.0150	1.19	< 0.0010	0.182	0.0012	0.0047	0.57	< 0.50
	FR_TBSSMW-2_2019-08-08	2019 08 08	15.06	7.84	7.62	388.8	34.2	8.27	221	390	232	< 1.0	< 0.10	133	133	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.263	69.4	0.0082	1.76	< 0.0010	0.259	0.0011	< 0.0020	1.25	0.93
	FR_TBSSMW2-2019_10_07	2019 10 07	5.93	6.98	8.73	504.9	59.7	8.36	271	482	327	9.3	1.0	144	130	13.6	< 1.0	-	-	-	< 0.050	< 0.50	0.260	119	< 0.0050	2.88	< 0.0010	0.177	< 0.0010	0.0049	< 0.50	< 0.50
	FR_TBSSMW-2-2019-11-26	2019 11 26	1.25	7.87	10.45	571.7	27.1	8.03	303	537	345	< 1.0	0.21	140	140	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.177	152	0.0236	3.86	< 0.0010	< 0.050	0.0015	0.0061	1.28	1.31
FR_POTWELLS	FR_POTWELLS_QTR_2019-01-07_N	2019 03 14	1.9	7.81	15.00	492.3	248.1	8.12	342	624	435	< 1.0	0.13	159	159	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.132	169	0.0454	4.44	< 0.0010	0.223	0.0017	0.0027	< 0.50	< 0.50
	FR_POTWELLS_QTR_2019-04-01_N	2019 06 13	5.5	7.96	10.71	301.9	135.1	8.18	176	332	204	< 1.0	0.38	124	124	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.236	56.5	0.0198	1.40	< 0.0010	0.313	< 0.0010	< 0.0020	< 0.50	< 0.50
	FR_POTWELLS_QTR_2019-07-01_N	2019 07 31	7.4	7.82	17.46	311.6	145.9	8.35	192	365	224	< 1.0	< 0.10	135	132	3.0	< 1.0	-	-	-	< 0.050	< 0.50	0.223	50.2	< 0.0050	1.13	< 0.0010	0.278	0.0022	< 0.0020	0.70	0.68
	FR_POTWELLS_QTR_2019-10-07_N	2019 11 07	3.3	7.92	14.42	608	141.1	8.24	283	407	331	< 1.0	0.21	147	147	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.206	118	< 0.0050	2.77	< 0.0010	0.058	0.0023	< 0.0020	< 0.50	< 0.50
FR_GCMW-1B	FR_GCMW-1B_2019-03-27	2019 03 27	2.61	8.23	0.28	753.2	43.2	8.38	84.3	751	464	23.4	26.1	361	353	8.2	< 1.0	-	-	-	< 0.25	10.6	*1.09*	29.5	0.157	< 0.025	0.130	0.483	0.0067	0.0402	7.60	6.53
	FR_GCMW_1B_2019-05-31_NP	2019 05 31	8.81	8.1	0.12	719	-116.7	8.64	90.0	759	448	6.2	17.4	353	328	25.2	< 1.0	-	-	-	0.143	13.2	*1.37*	23.6	0.0739	< 0.0050	< 0.0010	0.385	< 0.0010	0.0321	6.29	5.76
	FR_GCMW-1B_QTR_2019-07-01_N	2019 07 26	8.1	8.14	0.1	638.4	-178.6	8.57	80.3	754	489	30.0	20.7	398	381	17.4	< 1.0	-	-	-	0.122	14.0	*1.51*	16.0	0.0413	0.0082	< 0.0010	0.462	< 0.0010	0.0717	9.54	6.97
	FR_GCMW-1B_2019-08-13	2019 08 13	13.87	8.12	0.29	770.4	-177.5	8.51	85.6	751	453	1.9	8.15	384	368	16.4	< 1.0	-	-	-	0.144	16.4	*1.98*	15.9	0.0702	0.0338	< 0.0010	0.344	0.0061	0.0195	6.87	6.71
	FR_GCMW-1B_QTR_2019-10-07_N	2019 10 03	7.97	8.13	0.41	734.8	-149	8.55	82.3	728	442	1.3	4.90	390	370	20.0	< 1.0	-	-	-	0.102	13.0	*1.57*	9.91	0.0769	0.0081	< 0.0010	0.361	0.0087	0.025	6.52	7.02
	FR_GCMW-1B-2019-12-09	2019 12 09	3.8	8.26	0.52	716.8	-188.7	8.25	83.9	701	496	6.9	5.23	391	391	< 1.0	< 1.0	-	-	-	0.074	11.7	*1.69*	5.25	0.127	< 0.0050	< 0.0010	0.375	0.0071	0.0184	8.70	9.23
FR_GCMW-2	FR_GCMW-2_QTR_2019-01-07_N	2019 03 13	3.5	7.37	3.83	1,517	264.8	7.72	947	1,760	1,470	2.3	1.73	222	222	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.13	574	0.0597	83.5	< 0.0050	< 0.050	0.0020	0.0039	< 0.50	< 0.50
	FR_GCMW-2_QTR_2019-04-01_N	2019 06 14	6.0	7.42	6.38	1,096	181.3	8.15	623	1,170	817	1.6	1.46	198	198	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.22	327	< 0.0050	35.7	< 0.0050	< 0.050	< 0.0010	0.0022	0.67	0.80
	FR_GCMW-2_QTR_2019-07-01_N	2019 07 26	8	7.41	4	945	54.3	8.21	591	1,110	867	1.8	0.68	216	216	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.26	300	0.0080	31.3	< 0.0050	< 0.050	0.0020	0.0044	2.54	2.31
	FR_GCMW-2_QTR_2019-10-07_N	2019 11 07	6.4	7.32	4.61	1,388	164.3	7.93	799	1,120	1,050	2.8	0.72	243	243	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.18	408	< 0.0050	42.7	< 0.0050	< 0.050	0.0027	0.0027	< 0.50	< 0.50
FR_MW-1B	FR_MW-1B_QTR_2019-01-07_N	2019 03 22	2.8	7.83	8.18	741.8	248.1	7.96	436	790	566	1.8	2.77	172	172	< 1.0	< 1.0	-	-	-	< 0.050	0.73	0.168	202	0.0116	17.0	< 0.0010	0.402	0.0029	0.0049	0.95	1.05
	FR_MW-1B_QTR_2019-04-01_N	2019 05 30	3.8	7.89	10.90	443.3	198.9	8.37	254	520	314	2.4	1.96	148	142	5.4	< 1.0	-	-	-	< 0.050	< 0.50	0.193	95.9	< 0.0050	6.01	< 0.0010	< 0.050	< 0.0010	0.0062	< 0.50	< 0.50
	FR_MW-1B_QTR_2019-07-01_N	2019 07 25	5.6	7.87	7.46	405.4	137	8.30	247	488	314	< 1.0	1.70	154	152	2.2	< 1.0	-	-	-	< 0.050	< 0.50	0.199	84.5	0.0056	5.73	< 0.0010	0.073	0.0021	0.0021	< 0.50	< 0.50
	FR_MW-1B_QTR_2019-10-07_N	2019 11 07	5.5	7.89	9.29	752.6	97.9	8.24	397	645	516	2.5	2.38	175	175	< 1.0	< 1.0	-	-	-	< 0.050	0.56	0.131	182	< 0.0050	12.8	< 0.0010	< 0.050	0.0048	0.0049	< 0.50	< 0.50

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 2c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters					Physical Parameters						Dissolved Inorganics											Nutrients						Organics	
			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 Dissolved Solids mg/L	Total Suspended Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P 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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Fording River Valley (+ denotes well part of Study Area 1)																																
FR_MW_NTPNE	FR_MW_NTPNE_WG_2019_0917_NP	2019 09 17	-	-	-	-	-	8.11	239	519	336	3.4	5.22	152	152	< 1.0	< 1.0	186	< 5.0	< 5.0	< 0.050	29.8	0.330	85.6	0.111	< 0.0050	< 0.0010	0.222	0.0020	0.0048	< 0.50	< 0.50
	FR_MW_CH10-A_WG_2019_0917_NP	Duplicate	-	-	-	-	-	8.11	237	516	333	2.7	5.30	150	150	< 1.0	< 1.0	183	< 5.0	< 5.0	< 0.050	29.9	0.328	85.3	0.113	< 0.0050	< 0.0010	0.140	0.0019	0.0040	0.53	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	1	1	*	2	1	1	*	*	2	*	*	*	0	1	0	2	*	*	*	*	*	*	*
	FR_MW_NTPNE_WG_2019_11_27_NP	2019 11 27	3	7.87	0.23	532	-92.6	7.88	232	497	324	8.6	9.65	146	146	< 1.0	< 1.0	179	< 5.0	< 5.0	< 0.050	27.7	0.235	79.9	0.0951	< 0.0050	< 0.0010	0.113	< 0.0010	0.0073	< 0.50	< 0.50
	FR_MW_CH10-A_WG_2019_11_27_NP	Duplicate	-	7.87	-	-	-	7.82	225	499	342	7.6	8.99	155	155	< 1.0	< 1.0	189	< 5.0	< 5.0	< 0.050	27.6	0.234	79.2	0.0965	< 0.0050	< 0.0010	0.109	0.0013	0.0041	< 0.50	< 0.50
	QA/QC RPD%		-	*	-	-	-	1	3	0	5	12	7	6	6	*	*	5	*	*	*	0	0	1	1	*	*	*	*	*	*	*
FR_MW_NTPSE	FR_MW_NTPSE_WG_2019_0917_NP	2019 09 17	-	-	-	-	-	7.86	1,190	1,740	1,340	81.4	301	669	669	< 1.0	< 1.0	816	< 5.0	< 5.0	< 0.25	7.6	0.12	514	0.777	0.057	< 0.0050	1.03	< 0.0010	0.0268	5.82	5.22
	FR_MW_NTPSE_WG_2019_11_27_NP	2019 11 27	6.8	7.05	0.65	1,824	-102.4	7.53	1,060	1,670	1,350	73.0	278	652	652	< 1.0	< 1.0	795	< 5.0	< 5.0	< 0.25	5.2	< 0.10	459	0.705	< 0.025	< 0.0050	0.877	< 0.0010	0.0508	5.06	4.72
FR_MW_STPNW	FR_MW_STPNW_WG_2019_0917_NP	2019 09 17	-	-	-	-	-	8.24	137	311	189	< 1.0	1.91	170	170	< 1.0	< 1.0	207	< 5.0	< 5.0	< 0.050	5.11	0.177	< 0.30	0.151	< 0.0050	< 0.0010	0.296	0.0072	0.0074	< 0.50	< 0.50
	FR_MW_STPNW_WG_2019_11_26_NP	2019 11 26	4.1	8.11	0.25	321.5	-166.8	8.27	131	305	162	3.3	4.38	170	170	< 1.0	< 1.0	208	< 5.0	< 5.0	< 0.050	4.76	0.124	< 0.30	0.152	< 0.0050	< 0.0010	0.188	0.0051	0.0202	< 0.50	< 0.50
FR_MW_STPSW-A	FR_MW_STPSW-A_WG_2019_09_18_NP	2019 09 18	10.6	9.78	0.42	580	155	8.25	274	587	394	15.7	17.9	168	168	< 1.0	< 1.0	205	< 5.0	< 5.0	< 0.050	2.79	0.352	153	0.0463	1.30	0.106	0.305	0.0065	0.036	2.26	2.16
	FR_MW_STPSW-A_WG_2019_11_26_NP	2019 11 26	2.1	7.78	0.33	615.1	34	8.12	320	579	394	< 1.0	3.23	166	166	< 1.0	< 1.0	203	< 5.0	< 5.0	< 0.050	1.66	0.281	147	0.0250	2.95	0.0673	0.239	0.0064	0.0083	< 0.50	< 0.50
FR_MW_STPSW-B	FR_MW_STPSW-B_WG_2019_09_18_NP	2019 09 18	10.4	9.31	3.52	706	109	8.23	364	691	483	< 1.0	0.18	188	188	< 1.0	< 1.0	229	< 5.0	< 5.0	< 0.050	0.86	0.224	170	< 0.0050	8.68	0.0010	0.215	0.0037	0.0037	0.72	0.79
	FR_MW_STPSW-B_WG_2019_11_26_NP	2019 11 26	0.7	7.37	5.72	875	50.1	7.95	488	835	601	< 1.0	0.86	200	200	< 1.0	< 1.0	244	< 5.0	< 5.0	< 0.050	1.26	0.183	227	< 0.0050	13.1	0.0019	< 0.050	0.0031	< 0.0020	< 0.50	< 0.50
FR_09-04-A	FR_09-04-A_QTR_2019-01-07_N	2019 02 13	8.5	7.06	0.7	1,040	97.5	7.63	626	1,160	865	< 1.0	0.15	360	360	< 1.0	< 1.0	-	-	-	< 0.25	6.4	0.32	366	0.0361	1.12	0.0089	0.226	0.0047	< 0.0020	1.21	0.91
	FR_09-04-A_QTR_2019-04-01_N	2019 04 11	8.7	7.22	0.48	1,107	219.0	7.62	704	1,170	919	2.6	0.45	373	373	< 1.0	< 1.0	-	-	-	< 0.25	7.0	0.35	406	0.0088	2.35	0.0058	0.271	0.0048	0.0076	0.75	0.74
	FR_09-04-A_QTR_2019-07-01_N	2019 07 29	9.4	7.22	0.06	1,096	112.1	8.30	766	1,330	1,010	< 1.0	0.29	357	351	6.2	< 1.0	-	-	-	< 0.25	6.5	0.36	397	< 0.0050	3.29	0.0058	< 0.050	0.0039	< 0.0020	0.84	0.78
	FR_09-04-A_QTR_2019-10-07_N	2019 10 24	8.1	7.17	0.27	1,249	120.2	7.63	774	1,150	952	3.1	0.55	368	368	< 1.0	< 1.0	-	-	-	< 0.25	6.1	0.19	377	< 0.0050	1.31	< 0.0050	0.289	0.0037	0.0027	1.14	1.01
FR_09-04-B	FR_09-04-B_QTR_2019-01-07_N	2019 02 13	8.6	7.10	0.13	1,096	75.5	7.57	642	1,160	852	26.7	7.25	361	361	< 1.0	< 1.0	-	-	-	< 0.25	6.3	0.31	369	0.0750	1.05	0.0062	0.147	0.0038	0.0045	0.97	0.67
	FR_DC2_QTR_2019-01-07_N	Duplicate	-	-	-	-	-	7.64	648	1,170	885	19.3	4.97	359	359	< 1.0	< 1.0	-	-	-	< 0.25	6.3	0.31	369	0.0522	1.03	0.0073	0.247	0.0033	0.0043	1.20	0.80
	QA/QC RPD%		-	-	-	-	-	1	1	1	4	32	37	1	1	*	*	-	-	-	*	0	0	0	36	2	16	*	*	*	*	*
	FR_09-04-B_QTR_2019-04-01_N	2019 04 11	8.8	7.17	0.10	1,115	214.3	7.68	714	1,190	929	< 1.0	0.23	377	377	< 1.0	< 1.0	-	-	-	< 0.25	7.3	0.35	431	< 0.0050	2.36	0.0055	0.182	0.0033	< 0.0020	0.76	0.73
	FR_DC1_QTR_2019-04-01_N	Duplicate	-	-	-	-	-	7.68	728	1,210	923	< 1.0	0.24	377	377	< 1.0	< 1.0	-	-	-	< 0.25	7.0	0.34	412	0.0149	2.25	0.0074	0.212	0.0037	0.0031	0.75	0.73
	QA/QC RPD%		-	-	-	-	-	0	2	2	1	*	*	0	0	*	*	-	-	-	*	4	3	5	*	5	29	*	*	*	*	*
	FR_09-04-B_QTR_2019-07-01_N	2019 07 29	9.7	7.21	0.1	1,104	109.3	8.23	796	1,330	964	< 1.0	0.17	357	357	< 1.0	< 1.0	-	-	-	< 0.25	6.8	0.34	426	0.0059	3.29	< 0.0050	< 0.050	0.0031	< 0.0020	1.24	0.60
	FR_09-04-B_QTR_2019-10-07_N	2019 10 24	8.2	7.33	0.11	1,261	107.2	7.69	779	1,160	950	10.5	12.0	370	370	< 1.0	< 1.0	-	-	-	< 0.25	7.1	0.21	385	0.0051	1.50	< 0.0050	0.294	0.0048	0.0078	1.18	0.95
FR_KB-1	FR_KB-1_2019-02-28	2019 02 28	2.35	7.1	9.35	2,479.3	81.9	7.85	1,630	2,490	2,120	3.3	0.43	394	394	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.16	790	< 0.0050	97.5	< 0.0050	< 0.050	0.0023	0.0050	1.31	1.52
	FR_KB-1_2019-04-10	2019 04 10	3.89	7.3	8.21	2,631.5	67.8	7.68	1,540	2,410	2,040	1.2	0.39	410	410	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.16	813	0.0158	98.3	< 0.0050	< 0.050	0.0023	0.0024	0.80	0.98
	FR_KB-1-2019-06-11_NP	2019 06 11	9.41	7.11	6.63	1,450.2	74.7	7.96	745	1,390	1,180	< 1.0	0.23	355	355	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.22	372	< 0.0050	45.1	< 0.0050	< 0.25	0.0018	< 0.0020	1.10	0.86
	FR_KB_1_2019-07-31	2019 07 31	10.3	7.06	7.5	1,211	206	8.19	705	1,210	893	< 1.0	0.29	371	371	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.24	240	< 0.0050	27.2	< 0.0050	< 0.25	0.0018	< 0.0020	< 0.50	< 0.50
	FR_KB-1_2019-10-09	2019 10 09	3.66	7.3	8.45	1,664.80	39.4	8.05	983	1,470	1,260	1.6	0.36	435	435	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.20	381	0.0058	47.3	< 0.0050	< 0.050	0.0022	0.0022	0.57	0.57
	FR_KB-1-2019-11-27	2019 11 27	-	-	-	-	-	7.39	1,190	1,940	1,770	< 1.0	0.20	436	436	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.13	592	< 0.0050	65.1	< 0.0050	< 0.050	0.0027	0.0030	1.10	0.56

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 2c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (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 Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Total Alkalinity (mg/L)	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	Alkalinity, Carbonate (as CaCO3) (mg/L)	Alkalinity, Hydroxide (as CaCO3) (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Hydroxide (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Ammonia Nitrogen (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Kjeldahl Nitrogen-N (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphorous as P (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)
			Field Parameters					Physical Parameters						Dissolved Inorganics											Nutrients						Organics	
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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Fording River Valley (+ denotes well part of Study Area 1)																																
FR_KB-2	FR_KB-2_2019-02-28	2019 02 28	2.80	7.07	9.06	2,412.3	73.2	7.64	1,550	2,420	2,100	960	983	418	418	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.15	745	0.0149	95.2	< 0.0050	1.97	0.0020	1.47	2.37	0.83
	FR_KB-2_2019-04-10	2019 04 10	3.88	7.25	7.67	2,660.4	62.6	7.66	1,570	2,470	2,110	6.0	2.15	416	416	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.16	819	< 0.0050	102	< 0.0050	< 0.050	0.0016	0.0042	0.98	0.77
	FR_KB-2_2019-06-10_NP	2019 06 10	7.43	7.36	7.74	1,443.9	63.9	8.14	828	1,380	1,110	1.8	0.81	296	296	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.18	346	0.0069	42.9	< 0.0050	< 0.050	< 0.0010	0.0027	0.60	0.63
	FR_KB_2_2019-07-31	2019 07 31	12.4	7	5.86	1,207	199.1	8.10	702	1,160	912	3.7	7.85	331	331	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.21	246	< 0.0050	28.4	0.0158	< 0.25	0.0014	0.015	< 0.50	< 0.50
	FR_DC1-2019-07-31	Duplicate	-	-	-	-	-	8.09	694	1,190	895	3.6	5.51	352	352	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.20	240	< 0.0050	27.9	< 0.0050	< 0.25	0.0010	0.0070	0.80	0.73
	QA/QC RPD%		-	-	-	-	-	0	1	3	2	*	35	6	6	*	*	-	-	-	*	*	5	2	*	2	*	*	*	*	*	*
	FR_KB-2_2019-10-21	2019 10 21	4.74	7	7.44	1708	70.8	7.91	1,110	1,450	1,370	< 1.0	0.35	378	378	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.15	395	0.0088	50.2	< 0.0050	< 0.050	0.0017	< 0.0020	0.62	0.68
	FR_DC4_2019-10-21	Duplicate	-	-	-	-	-	7.93	1,110	1,450	1,340	1.4	0.26	425	425	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.15	391	< 0.0050	49.5	< 0.0050	< 0.050	0.0017	0.0023	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	0	0	2	*	*	12	12	*	*	-	-	-	*	*	0	1	*	1	*	*	*	*	*	*
	FR_KB-2-2019-12-10	2019 12 10	3.2	7.18	8.94	1,953	70.2	7.76	1,140	1,830	1,450	31.9	67.0	387	387	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	503	0.0062	66.0	< 0.0050	0.196	0.0028	0.0727	1.34	1.39
FR_KB-3A	FR_KB-3A_2019-02-26	2019 02 26	4.09	7.26	4.09	1,951.3	75.2	7.55	1,120	1,770	1,600	< 1.0	1.22	369	369	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	512	0.0109	63.1	0.0246	-	0.0025	0.0050	0.62	< 0.50
	FR_DC1_2019-02-26	Duplicate	-	-	-	-	-	7.52	1,100	1,760	1,560	1.4	1.75	365	365	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	516	0.0169	63.5	0.0293	-	0.0026	0.0030	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	2	1	3	*	36	1	1	*	*	-	-	-	*	*	*	1	*	1	17	-	*	*	*	*
	FR_KB-3A_2019-03-25	2019 03 25	4.04	7	4.33	1,934.4	68.9	7.60	1,130	1,900	1,600	10.5	6.09	383	383	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	547	0.0228	64.7	< 0.0050	< 0.050	0.0021	0.0150	0.63	1.19
	FR_DC1_2019-03-25	Duplicate	-	-	-	-	-	7.65	1,120	1,880	1,560	7.5	7.79	348	348	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	541	0.0226	64.3	< 0.0050	< 0.050	0.0019	0.0137	0.71	0.76
	QA/QC RPD%		-	-	-	-	-	1	1	1	3	33	24	10	10	*	*	-	-	-	*	*	*	1	*	1	*	*	*	9	*	*
	FR_KB-3A_2019-06-10_NP	2019 06 10	10.44	7.25	4.43	1,972.7	51.4	8.11	1,220	1,960	1,760	19.3	7.25	312	312	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	586	< 0.0050	68.4	< 0.0050	< 0.25	0.0011	0.0189	0.86	0.52
	FR_DC-4_2019-06-10_NP	Duplicate	-	-	-	-	-	8.10	1,200	2,000	1,690	24.6	8.57	316	316	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	593	< 0.0050	69.2	< 0.0050	< 0.25	0.0013	0.0200	0.68	0.52
	QA/QC RPD%		-	-	-	-	-	0	2	2	4	24	17	1	1	*	*	-	-	-	*	*	*	1	*	1	*	*	*	6	*	*
	FR_KB_3A_2019-07-30	2019 07 30	16.33	7.18	5.48	1,992.8	77.8	8.09	1,140	1,950	1,680	5.6	1.14	331	331	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.10	583	< 0.0050	71.4	< 0.0050	< 0.050	0.0015	0.0095	0.67	< 0.50
	FR_KB-3A_2019-10-18	2019 10 18	4.2	7.2	3.6	1,184	175.5	7.74	1,300	1,660	1,490	30.1	10.5	338	338	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	569	0.0074	63.3	0.0293	< 0.25	0.0012	0.0198	1.04	< 0.50
	FR_KB-3A-2019-12-11	2019 12 11	2.7	7.14	5.47	1,833	83.9	7.83	1,090	1,730	1,390	2.5	0.62	335	335	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	493	0.0107	58.6	0.0145	< 0.050	< 0.0010	0.0026	0.77	2.11
FR_KB-3B	FR_KB-3B_2019-02-25	2019 02 25	3.89	7.19	6.65	1,910.8	60.3	7.63	1,260	1,890	1,780	474	639	433	433	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.12	561	0.0647	72.9	0.206	-	< 0.0010	0.743	2.78	2.14
	FR_KB-3B_2019-03-25	2019 03 25	4.34	7.29	7.56	2,138.1	60.8	7.65	1,280	2,090	1,760	11.4	26.1	377	377	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	625	0.0266	76.7	0.0079	< 0.050	0.0021	0.0294	0.77	0.51
	FR_KB-3B_2019-06-10_NP	2019 06 10	7.83	7.26	7.05	2,071.6	80.1	8.14	1,230	1,950	1,830	8.0	8.93	297	297	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.13	584	< 0.0050	74.4	0.0147	< 0.25	0.0011	0.0216	0.52	0.61
	FR_KB_3B_2019-07-30	2019 07 30	11.6	6.96	6.31	1,597.9	79.3	8.06	888	1,580	1,290	2.0	2.11	303	303	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.14	417	< 0.0050	54.0	< 0.0050	< 0.050	0.0016	0.0089	< 0.50	< 0.50
	FR_KB-3B_2019-10-18	2019 10 18	3.2	7.29	7.98	1,610	168.1	7.72	1,040	1,410	1,240	12.9	5.50	353	353	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	412	< 0.0050	48.2	< 0.0050	< 0.25	0.0014	< 0.0020	< 0.50	< 0.50
	FR_KB-3B-2019-12-11	2019 12 11	2.3	7.18	7.63	1,714	82.9	7.78	1,030	1,600	1,280	2.8	1.82	316	316	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	426	0.0075	54.5	< 0.0050	< 0.050	< 0.0010	0.0028	0.94	1.23
	FR_DC4-2019-12-11	Duplicate	-	-	-	-	-	7.79	1,000	1,590	1,300	2.3	1.57	317	317	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	430	0.0057	54.2	< 0.0050	< 0.050	0.0012	0.0024	1.03	2.42
	QA/QC RPD%		-	-	-	-	-	0	3	1	2	*	15	0	0	*	*	-	-	-	*	*	*	1	*	1	*	*	*	*	*	*

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 2c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (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 Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Total Alkalinity (mg/L)	Alkalinity, Bicarbonate (as CaCO3 (mg/L)	Alkalinity, Carbonate (as CaCO3) (mg/L)	Alkalinity, Hydroxide (as CaCO3) (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Hydroxide (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Ammonia Nitrogen (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Kjeldahl Nitrogen-N (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphorous as P (mg/L)	Total Organic Carbon (mg/L)	Dissolved Organic Carbon (mg/L)
			Field Parameters					Physical Parameters						Dissolved Inorganics											Nutrients						Organics	
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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Fording River Valley (+ denotes well part of Study Area 1)																																
FR_MW-SK1A	FR_MW_SK1-A_WG_Q1_2019_NP	2019 03 28	4.1	7.33	9.62	2,000	-32.5	7.79	1,180	1,970	1,630	< 1.0	1.06	350	350	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	537	< 0.0050	66.0	< 0.0050	< 0.050	0.0027	0.0047	1.04	0.56
	FR_MW_SK1-C_WG_Q1-2019_NP	Duplicate	-	7.33	-	-	-	7.61	1,160	1,970	1,640	< 1.0	1.29	352	352	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	518	< 0.0050	64.6	< 0.0050	< 0.050	0.0019	0.0034	< 0.50	< 0.50
	QA/QC RPD%		-	*	-	-	-	2	2	0	1	*	*	1	1	*	*	-	-	-	*	*	*	4	*	2	*	*	*	-	*	*
	FR_MW-SK1A_WG_2019-06-13_N_17	2019 06 13	5.4	7.62	11.34	970	162.4	8.24	601	1,050	820	< 1.0	0.13	266	266	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.21	254	0.0134	31.2	< 0.0050	< 0.050	0.0021	< 0.0020	< 0.50	< 0.50
	FR_MW-SK1A_QTR_2019-07-01_N	2019 07 29	7.6	7.56	9.51	1,009	94.7	8.28	666	1,200	878	< 1.0	0.23	320	320	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.20	246	< 0.0050	26.8	< 0.0050	0.166	0.0042	0.0030	0.69	0.52
	FR_DC2_QTR_2019-07-01_N	Duplicate	-	-	-	-	-	8.32	690	1,210	917	< 1.0	0.11	338	332	6.2	< 1.0	-	-	-	< 0.25	< 2.5	0.24	268	< 0.0050	28.7	< 0.0050	< 0.050	0.0040	0.0034	0.78	0.75
	QA/QC RPD%		-	-	-	-	-	0	4	1	4	*	*	5	4	*	*	-	-	-	*	*	18	9	*	7	*	*	*	*	*	*
	FR_MW-SK1A_QTR_2019-10-07_N	2019 10 24	5.3	7.21	8.2	1,445	199.9	7.68	875	1,320	1,100	2.4	0.12	366	366	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.11	330	< 0.0050	41.3	< 0.0050	< 0.050	0.0036	0.0032	0.90	< 0.50
FR_MW-SK1B	FR_MW_SK1-B_WG_Q1_2019_NP	2019 03 28	4.8	7.8	0.29	796.3	-52.7	8.01	432	664	536	2.3	2.5	282	282	< 1.0	< 1.0	-	-	-	< 0.050	4.32	0.146	168	0.0146	0.805	0.0127	0.236	-	-	< 0.50	< 0.50
	FR_MW-SK1B_WG_2019-06-13_N_16	2019 06 13	6.0	7.51	0.25	720.7	-13.5	8.21	447	766	548	2.3	1.76	244	244	< 1.0	< 1.0	-	-	-	< 0.050	5.04	0.167	200	0.0231	1.52	0.0115	0.274	< 0.0010	0.0115	< 0.50	0.94
	FR_MW-SK1B_QTR_2019-07-01_N	2019 07 29	6.8	7.46	0.14	703.7	-34.3	8.27	448	852	588	< 1.0	1.04	248	248	< 1.0	< 1.0	-	-	-	< 0.050	4.63	0.145	198	0.0151	2.11	0.0099	0.064	< 0.0010	< 0.0020	1.13	0.95
	FR_MW-SK1B_20191024	2019 10 24	5.3	7.39	0.41	888	26.4	7.82	520	824	604	7.1	2.70	265	265	< 1.0	< 1.0	-	-	-	< 0.25	5.0	0.14	222	0.0088	3.23	< 0.0050	0.073	0.0013	0.0047	0.80	0.64
FR_09-01-A+	FR_09-01-A_QTR_2019-01-07_N	2019 03 14	0.9	7.51	13.77	882.1	284.0	7.89	589	1,000	808	< 1.0	0.11	205	205	< 1.0	< 1.0	-	-	-	< 0.050	1.78	0.106	302	0.0388	21.3	< 0.0010	< 0.050	0.0019	0.0023	0.68	0.64
	FR_09-01-A_QTR_2019-04-01_N	2019 05 30	5.5	7.51	11.30	1,132	229.8	8.29	813	1,300	956	< 1.0	< 0.10	250	250	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.22	343	< 0.0050	36.5	< 0.0050	< 0.050	< 0.0010	0.0029	< 0.50	0.62
	FR_09-01-A_QTR_2019-07-01_N	2019 07 29	7.6	7.2	10.51	952	132.9	8.27	622	1,150	832	< 1.0	0.16	322	322	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.24	215	< 0.0050	23.5	< 0.0050	< 0.050	0.0036	0.0027	0.75	0.71
	FR_09-01-A_QTR_2019-10-07_N	2019 11 01	4.2	7.31	9.8	1,474	116.1	8.28	861	1,210	1,090	1.1	< 0.10	354	354	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.14	371	0.0235	38.7	< 0.0050	< 0.050	0.0028	0.0027	< 0.50	< 0.50
FR_09-01-B+	FR_09-01-B_QTR_2019-01-07_N	2019 03 14	1.6	7.52	10.18	868.0	283.6	7.85	586	983	777	1.1	0.52	197	197	< 1.0	< 1.0	-	-	-	< 0.050	1.73	0.104	300	0.0287	21.1	< 0.0010	< 0.050	0.0028	0.0028	< 0.50	< 0.50
	FR_09-01-B_QTR_2019-04-01_N	2019 05 30	2.0	7.51	9.21	992	231.8	8.09	640	959	688	4.3	2.12	195	195	< 1.0	< 1.0	-	-	-	< 0.050	0.87	0.234	230	< 0.0050	20.5	< 0.0010	< 0.050	0.0012	0.0062	< 0.50	< 0.50
	FR_09-01-B_QTR_2019-07-01_N	2019 07 29	6.1	7.15	10.38	855	132.6	8.20	565	1,010	747	< 1.0	0.23	270	270	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.21	201	0.0169	19.3	< 0.0050	< 0.050	0.0029	0.0028	0.76	0.76
	FR_09-01-B_QTR_2019-10-07_N	2019 11 01	6.3	7.42	7.67	1,213	97	7.92	711	1,190	889	2.1	0.84	303	303	< 1.0	< 1.0	-	-	-	< 0.050	3.12	0.214	317	< 0.0050	20.4	0.0011	< 0.050	0.0069	0.0040	2.50	< 0.50
FR_09-02-A	FR_09-02-A_QTR_2019-01-07_N	2019 03 14	0.5	7.83	11.22	875.3	279.2	8.06	608	1,010	821	5.3	4.21	207	207	< 1.0	< 1.0	-	-	-	< 0.050	1.72	0.133	296	0.0467	21.9	< 0.0010	< 0.050	0.0031	0.0184	0.53	0.58
	FR_09-02-A_QTR_2019-04-01_N	2019 05 30	5.0	7.81	8.53	867	227.2	8.18	433	821	556	1.8	1.18	173	173	< 1.0	< 1.0	-	-	-	< 0.050	0.85	0.215	200	< 0.0050	13.3	< 0.0010	< 0.050	< 0.0010	0.0050	< 0.50	< 0.50
	FR_09-02-A_QTR_2019-07-01_N	2019 07 26	7.3	7.79	10.7	694.3	104.9	8.25	435	810	578	3.8	2.19	248	248	< 1.0	< 1.0	-	-	-	< 0.050	0.77	0.250	158	< 0.0050	12.7	< 0.0010	< 0.050	0.0038	0.0083	0.93	0.78
	FR_DC1_QTR_2019-07-01_N	Duplicate	-	-	-	-	-	8.28	437	811	584	4.0	2.15	243	243	< 1.0	< 1.0	-	-	-	< 0.050	0.86	0.247	158	0.0096	12.7	0.0010	< 0.050	0.0038	0.0094	0.71	0.69
	QA/QC RPD%		-	-	-	-	-	0	0	0	1	*	2	2	2	*	*	-	-	-	*	*	1	0	*	0	*	*	*	*	*	*
	FR_09-02-A_QTR_2019-10-07_N	2019 10 24	8.2	7.69	10.4	820	139	8.01	458	780	594	4.7	2.58	186	186	< 1.0	< 1.0	-	-	-	< 0.050	1.15	0.146	219	0.0092	10.4	< 0.0010	< 2.5	0.0032	0.0069	1.05	< 0.50
	FR_DC3_QTR_2019-10-07_N	Duplicate	-	-	-	-	-	8.08	463	762	607	20.9	17.8	186	186	< 1.0	< 1.0	-	-	-	< 0.050	1.59	0.153	218	< 0.0050	10.3	< 0.0010	< 0.050	0.0034	0.0412	1.87	0.82
	QA/QC RPD%		-	-	-	-	-	1	1	2	2	*	149	0	0	*	*	-	-	-	*	*	5	0	*	1	*	*	*	*	*	*
FR_09-02-B	FR_09-02-B_QTR_2019-01-07_N	2019 03 14	1.1	7.61	11.58	864.7	283.4	8.05	600	1,010	764	2.4	1.75	201	201	< 1.0	< 1.0	-	-	-	< 0.050	1.67	0.173	296	0.0306	21.8	< 0.0010	< 0.050	0.0021	0.0038	0.66	0.63
	FR_09-02-B_QTR_2019-04-01_N	2019 05 30	3.7	7.70	10.39	720.1	225.4	8.13	620	1,150	840	1.6	0.60	205	205	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.20	319	< 0.0050	31.9	< 0.0050	< 0.050	< 0.0010	0.0033	< 0.50	< 0.50
	FR_09-02-B_QTR_2019-07-01_N	2019 07 26	6.7	7.7	9.02	318.2	111.5	8.32	362	685	474	< 1.0	0.16	217	213	4.2	< 1.0	-	-	-	< 0.050	0.81	0.257	130	0.0242	8.56	< 0.0010	< 0.050	0.0024	0.0025	< 0.50	< 0.50
	FR_09-02-B_QTR_2019-10-07_N	2019 10 24	8.3	7.61	8.06	755	151.6	7.93	424	714	512	2.0	0.16	210	210	< 1.0	< 1.0	-	-	-	< 0.050	1.35	0.181	180	< 0.0050	9.24	< 0.0010	< 0.050	0.0027	0.0026	0.87	0.84

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 2c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters					Physical Parameters						Dissolved Inorganics												Nutrients						Organics	
			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 Dissolved Solids mg/L	Total Suspended Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P 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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Fording River Valley (+ denotes well part of Study Area 1)																																
FR_GH_WELL4+	FR_GH_WELL4_QTR_2019-01-07_N	2019 03 21	7.7	7.3	-	1,166	120.2	7.98	767	1,340	1,030	< 1.0	4.92	280	280	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	342	0.115	37.7	**0.579**	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	FR_GH_WELL4_QTR_2019-04-01_N	2019 06 13	6.9	7.32	6.78	1,262	87.3	8.23	818	1,400	1,090	< 1.0	0.60	288	288	< 1.0	< 1.0	-	-	-	< 0.25	5.2	0.12	400	0.0223	43.1	0.0070	< 0.25	0.0011	< 0.0020	0.51	< 0.50
	FR_GH_WELL4_QTR_2019-07-01_N	2019 07 30	7.4	7.33	7.31	1,109	76.1	8.27	720	1,280	984	< 1.0	0.26	284	284	< 1.0	< 1.0	-	-	-	< 0.25	3.4	0.14	342	< 0.0050	36.6	< 0.0050	< 0.25	0.0012	< 0.0020	0.58	0.53
	FR_DC3_QTR_2019-07-01_N	Duplicate	-	-	-	-	-	8.28	738	1,280	1,040	< 1.0	0.24	269	269	< 1.0	< 1.0	-	-	-	< 0.25	3.1	0.13	339	< 0.0050	36.7	< 0.0050	< 0.25	0.0011	< 0.0020	1.26	1.19
	QA/QC RPD%		-	-	-	-	-	0	2	0	6	*	*	5	5	*	*	-	-	-	*	9	7	1	*	0	*	*	*	*	*	*
	FR_GH_WELL4_QTR_2019-10-07_N	2019 11 01	8.9	7.4	5.65	1,166	115	8.25	697	907	837	< 1.0	0.17	207	207	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.13	278	0.0262	31.9	< 0.0050	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_MW_FRRD1	FR_MW_FRRD1_WG_Q1-2019_NP	2019 03 26	3.9	7.26	6.5	643.2	84.5	7.96	316	651	354	13.0	22.3	285	285	< 1.0	< 1.0	347	< 5.0	< 5.0	0.054	39.4	0.182	13.3	< 0.0050	0.166	0.0152	0.184	0.0011	0.0281	2.00	1.58
	FR_MW_FRRD1_A_WG_Q1-2019_NP	Duplicate	-	7.26	-	-	-	7.94	314	653	357	15.2	22.8	303	303	< 1.0	< 1.0	370	< 5.0	< 5.0	< 0.050	39.3	0.179	13.4	< 0.0050	0.166	0.0085	0.195	< 0.0010	< 0.0020	1.80	1.71
	QA/QC RPD%		-	*	-	-	-	0	1	0	1	16	2	6	6	*	*	6	*	*	*	0	2	1	*	0	57	*	*	*	*	*
	FR_MW_FRRD1_WG_2019_05_23_NP	2019 05 23	3.7	7.05	3.20	248.0	96.5	8.02	324	698	383	1.3	3.74	286	286	< 1.0	< 1.0	348	< 5.0	< 5.0	0.072	58.0	0.155	13.5	0.0115	0.286	0.0010	0.067	0.0038	0.0072	1.18	1.20
	FR_MW_FRRD1_WG_2019_07_08_NP	2019 07 08	7.5	6.95	5.72	543	193.6	8.25	350	794	428	1.7	1.52	325	325	< 1.0	< 1.0	396	< 5.0	< 5.0	0.082	73.2	0.173	17.9	< 0.0050	0.716	0.0047	0.162	0.0033	0.0031	1.13	1.14
	FR_MW_CH10-A_WG_2019_07_08_NP	Duplicate	-	6.95	-	-	-	8.26	354	793	426	< 1.0	1.63	318	318	< 1.0	< 1.0	388	< 5.0	< 5.0	0.082	72.2	0.170	17.5	0.0060	0.703	0.0057	0.111	0.0033	0.0066	1.17	1.40
	QA/QC RPD%		-	*	-	-	-	0	1	0	0	*	7	2	2	*	*	2	*	*	*	1	2	2	*	2	*	*	*	*	*	*
	FR_MW_FRRD1_WG_2019_09_18_NP	2019 09 18	4.9	9.04	2.6	751	220	8.08	337	747	416	1.3	1.15	319	319	< 1.0	< 1.0	390	< 5.0	< 5.0	0.057	58.1	0.184	13.8	0.0088	0.423	< 0.0010	0.131	0.0038	0.0066	2.03	1.78
	FR_MW_CH10-A_WG_2019_09_18_NP	Duplicate	-	9.04	-	-	-	8.08	338	744	433	< 1.0	1.25	317	317	< 1.0	< 1.0	387	< 5.0	< 5.0	< 0.050	58.0	0.162	13.8	< 0.0050	0.415	< 0.0010	0.158	0.0037	0.0067	1.27	1.65
	QA/QC RPD%		-	*	-	-	-	0	0	0	4	*	8	1	1	*	*	1	*	*	*	0	13	0	*	2	*	*	*	*	*	*
	FR_MW_FRRD1_WG_2019_11_25_NP	2019 11 25	3.5	7.24	3.99	710.6	87.3	7.90	368	689	400	1.7	1.69	325	325	< 1.0	< 1.0	397	< 5.0	< 5.0	< 0.050	37.2	0.090	12.3	0.0073	0.295	< 0.0010	0.124	0.0038	0.0038	1.45	1.12
	FR_MW_CH10-A_WG_2019_11_25_NP	Duplicate	-	7.24	-	-	-	7.91	343	683	402	1.5	1.55	329	329	< 1.0	< 1.0	401	< 5.0	< 5.0	< 0.050	37.0	0.092	12.3	0.0093	0.302	< 0.0010	0.114	0.0036	0.0056	1.34	1.28
	QA/QC RPD%		-	*	-	-	-	0	7	1	0	*	9	1	1	*	*	1	*	*	*	1	*	0	*	2	*	*	*	*	*	*
FR_MW_CASW6-A	FR_MW-CASW6-A_WG_Q1-2019_NP	2019 02 28	3.5	7.31	1.04	756.5	39.2	7.86	282	765	465	6.0	8.00	435	435	< 1.0	< 1.0	531	< 5.0	< 5.0	< 0.050	4.53	0.242	0.43	2.52	< 0.0050	< 0.0010	2.39	< 0.0010	0.0087	2.21	2.38
	FR_MW_CASW6-A_WG_2019_05_22_NP	2019 05 22	5.9	6.71	0.15	830	-68.1	8.22	321	781	440	6.0	14.4	458	458	< 1.0	< 1.0	558	< 5.0	< 5.0	< 0.050	4.10	0.172	< 0.30	2.43	< 0.0050	< 0.0010	2.71	0.0021	0.0078	1.23	1.31
	FR_MW_CH10-A_WG_2019_05_22_NP	Duplicate	5.9	6.71	0.15	830	-68.1	8.22	316	754	433	3.9	15.8	433	433	< 1.0	< 1.0	528	< 5.0	< 5.0	< 0.050	4.05	0.158	< 0.30	2.47	< 0.0050	< 0.0010	2.75	0.0072	0.0077	1.33	1.33
	QA/QC RPD%		*	*	*	*	*	0	2	4	2	*	9	6	6	*	*	6	*	*	*	1	8	*	2	*	*	*	*	*	*	*
	FR_MW_CASW6-A_WG_2019-07-09_NP	2019 07 09	11.68	7.03	0.52	623	-57.5	8.22	315	809	461	4.7	23.6	485	485	< 1.0	< 1.0	591	< 5.0	< 5.0	< 0.050	3.94	0.172	< 0.30	2.48	0.0239	< 0.0010	2.63	0.0075	0.0094	1.21	2.77
	FR_MW_CASW6-A_WG_2019-09-16_NP	2019 09 16	12.2	7.11	0.43	816	0.3	8.02	319	808	452	6.4	26.3	484	484	< 1.0	< 1.0	591	< 5.0	< 5.0	< 0.050	4.68	0.141	< 0.30	2.74	< 0.0050	< 0.0010	2.68	0.0147	0.020	1.43	1.48
	FR_MW_CASW6-A_WG_2019_11_25_NP	2019 11 25	3.9	7.03	0.66	802.8	-71	7.75	327	762	470	4.1	22.6	463	463	< 1.0	< 1.0	565	< 5.0	< 5.0	< 0.050	4.97	0.108	< 0.30	2.54	< 0.0050	< 0.0010	2.74	0.0025	0.0148	1.59	1.52
FR_MW_CASW6-B	FR_MW-CASW6-B_WG_Q1-2019_NP	2019 02 28	1.8	7	4.77	1,387	16.7	7.38	429	1,370	865	51.0	63.9	564	564	< 1.0	< 1.0	688	< 5.0	< 5.0	0.29	83.9	0.28	87.8	0.760	< 0.025	< 0.0050	1.13	< 0.0010	0.0484	14.1	15.0
	FR_MW_CASW6-B_WG_2019_05_22_NP	2019 05 22	11.9	6.69	0.47	1,205	-103.4	8.22	386	1,070	573	99.2	464	446	446	< 1.0	< 1.0	545	< 5.0	< 5.0	< 0.25	94.8	0.26	10.7	0.211	< 0.025	< 0.0050	0.416	< 0.0010	0.0699	7.84	8.25
	FR_MW_CASW6-B_WG_2019-07-09_NP	2019 07 09	18.08	6.9	0.96	1,078	-125.8	7.90	386	1,110	591	92.1	410	501	501	< 1.0	< 1.0	611	< 5.0	< 5.0	< 0.25	90.2	0.27	8.0	0.222	0.236	< 0.0050	0.50	< 0.050	0.0997	8.62	10.2
	FR_MW_CASW6-B_WG_2019-09-16_NP	2019 09 16	12.9	7.21	0.46	1,271	-89	7.83	466	1,170	629	95.8	550	540	540	< 1.0	< 1.0	659	< 5.0	< 5.0	< 0.25	98.8	0.21	1.8	0.233	< 0.025	< 0.0050	0.436	< 0.0010	0.14	7.99	8.16
	FR_MW_CASW6-B_WG_2019_11_26_NP	2019 11 26	3	7	0.59	1,097	-130.4	7.41	415	1,000	574	58.0	390	437	437	< 1.0	< 1.0	533	< 5.0	< 5.0	< 0.25	96.4	0.18	2.4	0.152	< 0.025	< 0.0050	0.67	< 0.0010	0.099	6.60	6.62

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 2c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters: Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	Field ORP mV	Physical Parameters: pH pH	Hardness mg/L	Conductivity µS/cm	Total Dissolved Solids mg/L	Total Suspended Solids mg/L	Turbidity NTU	Dissolved Inorganics: Total Alkalinity mg/L	Alkalinity, Bicarbonate (as CaCO3 mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	Nutrients: Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Organics: 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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Fording River Valley (+ denotes well part of Study Area 1)																																
FR_MW_CH1-A	FR_MW-CH1-A_WG_Q1-2019_NP	2019 02 28	3.4	7.7	7.64	299.6	39.5	8.13	153	305	222	49.1	62.3	137	137	< 1.0	< 1.0	168	< 5.0	< 5.0	< 0.050	< 0.50	0.266	26.1	0.0165	0.166	0.0013	< 0.050	0.0019	0.0835	0.55	0.57
	FR_MW-CH1-D_WG_Q1-2019_NP	Duplicate	-	7.7	-	-	-	8.13	152	301	220	43.1	60.2	156	156	< 1.0	< 1.0	190	< 5.0	< 5.0	< 0.050	< 0.50	0.261	25.8	0.0119	0.165	< 0.0010	< 0.050	0.0016	0.0691	1.03	0.72
	QA/QC RPD%		-	*	-	-	-	0	1	1	1	13	3	13	13	*	*	12	*	*	*	*	2	1	*	1	*	*	*	19	*	*
	FR_MW_CH1-A_WG_2019_05_22_NP	2019 05 22	2.9	7.63	8.57	304.1	15.9	8.36	151	304	154	4.4	3.95	137	135	1.4	< 1.0	165	< 5.0	< 5.0	< 0.050	0.65	0.158	26.7	< 0.0050	0.143	< 0.0010	< 0.050	0.0028	0.0073	< 0.50	< 0.50
	FR_MW_CH1-A_WG_2019_07_08_NP	2019 07 08	4.92	6.87	4.98	162	227.1	8.22	133	263	122	8.2	3.30	134	134	< 1.0	< 1.0	163	< 5.0	< 5.0	0.090	< 0.50	0.188	13.7	< 0.0050	0.0848	< 0.0010	< 0.050	0.0032	0.0057	< 0.50	< 0.50
	FR_MW_CH1-A_WG_2019-09-16_NP	2019 09 16	5.24	7.3	10.09	280	180.6	8.09	145	282	159	7.0	3.73	143	143	< 1.0	< 1.0	175	< 5.0	< 5.0	< 0.050	< 0.50	0.214	17.0	0.0087	0.0434	< 0.0010	< 0.050	0.0033	0.017	0.61	0.57
	FR_MW_CH1-A_WG_2019_11_25_NP	2019 11 25	5.3	7.8	5.86	287.4	4.7	8.08	165	281	171	3.4	3.77	144	144	< 1.0	< 1.0	176	< 5.0	< 5.0	< 0.050	< 0.50	0.193	19.7	0.0059	0.0821	< 0.0010	< 0.050	0.0014	0.0114	< 0.50	< 0.50
Blanks																																
Field Blank																																
FR_HMW1D	FR_FLD_QTR_2019-01-07_N	2019 02 13	-	-	-	-	-	5.42	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.747	< 0.0050	< 0.0010	0.203	0.0014	< 0.0020	< 0.50	< 0.50
FR_KB-3A	FR_FLD_2019-02-26	2019 02 26	-	-	-	-	-	5.38	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0187	< 0.0050	< 0.0010	-	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_09-04-A	FR_FLD_QTR_2019-04-01_N	2019 04 11	-	-	-	-	-	5.52	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0124	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_KB-1	FR_FLD_2019-06-10_NP	2019 06 10	-	-	-	-	-	5.60	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_09-04-A	FR_FLD_QTR_2019-07-01_N	2019 07 29	-	-	-	-	-	6.06	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_KB-1	FR_FLD-2019-07-31	2019 07 31	-	-	-	-	-	5.98	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_TBSSMW-1	FR_FLD-2019-10-07	2019 10 07	-	-	-	-	-	5.51	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0070	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_KB-2	FR_FLD4_2019-10-21	2019 10 21	-	-	-	-	-	5.54	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_HMW1D	FR_FLD_QTR_2019-10-07_N	2019 10 23	-	-	-	-	-	5.58	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0069	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
FR_KB-3A	FR_FLD4-2019-12-11	2019 12 11	-	-	-	-	-	5.45	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 5.0	< 5.0	< 5.0	< 5.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
Trip Blank																																
	FR_TRP_QTR_2019-01-07_N	2019 02 13	-	-	-	-	-	5.28	-	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.140	< 0.0050	< 0.0010	0.071	0.0016	< 0.0020	< 0.50	-
	FR_TRP_2019-02-26	2019 02 25	-	-	-	-	-	5.38	-	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0448	< 0.0050	< 0.0010	-	< 0.0010	< 0.0020	< 0.50	< 0.50
	FR_TRP_2019-04-10	2019 04 10	-	-	-	-	-	5.42	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0305	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	FR_TRP_QTR_2019-04-01_N	2019 04 11	-	-	-	-	-	5.45	-	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0374	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	FR_TRP_2019-06-10_NP	2019 06 10	-	-	-	-	-	5.32	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	FR_TRP_QTR_2019-07-01_N	2019 07 24	-	-	-	-	-	5.59	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0385	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	FR_TRP_2019-10-21	2019 10 21	-	-	-	-	-	5.42	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0162	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	FR_TRP_QTR_2019-10-07_N	2019 10 22	-	-	-	-	-	6.12	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0276	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[d] Standard varies with Chloride.

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

Table 2d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																															
			Hardness 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
Henretta Creek Valley (^ denotes well part of Background)																																		
FR_HMW1D	FR_HMW1D_QTR_2019-01-07_N	2019 03 13	2,600	< 3.0	0.38	< 0.20	11.0	< 0.040	< 0.10	44	0.080	533	< 0.20	4.54	< 0.50	< 20	< 0.10	82.7	308	*538*	< 0.0050	0.74	33.4	6.92	***119***	< 0.020	2.33	343	< 0.020	< 0.20	< 10	*12.4*	< 1.0	6.1
	FR_HMW1D_QTR_2019-04-01_N	2019 05 29	2,790	< 5.0	< 0.50	< 0.50	11.0	< 0.10	< 0.25	< 50	0.059	575	< 0.50	4.85	< 1.0	< 50	< 0.25	88.7	328	*569*	< 0.0050	0.87	35.2	6.84	***55.4***	< 0.050	2.33	335	< 0.050	< 0.50	< 10	*12.7*	< 2.5	6.0
	FR_HMW1D_QTR_2019-07-01_N	2019 07 25	2,710	< 3.0	0.35	< 0.20	10.9	< 0.040	< 0.10	46	0.082	569	< 0.20	4.77	< 0.50	< 20	< 0.10	81.7	313	*582*	< 0.0050	0.77	34.5	6.65	***23.5***	< 0.020	2.26	326	< 0.020	< 0.20	< 10	*12.8*	< 1.0	6.8
	FR_HMW1D_QTR_2019-10-07_N	2019 10 23	2,570	< 3.0	0.38	< 0.20	13.0	< 0.040	< 0.10	47	0.104	548	< 0.20	4.48	< 0.40	< 20	< 0.10	78.2	293	*680*	< 0.0050	0.77	30.9	6.20	5.89	< 0.020	2.11	334	< 0.020	< 0.20	< 10	*11.1*	< 1.0	6.7
	FR_DC1_QTR_2019-10-07_N	Duplicate	2,500	< 3.0	0.39	< 0.20	13.0	< 0.040	< 0.10	50	0.075	534	< 0.20	4.30	< 0.40	< 20	< 0.10	80.8	282	*654*	< 0.0050	0.74	29.4	5.84	5.91	< 0.020	2.05	303	< 0.020	< 0.20	< 10	*10.9*	< 1.0	6.4
	QA/QC RPD%		3	*	*	*	0	*	*	*	32	3	*	4	*	*	*	3	4	4	*	4	5	6	0	*	3	10	*	*	*	2	*	5
FR_HMW1S	FR_HMW1S_QTR_2019-01-07_N	2019 03 13	2,560	< 3.0	0.34	< 0.20	10.3	< 0.040	< 0.10	45	0.125	540	< 0.20	4.12	< 0.50	< 20	< 0.10	94.0	295	*335*	< 0.0050	0.98	40.1	7.43	***214***	< 0.020	2.14	335	0.033	< 0.20	< 10	*12.0*	< 1.0	4.9
	FR_HMW1S_QTR_2019-04-01_N	2019 05 29	2,750	< 3.0	0.34	< 0.20	10.8	< 0.040	< 0.10	48	0.103	572	< 0.20	4.52	< 0.50	< 20	< 0.10	100	320	*369*	< 0.0050	0.92	42.6	7.89	***194***	< 0.020	2.30	328	0.030	< 0.20	< 10	*12.5*	< 1.0	9.5
	FR_HMW1S_QTR_2019-07-01_N	2019 07 25	2,670	< 3.0	0.34	< 0.20	9.83	< 0.040	< 0.10	44	0.117	559	< 0.20	4.33	< 0.50	< 20	< 0.10	84.2	310	*353*	< 0.0050	1.07	43.0	7.63	***213***	< 0.020	2.20	343	0.030	< 0.20	< 10	*12.8*	< 1.0	6.0
	FR_HMW1S_QTR_2019-10-07_N	2019 10 23	2,460	< 3.0	0.33	< 0.20	10.7	< 0.040	< 0.10	45	0.119	523	< 0.20	4.50	0.47	< 20	< 0.10	78.2	281	*370*	< 0.0050	0.88	40.7	7.18	***109***	< 0.020	2.03	299	0.027	< 0.20	< 10	*10.7*	< 1.0	5.1
FR_HMW2	FR_HMW2_QTR_2019-01-07_N	2019 03 11	2,330	< 3.0	< 0.20	< 0.20	12.3	< 0.040	< 0.10	54	0.280	491	< 0.20	0.22	< 0.50	< 20	< 0.10	138	268	115	< 0.0050	0.53	16.0	7.07	***522***	< 0.020	2.26	285	0.064	< 0.20	< 10	*10.3*	< 1.0	8.2
	FR_HMW2_QTR_2019-04-01_N	2019 05 29	2,370	< 3.0	< 0.20	< 0.20	12.5	< 0.040	< 0.10	51	0.360	492	< 0.20	0.24	< 0.50	< 20	< 0.10	136	278	193	< 0.0050	0.43	15.9	7.03	***510***	< 0.020	2.20	270	0.056	< 0.20	< 10	*10.5*	< 1.0	8.3
	FR_HMW2_QTR_2019-07-01_N	2019 07 25	2,280	32.7	< 0.20	< 0.20	14.0	< 0.040	< 0.10	47	0.334	476	< 0.20	0.27	0.52	62	< 0.10	119	264	141	< 0.0050	0.59	17.2	7.16	***407***	< 0.020	2.24	284	0.054	< 0.20	< 10	*10.7*	< 1.0	8.7
	FR_HMW2_QTR_2019-10-07_N	2019 10 22	2,300	< 3.0	< 0.20	< 0.20	13.9	< 0.040	< 0.10	50	0.241	465	< 0.20	0.25	1.69	< 20	< 0.10	132	277	48.2	< 0.0050	1.60	16.0	7.48	***745***	< 0.020	1.72	249	0.053	< 0.20	< 10	9.90	< 1.0	10.6
FR_HMW3	FR_HMW3_QTR_2019-01-07_N	2019 03 11	482	< 10	< 1.0	< 1.0	31.9	< 0.20	< 0.50	< 100	0.052	115	< 1.0	< 1.0	< 2.0	270	< 0.50	27	47.1	116	< 0.0050	0.94	< 5.0	1.72	***62.3***	< 0.10	1.61	126	< 0.10	< 1.0	< 10	2.01	< 5.0	< 10
	FR_DC1_QTR_2019-01-07_N	Duplicate	479	< 3.0	0.17	0.17	32.0	< 0.020	< 0.050	17	0.0289	114	< 0.10	0.22	< 0.50	268	< 0.050	27.1	47.0	116	< 0.0050	1.04	1.33	1.82	***71.3***	< 0.010	1.50	130	0.010	< 0.10	< 10	2.03	< 0.50	1.1
	QA/QC RPD%		1	*	*	*	0	*	*	*	57	1	*	*	*	1	*	0	0	0	*	10	*	6	13	*	7	3	*	*	*	1	*	*
	FR_HMW3_QTR_2019-04-01_N	2019 05 16	487	< 3.0	0.17	0.14	28.5	< 0.020	< 0.050	12	0.0189	115	0.12	0.18	< 0.50	266	< 0.050	22.6	48.7	80.5	0.0132	1.08	1.18	1.87	***55.5***	< 0.010	1.28	125	< 0.010	< 0.10	< 10	1.89	< 0.50	5.0
	FR_DC2_QTR_2019-04-01_N	Duplicate	446	< 3.0	0.17	0.14	27.6	< 0.020	< 0.050	13	0.0217	106	< 0.10	0.17	< 0.50	227	< 0.050	22.6	43.7	76.3	< 0.0050	1.05	1.13	1.70	***51.7***	< 0.010	1.24	116	< 0.010	< 0.10	< 10	1.71	< 0.50	< 1.0
	QA/QC RPD%		9	*	*	*	3	*	*	*	*	8	*	*	*	16	*	0	11	5	*	3	*	10	7	*	3	7	*	*	*	10	*	*
	FR_HMW3_QTR_2019-07-01_N	2019 07 24	347	7.3	0.21	0.17	26.0	< 0.020	< 0.050	13	0.0178	82.3	0.13	0.16	< 0.50	308	< 0.050	21.5	34.2	60.8	< 0.0050	1.12	0.94	1.75	***42***	< 0.010	1.05	94.3	< 0.010	< 0.10	< 10	1.50	< 0.50	1.1
	FR_HMW3_QTR_2019-10-07_N	2019 10 23	466	3.4	0.19	0.14	36.8	< 0.020	< 0.050	14	0.0335	114	< 0.10	0.15	< 0.20	254	< 0.050	22.4	44.0	76.2	< 0.0050	1.03	1.32	1.95	***60.6***	< 0.010	1.07	128	0.010	< 0.10	< 10	1.81	< 0.50	1.3
	FR_DC2_QTR_2019-10-07_N	Duplicate	462	4.2	0.19	0.20	38.4	< 0.020	< 0.050	16	0.0281	112	< 0.10	0.17	< 0.20	316	< 0.050	24.5	44.1	89.5	< 0.0050	1.03	1.24	1.97	***59.2***	< 0.010	1.16	127	0.011	< 0.10	< 10	1.79	< 0.50	1.0
	QA/QC RPD%		1	*	*	*	4	*	*	*	18	2	*	*	*	22	*	9	0	16	*	0	*	1	2	*	8	1	*	*	*	1	*	*
FR_HMW5^	FR_HMW5_QTR_2019-04-01_N	2019 05 16	178	6.5	< 0.10	< 0.10	209	< 0.020	< 0.050	55	< 0.0050	39.7	< 0.10	< 0.10	< 0.50	< 10	< 0.050	234	19.1	46.3	< 0.00050	< 0.050	< 0.50	0.744	1.32	< 0.010	16.5	377	< 0.010	< 0.10	< 10	0.012	< 0.50	< 1.0
	FR_HMW5_QTR_2019-07-01_N	2019 07 24	173	5.3	< 0.10	< 0.10	210	< 0.020	< 0.050	40	< 0.0050	38.6	< 0.10	< 0.10	< 0.50	13	< 0.050	171	18.6	46.5	< 0.0050	< 0.050	< 0.50	0.674	4.95	< 0.010	9.94	373	< 0.010	0.14	< 10	0.016	< 0.50	3.2
	FR_HMW5_QTR_2019-10-07_N	2019 10 22	182	5.7	< 0.10	< 0.10	199	< 0.020	< 0.050	30	< 0.0050	40.8	< 0.10	< 0.10	< 0.20	< 10	< 0.050	148	19.5	47.6	< 0.0050	< 0.050	< 0.50	0.669	1.36	< 0.010	6.79	368	< 0.010	< 0.10	< 10	0.032	< 0.50	< 1.0
Fording River Valley (+ denotes well part of Study Area 1)																																		
FR_TBSSMW-1	FR_TBSSMW-1_2019-03-26	2019 03 26	148	< 3.0	< 0.10	1.32	1,760	< 0.020	< 0.050	16	< 0.0050	13.7	< 0.10	< 0.10	< 0.50	128	< 0.050	197	27.7	43.9	< 0.0050	*14.7*	< 0.50	6.68	< 0.050	< 0.010	14.8	239	< 0.010	< 0.10	< 10	0.213	< 0.50	1.2
	FR_TBSSMW-1_2019_06_06_NP	2019 06 06	132	2.2	< 0.10	1.22	1,600	< 0.020	< 0.050	12	0.0051	11.7	< 0.10	< 0.10	< 0.20	108	< 0.050	189	24.9	38.4	< 0.0050	*13.6*	< 0.50	5.85	< 0.050	< 0.010	18.9	222	< 0.010	< 0.10	< 10	0.168	< 0.50	1.7
	FR_TBSSMW-1_QTR_2019-07-01_N	2019 07 26	151	< 3.0	< 0.10	1.28	2,250	< 0.020	< 0.050	18	< 0.0050	14.0	< 0.10	< 0.10	< 0.50	255	< 0.050	175	28.1	41.8	< 0.0050	*12.4*	< 0.50	6.82	< 0.050	< 0.010	12.8	230	< 0.010	< 0.10	< 10	0.238	< 0.50	1.2
	FR_TBSSMW-1_2019-08-08	2019 08 08	145	3.6	< 0.10	1.26	1,160	< 0.020	< 0.050	11	0.0062	12.8	< 0.10	< 0.10	< 0.20	123	< 0.050	222	27.4	38.9	< 0.0050	*14.4*	< 0.50	6.15	< 0.050	< 0.010	17.8	220	< 0.010	0.10	< 10	0.170	< 0.50	1.3
	FR_DC2-2019-08-08	Duplicate of	147	2.1	< 0.10	1.22	945	< 0.020	< 0.050	11	< 0.0050	13.6	< 0.10	< 0.10	< 0.20	126	< 0.050	222	27.5	38.9	< 0.0050	*14.8*	< 0.50	6.09	< 0.050	< 0.010	17.3	225	< 0.010	< 0.10	< 10	0.170	< 0.50	1.2
	QA/QC RPD%		1	*	*	3	20	*	*	*	*	6	*	*	*	2	*	0	0	0	*	3	*	1	*	*	3	2	*	*	*	0	*	*
	FR_TBSSMW1-2019_10_07	2019 10 07	146	< 3.0	< 0.10	1.29	1,830	< 0.020	< 0.050	11	< 0.0050	12.2	< 0.10	< 0.10	< 0.20	172	< 0.050	180	28.1	38.0	< 0.0050	*13.8*	< 0.50	5.72	< 0.050	< 0.010	18.3	208	< 0.010	< 0.10	< 10	0.162	< 0.50	1.6
	FR_DC3-2019_10_07	Duplicate of	145	< 3.0	< 0.10	1.30	1,840	< 0.020	< 0.050	11	< 0.0050	12.2	< 0.10	< 0.10	< 0.20	168	< 0.050	179	27.9	37.9	< 0.0050	*14.1*	< 0.50	5.71	< 0.050	< 0.010	18.0	213	< 0.010	< 0.10	< 10	0.165	< 0.50	1.3
	QA/QC RPD%		1	*	*	1	1	*	*	*	*	0	*	*	*	2	*	1	1	0	*	2	*	0	*	*	2	2	*	*	*	2	*	*
	FR_TBSSMW-1-2019-12-04	2019 12 04	146	2.2	< 0.10	1.29	1,980	< 0.020	< 0.050	12	0.0060	12.8	< 0.10	< 0.10	< 0.20	230	< 0.050	204	27.7	38.0	< 0.0050	*14.3*	< 0.50	6.25	< 0.050	< 0.010	16.3	227	< 0.010	< 0.10	< 10	0.160	< 0.50	4.2
FR_TBSSMW-2	FR_TBSSMW-2_2019-03-26	2019 03 26	354	< 3.0	< 0.10	< 0.10	84.8	< 0.020	< 0.050	< 10	0.0102	88.1	< 0.10	< 0.10	< 0.50	< 10	< 0.050	8.9	32.5	< 0.10	< 0.0050	0.866	< 0.50	0.714	***32.4***	< 0.010	0.753	158	< 0.010	< 0.10	< 10	1.40	< 0.50	< 1.0
	FR_TBSSMW-2_2019-06-04	2019 06 04	189	1.2	< 0.10	< 0.10	49.2	< 0.020	< 0.050	< 10	0.0086	46.6	0.15	< 0.10	< 0.20	< 10	< 0.050	7.5	17.6	< 0.10	< 0.0050	0.890	< 0.50	0.632	12.7	< 0.010	0.569	86.2	< 0.010	< 0.10	< 10	0.725	< 0.50	3.4
	FR_TBSSMW-2_QTR_2019-07-01_N	2019 07 26	178	< 3.0	< 0.10	< 0.10	45.4	< 0.020	< 0.050	< 10	0.0074	44.2	0.15	< 0.10	< 0.50	< 10	< 0.050	6.3	16.6	0.18	< 0.0050	0.857	< 0.50	0.695	8.28	< 0.010	0.534	75.6	< 0.010	< 0.10	< 10	0.758	< 0.50	< 1.0
	FR_TBSSMW-2_2019-08-08	2019 08 08	221	1.3	< 0.10	< 0.10	56.1	< 0.020	< 0.050	< 10	0.0075	57.6	0.16	< 0.10	< 0.20	< 10	< 0.050	7.7	18.6	< 0.10	< 0.0050	0.974	< 0.50	0.759	12.8	< 0.010	0.563	92.8	< 0.010	< 0.10	< 10	0.926	< 0.50	< 1.0
	FR_TBSSMW2-2019_10_07	2019 10 07	271	< 3.0	< 0.10	< 0.10	66.4	< 0.020	< 0.050	< 10	0.0133	67.6	0.11	< 0.10	0.34	< 10	< 0.050	7.4	24.9	0.81	< 0.0050	0.924	< 0.50	0.789	***21.1***	< 0.010	0.632	116	< 0.010	< 0.10	< 10	1.09	< 0.50	< 1.0
	FR_TBSSMW-2-2019-11-26	2019 11 26	303	1.5	< 0.10	< 0.10	68.3	< 0.020	< 0.050	< 10	0.0099	75.4	0.10	< 0.10	< 0.20	< 10	< 0.050	6.6	28.0	< 0.10	< 0.0050	0.719	< 0.50	0.678	***36.3***	< 0.010	0.665	130	< 0.010	0.13	< 10	1.03	< 0.50	< 1.0
FR_POTWELLS	FR_POTWELLS_QTR_2019-01-07_N	2019 03 14	342	< 3.0	< 0.10	< 0.10	73.8	< 0.020	< 0.050	< 10	0.0101	87.6	0.11	< 0.10	0.63	< 10	< 0.050	7.2	30.0	< 0.10	< 0.0050	0.629	< 0.50	0.625	***25.3***	< 0.010	0.736	154	< 0.010	< 0.10	< 10	1.12	< 0.50	2.8
	FR_POTWELLS_QTR_2019-04-01_N	2019 06 13	176	< 3.0	< 0.10	< 0.10	46.2	< 0.020	< 0.050	< 10	0.0059	44.6	< 0.10	< 0.10	3.28	< 10	0.119	4.8	15.7	0.34	< 0.0050	0.679	< 0.50	0.579	8.73	< 0.010	0.552	84.2	< 0.010	< 0.10	< 10	0.692	< 0.50	11.0
	FR_POTWELLS_QTR_2019-07-01_N	2019 07 31	192	< 3.0	< 0.10	< 0.10	48.9	< 0.020	< 0.050	< 10	0.0062	49.5	0.12	< 0.10	2.43	< 10	0.053	5.1	16.7	0.26	< 0.0050	0.711	< 0.50	0.619	8.32	< 0.010	0.659	88.7	< 0.010	< 0.10	< 10	0.707	< 0.50	7.9
	FR_POTWELLS_QTR_2019-10-07_N	2019 11 07	283	< 3.0	< 0.10	< 0.10	69.8	< 0.020	< 0.050	< 10	0.0074	72.6	0.10	< 0.10	0.70	< 10	< 0.050	5.9	24.8	0.19	< 0.0050	0.715	< 0.50	0.683	17.4	< 0.010	0.761	138	< 0.010	< 0.10	< 10	0.994	< 0.50	4.5

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

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.

Table 2d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (FRO)

				Dissolved Metals																														
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness 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
Fording River Valley (+ denotes well part of Study Area 1)																																		
FR_GCMW-1B	FR_GCMW-1B_2019-03-27	2019 03 27	84.3	25.6	0.22	1.06	101	< 0.020	< 0.050	88	0.0119	23.1	0.11	0.19	0.40	< 10	< 0.050	158	6.47	73.7	< 0.0050	*27.3*	2.61	1.94	2.85	< 0.010	149	220	< 0.010	< 0.10	< 10	2.31	< 0.50	2.0
	FR_GCMW_1B_2019-05-31_NP	2019 05 31	90.0	9.2	0.23	2.04	94.5	< 0.020	< 0.050	81	< 0.025	24.1	< 0.10	0.25	< 0.50	164	< 0.050	126	7.27	144	< 0.0050	*31.0*	2.68	1.78	2	< 0.010	163	213	< 0.010	< 0.10	< 10	2.14	< 0.50	1.2
	FR_GCMW-1B_QTR_2019-07-01_N	2019 07 26	80.3	6.8	0.14	2.53	96.0	< 0.020	< 0.050	96	< 0.010	21.9	< 0.10	0.29	< 0.50	289	< 0.050	111	6.22	*238*	< 0.0050	*35.8*	2.62	1.56	0.419	< 0.010	146	175	< 0.010	< 0.10	< 10	1.50	< 0.50	< 1.0
	FR_GCMW-1B_2019-08-13	2019 08 13	85.6	9.0	0.15	3.20	113	< 0.020	< 0.050	98	0.0334	22.4	< 0.10	0.34	< 0.50	154	< 0.050	147	7.22	*296*	< 0.0050	*43.2*	2.75	1.71	0.113	< 0.010	186	192	< 0.010	< 0.10	< 10	1.33	< 0.50	< 1.0
	FR_GCMW-1B_QTR_2019-10-07_N	2019 10 03	82.3	10.8	< 0.10	2.92	101	< 0.020	< 0.050	82	< 0.0050	21.8	< 0.10	0.26	< 0.20	162	< 0.050	94.2	6.74	*286*	< 0.0050	*41.1*	1.84	1.58	0.14	< 0.010	152	162	< 0.010	< 0.10	< 10	0.822	< 0.50	< 1.0
	FR_GCMW-1B-2019-12-09	2019 12 09	83.9	11.8	< 0.10	3.03	123	< 0.020	< 0.050	63	0.0141	22.6	< 0.10	0.23	< 0.20	360	< 0.050	74.8	6.66	*298*	< 0.0050	*44.2*	1.76	1.59	0.182	< 0.010	159	177	< 0.010	0.18	< 10	0.645	< 0.50	< 1.0
FR_GCMW-2	FR_GCMW-2_QTR_2019-01-07_N	2019 03 13	947	< 3.0	0.42	< 0.10	78.0	< 0.020	< 0.050	14	0.0634	210	0.12	< 0.10	< 0.50	< 10	< 0.050	199	103	1.45	< 0.0050	1.92	3.43	3.44	***121***	< 0.010	4.23	337	< 0.010	< 0.10	< 10	8.26	< 0.50	2.5
	FR_GCMW-2_QTR_2019-04-01_N	2019 06 14	623	< 3.0	0.47	0.12	62.1	< 0.020	< 0.050	16	0.0471	133	0.12	< 0.10	1.73	< 10	0.076	130	70.5	0.32	< 0.0050	1.88	2.22	3.19	***73.8***	< 0.010	3.13	203	< 0.010	< 0.10	< 10	5.92	< 0.50	2.4
	FR_GCMW-2_QTR_2019-07-01_N	2019 07 26	591	3.3	0.41	< 0.10	58.0	< 0.020	< 0.050	18	0.0412	131	0.18	< 0.10	< 0.50	< 10	< 0.050	105	64.2	3.03	< 0.0050	1.99	2.25	3.25	***80.6***	< 0.010	3.80	206	< 0.010	< 0.10	< 10	5.79	< 0.50	1.8
	FR_GCMW-2_QTR_2019-10-07_N	2019 11 07	799	< 3.0	0.49	< 0.10	74.5	< 0.020	< 0.050	17	0.0541	181	< 0.10	< 0.10	0.21	< 10	< 0.050	144	84.4	0.38	< 0.0050	2.05	2.54	3.87	***97.9***	< 0.010	3.52	287	< 0.010	< 0.10	< 10	7.37	< 0.50	2.4
FR_MW-1B	FR_MW-1B_QTR_2019-01-07_N	2019 03 22	436	< 3.0	0.17	< 0.10	130	< 0.020	< 0.050	< 10	0.0158	105	0.11	< 0.10	< 0.50	< 10	< 0.050	36.7	42.4	< 0.10	< 0.0050	1.01	< 0.50	1.17	***44.6***	< 0.010	1.77	171	< 0.010	< 0.10	< 10	2.49	< 0.50	< 1.0
	FR_MW-1B_QTR_2019-04-01_N	2019 05 30	254	11.6	0.18	< 0.10	80.9	< 0.020	< 0.050	< 10	0.0105	62.9	0.14	< 0.10	< 0.50	< 10	< 0.050	20.5	23.6	0.73	< 0.0050	1.09	< 0.50	0.966	19.8	< 0.010	0.997	107	< 0.010	< 0.10	< 10	1.27	< 0.50	< 1.0
	FR_MW-1B_QTR_2019-07-01_N	2019 07 25	247	11.4	0.15	< 0.10	70.6	< 0.020	< 0.050	< 10	0.0090	62.8	0.20	< 0.10	< 0.50	< 10	< 0.050	17.3	21.8	0.25	< 0.0050	1.00	< 0.50	0.955	18.5	< 0.010	0.956	106	< 0.010	< 0.10	< 10	1.24	< 0.50	< 1.0
	FR_MW-1B_QTR_2019-10-07_N	2019 11 07	397	< 3.0	0.18	< 0.10	125	< 0.020	< 0.050	< 10	0.0125	100	0.14	< 0.10	< 0.20	< 10	< 0.050	23.7	35.4	< 0.10	< 0.0050	1.14	< 0.50	1.20	***40.1***	< 0.010	1.29	183	< 0.010	< 0.10	< 10	1.97	< 0.50	< 1.0
FR_MW_NTPNE	FR_MW_NTPNE_WG_2019_0917_NP	2019 09 17	239	1.9	< 0.10	0.64	86.0	< 0.020	< 0.050	37	< 0.0050	57.0	< 0.10	0.11	< 0.20	212	< 0.050	37.1	23.4	*282*	< 0.0050	1.33	< 0.50	1.04	< 0.050	< 0.010	14.5	534	< 0.010	< 0.10	< 0.30	0.468	< 0.50	< 1.0
	FR_MW_CH10-A_WG_2019_0917_NP	Duplicate	237	2.0	< 0.10	0.63	88.3	< 0.020	< 0.050	36	< 0.0050	56.6	< 0.10	0.11	< 0.20	214	< 0.050	35.9	23.2	*280*	< 0.0050	1.34	< 0.50	1.03	< 0.050	< 0.010	14.3	528	< 0.010	< 0.10	< 0.30	0.466	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	2	3	*	*	*	*	1	*	*	*	1	*	3	1	1	*	1	*	1	*	*	1	1	*	*	*	0	*	*
	FR_MW_NTPNE_WG_2019_11_27_NP	2019 11 27	232	1.3	< 0.10	0.56	90.4	< 0.020	< 0.050	38	< 0.0050	58.2	< 0.10	0.11	< 0.20	232	< 0.050	38.4	21.1	*239*	< 0.0050	1.22	< 0.50	0.95	< 0.050	< 0.010	13.4	505	< 0.010	< 0.10	< 0.30	0.485	< 0.50	< 1.0
	FR_MW_CH10-A_WG_2019_11_27_NP	Duplicate	225	1.8	< 0.10	0.60	93.1	< 0.020	< 0.050	41	0.0160	54.3	0.75	0.12	7.41	246	0.143	38.0	21.8	*247*	< 0.0050	1.22	< 0.50	0.99	< 0.050	< 0.010	13.7	494	< 0.010	0.31	< 0.30	0.471	< 0.50	2.7
	QA/QC RPD%		3	*	*	7	3	*	*	*	*	7	*	*	*	6	*	1	3	3	*	0	*	4	*	*	2	2	*	*	*	3	*	*
FR_MW_NTPSE	FR_MW_NTPSE_WG_2019_0917_NP	2019 09 17	1,190	2.9	< 0.10	3.63	118	< 0.020	< 0.050	11	< 0.0050	238	0.16	1.89	< 0.20	*27,300*	< 0.050	26.1	145	*3,760*	< 0.0050	2.20	9.01	2.71	0.180	< 0.010	7.88	300	0.016	< 0.10	< 0.30	1.01	0.59	2.1
	FR_MW_NTPSE_WG_2019_11_27_NP	2019 11 27	1,060	2.4	< 0.10	3.45	113	< 0.020	< 0.050	< 10	< 0.0050	198	0.17	2.06	< 0.20	*25,000*	< 0.050	22.9	138	*3,400*	< 0.0050	1.79	9.19	2.54	0.153	< 0.010	7.94	260	0.017	< 0.10	< 0.30	0.834	0.52	2.2
FR_MW_STPNW	FR_MW_STPNW_WG_2019_0917_NP	2019 09 17	137	4.3	< 0.10	0.50	606	< 0.020	< 0.050	18	< 0.0050	34.4	< 0.10	< 0.10	< 0.20	192	< 0.050	11.2	12.4	42.3	< 0.0050	1.70	< 0.50	1.05	< 0.050	< 0.010	14.2	331	< 0.010	< 0.10	< 0.30	0.085	< 0.50	< 1.0
	FR_MW_STPNW_WG_2019_11_26_NP	2019 11 26	131	3.8	< 0.10	0.43	684	< 0.020	< 0.050	19	0.0063	33.5	< 0.10	< 0.10	2.43	193	0.055	11.8	11.5	37.8	< 0.0050	1.64	< 0.50	1.02	< 0.050	< 0.010	15.1	297	< 0.010	0.10	< 0.30	0.065	< 0.50	1.6
FR_MW_STPSW-A	FR_MW_STPSW-A_WG_2019_09_18_NP	2019 09 18	274	3.9	0.26	0.50	42.3	< 0.020	< 0.050	32	0.0212	74.5	< 0.10	0.17	0.69	< 10	< 0.050	13.5	21.4	172	< 0.0050	2.69	0.96	2.29	3.94	< 0.010	16.2	229	0.019	0.10	< 0.30	1.62	< 0.50	1.0
	FR_MW_STPSW-A_WG_2019_11_26_NP	2019 11 26	320	2.8	< 0.10	0.34	65.8	< 0.020	< 0.050	17	0.0237	86.6	< 0.10	0.13	0.27	< 10	< 0.050	13.3	25.3	161	< 0.0050	1.76	0.84	1.89	10.9	< 0.010	12.9	230	0.010	0.12	< 0.30	1.37	< 0.50	1.2
FR_MW_STPSW-B	FR_MW_STPSW-B_WG_2019_09_18_NP	2019 09 18	364	3.4	0.23	0.19	84.0	< 0.020	< 0.050	12	0.0198	88.2	0.47	< 0.10	< 0.20	< 10	< 0.050	26.9	35.0	8.65	< 0.0050	1.40	0.64	1.73	***39.1***	< 0.010	3.38	184	< 0.010	< 0.10	< 0.30	2.29	< 0.50	< 1.0
	FR_MW_STPSW-B_WG_2019_11_26_NP	2019 11 26	488	2.0	0.34	0.12	93.7	< 0.020	< 0.050	< 10	0.0256	117	< 0.10	< 0.10	0.25	< 10	< 0.050	30.6	47.7	2.62	< 0.0050	1.28	0.50	1.47	***62.7***	< 0.010	3.79	265	< 0.010	< 0.10	< 0.30	2.85	< 0.50	< 1.0
FR_09-04-A	FR_09-04-A_QTR_2019-01-07_N	2019 02 13	626	< 3.0	0.10	< 0.10	92.5	< 0.020	< 0.050	30	0.955	130	< 0.10	1.12	< 0.50	17	< 0.050	87.3	73.1	*1,300*	< 0.0050	1.87	7.12	5.49	2.38	< 0.010	6.21	217	0.058	< 0.10	< 10	6.57	< 0.50	3.3
	FR_09-04-A_QTR_2019-04-01_N	2019 04 11	704	< 3.0	0.12	< 0.10	108	< 0.020	< 0.050	33	1.11	145	< 0.10	1.31	< 0.50	< 10	0.053	86.8	83.4	*1,470*	< 0.0050	1.92	8.26	5.84	5.38	< 0.010	6.80	242	0.058	< 0.10	< 10	6.42	< 0.50	4.6
	FR_09-04-A_QTR_2019-07-01_N	2019 07 29	766	< 3.0	0.12	< 0.10	110	< 0.020	< 0.050	33	1.11	163	< 0.10	1.39	< 0.50	< 10	< 0.050	91.0	87.3	*1,520*	< 0.0050	1.96	8.15	5.84	3.57	< 0.010	6.66	253	0.060	< 0.10	< 10	7.09	< 0.50	4.4
	FR_09-04-A_QTR_2019-10-07_N	2019 10 24	774	< 3.0	0.12	< 0.10	96.5	< 0.020	< 0.050	31	1.12	157	< 0.10	1.48	0.31	< 10	< 0.050	90.4	92.8	*1,560*	< 0.0050	2.02	8.27	5.43	0.395	< 0.010	7.21	243	0.054	< 0.10	< 10	6.48	< 0.50	4.3
FR_09-04-B	FR_09-04-B_QTR_2019-01-07_N	2019 02 13	642	< 3.0	0.10	< 0.10	95.7	< 0.020	< 0.050	31	0.931	136	< 0.10	1.07	< 0.50	< 10	< 0.050	91.6	73.4	*1,320*	< 0.0050	1.80	7.29	5.32	2.25	< 0.010	6.16	224	0.058	< 0.10	< 10	6.03	< 0.50	3.1
	FR_DC2_QTR_2019-01-07_N	Duplicate	648	< 3.0	0.10	< 0.10	89.2	< 0.020	< 0.050	30	0.891	139	< 0.10	1.10	< 0.50	< 10	< 0.050	89.2	73.3	*1,310*	< 0.0050	1.71	7.43	5.26	2.32	< 0.010	6.12	228	0.062	< 0.10	< 10	6.27	< 0.50	3.0
	QA/QC RPD%		1	*	*	*	7	*	*	*	4	2	*	3	*	*	*	3	0	1	*	5	2	1	3	*	1	2	7	*	*	4	*	*
	FR_09-04-B_QTR_2019-04-01_N	2019 04 11	714	< 3.0	0.12	< 0.10	101	< 0.020	< 0.050	32	1.03	149	< 0.10	1.22	< 0.50	< 10	< 0.050	86.6	83.2	*1,420*	< 0.0050	1.77	8.02	5.70	5	< 0.010	7.11	237	0.062	< 0.10	< 10	6.03	< 0.50	3.9
	FR_DC1_QTR_2019-04-01_N	Duplicate	728	< 3.0	0.11	< 0.10	102	< 0.020	< 0.050	32	1.02	153	< 0.10	1.24	< 0.50	< 10	< 0.050	81.7	84.2	*1,430*	< 0.0050	1.75	8.41	5.69	5.13	< 0.010	7.28	239	0.056	< 0.10	< 10	5.71	< 0.50	4.1
	QA/QC RPD%		2	*	*	*	1	*	*	*	1	3	*	2	*	*	*	6	1	1	*	1	5	0	3	*	2	1	10	*	*	5	*	*
	FR_09-04-B_QTR_2019-07-01_N	2019 07 29	796	< 3.0	0.12	< 0.10	110	< 0.020	< 0.050	33	1.16	163	< 0.10	1.43	< 0.50	< 10	< 0.050	92.9	94.7	*1,540*	< 0.0050	1.81	8.78	5.96	3.62	< 0.010	7.04	247	0.061	< 0.10	< 10	6.64	< 0.50	4.9
	FR_09-04-B_QTR_2019-10-07_N	2019 10 24	779	< 3.0	0.11	< 0.10	94.0	< 0.020	< 0.050	32	1.04	159	< 0.10	1.39	0.33	< 10	< 0.050	90.8	92.9	*1,570*	< 0.0050	1.87	8.11	5.41	0.557	< 0.010	8.00	242	0.057	< 0.10	< 10	6.17	< 0.50	4.5
FR_KB-1	FR_KB-1_2019-02-28	2019 02 28	1,630	< 1.0	0.41	0.14	50.8	< 0.020	< 0.050	25	0.547	364	< 0.10	3.53	< 0.20	< 10	< 0.050	103	176	< 0.10	< 0.0050	1.41	20.0	4.97	***378***	< 0.010	4.59	308	0.016	< 0.10	< 10	*12.9*	< 0.50	10.0
	FR_KB-1_2019-04-10	2019 04 10	1,540	< 5.0	< 0.50	< 0.50	47.9	< 0.10	< 0.25	< 50	0.611	350	< 0.50	1.95	< 1.0	< 50	< 0.25	100	162	< 0.50	< 0.0050	1.11	24.2	4.88	***287***	< 0.050	4.33	293	< 0.050	< 0.50	< 10	*13.2*	< 2.5	12.3
	FR_KB-1-2019-06-11_NP	2019 06 11	745	< 1.0	0.44	0.10	34.2	< 0.020	< 0.050	28	0.476	158	< 0.10	2.08	0.22	< 10	< 0.050	61.8	85.1	< 0.10	< 0.0050	1.86	14.8	4.12	***206***	< 0.010	3.15	165	0.015	< 0.10	< 10	5.99	< 0.50	9.7
	FR_KB_1_2019-07-31	2019 07 31	705	< 3.0	0.57	< 0.10	29.1	< 0.020	< 0.050	27	0.392	158	< 0.10	0.23	< 0.50	< 10	< 0.050	55.7	75.4	< 0.10	< 0.0050	1.89	12.1	3.51	***116***	< 0.010	2.49	156	0.013	< 0.10	< 10	6.04	< 0.50	8.6
	FR_KB-1_2019-10-09	2019 10 09	983	< 3.0	0.54	< 0.10	39.5	< 0.020	< 0.050	29	0.514	218	< 0.10	0.12	0.43	< 10	< 0.050	74.4	106	< 0.10	< 0.0050	1.87	16.8	4.32	***175***	< 0.010	3.13	214	0.016	< 0.10	< 10	8.49	< 0.50	9.7
	FR_KB-1-2019-11-27	2019 11 27	1,190	< 3.0	0.40	< 0.10	54.0	< 0.020	< 0.050	29	0.476	277	< 0.10	0.84	0.20	< 10	< 0.050	83.2	121	< 0.10	< 0.0050	1.20	12.0	4.63	***215***	< 0.010	3.88	253	0.019	< 0.10	< 10	9.83	< 0.50	9.4

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

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.

Table 2d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness mg/L	Dissolved Metals																														
				Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium 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
Fording River Valley (+ denotes well part of Study Area 1)																																		
FR_KB-2	FR_KB-2_2019-02-28	2019 02 28	1,550	19.0	< 0.50	< 0.50	48.6	< 0.10	< 0.25	64	0.521	349	< 0.50	3.51	< 1.0	< 50	< 0.25	93.8	165	< 0.50	< 0.0050	1.38	20.1	4.99	**273**	< 0.050	4.30	296	< 0.050	< 0.50	< 10	*13.4*	< 2.5	12.9
	FR_KB-2_2019-04-10	2019 04 10	1,570	< 5.0	< 0.50	< 0.50	78.0	< 0.10	< 0.25	< 50	0.145	367	< 0.50	< 0.50	< 1.0	< 50	< 0.25	98.2	158	0.85	< 0.0050	1.10	5.2	4.42	**300**	< 0.050	4.26	310	< 0.050	< 0.50	< 10	*12.2*	< 2.5	< 5.0
	FR_KB-2_2019-06-10_NP	2019 06 10	828	< 3.0	0.29	< 0.10	43.2	< 0.020	< 0.050	22	0.0934	182	0.14	0.31	< 0.50	< 10	< 0.050	66.0	90.7	1.40	< 0.0050	0.875	3.30	3.55	**174**	< 0.010	3.12	153	< 0.010	< 0.10	< 10	5.73	< 0.50	3.3
	FR_KB_2_2019-07-31	2019 07 31	702	< 3.0	0.35	< 0.10	38.9	< 0.020	< 0.050	25	0.0700	157	< 0.10	< 0.10	< 0.50	< 10	< 0.050	56.4	75.4	0.86	< 0.0050	1.21	2.60	3.35	**122**	< 0.010	2.67	145	< 0.010	< 0.10	< 10	5.99	< 0.50	2.1
	FR_DC1-2019-07-31	Duplicate	694	< 3.0	0.35	< 0.10	39.2	< 0.020	< 0.050	24	0.0708	156	< 0.10	< 0.10	< 0.50	< 10	< 0.050	56.2	73.8	0.83	< 0.0050	1.24	2.57	3.30	**121**	< 0.010	2.65	147	< 0.010	< 0.10	< 10	5.81	< 0.50	2.4
	QA/QC RPD%		1	*	*	*	1	*	*	*	1	1	*	*	*	*	*	0	2	4	*	2	1	2	1	*	1	1	*	*	*	3	*	*
	FR_KB-2_2019-10-21	2019 10 21	1,110	11.4	0.43	< 0.10	55.0	< 0.020	< 0.050	26	0.123	262	< 0.10	< 0.10	0.36	19	< 0.050	70.1	110	1.99	< 0.0050	1.25	4.15	3.97	**170**	< 0.010	3.03	222	< 0.010	< 0.10	< 10	8.82	< 0.50	3.0
	FR_DC4_2019-10-21	Duplicate	1,110	9.2	0.43	0.10	54.7	< 0.020	< 0.050	27	0.131	263	< 0.10	< 0.10	0.48	19	< 0.050	69.8	110	2.02	< 0.0050	1.29	4.10	3.96	**167**	< 0.010	3.03	221	< 0.010	< 0.10	< 10	8.80	< 0.50	3.5
	QA/QC RPD%		0	21	*	*	1	*	*	*	6	0	*	*	*	*	*	0	0	1	*	3	1	0	2	*	0	0	*	*	*	0	*	*
	FR_KB-2-2019-12-10	2019 12 10	1,140	5.7	< 0.50	< 0.50	66.0	< 0.10	< 0.25	< 50	0.121	252	< 0.50	< 0.50	< 1.0	< 50	< 0.25	72.9	124	0.58	< 0.0050	1.36	< 2.5	3.92	**192**	< 0.050	3.40	252	< 0.050	< 0.50	< 10	9.26	< 2.5	< 5.0
FR_KB-3A	FR_KB-3A_2019-02-26	2019 02 26	1,120	< 1.0	< 0.10	< 0.10	62.4	< 0.020	< 0.050	17	0.0273	272	0.17	2.57	< 0.20	< 10	< 0.050	34.5	107	2.34	< 0.0050	0.307	< 0.50	2.18	**237**	< 0.010	4.13	311	< 0.010	< 0.10	< 10	5.02	< 0.50	1.7
	FR_DC1_2019-02-26	2019 02 26	1,100	< 1.0	0.11	0.11	61.5	< 0.020	< 0.050	16	0.0296	267	0.14	2.55	< 0.20	< 10	< 0.050	31.8	105	2.32	< 0.0050	0.319	< 0.50	2.24	**233**	< 0.010	4.01	296	0.015	< 0.10	< 10	4.99	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	*	1	*	*	*	8	2	*	1	*	*	*	8	2	1	*	4	*	3	2	*	3	5	*	*	*	1	*	*
	FR_KB-3A_2019-03-25	2019 03 25	1,130	< 3.0	< 0.10	< 0.10	62.8	< 0.020	< 0.050	15	0.0275	267	0.17	2.75	< 0.50	< 10	< 0.050	35.8	112	5.37	< 0.0050	0.263	< 0.50	2.08	**244**	< 0.010	4.02	294	< 0.010	< 0.10	< 10	5.75	< 0.50	5.2
	FR_DC1_2019-03-25	Duplicate	1,120	< 3.0	< 0.10	< 0.10	63.8	< 0.020	< 0.050	16	0.0316	268	0.12	2.76	< 0.50	< 10	< 0.050	34.9	109	5.50	< 0.0050	0.267	< 0.50	2.06	**241**	< 0.010	3.95	303	< 0.010	< 0.10	< 10	5.71	< 0.50	5.0
	QA/QC RPD%		1	*	*	*	2	*	*	*	14	0	*	0	*	*	*	3	3	2	*	2	*	1	1	*	2	3	*	*	*	1	*	4
	FR_KB-3A_2019-06-10_NP	2019 06 10	1,220	< 3.0	< 0.20	< 0.20	65.9	< 0.040	< 0.10	< 20	< 0.010	289	< 0.20	3.06	< 0.50	< 20	< 0.10	40.0	122	2.34	< 0.0050	0.39	5.0	2.17	**216**	< 0.020	4.22	319	< 0.020	< 0.20	< 10	5.58	< 1.0	10.3
	FR_DC-4_2019-06-10_NP	Duplicate	1,200	< 3.0	< 0.20	< 0.20	63.9	< 0.040	< 0.10	< 20	0.012	285	< 0.20	2.99	< 0.50	< 20	< 0.10	38.7	119	2.51	< 0.0050	0.41	4.9	2.17	**208**	< 0.020	4.33	316	< 0.020	< 0.20	< 10	5.68	< 1.0	3.9
	QA/QC RPD%		2	*	*	*	3	*	*	*	*	1	*	2	*	*	*	3	2	7	*	5	2	0	4	*	3	1	*	*	*	2	*	*
	FR_KB_3A_2019-07-30	2019 07 30	1,140	< 3.0	0.20	< 0.10	63.5	< 0.020	< 0.050	17	0.0199	282	0.14	2.81	< 0.50	< 10	< 0.050	39.1	107	2.48	< 0.0050	1.26	0.84	1.87	**266**	< 0.010	3.75	318	< 0.010	< 0.10	< 10	5.63	< 0.50	5.1
	FR_KB-3A_2019-10-18	2019 10 18	1,300	< 3.0	0.28	< 0.10	61.7	< 0.020	< 0.050	18	0.0317	314	0.18	2.73	0.87	< 10	< 0.050	39.4	127	9.13	< 0.0050	0.949	2.47	2.15	**226**	< 0.010	3.99	338	< 0.010	0.11	< 10	5.50	< 0.50	7.4
	FR_KB-3A-2019-12-11	2019 12 11	1,090	< 3.0	0.15	< 0.10	55.2	< 0.020	< 0.050	18	0.0210	276	0.13	2.08	0.67	< 10	< 0.050	39.6	97.8	1.20	< 0.0050	0.367	0.77	1.97	**194**	< 0.010	3.62	306	< 0.010	0.35	< 10	5.34	< 0.50	4.8
FR_KB-3B	FR_KB-3B_2019-02-25	2019 02 25	1,260	1.7	0.15	0.12	76.3	< 0.020	< 0.050	20	0.0275	289	0.13	1.20	< 0.20	< 10	< 0.050	58.3	130	15.5	< 0.0050	0.700	0.55	3.72	**281**	< 0.010	4.90	281	0.014	< 0.10	< 10	7.25	< 0.50	< 1.0
	FR_KB-3B_2019-03-25	2019 03 25	1,280	< 3.0	0.12	< 0.10	80.3	< 0.020	< 0.050	18	0.0343	294	0.13	0.89	< 0.50	< 10	< 0.050	61.6	131	3.29	< 0.0050	0.443	< 0.50	3.17	**297**	< 0.010	3.67	277	< 0.010	< 0.10	< 10	8.86	< 0.50	2.3
	FR_KB-3B_2019-06-10_NP	2019 06 10	1,230	< 3.0	0.12	< 0.10	73.1	< 0.020	< 0.050	18	0.0296	278	0.12	0.56	< 0.50	< 10	< 0.050	59.9	130	6.28	< 0.0050	0.505	0.57	3.24	**271**	< 0.010	4.40	263	< 0.010	< 0.10	< 10	7.25	< 0.50	1.6
	FR_KB_3B_2019-07-30	2019 07 30	888	< 3.0	0.12	< 0.10	63.1	< 0.020	< 0.050	19	0.0217	207	0.10	0.39	< 0.50	< 10	< 0.050	52.1	90.0	1.20	< 0.0050	0.526	< 0.50	2.49	**200**	< 0.010	3.43	210	< 0.010	< 0.10	< 10	5.86	< 0.50	1.4
	FR_KB-3B_2019-10-18	2019 10 18	1,040	3.1	0.11	< 0.10	61.3	< 0.020	< 0.050	20	0.0209	239	0.11	0.31	0.46	< 10	< 0.050	52.5	108	1.03	< 0.0050	0.517	< 0.50	2.77	**188**	< 0.010	2.93	222	< 0.010	< 0.10	< 10	6.18	< 0.50	< 1.0
	FR_KB-3B-2019-12-11	2019 12 11	1,030	< 3.0	0.12	< 0.10	60.3	< 0.020	< 0.050	21	0.0231	253	0.13	0.22	0.45	< 10	< 0.050	59.0	96.8	0.73	< 0.0050	0.522	< 0.50	2.73	**191**	< 0.010	3.09	239	< 0.010	< 0.10	< 10	6.73	< 0.50	2.6
	FR_DC4-2019-12-11	Duplicate	1,000	< 3.0	0.13	< 0.10	60.4	< 0.020	< 0.050	21	0.0265	242	0.12	0.23	0.40	< 10	< 0.050	56.3	96.6	0.71	< 0.0050	0.527	< 0.50	2.73	**184**	< 0.010	3.09	238	< 0.010	< 0.10	< 10	6.72	< 0.50	2.4
	QA/QC RPD%		3	*	*	*	0	*	*	*	*	4	*	*	*	*	*	5	0	3	*	1	*	0	4	*	0	0	*	*	*	0	*	*
FR_MW-SK1A	FR_MW_SK1-A_WG_Q1_2019_NP	2019 03 28	1,180	< 1.0	< 0.10	< 0.10	94.8	< 0.020	< 0.050	16	0.0392	281	0.44	0.42	< 0.20	< 10	< 0.050	50.0	115	0.40	< 0.0050	0.447	< 0.50	2.85	**266**	< 0.010	4.24	294	< 0.010	< 0.10	< 0.30	6.44	< 0.50	< 1.0
	FR_MW_SK1-C_WG_Q1-2019_NP	Duplicate	1,160	1.0	0.10	< 0.10	95.6	< 0.020	< 0.050	15	0.0451	278	0.23	0.42	< 0.20	< 10	< 0.050	54.4	113	0.31	< 0.0050	0.419	< 0.50	2.70	**260**	< 0.010	4.20	285	< 0.010	< 0.10	< 0.30	6.58	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	*	1	*	*	*	14	1	*	*	*	*	*	8	2	*	*	6	*	5	2	*	1	3	*	*	*	2	*	*
	FR_MW-SK1A_WG_2019-06-13_N_17	2019 06 13	601	< 3.0	0.26	< 0.10	48.4	< 0.020	< 0.050	13	0.0168	135	< 0.10	< 0.10	0.54	< 10	< 0.050	43.4	63.9	< 0.10	< 0.0050	1.69	< 0.50	2.73	**114**	< 0.010	2.74	127	< 0.010	< 0.10	< 10	5.53	< 0.50	< 1.0
	FR_MW-SK1A_QTR_2019-07-01_N	2019 07 29	666	< 3.0	0.35	< 0.10	60.7	< 0.020	< 0.050	20	0.0254	153	< 0.10	0.13	1.36	< 10	0.060	50.8	69.2	< 0.10	< 0.0050	1.67	< 0.50	3.03	**112**	< 0.010	2.75	149	< 0.010	< 0.10	< 10	5.66	< 0.50	1.5
	FR_DC2_QTR_2019-07-01_N	Duplicate	690	< 3.0	0.33	< 0.10	62.4	< 0.020	< 0.050	19	0.0254	159	< 0.10	0.12	< 0.50	< 10	< 0.050	51.7	71.0	< 0.10	< 0.0050	1.63	< 0.50	3.10	**112**	< 0.010	2.85	154	< 0.010	< 0.10	< 10	5.79	< 0.50	< 1.0
	QA/QC RPD%		4	*	*	*	3	*	*	*	0	4	*	*	*	*	*	2	3	*	*	2	*	2	0	*	4	3	*	*	*	2	*	*
	FR_MW-SK1A_QTR_2019-10-07_N	2019 10 24	875	< 3.0	0.15	< 0.10	72.4	< 0.020	< 0.050	18	0.0336	201	0.12	0.15	< 0.20	< 10	< 0.050	46.8	90.8	< 0.10	< 0.0050	0.525	< 0.50	2.60	**171**	< 0.010	4.08	201	< 0.010	< 0.10	< 10	5.10	< 0.50	< 1.0
FR_MW-SK1B	FR_MW_SK1-B_WG_Q1_2019_NP	2019 03 28	432	1.1	< 0.10	0.37	81.0	< 0.020	< 0.050	15	0.0094	116	< 0.10	0.24	< 0.20	231	< 0.050	10.9	34.6	*282*	< 0.0050	0.621	0.67	0.99	1.98	< 0.010	5.02	248	< 0.010	< 0.10	< 0.30	1.41	< 0.50	< 1.0
	FR_MW-SK1B_WG_2019-06-13_N_16	2019 06 13	447	< 3.0	< 0.10	0.22	61.4	< 0.020	< 0.050	13	0.0099	117	0.11	0.22	< 0.50	163	< 0.050	9.5	37.9	*278*	< 0.0050	0.579	0.80	1.03	1.98	< 0.010	4.45	239	0.012	< 0.10	< 10	1.88	< 0.50	5.5
	FR_MW-SK1B_QTR_2019-07-01_N	2019 07 29	448	< 3.0	0.15	0.21	54.4	< 0.020	< 0.050	15	0.0135	116	< 0.10	0.31	< 0.50	97	< 0.050	10.3	38.3	*287*	< 0.0050	0.539	1.19	1.03	3.23	< 0.010	4.44	239	0.014	< 0.10	< 10	2.30	< 0.50	1.4
	FR_MW-SK1B_20191024	2019 10 24	520	< 3.0	0.24	0.16	46.0	< 0.020	< 0.050	14	0.0210	135	< 0.10	0.46	< 0.20	25	< 0.050	10.5	44.3	*354*	< 0.0050	0.460	1.62	1.08	4.48	< 0.010	4.75	244	0.014	< 0.10	< 10	3.14	< 0.50	< 1.0
FR_09-01-A+	FR_09-01-A_QTR_2019-01-07_N	2019 03 14	589	< 3.0	0.15	< 0.10	59.0	< 0.020	< 0.050	< 10	0.0553	133	< 0.10	0.12	< 0.50	< 10	< 0.050	41.1	62.1	< 0.10	< 0.0050	0.637	0.69	2.08	**50.5**	< 0.010	2.66	178	< 0.010	< 0.10	< 10	3.49	< 0.50	< 1.0
	FR_09-01-A_QTR_2019-04-01_N	2019 05 30	813	< 3.0	0.22	< 0.10	87.0	< 0.020	< 0.050	12	0.0310	182	< 0.10	0.16	< 0.50	< 10	< 0.050	60.7	87.0	< 0.10	< 0.0050	1.03	< 0.50	2.94	**130**	< 0.010	3.29	239	< 0.010	< 0.10	< 10	5.90	< 0.50	< 1.0
	FR_09-01-A_QTR_2019-07-01_N	2019 07 29	622	< 3.0	0.40	< 0.10	68.0	< 0.020	< 0.050	20	0.0284	139	< 0.10	0.11	< 0.50	< 10	< 0.050	52.0	66.6	< 0.10	< 0.0050	2.20	< 0.50	3.01	**102**	< 0.010	2.53	160	< 0.010	< 0.10	< 10	6.36	< 0.50	< 1.0
	FR_09-01-A_QTR_2019-10-07_N	2019 11 01	861	< 3.0	0.28	< 0.10	91.1	< 0.020	< 0.050	20	0.0377	197	< 0.10	0.23	< 0.20	< 10	< 0.050	64.6	89.8	< 0.10	< 0.0050	0.781	0.59	3.29	**126**	< 0.010	3.42	240	< 0.010	< 0.10	< 10	5.28	< 0.50	< 1.0
FR_09-01-B+	FR_09-01-B_QTR_2019-01-07_N	2019 03 14	586	< 3.0	< 0.10	< 0.10	88.2	< 0.020	< 0.050	< 10	0.0351	134	0.10	0.13	< 0.50	< 10	< 0.050	34.4	61.2	< 0.10	< 0.0050	0.728	0.52	2.34	**52.2**	< 0.010	2.46	152	< 0.010	< 0.10	< 10	3.21	< 0.50	< 1.0
	FR_09-01-B_QTR_2019-04-01_N	2019 05 30	640	< 3.0	0.21	< 0.10	135	< 0.020	< 0.050	11	0.0280	147	< 0.10	< 0.10	< 0.50	< 10	< 0.050	45.8	66.1	< 0.10	< 0.0050	1.91	< 0.50	2.04	**76**	< 0.010	2.51	209	< 0.010	< 0.10	< 10	4.09	< 0.50	< 1.0
	FR_09-01-B_QTR_2019-07-01_N	2019 07 29	565	< 3.0	0.14	< 0.10	103	< 0.020	< 0.050	13	0.0153	130	< 0.10	0.17	< 0.50	< 10	< 0.050	50.6	58.7	< 0.10	< 0.0050	1.20	< 0.50	2.74	**83.2**	< 0.010	2.40	165	< 0.010	< 0.10	< 10	5.08	< 0.50	< 1.0
	FR_09-01-B_QTR_2019-10-07_N	2019 11 01	711	< 3.0	0.16	< 0.10	119	< 0.020	< 0.050	16	0.0327	164	< 0.10	0.49	< 0.20	< 10	< 0.050	54.1	73.0	< 0.10	< 0.0050	1.37	0.80	3.19	**70.7**	< 0.010	3.94	218	< 0.010	< 0.10	< 10	5.64	< 0.50	1.6

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[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.

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 2d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness 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
				Dissolved Metals																														
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
Fording River Valley (+ denotes well part of Study Area 1)																																		
FR_09-02-A	FR_09-02-A_QTR_2019-01-07_N	2019 03 14	608	< 3.0	0.15	< 0.10	113	< 0.020	< 0.050	< 10	0.0414	138	< 0.10	0.11	< 0.50	< 10	< 0.050	53.9	63.7	< 0.10	< 0.0050	1.65	0.51	1.53	***50.4***	< 0.010	2.62	197	< 0.010	< 0.10	< 10	3.82	< 0.50	< 1.0
	FR_09-02-A_QTR_2019-04-01_N	2019 05 30	433	< 3.0	0.13	< 0.10	130	< 0.020	< 0.050	< 10	0.0134	97.6	0.11	< 0.10	0.74	< 10	0.087	38.0	46.0	0.14	< 0.0050	1.28	< 0.50	1.69	***52.9***	< 0.010	2.38	158	< 0.010	< 0.10	< 10	2.98	< 0.50	3.1
	FR_09-02-A_QTR_2019-07-01_N	2019 07 26	435	< 3.0	0.27	< 0.10	110	< 0.020	< 0.050	16	0.0201	96.7	0.14	0.13	< 0.50	< 10	< 0.050	37.9	46.9	< 0.10	< 0.0050	1.97	< 0.50	2.18	***49***	< 0.010	2.02	138	< 0.010	< 0.10	< 10	3.77	< 0.50	< 1.0
	FR_DC1_QTR_2019-07-01_N	Duplicate	437	< 3.0	0.27	< 0.10	109	< 0.020	< 0.050	17	0.0225	99.0	< 0.10	0.13	< 0.50	< 10	< 0.050	37.2	46.1	< 0.10	< 0.0050	1.95	< 0.50	2.12	***49.5***	< 0.010	1.99	139	< 0.010	< 0.10	< 10	3.74	< 0.50	< 1.0
	QA/QC RPD%		0	*	*	*	1	*	*	*	*	2	*	*	*	*	*	2	2	*	*	1	*	3	1	*	1	1	*	*	*	1	*	*
	FR_09-02-A_QTR_2019-10-07_N	2019 10 24	458	< 3.0	0.24	0.15	119	< 0.020	< 0.050	16	0.0326	105	0.12	< 0.10	1.75	13	0.065	28.8	47.8	0.25	< 0.0050	1.70	< 0.50	2.25	***49.3***	< 0.010	2.26	147	< 0.010	< 0.10	< 10	2.79	< 0.50	4.2
	FR_DC3_QTR_2019-10-07_N	Duplicate	463	< 3.0	0.23	< 0.10	119	< 0.020	< 0.050	13	0.0272	106	0.13	< 0.10	< 0.20	< 10	< 0.050	28.9	48.3	< 0.10	< 0.0050	1.64	< 0.50	2.26	***52.4***	< 0.010	1.80	151	< 0.010	< 0.10	< 10	2.72	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	*	0	*	*	*	18	1	*	*	*	*	*	0	1	*	*	4	*	0	6	*	23	3	*	*	*	3	*	*
FR_09-02-B	FR_09-02-B_QTR_2019-01-07_N	2019 03 14	600	< 3.0	< 0.10	< 0.10	159	< 0.020	< 0.050	< 10	0.0334	138	< 0.10	0.12	< 0.50	< 10	< 0.050	43.6	62.1	< 0.10	< 0.0050	0.896	0.60	1.74	***51.8***	< 0.010	2.67	206	< 0.010	< 0.10	< 10	3.35	< 0.50	1.2
	FR_09-02-B_QTR_2019-04-01_N	2019 05 30	620	< 3.0	0.11	< 0.10	102	< 0.020	< 0.050	< 10	0.0200	142	< 0.10	0.14	< 0.50	< 10	< 0.050	40.6	64.6	< 0.10	< 0.0050	0.781	< 0.50	2.48	***111***	< 0.010	2.70	177	< 0.010	< 0.10	< 10	3.79	< 0.50	< 1.0
	FR_09-02-B_QTR_2019-07-01_N	2019 07 26	362	< 3.0	0.13	< 0.10	98.3	< 0.020	< 0.050	10	0.0137	81.4	0.13	0.14	< 0.50	< 10	< 0.050	33.3	38.4	< 0.10	< 0.0050	1.40	< 0.50	1.92	***30.6***	< 0.010	1.84	121	< 0.010	< 0.10	< 10	2.84	< 0.50	< 1.0
	FR_09-02-B_QTR_2019-10-07_N	2019 10 24	424	< 3.0	0.14	< 0.10	120	< 0.020	< 0.050	14	0.0207	96.7	0.12	0.12	< 0.20	< 10	< 0.050	37.3	44.2	< 0.10	< 0.0050	1.48	< 0.50	1.94	***36.3***	< 0.010	2.48	152	< 0.010	< 0.10	< 10	2.71	< 0.50	2.2
FR_GH_WELL4+	FR_GH_WELL4_QTR_2019-01-07_N	2019 03 21	767	< 3.0	< 0.10	< 0.10	106	< 0.020	< 0.050	12	0.0500	181	< 0.10	0.58	1.09	71	0.076	29.2	76.5	11.1	< 0.0050	0.329	< 0.50	1.44	***147***	< 0.010	2.98	242	< 0.010	< 0.10	< 10	3.39	< 0.50	31.9
	FR_GH_WELL4_QTR_2019-04-01_N	2019 06 13	818	< 3.0	< 0.10	< 0.10	109	< 0.020	< 0.050	11	0.0529	194	0.11	0.76	0.64	15	< 0.050	28.0	81.0	0.35	< 0.0050	0.314	< 0.50	1.74	***140***	< 0.010	2.99	250	< 0.010	< 0.10	< 10	4.18	< 0.50	13.9
	FR_GH_WELL4_QTR_2019-07-01_N	2019 07 30	720	< 3.0	< 0.10	< 0.10	92.5	< 0.020	< 0.050	10	0.0562	175	0.14	0.42	0.76	14	< 0.050	31.7	68.8	0.90	< 0.0050	0.365	< 0.50	1.49	***118***	< 0.010	2.69	237	< 0.010	< 0.10	< 10	3.77	< 0.50	29.4
	FR_DC3_QTR_2019-07-01_N	Duplicate	738	< 3.0	< 0.10	< 0.10	92.2	< 0.020	< 0.050	11	0.0519	183	0.11	0.44	0.78	14	< 0.050	33.1	68.3	0.80	< 0.0050	0.348	< 0.50	1.54	***117***	< 0.010	2.83	241	< 0.010	< 0.10	< 10	3.99	< 0.50	29.7
	QA/QC RPD%		2	*	*	*	0	*	*	*	8	4	*	*	*	*	*	4	1	12	*	5	*	3	1	*	5	2	*	*	*	6	*	1
	FR_GH_WELL4_QTR_2019-10-07_N	2019 11 01	697	< 3.0	< 0.10	< 0.10	81.1	< 0.020	< 0.050	11	0.0463	170	< 0.10	0.22	1.70	15	< 0.050	30.0	66.4	0.92	< 0.0050	0.336	< 0.50	1.49	***103***	< 0.010	3.00	226	< 0.010	< 0.10	< 10	3.62	< 0.50	64.0
FR_MW_FRRD1	FR_MW_FRRD1_WG_Q1-2019_NP	2019 03 26	316	3.2	0.23	0.43	190	< 0.020	< 0.050	11	0.0423	91.1	0.16	0.53	0.33	< 10	< 0.050	6.7	21.121.4	190	< 0.0050	0.846	3.21	1.71	0.790	< 0.010	21.0	135	0.012	0.23	< 0.30	1.13	< 0.50	4.4
	FR_MW_FRRD1_A_WG_Q1-2019_NP	Duplicate	314	3.9	0.22	0.44	183	< 0.020	< 0.050	11	0.0424	90.4	0.16	0.55	0.32	< 10	3.38	6.7	21.121.5	184	< 0.0050	0.824	3.14	1.73	0.712	< 0.010	21.0	130	0.011	0.24	< 0.30	1.16	< 0.50	3.8
	QA/QC RPD%		1	*	*	*	4	*	*	*	0	1	*	4	*	*	*	0	*	3	*	3	2	1	10	*	0	4	*	*	*	3	*	*
	FR_MW_FRRD1_WG_2019_05_23_NP	2019 05 23	324	1.6	0.11	0.26	259	< 0.020	< 0.050	< 10	0.0135	94.7	0.10	0.12	0.28	< 10	< 0.050	6.2	21.3	63.2	< 0.0050	0.582	1.07	1.50	0.995	< 0.010	28.8	141	0.015	< 0.10	< 0.30	0.840	< 0.50	< 1.0
	FR_MW_FRRD1_WG_2019_07_08_NP	2019 07 08	350	1.6	< 0.10	0.21	299	< 0.020	< 0.050	< 10	0.0214	103	< 0.10	< 0.10	< 0.20	< 10	< 0.050	5.9	22.4	33.6	< 0.0050	0.562	0.91	1.48	2.27	< 0.010	35.0	158	0.014	< 0.10	< 0.30	0.719	< 0.50	1.2
	FR_MW_CH10-A_WG_2019_07_08_NP	Duplicate	354	1.5	< 0.10	0.20	302	< 0.020	< 0.050	< 10	0.0194	105	< 0.10	< 0.10	< 0.20	< 10	< 0.050	6.2	22.1	33.6	< 0.0050	0.580	0.82	1.48	2.22	< 0.010	34.7	165	0.013	< 0.10	< 0.30	0.754	< 0.50	1.7
	QA/QC RPD%		1	*	*	*	1	*	*	*	*	2	*	*	*	*	*	5	1	0	*	3	*	0	2	*	1	4	*	*	*	5	*	*
	FR_MW_FRRD1_WG_2019_09_18_NP	2019 09 18	337	3.7	< 0.10	0.22	287	< 0.020	< 0.050	10	0.0134	98.0	< 0.10	< 0.10	0.26	< 10	< 0.050	6.7	22.4	23.9	< 0.0050	0.564	1.10	1.86	0.956	< 0.010	29.6	145	0.015	< 0.10	< 0.30	0.867	< 0.50	< 1.0
	FR_MW_CH10-A_WG_2019_09_18_NP	Duplicate	338	3.4	< 0.10	0.22	290	< 0.020	< 0.050	10	0.0135	97.3	< 0.10	< 0.10	0.24	< 10	< 0.050	7.0	23.0	23.4	< 0.0050	0.553	1.06	1.86	0.994	< 0.010	30.4	148	0.016	< 0.10	< 0.30	0.818	< 0.50	< 1.0
	QA/QC RPD%		0	*	*	*	1	*	*	*	*	1	*	*	*	*	*	4	3	2	*	2	*	0	4	*	3	2	*	*	*	6	*	*
	FR_MW_FRRD1_WG_2019_11_25_NP	2019 11 25	368	2.1	< 0.10	0.22	345	< 0.020	< 0.050	< 10	0.0184	107	< 0.10	< 0.10	0.40	< 10	< 0.050	5.7	24.7	37.4	< 0.0050	0.520	0.80	1.67	0.278	< 0.010	23.3	148	< 0.010	< 0.10	< 0.30	0.803	< 0.50	< 1.0
	FR_MW_CH10-A_WG_2019_11_25_NP	Duplicate	343	1.9	< 0.10	0.20	317	< 0.020	< 0.050	< 10	0.0137	98.4	< 0.10	< 0.10	0.24	< 10	< 0.050	5.3	23.6	34.5	< 0.0050	0.471	0.72	1.51	0.243	< 0.010	22.1	140	0.017	< 0.10	< 0.30	0.808	< 0.50	< 1.0
	QA/QC RPD%		7	*	*	*	8	*	*	*	*	8	*	*	*	*	*	7	5	8	*	10	*	10	*	*	5	6	*	*	*	1	*	*
FR_MW_CASW6-A	FR_MW-CASW6-A_WG_Q1-2019_NP	2019 02 28	282	< 5.0	0.56	6.02	7,080	< 0.10	< 0.25	131	< 0.025	81.3	< 0.50	1.14	< 1.0	245	< 0.25	241	19.019.1	181	0.0081	4.95	5.0	6.20	< 0.25	< 0.050	47.4	1,530	< 0.050	< 0.50	< 1.5	0.659	< 2.5	8.9
	FR_MW_CASW6-A_WG_2019_05_22_NP	2019 05 22	321	< 1.0	< 0.10	15.4	**11,600**	< 0.020	< 0.050	108	0.0085	93.4	< 0.10	1.14	< 0.20	1,360	< 0.050	369	21.3	133	< 0.0050	4.95	8.08	5.98	< 0.050	< 0.010	56.8	1,900	0.015	< 0.10	< 0.30	0.125	< 0.50	9.2
	FR_MW_CH10-A_WG_2019_05_22_NP	Duplicate	316	< 1.0	< 0.10	15.3	**11,800**	< 0.020	< 0.050	100	0.0070	92.2	< 0.10	1.10	< 0.20	1,340	< 0.050	370	20.8	141	< 0.0050	4.89	7.83	5.91	< 0.050	< 0.010	56.2	1,920	0.013	< 0.10	< 0.30	0.136	< 0.50	9.1
	QA/QC RPD%		2	*	*	1	2	*	*	8	*	1	*	4	*	1	*	0	2	6	*	1	3	1	*	*	1	1	*	*	*	8	*	1
	FR_MW_CASW6-A_WG_2019-07-09_NP	2019 07 09	315	< 1.0	< 0.10	14.9	**10,300**	< 0.020	< 0.050	121	0.0168	94.6	< 0.10	1.08	< 0.20	1,590	< 0.050	334	19.0	89.8	< 0.0050	4.73	8.51	5.41	< 0.050	< 0.010	51.2	2,200	0.015	< 0.10	< 0.30	0.096	< 0.50	9.6
	FR_MW_CASW6-A_WG_2019-09-16_NP	2019 09 16	319	< 1.0	< 0.10	18.2	**11,500**	< 0.020	< 0.050	105	0.0065	88.7	< 0.10	1.06	< 0.20	1,850	< 0.050	315	23.6	93.0	< 0.0050	5.32	9.37	6.12	< 0.050	< 0.010	60.0	1,850	0.015	< 0.10	< 0.30	0.076	< 0.50	6.9
	FR_MW_CASW6-A_WG_2019_11_25_NP	2019 11 25	327	< 1.0	< 0.10	19.2	**12,900**	< 0.020	< 0.050	85	0.0065	94.5	< 0.10	1.10	< 0.20	2,110	< 0.050	337	22.0	86.5	< 0.0050	5.00	9.58	6.72	0.054	< 0.010	60.1	1,810	< 0.010	< 0.10	< 0.30	0.064	< 0.50	8.6
FR_MW_CASW6-B	FR_MW-CASW6-B_WG_Q1-2019_NP	2019 02 28	429	1,310	0.56	2.04	706	0.19	< 0.25	122	0.629	114	2.76	14.9	6.5	*6,880*	5.04	42.2	34.135.1	*2,600*	0.0060	3.63	21.4	3.81	0.54	0.105	137	441	0.087	< 0.50	16.7	6.03	5.5	30.3
	FR_MW_CASW6-B_WG_2019_05_22_NP	2019 05 22	386	2.1	< 0.10	5.20	772	< 0.020	< 0.050	11	0.0056	102	0.13	21.2	< 0.20	*39,700*	< 0.050	4.7	31.7	*2,070*	< 0.0050	3.46	26.9	1.80	0.119	< 0.010	93.0	245	< 0.010	< 0.10	< 0.30	0.841	< 0.50	11.4
	FR_MW_CASW6-B_WG_2019-07-09_NP	2019 07 09	386	1.5	< 0.10	5.98	839	< 0.020	< 0.050	14	0.0053	107	< 0.10	19.3	< 0.20	*39,500*	< 0.050	5.1	29.0	*1,710*	< 0.0050	4.17	26.1	1.69	0.099	< 0.010	71.2	324	< 0.010	< 0.10	< 0.30	0.726	< 0.50	5.3
	FR_MW_CASW6-B_WG_2019-09-16_NP	2019 09 16	466	2.2	< 0.10	7.51	1,040	< 0.020	< 0.050	12	0.0074	119	0.15	19.3	< 0.20	*45,100*	< 0.050	4.6	40.9	*2,190*	< 0.0050	4.43	30.3	2.16	0.147	< 0.010	82.2	311	< 0.010	< 0.10	< 0.30	0.401	< 0.50	7.2
	FR_MW_CASW6-B_WG_2019_11_26_NP	2019 11 26	415	5.8	< 0.10	4.68	994	< 0.020	< 0.050	< 10	0.0159	111	< 0.10	16.9	0.23	*34,200*	< 0.050	4.3	33.7	*1,740*	< 0.0050	2.94	31.0	1.75	0.138	< 0.010	74.8	256	< 0.010	0.18	< 0.30	0.252	< 0.50	7.6
FR_MW_CH1-A	FR_MW-CH1-A_WG_Q1-2019_NP	2019 02 28	153	4.2	< 0.10	0.15	109	< 0.020	< 0.050	< 10	0.0123	41.1	0.17	< 0.10	< 0.20	< 10	< 0.050	5.7	12.112.3	69.4	< 0.0050	1.33	< 0.50	0.42	0.983	< 0.010	1.28	83.4	< 0.010	< 0.10	< 0.30	0.538	< 0.50	< 1.0
	FR_MW-CH1-D_WG_Q1-2019_NP	Duplicate	152	3.9	< 0.10	0.14	120	< 0.020	< 0.050	< 10	0.0146	40.9	0.21	< 0.10	< 0.20	< 10	< 0.050	6.3	12.012.2	69.0	0.0096	1.31	< 0.50	0.42	0.986	< 0.010	1.26	84.7	< 0.010	< 0.10	< 0.30	0.520	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	*	10	*	*	*	*	0	*	*	*	*	*	10	*	1	*	2	*	0	0	*	2	2	*	*	*	3	*	*
	FR_MW_CH1-A_WG_2019_05_22_NP	2019 05 22	151	1.0	< 0.10	< 0.10	64.6	< 0.020	< 0.050	< 10	0.0052	41.6	0.20	< 0.10	< 0.20	< 10	< 0.050	3.0	11.3	1.70	< 0.0050	0.443	< 0.50	0.31	1.05	< 0.010	1.19	71.1	< 0.010	< 0.10	< 0.30	0.532	< 0.50	1.8
	FR_MW_CH1-A_WG_2019_07_08_NP	2019 07 08	133	3.7	< 0.10	< 0.10	57.2	< 0.020	< 0.050	< 10	0.0100	37.9	0.17	< 0.10	< 0.20	< 10	< 0.050	3.2	9.26	0.46	< 0.0050	2.54	< 0.50	0.31	0.767	< 0.010	1.11	69.4	< 0.010	< 0.10	< 0.30	0.475	< 0.50	1.4
	FR_MW_CH1-A_WG_2019-09-16_NP	2019 09 16	145	1.3	< 0.10	< 0.10	64.9	< 0.020	< 0.050	< 10	0.0067	38.7	0.21	< 0.10	< 0.20	< 10	< 0.050	3.6	11.8	0.74	< 0.0050	0.694	< 0.50	0.36	0.714	< 0.010	1.10	67.7	< 0.010	< 0.10	< 0.30	0.548	< 0.50	< 1.0
	FR_MW_CH1-A_WG_2019_11_25_NP	2019 11 25	165	1.6	< 0.10	< 0.10	157	< 0.020	< 0.050	< 10	0.0285	44.5	0.20	< 0.10	0.25	< 10	< 0.050	7.0	13.2	31.4	< 0.0050	1.61	< 0.50	0.45	0.851	< 0.010	1.76	89.5	< 0.010	< 0.10	< 0.30	0.577	< 0.50	< 1.0

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[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.

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 2d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness mg/L	Dissolved Metals Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium 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
Blanks																																		
Field Blank																																		
FR_HMW1D	FR_FLD_QTR_2019-01-07_N	2019 02 13	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	46	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 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
FR_KB-3A	FR_FLD_2019-02-26	2019 02 26	< 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	< 10	< 0.010	< 0.50	< 1.0
FR_09-04-A	FR_FLD_QTR_2019-04-01_N	2019 04 11	< 0.50	< 3.0	< 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	< 0.10	< 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
FR_KB-1	FR_FLD_2019-06-10_NP	2019 06 10	< 0.50	< 3.0	< 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	< 0.10	< 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
FR_09-04-A	FR_FLD_QTR_2019-07-01_N	2019 07 29	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 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
FR_KB-1	FR_FLD-2019-07-31	2019 07 31	< 0.50	< 3.0	< 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	< 0.10	< 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
FR_TBSSMW-1	FR_FLD-2019-10-07	2019 10 07	< 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	2.8
FR_KB-2	FR_FLD4_2019-10-21	2019 10 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	< 10	< 0.010	< 0.50	< 1.0
FR_HMW1D	FR_FLD_QTR_2019-10-07_N	2019 10 23	< 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
FR_KB-3A	FR_FLD4-2019-12-11	2019 12 11	< 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
Trip Blank																																		
	FR_TRP_QTR_2019-01-07_N	2019 02 13	-	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	FR_TRP_2019-02-26	2019 02 25	-	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	FR_TRP_2019-04-10	2019 04 10	< 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	< 10	< 0.010	< 0.50	< 1.0
	FR_TRP_QTR_2019-04-01_N	2019 04 11	-	< 3.0	< 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	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 0.30	< 0.010	< 0.50	< 3.0
	FR_TRP_2019-06-10_NP	2019 06 10	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	0.12	< 0.10	< 0.50	< 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
	FR_TRP_QTR_2019-07-01_N	2019 07 24	< 0.50	< 3.0	< 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	< 0.10	< 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
	FR_TRP_2019-10-21	2019 10 21	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	FR_TRP_QTR_2019-10-07_N	2019 10 22	< 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

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

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.

Table 2e: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
Guidelines for Canadian Drinking Water Quality (DW)				50
SPO			Fording River [GH_FR1 (0200378)]	63
Compliance Point			Fording River [FR_FRCP1 (E300071)]	130
Henretta Creek Valley (^ denotes well part of Background)				
FR_HMW1D	FR_HMW1D_QTR_2019-01-07_N	2019 03 13	FR_FRCP1 (E300071)	**119**
	FR_HMW1D_QTR_2019-04-01_N	2019 05 29	FR_FRCP1 (E300071)	**55.4**
	FR_HMW1D_QTR_2019-07-01_N	2019 07 25	FR_FRCP1 (E300071)	23.5
FR_HMW1S	FR_HMW1S_QTR_2019-01-07_N	2019 03 13	FR_FRCP1 (E300071)	**214**
	FR_HMW1S_QTR_2019-04-01_N	2019 05 29	FR_FRCP1 (E300071)	**194**
	FR_HMW1S_QTR_2019-07-01_N	2019 07 25	FR_FRCP1 (E300071)	**213**
	FR_HMW1S_QTR_2019-10-07_N	2019 10 23	FR_FRCP1 (E300071)	**109**
FR_HMW2	FR_HMW2_QTR_2019-01-07_N	2019 03 11	FR_FRCP1 (E300071)	**522**
	FR_HMW2_QTR_2019-04-01_N	2019 05 29	FR_FRCP1 (E300071)	**510**
	FR_HMW2_QTR_2019-07-01_N	2019 07 25	FR_FRCP1 (E300071)	**407**
	FR_HMW2_QTR_2019-10-07_N	2019 10 22	FR_FRCP1 (E300071)	**745**
FR_HMW3	FR_HMW3_QTR_2019-01-07_N	2019 03 11	FR_FRCP1 (E300071)	**62.3**
	FR_DC1_QTR_2019-01-07_N	Duplicate	FR_FRCP1 (E300071)	**71.3**
		QA/QC RPD%		13
	FR_HMW3_QTR_2019-04-01_N	2019 05 16	FR_FRCP1 (E300071)	**55.5**
	FR_DC2_QTR_2019-04-01_N	Duplicate	FR_FRCP1 (E300071)	**51.7**
		QA/QC RPD%		7
	FR_HMW3_QTR_2019-07-01_N	2019 07 24	FR_FRCP1 (E300071)	42
	FR_HMW3_QTR_2019-10-07_N	2019 10 23	FR_FRCP1 (E300071)	**60.6**
	FR_DC2_QTR_2019-10-07_N	Duplicate	FR_FRCP1 (E300071)	**59.2**
		QA/QC RPD%		2
Fording River Valley (+ denotes well part of Study Area 1)				
FR_TBSSMW-2	FR_TBSSMW-2_2019-03-26	2019 03 26	FR_FRCP1 (E300071)	32.4
	FR_TBSSMW-2_2019-06-04	2019 06 04	FR_FRCP1 (E300071)	12.7
	FR_TBSSMW-2_2019-08-08	2019 08 08	FR_FRCP1 (E300071)	12.8
	FR_TBSSMW2-2019_10_07	2019 10 07	FR_FRCP1 (E300071)	21.1
	FR_TBSSMW-2-2019-11-26	2019 11 26	FR_FRCP1 (E300071)	36.3
FR_POTWELLS	FR_POTWELLS_QTR_2019-01-07_N	2019 03 14	FR_FRCP1 (E300071)	25.3
	FR_POTWELLS_QTR_2019-10-07_N	2019 11 07	FR_FRCP1 (E300071)	17.4
FR_GCMW-2	FR_GCMW-2_QTR_2019-01-07_N	2019 03 13	FR_FRCP1 (E300071)	**121**
	FR_GCMW-2_QTR_2019-04-01_N	2019 06 14	FR_FRCP1 (E300071)	**73.8**
	FR_GCMW-2_QTR_2019-07-01_N	2019 07 26	FR_FRCP1 (E300071)	**80.6**
	FR_GCMW-2_QTR_2019-10-07_N	2019 11 07	FR_FRCP1 (E300071)	**97.9**
FR_MW-1B	FR_MW-1B_QTR_2019-01-07_N	2019 03 22	FR_FRCP1 (E300071)	44.6
	FR_MW-1B_QTR_2019-04-01_N	2019 05 30	FR_FRCP1 (E300071)	19.8
	FR_MW-1B_QTR_2019-07-01_N	2019 07 25	FR_FRCP1 (E300071)	18.5
	FR_MW-1B_QTR_2019-10-07_N	2019 11 07	FR_FRCP1 (E300071)	40.1
FR_MW_STPSW-A	FR_MW_STPSW-A_WG_2019_11_26_NP	2019 11 26	FR_FRCP1 (E300071)	10.9
FR_MW_STPSW-B	FR_MW_STPSW-B_WG_2019_09_18_NP	2019 09 18	FR_FRCP1 (E300071)	39.1
	FR_MW_STPSW-B_WG_2019_11_26_NP	2019 11 26	FR_FRCP1 (E300071)	**62.7**
FR_KB-1	FR_KB-1_2019-02-28	2019 02 28	FR_FRCP1 (E300071)	**378**
	FR_KB-1_2019-04-10	2019 04 10	FR_FRCP1 (E300071)	**287**
	FR_KB-1-2019-06-11_NP	2019 06 11	FR_FRCP1 (E300071)	**206**
	FR_KB_1_2019-07-31	2019 07 31	FR_FRCP1 (E300071)	**116**
	FR_KB-1_2019-10-09	2019 10 09	FR_FRCP1 (E300071)	**175**
	FR_KB-1-2019-11-27	2019 11 27	FR_FRCP1 (E300071)	**215**
FR_KB-2	FR_KB-2_2019-02-28	2019 02 28	FR_FRCP1 (E300071)	**273**
	FR_KB-2_2019-04-10	2019 04 10	FR_FRCP1 (E300071)	**300**
	FR_KB-2_2019-06-10_NP	2019 06 10	FR_FRCP1 (E300071)	**174**
	FR_KB_2_2019-07-31	2019 07 31	FR_FRCP1 (E300071)	**122**
	FR_DC1-2019-07-31	Duplicate	FR_FRCP1 (E300071)	**121**
		QA/QC RPD%		1
	FR_KB-2_2019-10-21	2019 10 21	FR_FRCP1 (E300071)	**170**
	FR_DC4_2019-10-21	Duplicate	FR_FRCP1 (E300071)	**167**
		QA/QC RPD%		2
	FR_KB-2-2019-12-10	2019 12 10	FR_FRCP1 (E300071)	**192**

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

BOLD	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
SHADED	Concentration greater than SPO by Area/Compliance Point by Area

Table 2e: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (FRO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
Guidelines for Canadian Drinking Water Quality (DW)				50
SPO			Fording River [GH_FR1 (0200378)]	63
Compliance Point			Fording River [FR_FRCP1 (E300071)]	130
Fording River Valley (+ denotes well part of Study Area 1)				
FR_KB-3A	FR_KB-3A_2019-02-26	2019 02 26	FR_FRCP1 (E300071)	**237**
	FR_DC1_2019-02-26	2019 02 26	FR_FRCP1 (E300071)	**233**
	QA/QC RPD%			2
	FR_KB-3A_2019-03-25	2019 03 25	FR_FRCP1 (E300071)	**244**
	FR_DC1_2019-03-25	Duplicate	FR_FRCP1 (E300071)	**241**
	QA/QC RPD%			1
	FR_KB-3A_2019-06-10_NP	2019 06 10	FR_FRCP1 (E300071)	**216**
	FR_DC-4_2019-06-10_NP	Duplicate	FR_FRCP1 (E300071)	**208**
	QA/QC RPD%			4
	FR_KB_3A_2019-07-30	2019 07 30	FR_FRCP1 (E300071)	**266**
	FR_KB-3A_2019-10-18	2019 10 18	FR_FRCP1 (E300071)	**226**
	FR_KB-3A-2019-12-11	2019 12 11	FR_FRCP1 (E300071)	**194**
FR_KB-3B	FR_KB-3B_2019-02-25	2019 02 25	FR_FRCP1 (E300071)	**281**
	FR_KB-3B_2019-03-25	2019 03 25	FR_FRCP1 (E300071)	**297**
	FR_KB-3B_2019-06-10_NP	2019 06 10	FR_FRCP1 (E300071)	**271**
	FR_KB_3B_2019-07-30	2019 07 30	FR_FRCP1 (E300071)	**200**
	FR_KB-3B_2019-10-18	2019 10 18	FR_FRCP1 (E300071)	**188**
	FR_KB-3B-2019-12-11	2019 12 11	FR_FRCP1 (E300071)	**191**
	FR_DC4-2019-12-11	Duplicate	FR_FRCP1 (E300071)	**184**
	QA/QC RPD%			4
FR_MW-SK1A	FR_MW_SK1-A_WG_Q1_2019_NP	2019 03 28	FR_FRCP1 (E300071)	**266**
	FR_MW_SK1-C_WG_Q1-2019_NP	Duplicate	FR_FRCP1 (E300071)	**260**
	QA/QC RPD%			2
	FR_MW-SK1A_WG_2019-06-13_N_17	2019 06 13	FR_FRCP1 (E300071)	**114**
	FR_MW-SK1A_QTR_2019-07-01_N	2019 07 29	FR_FRCP1 (E300071)	**112**
	FR_DC2_QTR_2019-07-01_N	Duplicate	FR_FRCP1 (E300071)	**112**
	QA/QC RPD%			0
	FR_MW-SK1A_QTR_2019-10-07_N	2019 10 24	FR_FRCP1 (E300071)	**171**
FR_09-01-A+	FR_09-01-A_QTR_2019-01-07_N	2019 03 14	FR_FRCP1 (E300071)	**50.5**
	FR_09-01-A_QTR_2019-04-01_N	2019 05 30	FR_FRCP1 (E300071)	**130**
	FR_09-01-A_QTR_2019-07-01_N	2019 07 29	FR_FRCP1 (E300071)	**102**
	FR_09-01-A_QTR_2019-10-07_N	2019 11 01	FR_FRCP1 (E300071)	**126**
FR_09-01-B+	FR_09-01-B_QTR_2019-01-07_N	2019 03 14	FR_FRCP1 (E300071)	**52.2**
	FR_09-01-B_QTR_2019-04-01_N	2019 05 30	FR_FRCP1 (E300071)	**76**
	FR_09-01-B_QTR_2019-07-01_N	2019 07 29	FR_FRCP1 (E300071)	**83.2**
	FR_09-01-B_QTR_2019-10-07_N	2019 11 01	FR_FRCP1 (E300071)	**70.7**
FR_09-02-A	FR_09-02-A_QTR_2019-01-07_N	2019 03 14	FR_FRCP1 (E300071)	**50.4**
	FR_09-02-A_QTR_2019-04-01_N	2019 05 30	FR_FRCP1 (E300071)	**52.9**
	FR_09-02-A_QTR_2019-07-01_N	2019 07 26	FR_FRCP1 (E300071)	49
	FR_DC1_QTR_2019-07-01_N	Duplicate	FR_FRCP1 (E300071)	49.5
	QA/QC RPD%			1
	FR_09-02-A_QTR_2019-10-07_N	2019 10 24	FR_FRCP1 (E300071)	49.3
	FR_DC3_QTR_2019-10-07_N	Duplicate	FR_FRCP1 (E300071)	**52.4**
	QA/QC RPD%			6
FR_09-02-B	FR_09-02-B_QTR_2019-01-07_N	2019 03 14	FR_FRCP1 (E300071)	**51.8**
	FR_09-02-B_QTR_2019-04-01_N	2019 05 30	FR_FRCP1 (E300071)	**111**
	FR_09-02-B_QTR_2019-07-01_N	2019 07 26	FR_FRCP1 (E300071)	30.6
	FR_09-02-B_QTR_2019-10-07_N	2019 10 24	FR_FRCP1 (E300071)	36.3
FR_GH_WELL4+	FR_GH_WELL4_QTR_2019-01-07_N	2019 03 21	GH_FR1 (0200378)	**147**
	FR_GH_WELL4_QTR_2019-04-01_N	2019 06 13	GH_FR1 (0200378)	**140**
	FR_GH_WELL4_QTR_2019-07-01_N	2019 07 30	GH_FR1 (0200378)	**118**
	FR_DC3_QTR_2019-07-01_N	Duplicate	GH_FR1 (0200378)	**117**
	QA/QC RPD%			1
	FR_GH_WELL4_QTR_2019-10-07_N	2019 11 01	GH_FR1 (0200378)	**103**

Data provided by Teck Coal Ltd.

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

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

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

BOLD	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
SHADED	Concentration greater than SPO by Area/Compliance Point by Area

Table 3a: Summary of Groundwater Monitoring Locations, Well Installation Details and Hydrogeological Information (GHO)

Area	Well ID	Monitoring Program[a]	Well Type	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
Porter Creek Drainage (Fording River Valley)	GH_MW-PC	SSGMP, RGMP	Monitoring	653526	5555339	1583.50	1582.28	1.22	45.0	51	3.5	6.5	Gravel and Cobbles	5.5	6.3E-07
Greenhills Creek Drainage (Fording River Valley)	GH_MW-SITE-A[f]	SSGMP[a]	Monitoring	653747	5547430	1738.12	1739.46	1.34	37.8	100	32.3	35.3	Sand / Clay	-	-
	GH_MW-GHC-A[g]	SSGMP	Monitoring	654052[i]	5547207[i]	1610.00	1610.80	0.80	23.2	51	18.3	21.4	Bedrock	14.6	5.0E-05
	GH_MW-GHC-B[h]	SSGMP	Monitoring	654050[i]	5547205[i]	1610.00	1610.80	0.80	14.6	51	4.6	7.6	Silty Gravel	14.6	3.0E-07
	GH_MW-TD	SSGMP	Monitoring	652694	5546536	1600.00	1600.75	0.75	38.1	51	31.4	34.4	Sand and Silt	35.1	-
	GH_MW-RLP-1D	SSGMP[j], RGMP	Monitoring	654088	5545381	1495.00	1496.22[k]	1.22[e]	83.5	51	79.5	82.5	Sand and Gravel	-	-
	GH_POTW09	SSGMP[b], RGMP	Supply	654208	5545404	-	-	-	37.0	-	26.8	36.3	Silty Gravel	36.1	-
	GH_POTW10	RGMP	Supply	653291	5545484	-	-	-	53.6	-	-	-	Gravel and Cobbles	-	-
	GH_POTW15	RGMP	Supply	653169	5545667	-	-	-	43.9	-	-	-	Gravel and Cobbles	-	-
	GH_POTW17	SSGMP[b], RGMP	Supply	653698	5545811	1504	-	-	47.2	-	39.3	42.4	Sand and Gravel	-	1.3E-04
Elk River Valley	GH_GA-MW-1	SSGMP, RGMP	Monitoring	648019	5554750	1379.21	1380.26	1.05	22.6	-	15.5	18.5	Clayey Sand	22.6	1.0E-12
	GH_MW-MC-1D	SSGMP[b]	Monitoring	647979	5553565	1313.08	1313.99	0.91	47.2	51	30.4	31.9	Sand and Gravel	42.7	2.6E-04
	GH_MW-MC-1S	SSGMP[b]	Monitoring			1313.10	1314.01	0.91		51	9.3	10.8	Sand and Gravel		2.5E-03
	GH_MW-MC-2D	SSGMP[b]	Monitoring	648211	5553498	1314.13	1315.13	1.00	16.8	51	12.2	15.2	Sand and Gravel	15.8	7.1E-08
	GH_MW-MC-2S	SSGMP[b]	Monitoring			1314.13	1315.12	0.99		51	4.5	6.0	Silt / Sand and Gravel		2.0E-05
	GH_GA-MW-4	SSGMP, RGMP	Monitoring	648217	5552963	1312.15	1313.05	0.90	17.2	-	13.7	16.7	Sand and Gravel	-	1.0E-04
	GH_GA-MW-2	SSGMP, RGMP	Monitoring	648291	5552115	1306.66	1307.68	1.02	29.6	-	23.0	29.0	Sand/Silt	28.5	1.0E-03
	GH_GA-MW-3	SSGMP, RGMP	Monitoring	648578	5550296	1299.78	1300.75	0.97	14.4	-	8.0	14.0	Sand and Gravel	14.4	2.0E-06
	GH_MW-UTC-A[c]	SSGMP	Monitoring	651011	5549879	1602.00	1603.22	1.22[e]	50.0	51	40.0	43.0	Bedrock	7.0	2.4E-08
	GH_MW-UTC-B[d]	SSGMP	Monitoring	651011	5549879	1602.00	1603.22	1.22[e]	7.6	51	4.5	7.5	Clay/Bedrock	5.5	1.0E-06
	GH_MW-ERSC-1	SSGMP[b], RGMP	Monitoring	649081	5548704	1283.36	1284.11	0.75	7.9	-	4.1	7.2	Sand and Gravel/Bedrock	6.1	3.0E-06

Notes:

[a] SSGMP denotes GHO Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.
[b] Included in the SSGMP Program based on the 2018 SSGMP Update.
[c] Previously known as GH_MW-UTC-1D.
[d] Previously known as GH_MW-UTC-1S.
[e] Stick up not surveyed, but reported estimate was 1.22 m.
[f] Previously known as GHO_CCR-12-01.
[g] Previously known as GH_MW-GHC-1D.
[h] Previously known as GH_MW-GHC-1S.
[i] UTM coordinates obtained from LiDAR.
[j] Removal of well proposed in the 2018 SSGMP Update.
[k] TOC elevation has been corrected to reflect estimated top of pipe casing.
masl = metres above sea level
mbgs = metres below ground surface
TOC = top of pipe casing
"-" denotes data not available

Table 3b: Summary of Groundwater Levels and Sampling Information (GHO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		m/m	Direction	Quarter	
Porter Creek Watershed (Fording River Valley)	GH_MW-PC	1583.50	1582.28	1.22	2019-03-25	4.01	1578.27				Q1, Q2, Q3, Q4	Bladder Pump
					2019-06-05	5.78	1576.50					
					2019-09-16	4.51	1577.77					
					2019-12-12	4.30	1577.98					
Greenhills Creek Watershed (Fording River Valley)	GH_MW-SITE-A[c]	1738.12	1739.46	1.34	2019-03-28	Dry	-				Q2, Q3, Q4	Bladder Pump
					2019-06-19	Dry	-					
					2019-09-24	35.48	1703.98					
					2019-12-11	35.41	1704.05					
	GH_MW-GHC-A[d]	1610.00	1610.80	0.80	2019-03-28	9.91	1600.89	GH_MW_GHC-A and GH_MW_GHC-B	0.64	Downward	Q3, Q4	Bladder Pump
					2019-04-25	8.90	1601.90		0.57	Downward		
					2019-08-26	9.17	1601.63		0.48	Downward		
					2019-11-20	9.37	1601.43		0.44	Downward		
	GH_MW-GHC-B[e]	1610.00	1610.80	0.80	2019-03-28	1.10	1609.70				Q3, Q4	Bladder Pump
					2019-04-25	1.13	1609.67					
					2019-08-26	2.60	1608.20					
					2019-11-20	3.28	1607.53					
	GH_MW-TD	1600.00	1600.75	0.75	2019-03-12	Artesian	> 1600.75				-	Discharge Spigot
					2019-05-27	Artesian	> 1600.75					
					2019-08-28	Artesian	> 1600.75					
					2019-12-12	Artesian	> 1600.75					
	GH_MW-RLP-1D	1495.00	1496.22[g]	1.22[f]	2019-03-25	6.12	1490.10				Q1	Bladder Pump
					2019-04-30	6.49	1489.74					
					2019-09-24	5.64	1490.58					
					2019-12-12	5.83	1490.39					
	GH_POTW09	-	-	-	-	-	-				Q1, Q2, Q3, Q4[h]	Distribution Point
	GH_POTW10	-	-	-	-	-	-				Q1, Q2, Q3, Q4[h]	Distribution Point
	GH_POTW15	-	-	-	-	-	-				Q1, Q2, Q3, Q4[h]	Distribution Point
	GH_POTW17	1504.00	-	-	-	-	-				Q1, Q2, Q3, Q4[h]	Distribution Point
Elk River Valley	GH_GA-MW-1	1379.21	1380.26	1.05	2019-03-04	17.15	1363.11				Q2, Q3, Q4	Bladder Pump
					2019-04-29	16.92	1363.34					
					2019-07-30	16.85	1363.42					
					2019-11-27	16.74	1363.52					
	GH_MW-MC-1D	1313.08	1313.99	0.91	2019-04-16	3.12	1310.87	GH_MW-MC-1D and GH_MW-MC-1S	0.02	Upward	Q1, Q2, Q3, Q4	Peristaltic Pump
					2019-06-26	2.48	1311.51		0.01	Upward		
					2019-08-19	2.98	1311.01		0.02	Upward		
					2019-10-28	3.27	1310.72		0.03	Upward		
					2019-12-09	3.29	1310.69		0.03	Upward		
	GH_MW-MC-1S	1313.10	1314.01	0.91	2019-04-16	3.55	1310.46				Q1, Q2, Q3, Q4	Peristaltic Pump
					2019-06-26	2.66	1311.35					
					2019-08-19	3.36	1310.65					
					2019-10-28	3.82	1310.19					
					2019-12-09	3.87	1310.14					
	GH_MW-MC-2D	1314.13	1315.13	1.00	2019-01-29	2.96	1312.17	GH_MW-MC-2D and GH_MW-MC-2S	0.25	Upward	Q1, Q2, Q3, Q4	Peristaltic Pump
					2019-04-16	2.68	1312.45		0.24	Upward		
					2019-06-26	2.64	1312.49		0.22	Upward		
					2019-08-19	2.60	1312.54		0.27	Upward		
					2019-10-28	2.78	1312.35		0.26	Upward		
					2019-12-09	2.86	1312.27		0.25	Upward		

Notes:

[a] Previously known as GH_MW-UTC-1D.

[b] Previously known as GH_MW-UTC-1S.

[c] Previously known as GHO_CCR-12-01.

[d] Previously known as GH_MW-GHC-1D.

[e] Previously known as GH_MW-GHC-1S.

[f] Stick up not surveyed, but reported estimate was 1.2 m.

[g] TOC elevation has been corrected to reflect estimated top of pipe casing.

[h] Continuous water levels could not be plotted as the dataloggers require calibration.

TOC denotes top of casing.

masl denotes meters above sea level.

mbtoc denotes meters below top of casing.

"-" denotes data not available.

Quarter is represented as Q1, Q2, Q3, Q4.

Table 3b: Summary of Groundwater Levels and Sampling Information (GHO)

Area	Well ID	Ground Elevation	TOC Elevation	Stick Up	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		m/m	Direction	Quarter	
Elk River Valley	GH_MW-MC-2S	1314.13	1315.12	0.99	2019-01-29	5.05	1310.06				Q1, Q2, Q3, Q4	Peristaltic Pump / Geosub Pump (Q4 only)
					2019-04-16	4.72	1310.40					
					2019-06-26	4.49	1310.62					
					2019-08-19	4.90	1310.22					
					2019-10-28	4.96	1310.16					
					2019-12-09	5.02	1310.10					
	GH_GA-MW-4	1312.15	1313.05	0.90	2019-03-04	6.77	1306.28				Q2, Q3, Q4	Bladder Pump
					2019-04-29	5.69	1307.36					
					2019-09-19	5.84	1307.21					
					2019-12-09	6.73	1306.32					
	GH_GA-MW-2	1306.66	1307.68	1.02	2019-03-06	6.72	1300.96				Q2, Q3, Q4	Bladder Pump
					2019-05-23	4.50	1303.18					
					2019-09-19	4.81	1302.87					
					2019-11-27	5.59	1302.09					
	GH_GA-MW-3	1299.78	1300.75	0.97	2019-03-06	9.05	1291.70				Q2, Q3, Q4	Bladder Pump
					2019-05-29	6.61	1294.14					
					2019-09-23	8.82	1291.93					
					2019-12-09	6.80	1293.95					
	GH_MW-UTC-A[a]	1602.00	1603.22	1.22[f]	2019-03-27	3.74	1599.48	GH_MW_UTC-A and GH_MW_UTC-B	0.05	Downward	Q1, Q2, Q3	Bladder Pump
					2019-05-30	3.55	1599.67		0.04	Downward		
					2019-09-18	3.64	1599.58		0.03	Downward		
					2019-11-25	Frozen	-		-	-		
	GH_MW-UTC-B[b]	1602.00	1603.22	1.22[f]	2019-03-27	1.79	1601.43				Q1, Q2, Q3	Bladder Pump
					2019-05-30	2.26	1600.96					
					2019-09-18	2.64	1600.58					
					2019-11-25	2.61	1600.61					
	GH_MW-ERSC-1	1283.36	1284.11	0.75	2019-03-07	5.37	1278.74				Q1, Q3	Bladder Pump
					2019-05-29	5.36	1278.75					
					2019-09-23	6.35	1277.76					
					2019-12-11	5.68	1278.43					

Notes:

[a] Previously known as GH_MW-UTC-1D.
[b] Previously known as GH_MW-UTC-1S.
[c] Previously known as GHO_CCR-12-01.
[d] Previously known as GH_MW-GHC-1D.
[e] Previously known as GH_MW-GHC-1S.
[f] Stick up not surveyed, but reported estimate was 1.22 m.
[g] TOC elevation has been corrected to reflect estimated top of pipe casing.
[h] Continuous water levels could not be plotted as the dataloggers require calibration.
TOC denotes top of casing.
masl denotes meters above sea level.
mbtoc denotes meters below top of casing.
"-" denotes data not available.
Quarter is represented as Q1, Q2, Q3, Q4.

Table 3c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (GHO)

Sample Location	Sample ID	Sample Date	Field Parameters					Physical Parameters						Dissolved Inorganics											Nutrients						Organics	
			Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Dissolved Solids	Total Suspended Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulfate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Total Organic Carbon	Dissolved Organic Carbon
Location	ID	(yyyy mm dd)	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	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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Fording River Valley (Porter Creek Drainage) (^ denotes well part of Study Area 1)																																
GH_MW-PC^	GH_MW-PC_WG_2019-01-01_NP	2019 03 25	2.5	7.56	9.27	981	245.0	8.10	578	1,000	758	< 1.0	1.20	189	189	< 1.0	< 1.0	231	< 5.0	< 5.0	< 0.25	< 2.5	0.36	386	0.0259	1.82	< 0.0050	0.269	0.0062	0.0074	1.32	1.55
	GH_MW-PC_WG_2019-04-01_NP	2019 06 05	5.2	7.53	7;11	1,026	171.9	8.15	646	1,100	849	4.9	2.94	202	202	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.39	452	0.0130	2.37	< 0.0050	0.405	0.0062	0.0164	1.50	1.22
	GH_MW-PC_WG_2019-07-01_NP	2019 09 16	9.0	7.30	3.82	1,042	192.6	8.04	666	1,110	888	462	255	248	248	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.37	440	0.0384	1.76	< 0.0050	0.871	0.0083	0.436	< 2.5	1.13
	GH_MW-PC_WG_2019-10-01_NP	2019 12 12	2.8	8.19	8.11	1,051	161.4	8.29	686	1,110	895	85.2	41.3	208	208	< 1.0	< 1.0	-	-	-	< 0.050	0.96	0.222	407	0.0065	1.99	< 0.0010	0.372	0.0073	0.0867	1.45	1.09
Fording River Valley (Greenhills Creek Drainage)(+ denotes well part of Study Area 3)																																
GH_MW-GHC-A	GH_MW-GHC-1D_WG_2019-01-01_NP	2019 03 28	4.6	7.02	1.47	1,028	260.9	7.48	655	1,060	776	2.3	3.30	298	298	< 1.0	< 1.0	-	-	-	< 0.25	3.0	0.53	365	0.0110	0.092	< 0.0050	0.088	0.0029	0.0063	1.38	1.64
	GH_GHER1_WG_2019-01-01_NP	Duplicate	-	-	-	-	-	7.54	656	1,060	796	2.5	4.98	295	295	< 1.0	< 1.0	-	-	-	< 0.25	2.8	0.49	345	0.0053	0.105	< 0.0050	0.087	0.0044	0.0063	1.25	1.16
	QA/QC RPD%		-	-	-	-	-	1	0	0	3	*	41	1	1	*	*	-	-	-	*	7	8	6	*	13	*	*	*	-	*	*
	GH_MW-GHC-1D_WG_2019-04-01_NP	2019 04 25	5.3	7.28	2.40	1,102	208.9	7.97	668	1,040	790	2.0	4.25	345	345	< 1.0	< 1.0	-	-	-	< 0.25	3.7	0.58	391	0.0055	0.121	< 0.0050	< 0.050	0.0027	0.0063	2.07	2.04
	GH_GHER1_WG_2019-04-01_NP	Duplicate	-	-	-	-	-	7.86	651	1,050	817	2.2	4.73	341	341	< 1.0	< 1.0	-	-	-	< 0.25	3.5	0.55	380	0.0181	0.089	< 0.0050	< 0.050	0.0032	<0.0020	2.13	1.93
	QA/QC RPD%		-	-	-	-	-	1	3	1	3	*	11	1	1	*	*	-	-	-	*	6	5	3	*	30	*	*	*	-	*	*
	GH_MW-GHC-1D_WG_2019-07-01_NP	2019 08 26	7.6	7.06	1.48	1,005	128	8.06	672	1,080	771	5.6	11.6	280	280	< 1.0	< 1.0	-	-	-	< 0.050	2.94	0.547	349	0.0053	0.0829	< 0.0010	< 0.050	0.0036	0.0198	1.76	1.70
	GH_MW-GHC-1A_WG_2019-10-01_NP	2019 11 20	4.6	6.75	0.98	1,000	110.3	7.90	600	988	781	4.4	6.02	301	301	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	0.50	307	< 0.0050	0.101	< 0.0050	< 0.050	0.0038	0.0120	0.97	1.03
GH_MW-GHC-B	GH_MW-GHC-1S_WG_2019-01-01_NP	2019 03 28	3.2	7.11	0.23	1,325	-48.4	7.54	890	1,370	1,110	42.3	40.6	248	248	< 1.0	< 1.0	-	-	-	< 0.25	9.0	0.14	612	0.0399	< 0.025	< 0.0050	0.188	< 0.0010	0.0193	2.68	2.30
	GH_MW-GHC-1S_WG_2019-04-01_NP	2019 04 25	4.2	7.30	0.37	1,355	7.1	7.95	827	1,280	1,050	20.0	26.1	304	304	< 1.0	< 1.0	-	-	-	< 0.25	9.1	0.21	593	0.0197	0.061	< 0.0050	0.124	< 0.0010	0.0154	3.06	2.70
	GH_MW-GHC-1S_WG_2019-07-01_NP	2019 08 26	7.6	7.04	0.45	1306	-12.2	8.00	905	1,390	1,070	9.8	9.38	266	266	< 1.0	< 1.0	-	-	-	< 0.25	9.5	0.17	595	0.0214	< 0.025	< 0.0050	0.228	< 0.0010	0.0054	2.09	2.07
	GH_MW-GHC-1B_WG_2019-10-01_NP	2019 11 20	5.8	6.73	0.46	1,352	-1.4	7.91	834	1,330	1,140	7.1	6.14	260	260	< 1.0	< 1.0	-	-	-	< 0.25	8.6	0.17	570	0.0200	< 0.025	< 0.0050	0.096	< 0.0010	0.0061	1.63	1.68
	GH_GWD1_WG_2019-10-01_NP	Duplicate	-	-	-	-	-	7.79	826	1,330	1,130	5.3	4.91	269	269	< 1.0	< 1.0	-	-	-	< 0.25	8.9	0.17	573	0.0203	< 0.025	< 0.0050	0.084	< 0.0010	0.0049	1.62	1.57
	QA/QC RPD%							2	1	0	1	29	22	3	3	*	*	-	-	-	*	3	0	1	*	*	*	*	*	*	*	*
GH_MW-SITE-A	GH_MW_SITE-A_WG_2019-10-01_NP	2019 12 11	14.9	6.53	0.49	2,871	-66.1	7.96	1,940	2,900	2,770	75.9	61.0	663	663	< 1.0	< 1.0	-	-	-	< 0.25	< 2.5	< 0.10	1,340	0.302	< 0.025	< 0.0050	1.77	< 0.0010	0.195	11.6	12.8
GH_MW-TD	GH_MW-TD_WG_2019-01-01_NP	2019 03 12	5.2	7.64	2.12	760	15.3	7.76	340	750	453	1.4	2.91	342	342	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.287	79.7	0.116	< 0.0050	< 0.0010	0.108	< 0.0010	< 0.0020	0.59	0.53
	GH_MW-TD_WG_2019-04-01_NP	2019 05 27	10.7	7.23	4.76	688	-33.6	8.16	367	782	423	< 1.0	11.7	341	341	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.277	86.7	0.0826	< 0.0050	< 0.0010	0.071	0.0013	< 0.0020	0.60	0.53
	GH_MW-TD_WG_2019-07-01_NP	2019 08 28	12.1	7.15	1.67	696	-35.2	8.11	366	736	433	< 1.0	12.8	346	346	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	0.276	85.5	0.0906	< 0.0050	< 0.0010	0.089	< 0.0010	< 0.0020	< 0.50	< 0.50
	GH_MW-TD_WG_2019-10-01_NP	2019 12 12	4.8	8.24	4.73	965	-57.9	8.31	361	736	512	3.4	0.98	367	360	6.2	< 1.0	-	-	-	< 0.050	< 0.50	0.288	81.8	0.0925	0.0071	< 0.0010	0.091	< 0.0010	< 0.0020	< 0.50	0.91
GH_MW-RLP-1D	GH_MW-RLP_WG_2019-01-01_NP	2019 03 25	6.4	7.66	2.30	468.1	-121.5	8.20	252	482	291	6.1	9.35	223	223	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	*1.86*	39.8	0.0424	< 0.0050	< 0.0010	0.156	< 0.0010	0.0091	0.65	< 0.50
	GH_MW-RLP-1D_WG_2019-04-01_NP	2019 04 30	5.9	7.72	0.25	483.9	-220	8.14	271	473	266	36.8	50.8	361	361	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	*1.82*	40.0	0.0716	< 0.0050	< 0.0010	0.239	< 0.0010	0.0413	1.67	< 0.50
	GH_MW-RLP-1D_WG_2019-07-01_NP	2019 09 24	7.0	8.18	1.35	366.4	-284.1	8.17	273	488	254	19.4	31.4	232	232	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	*1.75*	42.7	0.0412	< 0.0050	< 0.0010	0.080	< 0.0010	0.0172	0.60	< 0.50
	GH_GWD3_WG_2019-07-01_NP	Duplicate	-	-	-	-	-	8.17	270	485	244	21.2	34.5	233	233	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	*1.87*	42.4	0.0519	< 0.0050	< 0.0010	0.070	0.0013	0.0191	1.16	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	1	4	9	9	0	0	*	*	-	-	-	*	*	7	1	23	*	*	*	*	10	*	*
	GH_MW-RLP-1D_WG_2019-10-01_NP	2019 12 12	5.7	8.54	0.90	373.6	-309.4	8.32	222	396	269	3.7	91.4	171	163	7.4	< 1.0	-	-	-	< 0.050	1.48	*1.40*	3.51	0.55	0.0079	< 0.0010	< 0.50	< 0.0010	0.0024	17.7	12.0
GH_POTW09+	GH_POTW09_WG_2019-01-01_NP	2019 01 15	6.4	7.45	9.15	714	30.4	8.15	406	744	485	< 1.0	0.93	248	248	< 1.0	< 1.0	-	-	-	< 0.050	6.18	0.799	165	0.0510	0.0121	< 0.0010	0.168	< 0.0010	< 0.0020	0.61	0.63
	GH_POTW09_WG_2019-04-01_NP	2019 04 24	7.9	7.64	5.28	742	24.1	7.93	394	736	513	< 1.0	1.11	255	255	< 1.0	< 1.0	-	-	-	< 0.050	6.67	0.941	173	0.0273	0.0112	< 0.0010	< 0.050	< 0.0010	0.0025	< 0.50	< 0.50
	GH_POTW09_WG_2019-07-01_NP	2019 08 22	10.7	7.72	6.93	722	42.0	8.16	453	736	493	< 1.0	0.97	257	257	< 1.0	< 1.0	-	-	-	< 0.050	6.68	0.784	171	0.0663	0.0134	< 0.0010	0.084	< 0.0010	< 0.0020	< 0.50	< 0.50
	GH_POTW09_WG_2019-10-01_NP	2019 11 13	6.0	7.16	8.05	734	52.6	8.37	409	662	489	< 1.0	0.87	246	240	6.0	< 1.0	-	-	-	< 0.050	6.44	0.838	180	0.0251	0.0084	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50

Data provided by Teck Coal Ltd.

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

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

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

[a] Standard to protect freshwater aquatic life.

[b] Standard varies with Hardness.

[c] Standard varies with pH.

[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 3c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (GHO)

Sample Location	Sample ID	Sample Date	Field Parameters					Physical Parameters						Dissolved Inorganics											Nutrients						Organics	
			Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Dissolved Solids	Total Suspended Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulfate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Total Organic Carbon	Dissolved Organic Carbon
		(yyyy mm dd)	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	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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Fording River Valley (Greenhills Creek Drainage)(+ denotes well part of Study Area 3)																																
GH_POTW10+	GH_POTW10_WG_2019-01-01_NP	2019 01 15	6.9	7.49	2.72	697	-23.8	8.18	375	726	497	2.0	11.7	206	206	< 1.0	< 1.0	-	-	-	< 0.050	5.63	0.816	189	0.0879	0.539	0.0142	0.148	< 0.0010	< 0.0020	< 0.50	< 0.50
	GH_POTW10_WG_2019-04-01_NP	2019 04 24	8.0	7.59	1.64	751	71.2	7.94	380	706	504	1.7	11.9	238	238	< 1.0	< 1.0	-	-	-	< 0.050	6.05	0.927	197	0.0547	0.688	0.0156	0.065	< 0.0010	0.0049	< 0.50	< 0.50
	GH_GHER3_WG_2019-04-01_NP	Duplicate	-	-	-	-	-	7.86	390	691	515	1.5	12.3	247	247	< 1.0	< 1.0	-	-	-	< 0.050	6.12	0.858	198	0.0550	0.691	0.0153	0.141	< 0.0010	0.0021	0.54	0.55
	QA/QC RPD%		-	-	-	-	-	1	3	2	2	*	3	4	4	*	*	-	-	-	*	1	8	1	1	0	2	*	*	*	*	*
	GH_POTW10_WG_2019-07-01_NP	2019 08 22	10.1	7.67	6.42	703	14.2	8.16	391	692	474	1.2	7.16	209	209	< 1.0	< 1.0	-	-	-	< 0.050	6.04	0.808	187	0.0671	0.288	0.0132	0.063	< 0.0010	< 0.0020	< 0.50	< 0.50
	GH_GWD2_WG_2019-07-01_NP	Duplicate	-	-	-	-	-	8.15	425	706	478	< 1.0	5.43	214	214	< 1.0	< 1.0	-	-	-	< 0.050	6.01	0.806	184	0.0552	0.288	0.0132	0.086	< 0.0010	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	8	2	1	*	27	2	2	*	*	-	-	-	*	0	0	2	19	0	0	*	*	*	*	*
	GH_POTW10_WG_2019-10-01_NP	2019 11 13	7.0	7.15	4.57	693	-6.9	8.31	389	641	480	8.0	26.3	204	202	2.4	< 1.0	-	-	-	< 0.050	6.53	0.892	194	0.0541	0.445	0.0101	0.213	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_POTW15+	GH_POTW15_WG_2019-01-01_NP	2019 01 15	6.6	7.37	1.35	883	18.8	8.11	495	923	642	3.0	11.8	227	227	< 1.0	< 1.0	-	-	-	< 0.25	27.6	0.19	250	0.0556	< 0.025	< 0.0050	0.144	< 0.0010	< 0.0020	1.06	1.04
	GH_POTW15_WG_2019-04-01_NP	2019 04 24	6.7	7.43	1.72	951	25.7	7.94	489	879	630	4.1	12.1	250	250	< 1.0	< 1.0	-	-	-	< 0.25	33.6	0.22	281	0.0346	< 0.025	< 0.0050	< 0.050	< 0.0010	< 0.0020	0.96	0.94
	GH_POTW15_WG_2019-07-01_NP	2019 08 22	4.8	7.57	5.35	897	19.0	8.08	523	912	670	1.8	10.4	238	238	< 1.0	< 1.0	-	-	-	0.085	29.0	0.174	256	0.0873	0.0118	< 0.0010	0.142	< 0.0010	< 0.0020	0.94	0.91
	GH_POTW15_WG_2019-10-01_NP	2019 11 13	6.2	7.02	8.35	888	1.8	8.28	490	810	647	1.5	8.12	228	228	< 1.0	< 1.0	-	-	-	0.101	29.4	0.152	261	0.0406	< 0.0050	< 0.0010	0.074	< 0.0010	< 0.0020	0.65	0.61
GH_POTW17+	GH_POTW17_WG_2019-01-01_NP	2019 01 15	7.9	7.39	2.51	1,202	164.5	7.99	743	1,260	958	1.7	1.67	291	291	< 1.0	< 1.0	-	-	-	< 0.25	19.0	0.18	447	0.0477	0.782	< 0.0050	0.111	0.0013	< 0.0020	0.84	0.94
	GH_POTW17_WG_2019-04-01_NP	2019 04 24	8.3	7.57	3.01	1,290	124.7	7.77	724	1,190	942	3.1	3.49	323	323	< 1.0	< 1.0	-	-	-	< 0.25	20.3	0.19	489	0.0168	0.244	< 0.0050	< 0.050	< 0.0010	0.0041	0.77	0.86
	GH_POTW17_WG_2019-07-01_NP	2019 08 22	10.2	7.55	2.41	1,229	71.2	8.05	841	1,250	998	< 1.0	1.31	290	290	< 1.0	< 1.0	-	-	-	< 0.25	17.8	0.17	482	0.0298	0.398	< 0.0050	0.051	< 0.0010	< 0.0020	0.82	0.80
	GH_POTW17_WG_2019-10-01_NP	2019 11 13	7.0	6.92	2.52	1,254	84.2	8.26	760	1,100	1,020	2.3	4.27	283	283	< 1.0	< 1.0	-	-	-	< 0.25	18.8	0.14	504	0.0146	0.443	< 0.0050	0.080	< 0.0010	< 0.0020	< 0.50	< 0.50
Elk River Valley (* denotes well Part of Study Area 4, ** denotes well is part of background)																																
GH_GA-MW-1**	GH_GA-MW-1_WG_2019-01-01_NP	2019 03 04	4.0	7.34	5.31	1,207	192.3	7.67	290	1,200	765	< 1.0	3.56	381	381	< 1.0	< 1.0	465	< 5.0	< 5.0	< 0.25	15.8	0.54	271	0.194	0.172	0.0100	0.367	0.0329	0.0393	3.13	2.61
	GH_GA-MW-1_WG_2019-04-01_NP	2019 04 29	5.3	7.57	5.61	1,035	105.9	8.13	309	1,060	709	3.1	2.19	468	468	< 1.0	< 1.0	-	-	-	< 0.25	12.9	0.73	254	0.0841	1.23	< 0.0050	0.238	0.0297	0.0353	2.15	2.41
	GH_GA-MW-1_WG_2019-07-01_NP	2019 07 30	8.8	7.65	5.60	989	100.7	8.37	287	1,230	801	5.2	3.47	379	370	9.2	< 1.0	-	-	-	< 0.25	15.9	0.64	265	0.139	0.116	< 0.0050	0.194	0.0281	0.0301	2.73	2.68
	GH_GWD1_WG_2019-07-01_NP	Duplicate	-	-	-	-	-	8.44	271	1,300	827	7.1	4.08	391	374	17.6	< 1.0	-	-	-	< 0.25	18.5	0.650	300	0.121	0.140	< 0.0050	0.188	0.0259	0.0303	2.58	2.52
	QA/QC RPD%		-	-	-	-	-	1	6	6	3	31	16	3	1	63	*	-	-	-	*	15	2	12	14	19	*	*	8	1	6	6
	GH_GA-MW-1_WG_2019-10-01_NP	2019 11 27	1.1	7.21	2.83	1,253	111.4	7.69	281	1,110	780	3.0	2.39	398	398	< 1.0	< 1.0	-	-	-	< 0.25	14.1	0.43	249	0.194	0.479	< 0.0050	0.414	0.0293	0.0277	2.92	2.87
GH_MW-MC-1D	GH_MW-MC-1D-190130	2019 01 30	4	7.77	1.9	341.1	-85.8	8.25	119	367	237	56.5	4.34	187	187	< 1.0	< 1.0	228	< 5.0	< 5.0	0.062	11.4	0.769	2.94	0.0263	< 0.0050	< 0.0010	0.079	0.0011	0.0054	0.82	0.59
	GH_MW-MC-1D_04-18-2019	2019 04 18	3.8	7.61	2.25	201	45.6	8.30	121	356	194	7.7	6.59	216	216	< 1.0	< 1.0	264	< 5.0	< 5.0	0.062	10.6	0.797	1.80	0.0086	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	1.18	1.35
	GH_MW-MC-1C_04-18-2019	Duplicate	-	7.61	-	-	-	8.16	121	341	191	6.7	6.55	191	191	< 1.0	< 1.0	233	< 5.0	< 5.0	< 0.50	10.6	0.781	1.73	< 0.0050	< 0.050	< 0.010	< 0.050	< 0.0010	0.0025	1.84	1.27
	QA/QC RPD%		-	*	-	-	-	2	0	4	2	14	1	12	12	*	*	12	*	*	*	0	2	4	*	*	*	*	*	*	*	*
	GH_MW-MC-1D_WG_2019_06_28_NP	2019 06 28	7.6	7.78	0.92	380	-133.1	8.34	127	371	212	26.9	5.24	182	180	2.2	< 1.0	220	< 5.0	< 5.0	0.072	14.8	0.779	1.58	0.0385	< 0.0050	< 0.0010	0.123	< 0.0010	0.0213	< 0.50	< 0.50
	GH_MW-MC-1D_WG_2019_08_20_NP	2019 08 20	8.68	7.55	2.03	395	-230.6	8.20	137	385	222	< 1.0	0.68	187	187	< 1.0	< 1.0	228	< 5.0	< 5.0	0.121	15.8	0.754	1.48	0.0344	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	GH_MW-MC-1D_WG_2019_10_28_NP	2019 10 28	5.1	7.92	0.29	595	-186.1	8.19	131	357	199	9.9	4.02	192	192	< 1.0	< 1.0	234	< 5.0	< 5.0	0.081	18.1	0.613	1.12	0.0406	< 0.0050	< 0.0010	0.054	0.0011	0.0055	< 0.50	< 0.50
	GH_MW-MC-1D_WG_2019_12_10_NP	2019 12 10	4.1	8.08	0.25	393	-199.6	8.32	127	399	176	< 1.0	0.44	203	197	5.6	< 1.0	241	< 5.0	< 5.0	0.073	17.0	0.765	0.47	0.0327	< 0.0050	< 0.0010	< 0.050	0.0013	< 0.0020	< 0.50	< 0.50
GH_MW-MC-1S	GH_MW-MC-1S-190130	2019 01 30	2.4	7.72	9.81	302.8	-16.2	8.19	157	311	197	< 1.0	1.04	161	161	< 1.0	< 1.0	197	< 5.0	< 5.0	< 0.050	< 0.50	0.153	23.3	0.0222	0.114	0.0017	< 0.050	0.0014	0.0024	0.60	< 0.50
	GH_MW-MC-1S_04-18-2019	2019 04 18	5.96	7.43	10.08	198	118.6	8.18	162	321	182	< 1.0	0.39	179	179	< 1.0	< 1.0	218	< 5.0	< 5.0	< 0.050	< 0.50	0.159	26.1	0.0359	0.169	< 0.0010	0.053	0.0020	< 0.0020	0.64	0.65
	GH_MW-MC-1S_WG_2019-06-26_NP	2019 06 26	7.1	8.33	7.6	285.6	-92.6	8.40	155	296	177	< 1.0	0.23	145	140	5.2	< 1.0	170	< 5.0	< 5.0	< 0.050	< 0.50	0.169	15.3	0.0095	0.115	< 0.0010	< 0.050	< 0.0010	0.0023	< 0.50	< 0.50
	GH_MW-MC-1S_WG_2019_08_19_NP	2019 08 19	11.22	7.6	24.7	289	92	8.16	146	294	164	< 1.0	0.14	148	148	< 1.0	< 1.0	180	< 5.0	< 5.0	< 0.050	< 0.50	0.185	16.5	< 0.0050	0.0621	0.0012	< 0.050	0.0010	< 0.0020	< 0.50	< 0.50
	GH_MW-MC-1S_WG_2019_10_29_NP	2019 10 29	4	7.76	9.91	306.7	212.9	7.89	180	263	191	< 1.0	0.23	151	151	< 1.0	< 1.0	184	< 5.0	< 5.0	< 0.050	0.60	0.214	21.3	< 0.0050	0.0852	< 0.0010	< 0.050	0.0011	< 0.0020	< 0.50	< 0.50
	GH_MW-MC-1S_WG_2019_12_10_NP	2019 12 10	3.3	7.96	11.88	318.7	-173.4	8.22	152	314	146	< 1.0	< 0.10	164	164	< 1.0	< 1.0	201	< 5.0	< 5.0	< 0.050	< 0.50	0.137	21.2	0.0072	0.0995	< 0.0010	< 0.050	0.0018	< 0.0020	< 0.50	< 0.50

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 3c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (GHO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters: Field Temperature (C)	pH (field) (pH)	Dissolved Oxygen (mg/L)	Field Conductivity (µS/cm)	Field ORP (mV)	Physical Parameters: pH (pH)	Hardness (mg/L)	Conductivity (µS/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Dissolved Inorganics: Total Alkalinity (mg/L)	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	Alkalinity, Carbonate (as CaCO3) (mg/L)	Alkalinity, Hydroxide (as CaCO3) (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Hydroxide (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Nutrients: Ammonia Nitrogen (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Kjeldahl Nitrogen-N (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphorous as P (mg/L)	Organics: 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	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	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	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	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 well Part of Study Area 4, ** denotes well is part of background)																																
GH_MW-MC-2D	GH_MW-MC-2D-190129	2019 01 29	3.9	8.8	0.06	1,809	-261.7	8.91	28.5	1,870	1,130	17.9	264	559	491	68.2	< 1.0	598	40.9	< 5.0	0.80	*259*	***3.24***	23.6	0.541	0.039	0.0827	1.07	0.579	0.739	7.4	6.64
	GH_MW-MC-2D_04-18-2019	2019 04 18	8.88	8.73	0.31	1,298	-294.9	9.04	19.7	1,950	1,150	18.8	47.8	584	477	108	< 1.0	581	64.6	< 5.0	0.80	*269*	***3.32***	35.8	0.593	< 0.025	< 0.0050	0.68	0.568	0.616	5.5	5.9
	GH_MW-MC-2D_WG_2019-06-26_NP	2019 06 26	18.7	9.46	0.02	2,053	-412.5	9.14	17.3	2,070	1,290	48.6	96.4	572	473	98.8	< 1.0	577	59.3	< 5.0	0.79	*260*	***3.05***	35.0	0.87	< 0.025	< 0.0050	0.63	0.428	0.549	< 5.0	< 5.0
	GH_MW-MC-2D_WG_2019_08_19_NP	2019 08 19	21.43	9.04	0.34	2,010	-410	9.11	17.3	2,030	1,210	12.1	18.4	629	513	116	< 1.0	626	69.5	< 5.0	0.76	*259*	***3.07***	11.6	0.79	< 0.025	< 0.0050	< 1.0	0.44	0.478	2.99	4.26
	GH_MW-MC-2D_WG_2019_10_28_NP	2019 10 28	3.4	8.62	0.15	2,998	-383.8	8.98	34.2	1,780	1,100	3.7	6.04	574	485	89.2	< 1.0	591	53.5	< 5.0	0.76	*267*	*1.90*	41.9	0.60	0.460	< 0.0050	0.75	0.390	0.409	< 5.0	< 5.0
	GH_MW-MC-2D_WG_2019_12_10_NP	2019 12 10	1.5	8.93	0.19	2,009	-375.8	9.10	23.9	2,050	1,880	704	3,070	754	631	123	< 1.0	770	73.8	< 5.0	0.761	*240*	*1.95*	10.4	0.645	< 0.0050	< 0.0010	2.86	0.329	2.05	36	2.13
GH_MW-MC-2S	GH_MW-MC-2S-190129	2019 01 29	4.2	6.74	8.04	676.9	-5.7	8.03	374	692	457	1.9	2.69	311	311	< 1.0	< 1.0	380	< 5.0	< 5.0	< 0.050	3.59	0.128	88.5	0.0081	0.516	0.0013	0.091	0.0064	0.0073	1.52	1.63
	MW19-A-190129	Duplicate	-	6.74	-	-	-	7.99	373	694	453	1.2	3.14	311	311	< 1.0	< 1.0	379	< 5.0	< 5.0	< 0.050	3.58	0.126	88.1	0.0061	0.514	0.0013	0.103	0.0064	0.0072	1.49	1.67
	QA/QC RPD%		-	*	-	-	-	0	0	0	1	*	15	0	0	*	*	0	*	*	*	0	2	0	*	0	*	*	0	*	*	*
	GH_MW-MC-2S_04-18-2019	2019 04 18	7.75	6.83	6.76	399	109.4	8.05	309	620	381	< 1.0	1.19	276	276	< 1.0	< 1.0	336	< 5.0	< 5.0	< 0.050	3.04	0.158	85.1	0.0095	1.30	0.0029	0.278	0.0081	0.0078	2.89	2.83
	GH_MW-MC-2S_WG_2019-06-26_NP	2019 06 26	6.3	7.57	6.54	578.6	-63.9	8.42	304	588	369	< 1.0	3.38	246	235	11.8	< 1.0	286	7.1	< 5.0	< 0.050	2.62	0.155	77.5	0.0166	0.383	< 0.0010	0.091	0.0080	0.0110	1.94	1.89
	GH_MW-MC-2S_WG_2019_08_19_NP	2019 08 19	9.65	6.99	12.01	621	43.4	8.22	284	623	379	< 1.0	0.41	261	261	< 1.0	< 1.0	319	< 5.0	< 5.0	< 0.050	1.97	0.151	88.7	0.0064	0.247	< 0.0010	0.083	0.0066	0.012	2.41	2.47
	GH_MW-MC10-A_WG_2019_08_19_NP	Duplicate	-	6.99	-	-	-	8.20	285	623	392	< 1.0	0.58	259	259	< 1.0	< 1.0	316	< 5.0	< 5.0	< 0.050	2.03	0.152	89.1	< 0.0050	0.246	< 0.0010	0.060	0.0074	0.011	2.23	2.51
	QA/QC RPD%		-	*	-	-	-	0	0	0	3	*	*	1	1	*	*	1	*	*	*	*	1	0	*	0	*	*	11	9	*	*
	GH_MW-MC-2S_WG_2019_10_28_NP	2019 10 28	3.7	6.88	7.9	1,029	-113.2	7.68	360	629	388	< 1.0	0.40	300	300	< 1.0	< 1.0	366	< 5.0	< 5.0	< 0.050	2.66	0.107	91.4	0.0064	0.243	< 0.0010	0.077	0.0061	0.0057	1.72	1.73
	GH_MW_MC10-A_WG_2019_10_28_NP	Duplicate	-	6.88	-	-	-	7.77	372	632	367	< 1.0	0.55	282	282	< 1.0	< 1.0	344	< 5.0	< 5.0	< 0.050	2.70	0.098	91.3	0.0057	0.240	< 0.0010	0.085	0.0061	0.0059	1.99	2.01
	QA/QC RPD%		-	*	-	-	-	1	3	0	6	*	*	6	6	*	*	6	*	*	*	1	*	0	*	1	*	*	0	*	*	*
	GH_MW-MC-2S_WG_2019_12_09_NP	2019 12 09	4.5	6.96	8.36	688	226	8.02	344	603	442	< 1.0	1.14	227	227	< 1.0	< 1.0	277	< 5.0	< 5.0	< 0.050	3.09	0.106	88.1	< 0.0050	0.273	< 0.0010	0.089	0.0069	0.0081	1.76	1.65
	GH_MW_MC10-A_WG_2019_12_09_NP	Duplicate	-	6.96	-	-	-	8.02	345	600	404	< 1.0	0.90	220	220	< 1.0	< 1.0	268	< 5.0	< 5.0	< 0.050	3.08	0.104	88.0	< 0.0050	0.270	< 0.0010	0.062	0.0067	0.0083	1.69	1.80
	QA/QC RPD%		-	*	-	-	-	0	0	0	9	*	24	3	3	*	*	3	*	*	*	0	2	0	*	1	*	*	3	*	*	*
GH_GA-MW-4*	GH_GA-MW-4_WG_2019-01-01_NP	2019 03 04	4.1	7.79	6.15	383.9	247.3	7.88	190	371	221	< 1.0	0.22	170	170	< 1.0	< 1.0	208	< 5.0	< 5.0	< 0.050	3.18	0.170	30.5	0.0078	0.411	0.0018	< 0.050	0.0012	0.0030	< 0.50	< 0.50
	GH_GA-MW-4_WG_2019-04-01_NP	2019 04 29	4.2	7.86	6.90	396.9	182.2	8.15	191	347	209	< 1.0	0.37	226	226	< 1.0	< 1.0	-	-	-	< 0.050	3.84	0.161	29.4	< 0.0050	0.375	< 0.0010	< 0.050	0.0018	< 0.0020	< 0.50	< 0.50
	GH_GA-MW-4_WG_2019-07-01_NP	2019 09 19	8.4	7.55	5.51	1,109.9	134.9	8.37	227	435	260	< 1.0	0.17	201	196	5.2	< 1.0	-	-	-	< 0.050	2.42	0.195	49.7	< 0.0050	0.883	< 0.0010	0.222	0.0023	< 0.0020	0.56	< 0.50
	GH_GA-MW-4_WG_2019-10-01_NP	2019 12 09	4.7	7.76	5.39	357.4	191.6	8.45	243	401	257	< 1.0	< 0.10	185	172	12.6	< 1.0	-	-	-	< 0.050	2.52	0.130	33.0	< 0.0050	0.345	< 0.0010	0.104	0.0014	< 0.0020	< 0.50	< 0.50
	GH_GWD2_WG_2019-10-01_NP	Duplicate	-	-	-	-	-	8.48	230	410	263	< 1.0	< 0.10	177	164	13.8	< 1.0	-	-	-	< 0.050	2.49	0.177	33.2	< 0.0050	0.332	< 0.0010	0.068	0.0026	0.0037	< 0.50	0.83
	QA/QC RPD%		-	-	-	-	-	0	5	2	2	*	*	4	5	9	*	-	-	-	*	*	31	1	*	4	*	*	*	*	*	*
GH_GA-MW-2*	GH_GA-MW-2_WG_2019-01-01_NP	2019 03 06	4.0	7.52	0.38	932	244.3	7.90	512	898	656	3.2	1.40	213	213	< 1.0	< 1.0	260	< 5.0	< 5.0	< 0.050	6.91	0.106	274	0.0264	6.09	0.0864	0.235	0.0014	0.0047	0.52	0.75
	GH_GA-MW-2_WG_2019-04-01_NP	2019 05 23	10.9	7.44	0.51	912	140.1	8.20	512	984	640	< 1.0	0.34	212	212	< 1.0	< 1.0	-	-	-	< 0.25	7.3	0.11	320	< 0.0050	7.23	0.122	0.128	0.0014	0.0021	< 0.50	< 0.50
	GH_GA-MW-2_WG_2019-07-01_NP	2019 09 19	7.1	7.34	1.15	952	162.5	8.12	529	1,010	773	2.0	1.67	222	222	< 1.0	< 1.0	-	-	-	< 0.25	7.3	0.14	351	< 0.0050	7.21	0.143	< 0.25	0.0018	0.0060	< 0.50	< 0.50
	GH_GA-MW-2_WG_2019-10-01_NP	2019 11 27	1.4	7.16	1.00	1,024	140.2	7.66	598	1,020	785	1.7	0.65	214	214	< 1.0	< 1.0	-	-	-	< 0.25	6.9	< 0.10	354	< 0.0050	10.1	0.103	< 0.050	0.0013	0.0073	0.61	< 0.50
GH_GA-MW-3*	GH_GA-MW-3_WG_2019-01-01_NP	2019 03 06	4.3	7.55	0.24	601	-314.0	7.60	245	582	354	10.0	39.3	255	255	< 1.0	< 1.0	311	< 5.0	< 5.0	< 0.050	6.06	0.654	87.0	0.409	< 0.0050	0.0014	0.47	0.0127	0.0265	< 0.50	< 0.50
	GH_GA-MW-3_WG_2019-04-01_NP	2019 05 29	8.1	7.44	0.41	617	-332.5	8.39	288	733	407	19.8	40.0	249	242	7.2	< 1.0	-	-	-	< 0.050	7.83	0.656	106	0.379	0.0196	0.411	< 0.50	< 0.0010	0.0079	0.64	0.81
	GH_GA-MW-3_WG_2019-07-01_NP	2019 09 23	6.8	7.46	0.54	683	-280.5	7.88	362	767	425	8.0	43.4	249	249	< 1.0	< 1.0	-	-	-	< 0.050	7.21	0.613	128	0.321	0.498	0.710	< 0.50	< 0.0010	0.0150	0.68	0.61
	GH_GA-MW-3_WG_2019-10-01_NP	2019 12 09	4.3	7.49	0.35	595.9	-260.2	7.55	377	737	448	17.2	74.8	176	176	< 1.0	< 1.0	-	-	-	< 0.050	6.58	0.601	177	0.54	0.422	0.0228	0.96	0.0019	0.0553	2.28	2.01

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 3c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (GHO)

			Field Parameters					Physical Parameters						Dissolved Inorganics											Nutrients						Organics	
Sample Location	Sample ID	Sample Date	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Dissolved Solids	Total Suspended Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bicarbonate	Carbonate	Hydroxide	Bromide	Chloride	Fluoride	Sulfate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Total Organic Carbon	Dissolved Organic Carbon
		(yyyy mm dd)	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	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	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	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	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	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 well Part of Study Area 4, ** denotes well is part of background)																																
GH_MW-UTC-A	GH_MW-UTC_1D_WG_2019-01-01_NP	2019 03 27	4.5	8.67	0.21	1,535	-70.2	8.56	10.0	1,620	952	3.6	9.73	771	737	34.0	< 1.0	-	-	-	0.44	76.3	***7.14***	13.7	0.272	< 0.025	< 0.0050	0.673	0.259	0.308	9.08	10.6
	GH_GHER2_WG_2019-01-01_NP	Duplicate	-	-	-	-	-	8.56	10.2	1,600	968	4.1	9.90	803	768	34.6	< 1.0	-	-	-	0.28	76.1	***6.95***	18.5	0.289	< 0.025	< 0.0050	0.823	0.266	0.414	8.68	8.91
	QA/QC RPD%		-	-	-	-	-	0	2	1	2	*	2	4	4	2	*	-	-	-	44	0	3	30	6	*	*	20	3	29	5	17
	GH_MW-UTC-1D_WG_2019-04-01_NP	2019 05 30	7.7	8.43	0.37	1,443	-157.6	8.90	9.13	1,660	938	2.6	7.89	743	662	80.6	< 1.0	-	-	-	0.39	74.5	***6.80***	12.2	0.264	< 0.025	< 0.0050	0.560	0.266	0.300	5.97	5.51
	GH_MW-UTC-1D_WG_2019-07-01_NP	2019 09 18	6.9	8.53	0.29	1,462	-171.1	8.69	8.34	1,590	961	< 1.0	6.31	769	716	53.0	< 1.0	-	-	-	0.38	68.2	***6.19***	8.7	0.255	< 0.025	< 0.0050	0.483	0.303	0.337	7.10	6.08
GH_MW-UTC-B	GH_MW-UTC_1S_WG_2019-01-01_NP	2019 03 27	5.2	7.56	1.26	501	16.1	8.06	257	517	301	59.5	34.0	237	237	< 1.0	< 1.0	-	-	-	< 0.050	11.7	0.162	40.1	0.0960	0.0245	< 0.0010	0.338	0.0021	0.0840	2.06	3.14
	GH_MW-UTC-1S_WG_2019-04-01_NP	2019 05 30	6.0	7.41	3.25	445.1	28.3	8.26	228	460	270	40.8	20.0	199	199	< 1.0	< 1.0	-	-	-	< 0.050	8.09	0.165	34.1	0.0177	0.0364	< 0.0010	< 0.050	< 0.0010	0.0023	0.61	0.54
	GH_MW-UTC-1S_WG_2019-07-01_NP	2019 09 18	6.6	7.41	5.82	449.9	75.1	8.19	236	483	276	1.5	6.33	226	226	< 1.0	< 1.0	-	-	-	< 0.050	7.59	0.187	36.4	0.0504	0.0660	< 0.0010	0.063	0.0020	0.0042	0.57	0.61
	GH_MW-UTC-1B_WG_2019-10-01_NP	2019 11 25	5.9	7.36	2.84	473.5	112.9	7.90	221	474	279	5.2	4.22	227	227	< 1.0	< 1.0	-	-	-	< 0.050	9.11	0.196	37.1	0.0108	0.0450	< 0.0010	< 0.050	0.0023	0.0064	0.92	0.66
	GH_GWD3_WG_2019-10-01_NP	Duplicate	-	-	-	-	-	7.94	223	475	293	6.4	4.86	230	230	< 1.0	< 1.0	-	-	-	< 0.050	9.04	0.180	37.0	0.0071	0.0415	< 0.0010	< 0.050	0.0023	0.0077	0.67	0.59
	QA/QC RPD%							1	1	0	5	21	14	1	1	*	*	-	-	-	*	1	9	0	*	8	*	*	*	*	*	*
GH_MW-ERSC-1*	GH_MW-ERSC-1_WG_2019-01-01_NP	2019 03 07	4.4	7.53	8.38	1,218	175.1	7.79	705	1,200	934	6.5	1.93	199	199	< 1.0	< 1.0	243	< 5.0	< 5.0	< 0.25	7.0	< 0.10	440	0.0207	13.5	0.0054	0.137	0.0023	0.0218	0.68	0.68
	GH_MW-ERSC-1_WG_2019-04-01_NP	2019 05 29	7.3	7.34	9.81	585	67.3	8.44	323	646	392	1.0	0.68	197	189	8.2	< 1.0	-	-	-	< 0.050	3.47	0.123	139	0.0099	3.19	0.0010	0.478	0.0023	< 0.0020	1.21	1.33
	GH_GWD2_WG_2019-04-01_NP	Duplicate	-	-	-	-	-	8.45	325	650	394	< 1.0	0.76	199	191	8.0	< 1.0	-	-	-	< 0.050	3.46	0.123	137	0.0142	3.15	0.0025	0.286	0.0024	0.0048	1.19	1.23
	QA/QC RPD%		-	-	-	-	-	0	1	1	1	*	11	1	1	2	*	-	-	-	*	0	0	1	*	1	*	50	*	*	*	*
	GH_MW-ERSC-1_WG_2019-07-01_NP	2019 09 23	8.3	7.10	6.59	606	-47.8	8.04	348	636	325	1.9	5.39	342	342	< 1.0	< 1.0	-	-	-	< 0.050	2.14	0.198	23.7	0.0536	0.0903	< 0.0010	0.223	< 0.0010	0.0104	1.62	1.62
	GH_MW-ERSC-1_WG_2019-10-01_NP	2019 12 11	6.3	7.48	8.82	697	80.8	7.93	444	769	550	15.7	2.35	251	251	< 1.0	< 1.0	-	-	-	< 0.050	2.97	0.159	170	0.0162	4.03	0.0036	0.441	0.0037	0.0230	1.42	1.47
Blanks																																
Field Blank																																
GH_POTW06	GH_GHLRP3_WG_2019-01-01_NP	2019 01 15	-	-	-	-	-	5.57	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.50	< 0.020	< 0.30	0.0233	< 0.0050	< 0.0010	0.089	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-UTC-A	GH_GHLRP2_WG_2019-01-01_NP	2019 03 27	-	-	-	-	-	5.45	< 0.50	< 2.0	23	< 1.0	0.21	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0131	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-GHC-A	GH_GHLRP1_WG_2019-01-01_NP	2019 03 28	-	-	-	-	-	5.48	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-MC-1D	GH_MW-19-A_04-18-2019	2019 04 18	-	-	-	-	-	5.10	< 0.50	< 2.0	< 10	< 1.0	0.30	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_POTW10	GH_GHLRP3_WG_2019-04-01_NP	2019 04 24	-	-	-	-	-	5.28	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-GHC-A	GH_GHLRP1_WG_2019-04-01_NP	2019 04 25	-	-	-	-	-	5.30	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0067	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-ERSC-1	GH_GWB2_WG_2019-04-01_NP	2019 05 29	-	-	-	-	-	5.80	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0072	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-MC-2S	GH_MW-MC10-B_WG_2019_06_25_NP	2019 06 25	-	-	-	-	-	5.32	-	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
GH_GA-MW-1	GH_GWB1_WG_2019-07-01_NP	2019 07 30	-	-	-	-	-	5.44	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
GH_MW-MC-2S	GH_MW-MC10-B_WG_2019_08_19_NP	2019 08 19	-	-	-	-	-	5.49	-	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
GH_POTW10	GH_GWB2_WG_2019-07-01_NP	2019 08 22	-	-	-	-	-	5.55	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-RLP-1D	GH_GWB3_WG_2019-07-01_NP	2019 09 24	-	-	-	-	-	5.44	< 0.50	< 2.0	< 10	< 1.0	0.26	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0160	< 0.0050	< 0.0010	< 0.050	0.0016	< 0.0020	< 0.50	-
GH_MW-GHC-B	GH_GWB1_WG_2019-10-01_NP	2019 11 20	-	-	-	-	-	5.25	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-UTC-B	GH_GWB3_WG_2019-10-01_NP	2019 11 25	-	-	-	-	-	5.42	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
GH_GA-MW-4	GH_GWB2_WG_2019-10-01_NP	2019 12 09	-	-	-	-	-	5.55	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 10	< 10	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	0.0010	< 0.0020	< 0.50	< 0.50
GH_MW-MC-2S	GH_MW_MC10-B_WG_2019_12_09_NP	2019 12 09	-	-	-	-	-	5.33	-	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-

Data provided by Teck Coal Ltd.

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

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

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 3c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (GHO)

Sample Location	Sample ID	Sample Date	Field Parameters					Physical Parameters						Dissolved Inorganics												Nutrients						Organics	
		(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 Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	Turbidity (NTU)	Total Alkalinity (mg/L)	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	Alkalinity, Carbonate (as CaCO3) (mg/L)	Alkalinity, Hydroxide (as CaCO3) (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Hydroxide (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Ammonia Nitrogen (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Kjeldahl Nitrogen-N (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphorous as P (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	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	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	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	n/a	n/a	n/a	250	1.5	500	n/a	10	1	n/a	n/a	n/a	n/a	n/a
Blanks																																
Filter Blank																																
	GH_MW_MC10-D_WG_2019_08_19_NP	2019 08 19	-	-	-	-	-	-	< 0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.04
	GH_MW_MC10-D_WG_2019_10_28_NP	2019 10 28	-	-	-	-	-	-	< 0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.50
	GH_MW_MC10-D_WG_2019_12_09_NP	2019 12 09	-	-	-	-	-	-	< 0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.50
Trip Blank																																
	GH_TRP1_WG_2019-01-01_NP	2019 03 25	-	-	-	-	-	5.53	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.50	< 0.020	< 0.30	0.0372	< 0.0050	< 0.0010	0.207	< 0.0010	< 0.0020	< 0.50	< 0.50
	GH_TRIPGW_WG_2019-04-01_NP	2019 04 25	-	-	-	-	-	5.26	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0280	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	0.59	0.54
	GH_TRIPGW_WG_2019-07-01_NP	2019 07 30	-	-	-	-	-	5.50	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	< 0.005	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	GH_TRIPGW_WG_2019-10-01_NP	2019 11 20	-	-	-	-	-	5.13	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	-	-	-	< 0.050	< 0.50	< 0.020	< 0.30	0.0223	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	GH_MW_MC10-C_WG_2019_12_09_NP	2019 12 09	-	-	-	-	-	5.36	< 0.50	< 2.0	< 10	< 1.0	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 3d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (GHO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness 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
																		Dissolved Metals																
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
Fording River Valley (Porter Creek Drainage) (^ denotes well part of Study Area 1)																																		
GH_MW-PC^	GH_MW-PC_WG_2019-01-01_NP	2019 03 25	578	< 3.0	< 0.10	0.16	83.5	< 0.020	< 0.050	< 10	0.0296	106	0.21	< 0.10	20.1	< 10	< 0.050	6.2	76.2	0.26	< 0.0050	2.41	< 0.50	0.787	***60***	< 0.010	0.846	121	< 0.010	< 0.10	< 10	4.01	< 0.50	2.7
	GH_MW-PC_WG_2019-04-01_NP	2019 06 05	646	22.8	< 0.10	0.16	98.2	< 0.020	< 0.050	< 10	0.0417	117	0.21	< 0.10	53.7	10	< 0.050	7.2	86.0	0.66	< 0.0050	2.63	0.59	0.958	***83.3***	< 0.010	1.16	140	< 0.010	< 0.10	< 10	5.28	< 0.50	2.7
	GH_MW-PC_WG_2019-07-01_NP	2019 09 16	666	< 3.0	< 0.10	0.19	120	< 0.020	< 0.050	< 10	0.0450	128	0.22	< 0.10	12.3	< 10	< 0.050	9.2	84.3	0.58	< 0.0050	2.51	0.66	1.16	***76.4***	< 0.010	1.07	154	< 0.010	0.11	< 10	4.85	< 0.50	2.8
	GH_MW-PC_WG_2019-10-01_NP	2019 12 12	686	< 3.0	< 0.10	0.17	97.8	< 0.020	< 0.050	< 10	0.0372	123	0.25	< 0.10	5.31	< 10	< 0.050	8.0	91.9	0.39	< 0.0050	2.43	0.50	0.975	***80.5***	< 0.010	1.16	141	< 0.010	< 0.10	< 10	5.00	< 0.50	3.9
Fording River Valley (Greenhills Creek Drainage)(+ denotes well part of Study Area 3)																																		
GH_MW-GHC-A	GH_MW-GHC-1D_WG_2019-01-01_NP	2019 03 28	655	< 3.0	< 0.10	< 0.10	87.4	< 0.020	< 0.050	31	0.0207	169	< 0.10	< 0.10	< 0.50	< 10	< 0.050	17.7	56.2	< 0.10	< 0.0050	0.672	0.72	1.43	3.39	< 0.010	4.92	497	0.027	< 0.10	< 10	2.79	< 0.50	< 1.0
	GH_GHER1_WG_2019-01-01_NP	Duplicate	656	< 3.0	< 0.10	< 0.10	87.5	< 0.020	< 0.050	32	0.0194	170	< 0.10	< 0.10	< 0.50	< 10	< 0.050	17.4	56.1	< 0.10	< 0.0050	0.668	0.73	1.42	3.7	< 0.010	5.11	501	0.024	< 0.10	< 10	2.81	< 0.50	< 1.0
	QA/QC RPD%		0	*	*	*	0	*	*	*	*	1	*	*	*	*	*	2	0	*	*	1	*	1	9	*	4	1	*	*	*	1	*	*
	GH_MW-GHC-1D_WG_2019-04-01_NP	2019 04 25	668	< 3.0	< 0.10	< 0.10	86.3	< 0.020	< 0.050	36	0.0196	176	< 0.10	< 0.10	< 0.50	< 10	< 0.050	19.9	55.5	< 0.10	< 0.0050	0.636	0.87	1.41	3.89	< 0.010	4.79	478	0.026	< 0.10	< 10	2.76	< 0.50	< 1.0
	GH_GHER1_WG_2019-04-01_NP	Duplicate	651	< 3.0	< 0.10	< 0.10	86.4	< 0.020	< 0.050	35	0.0224	170	< 0.10	< 0.10	< 0.50	< 10	< 0.050	19.6	55.4	< 0.10	< 0.0050	0.599	0.82	1.42	3.45	< 0.010	4.69	467	0.023	< 0.10	< 10	2.67	< 0.50	< 1.0
	QA/QC RPD%		3	*	*	*	0	*	*	*	*	3	*	*	*	*	*	2	0	*	*	6	*	1	12	*	2	2	*	*	*	3	*	*
	GH_MW-GHC-1D_WG_2019-07-01_NP	2019 08 26	672	3.4	< 0.10	< 0.10	88.1	< 0.020	< 0.050	35	0.0222	170	< 0.10	< 0.10	< 0.50	81	< 0.050	18.1	60.1	0.16	< 0.0050	0.679	0.86	1.51	4.51	< 0.010	5.36	496	0.022	< 0.10	< 10	2.91	< 0.50	7.4
	GH_MW-GHC-1A_WG_2019-10-01_NP	2019 11 20	600	< 3.0	< 0.10	< 0.10	78.7	< 0.020	< 0.050	32	0.0175	144	< 0.10	< 0.10	0.58	< 10	< 0.050	16.6	58.3	0.10	< 0.0050	0.697	0.89	1.47	4.81	< 0.010	5.28	502	0.023	< 0.10	< 10	2.93	< 0.50	< 1.0
GH_MW-GHC-B	GH_MW-GHC-1S_WG_2019-01-01_NP	2019 03 28	890	< 3.0	< 0.10	0.96	29.4	< 0.020	< 0.050	32	0.0289	256	< 0.10	0.40	< 0.50	759	< 0.050	19.7	60.9	194	< 0.0050	0.883	1.55	1.85	0.141	< 0.010	4.44	688	< 0.010	< 0.10	< 10	1.77	< 0.50	1.1
	GH_MW-GHC-1S_WG_2019-04-01_NP	2019 04 25	827	4.0	< 0.10	1.03	25.5	< 0.020	< 0.050	36	0.0195	240	< 0.10	0.42	0.56	693	< 0.050	21.0	55.6	191	< 0.0050	0.831	1.43	1.76	0.351	< 0.010	4.26	593	0.011	< 0.10	< 10	1.61	< 0.50	1.8
	GH_MW-GHC-1S_WG_2019-07-01_NP	2019 08 26	905	< 3.0	< 0.10	1.01	33.7	< 0.020	< 0.050	43	0.0261	259	< 0.10	0.34	< 0.50	659	< 0.050	23.4	63.0	154	< 0.0050	0.977	1.78	2.23	0.387	< 0.010	5.34	689	0.011	< 0.10	< 10	1.65	< 0.50	4.0
	GH_MW-GHC-1B_WG_2019-10-01_NP	2019 11 20	834	< 3.0	< 0.10	1.05	29.2	< 0.020	< 0.050	41	0.0201	229	< 0.10	0.44	< 0.20	628	< 0.050	22.0	63.6	*216*	< 0.0050	0.976	1.47	2.18	0.073	< 0.010	5.23	705	0.013	< 0.10	< 10	1.81	< 0.50	1.8
	GH_GWD1_WG_2019-10-01_NP	Duplicate	826	< 3.0	< 0.10	1.10	28.5	< 0.020	< 0.050	41	0.0264	225	< 0.10	0.44	0.47	617	< 0.050	22.2	64.3	*216*	< 0.0050	0.994	1.49	2.15	0.071	< 0.010	5.16	704	0.012	< 0.10	< 10	1.86	< 0.50	2.0
	QA/QC RPD%		1	*	*	5	2	*	*	*	*	2	*	*	*	2	*	1	1	0	*	2	*	1	*	*	1	0	*	*	*	3	*	*
GH_MW-SITE-A	GH_MW_SITE-A_WG_2019-10-01_NP	2019 12 11	1,940	7.0	1.11	0.86	38.4	< 0.040	< 0.10	25	< 0.010	369	1.11	2.39	0.59	*19,900*	< 0.10	35.1	248	*4,230*	< 0.0050	1.46	6.5	7.15	0.2	< 0.020	54.9	312	< 0.020	< 0.20	< 10	2.67	< 1.0	2.4
GH_MW-TD	GH_MW-TD_WG_2019-01-01_NP	2019 03 12	340	< 3.0	< 0.10	0.12	21.3	< 0.020	< 0.050	356	0.203	85.0	0.41	0.42	< 0.50	271	< 0.050	40.0	31.0	*653*	< 0.0050	2.85	0.91	2.30	< 0.050	< 0.010	27.1	1,060	0.179	< 0.10	< 10	1.07	< 0.50	< 1.0
	GH_MW-TD_WG_2019-04-01_NP	2019 05 27	367	< 3.0	< 0.10	0.13	22.3	< 0.020	< 0.050	353	0.488	88.7	< 0.10	0.42	< 0.50	887	< 0.050	39.0	35.4	*712*	< 0.0050	2.88	0.93	2.42	< 0.050	< 0.010	28.5	1,150	0.160	< 0.10	< 10	1.01	< 0.50	1.1
	GH_MW-TD_WG_2019-07-01_NP	2019 08 28	366	< 3.0	< 0.10	0.14	22.0	< 0.020	< 0.050	382	0.227	85.0	< 0.10	0.44	< 0.50	980	< 0.050	41.5	37.3	*773*	< 0.0050	2.85	0.90	2.28	0.053	< 0.010	29.8	1,100	0.159	< 0.10	< 10	0.959	< 0.50	< 1.0
	GH_MW-TD_WG_2019-10-01_NP	2019 12 12	361	< 3.0	< 0.10	0.13	23.2	< 0.020	< 0.050	366	0.530	85.7	< 0.10	0.47	< 0.20	246	< 0.050	40.2	35.6	*779*	< 0.0050	2.92	0.96	2.42	< 0.050	< 0.010	28.0	1,100	0.191	< 0.10	< 10	1.13	< 0.50	1.3
GH_MW-RLP-1D	GH_MW-RLP_WG_2019-01-01_NP	2019 03 25	252	< 3.0	< 0.10	0.70	47.4	< 0.020	< 0.050	15	< 0.0050	55.2	< 0.10	< 0.10	0.77	18	< 0.050	6.4	27.8	84.4	< 0.0050	3.73	0.50	1.10	< 0.050	< 0.010	3.25	181	< 0.010	< 0.10	< 10	1.08	< 0.50	5.1
	GH_MW-RLP-1D_WG_2019-04-01_NP	2019 04 30	271	< 3.0	< 0.10	1.48	48.8	< 0.020	< 0.050	17	< 0.0050	58.4	< 0.10	< 0.10	< 0.50	519	< 0.050	6.6	30.4	93.3	< 0.0050	3.94	< 0.50	1.27	< 0.050	< 0.010	3.52	196	< 0.010	< 0.10	< 10	1.09	< 0.50	< 1.0
	GH_MW-RLP-1D_WG_2019-07-01_NP	2019 09 24	273	< 3.0	< 0.10	1.19	42.9	< 0.020	< 0.050	14	< 0.0050	59.5	< 0.10	< 0.10	< 0.20	519	< 0.050	6.7	30.3	86.5	< 0.0050	3.49	< 0.50	1.12	< 0.050	< 0.010	3.15	195	< 0.010	< 0.10	< 10	0.993	< 0.50	< 1.0
	GH_GWD3_WG_2019-07-01_NP	Duplicate	270	3.7	< 0.10	1.28	43.6	< 0.020	< 0.050	14	< 0.0050	58.3	< 0.10	< 0.10	< 0.20	522	< 0.050	6.5	30.2	88.3	< 0.0050	3.63	< 0.50	1.15	< 0.050	< 0.010	3.19	202	< 0.010	< 0.10	< 10	0.968	< 0.50	1.1
	QA/QC RPD%		1	*	*	7	2	*	*	*	*	2	*	*	*	1	*	3	0	2	*	4	*	3	*	*	1	4	*	*	*	3	*	*
	GH_MW-RLP-1D_WG_2019-10-01_NP	2019 12 12	222	3.8	< 0.10	0.12	43.7	< 0.020	< 0.050	17	< 0.0050	43.3	< 0.10	< 0.10	< 0.20	45	< 0.050	7.1	27.6	17.0	< 0.0050	0.053	< 0.50	1.17	1.68	< 0.010	3.23	192	< 0.010	0.14	< 10	0.195	< 0.50	< 1.0
GH_POTW09+	GH_POTW09_WG_2019-01-01_NP	2019 01 15	406	< 3.0	< 0.10	0.44	32.7	< 0.020	< 0.050	19	0.0077	94.7	< 0.10	0.18	1.34	157	< 0.050	10.9	41.1	195	< 0.0050	2.62	1.18	1.51	0.861	< 0.010	6.90	343	0.014	< 0.10	< 10	1.97	< 0.50	4.9
	GH_POTW09_WG_2019-04-01_NP	2019 04 24	394	< 3.0	< 0.10	0.41	34.7	< 0.020	< 0.050	19	0.0070	93.4	< 0.10	0.18	1.02	144	< 0.050	11.1	39.1	190	< 0.0050	2.63	1.12	1.43	1.06	< 0.010	6.53	350	0.018	< 0.10	< 10	2.03	< 0.50	5.6
	GH_POTW09_WG_2019-07-01_NP	2019 08 22	453	< 3.0	< 0.10	0.53	33.6	< 0.020	< 0.050	21	0.0052	104	< 0.10	0.18	0.69	148	< 0.050	12.6	46.9	196	< 0.0050	2.42	0.84	1.64	1.19	< 0.010	8.00	337	0.016	< 0.10	< 10	2.09	< 0.50	2.5
	GH_POTW09_WG_2019-10-01_NP	2019 11 13	409	< 3.0	< 0.10	0.47	33.3	< 0.020	< 0.050	19	0.0075	94.8	< 0.10	0.18	1.56	160	< 0.050	12.0	41.8	193	< 0.0050	2.46	0.71	1.57	0.926	< 0.010	7.14	336	0.015	< 0.10	< 10	2.12	< 0.50	3.9
GH_POTW10+	GH_POTW10_WG_2019-01-01_NP	2019 01 15	375	< 3.0	< 0.10	1.07	18.4	< 0.020	< 0.050	34	0.0074	82.8	< 0.10	0.16	< 0.50	698	0.067	14.3	40.8	51.2	< 0.0050	2.70	1.00	1.60	4.14	< 0.010	5.05	493	< 0.010	< 0.10	< 10	0.680	< 0.50	< 1.0
	GH_POTW10_WG_2019-04-01_NP	2019 04 24	380	< 3.0	< 0.10	1.11	19.5	< 0.020	< 0.050	34	0.0108	86.1	< 0.10	0.17	< 0.50	691	< 0.050	15.3	40.1	50.9	< 0.0050	2.87	1.07	1.56	4.72	< 0.010	4.82	527	< 0.010	< 0.10	< 10	0.677	< 0.50	< 1.0
	GH_GHER3_WG_2019-04-01_NP	Duplicate	390	< 3.0	< 0.10	1.10	19.8	< 0.020	< 0.050	35	0.0097	88.5	< 0.10	0.16	< 0.50	668	< 0.050	16.3	41.1	52.1	< 0.0050	2.89	1.06	1.55	4.52	< 0.010	4.88	526	< 0.010	< 0.10	< 10	0.691	< 0.50	1.2
	QA/QC RPD%		3	*	*	1	2	*	*	*	*	3	*	*	*	3	*	6	2	2	*	1	*	1	4	*	1	0	*	*	*	2	*	*
	GH_POTW10_WG_2019-07-01_NP	2019 08 22	391	< 3.0	< 0.10	0.99	19	< 0.020	< 0.050	36	0.0090	88.2	< 0.10	0.18	< 0.50	506	0.054	16.0	41.5	52.7	< 0.0050	2.81	2.93	1.69	3.03	< 0.010	5.07	500	0.011	< 0.10	< 10	0.756	< 0.50	1.3
	GH_GWD2_WG_2019-07-01_NP	Duplicate	425	< 3.0	< 0.10	1.01	18.2	< 0.020	< 0.050	40	0.0091	94.4	< 0.10	0.19	< 0.50	489	< 0.050	16.9	46.1	53.0	< 0.0050	2.80	2.21	1.70	2.93	< 0.010	5.43	512	< 0.010	< 0.10	< 10	0.666	< 0.50	3.6
	QA/QC RPD%		8	*	*	2	4	*	*	*	*	7	*	*	*	3	*	5	11	1	*	0	*	1	3	*	7	2	*	*	*	13	*	*
	GH_POTW10_WG_2019-10-01_NP	2019 11 13	389	< 3.0	< 0.10	1.06	17.3	< 0.020	< 0.050	37	0.0100	88.9	< 0.10	0.18	< 0.20	489	0.064	15.4	40.6	49.5	< 0.0050	3.09	3.59	1.63	4	< 0.010	4.92	543	< 0.010	< 0.10	< 10	0.717	< 0.50	1.2
GH_POTW15+	GH_POTW15_WG_2019-01-01_NP	2019 01 15	495	< 3.0	< 0.10	1.63	22.0	< 0.020	< 0.050	20	0.0086	124	< 0.10	0.22	< 0.50	817	< 0.050	13.5	45.2	189	< 0.0050	2.31	0.83	1.53	< 0.050	< 0.010	11.9	361	0.017	< 0.10	< 10	1.38	< 0.50	< 1.0
	GH_POTW15_WG_2019-04-01_NP	2019 04 24	489	< 3.0	< 0.10	1.61	22.4	< 0.020	< 0.050	19	0.0109	123	< 0.10	0.20	< 0.50	821	< 0.050	14.2	43.9	186	< 0.0050	2.45	0.82	1.45	0.068	< 0.010	10.7	385	0.016	< 0.10	< 10	1.34	< 0.50	< 1.0
	GH_POTW15_WG_2019-07-01_NP	2019 08 22	523	< 3.0	< 0.10	1.77	22.2	< 0.020	< 0.050	21	0.0116	129	< 0.10	0.21	< 0.50	858	< 0.050	15.1	48.5	192	< 0.0050	2.36	0.93	1.57	< 0.050	< 0.010	11.4	374	0.016	< 0.10	< 10	1.31	< 0.50	< 1.0
	GH_POTW15_WG_2019-10-01_NP	2019 11 13	490	< 3.0	< 0.10	1.74	19.6	< 0.020	< 0.050	21	0.0134	124	< 0.10	0.21	< 0.20	750	< 0.050	14.3	43.4	183	< 0.0050	2.51	1.02	1.49	< 0.050	< 0.010	10.7	382	0.016	< 0.10	< 10	1.41	< 0.50	2.1

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[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.

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 3d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (GHO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness 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
			Dissolved Metals																															
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
Fording River Valley (Greenhills Creek Drainage)(+ denotes well part of Study Area 3)																																		
GH_POTW17+	GH_POTW17_WG_2019-01-01_NP	2019 01 15	743	< 3.0	< 0.10	0.19	26.8	< 0.020	< 0.050	25	0.0477	178	< 0.10	0.14	0.71	162	0.353	13.3	72.6	77.5	< 0.0050	1.13	11.9	1.61	5.73	< 0.010	8.44	480	0.014	< 0.10	< 10	2.36	< 0.50	1.9
	GH_POTW17_WG_2019-04-01_NP	2019 04 24	724	< 3.0	< 0.10	0.20	30.2	< 0.020	< 0.050	22	0.0420	171	< 0.10	0.14	< 0.50	179	0.194	13.3	72.4	73.1	< 0.0050	1.14	6.44	1.58	5.39	< 0.010	7.99	484	0.013	< 0.10	< 10	2.16	< 0.50	2.5
	GH_POTW17_WG_2019-07-01_NP	2019 08 22	841	< 3.0	< 0.10	0.17	30.9	< 0.020	< 0.050	22	0.0498	191	< 0.10	0.13	< 0.50	130	< 0.050	13.7	88.5	61.1	< 0.0050	0.971	7.26	1.71	10.3	< 0.010	8.95	445	0.011	< 0.10	< 10	2.26	< 0.50	6.2
	GH_POTW17_WG_2019-10-01_NP	2019 11 13	760	< 3.0	< 0.10	0.14	27.2	< 0.020	< 0.050	21	0.0450	182	< 0.10	0.13	< 0.20	139	< 0.050	12.8	74.1	58.5	< 0.0050	1.10	7.19	1.61	9.42	< 0.010	7.92	489	0.011	< 0.10	< 10	2.54	< 0.50	4.7
Elk River Valley (* denotes well Part of Study Area 4, ** denotes well is part of background)																																		
GH_GA-MW-1**	GH_GA-MW-1_WG_2019-01-01_NP	2019 03 04	290	< 3.0	0.70	0.49	42.1	< 0.020	< 0.050	*748*	0.0313	62.9	0.11	0.54	31.4	27	< 0.050	152	32.4	176	< 0.0050	5.95	4.12	3.32	0.124	< 0.010	152	4,470	0.029	< 0.10	< 10	2.07	< 0.50	2.6
	GH_GA-MW-1_WG_2019-04-01_NP	2019 04 29	309	< 3.0	0.58	0.73	43.5	< 0.020	< 0.050	*809*	0.0238	67.2	0.17	0.33	29.7	50	< 0.050	174	34.3	116	< 0.0050	5.36	4.46	3.15	0.175	< 0.010	157	4,650	0.026	< 0.10	< 10	1.82	< 0.50	< 4.0
	GH_GA-MW-1_WG_2019-07-01_NP	2019 07 30	287	< 3.0	0.82	0.50	39.0	< 0.020	< 0.050	*902*	0.0277	59.6	0.11	0.31	54.4	39	< 0.050	180	33.6	126	< 0.0050	5.06	4.76	3.02	0.147	< 0.010	160	3,970	0.028	< 0.10	< 10	1.59	< 0.50	4.9
	GH_GWD1_WG_2019-07-01_NP	Duplicate	271	< 3.0	0.90	0.54	40.9	< 0.020	< 0.050	*843*	0.0244	57.9	0.12	0.30	56.2	41	< 0.050	167	30.7	125	< 0.0050	5.07	5.11	2.96	0.219	< 0.010	152	3,960	0.030	0.13	< 10	1.59	< 0.50	5.1
	QA/QC RPD%		6	*	9	8	5	*	*	7	*	3	*	*	3	*	*	7	9	1	*	0	7	2	*	*	5	0	*	*	*	0	*	*
	GH_GA-MW-1_WG_2019-10-01_NP	2019 11 27	281	< 3.0	0.49	0.56	36.8	< 0.020	< 0.050	*726*	0.0121	56.1	0.27	0.40	64.8	73	< 0.050	175	34.1	*214*	< 0.0050	5.54	3.07	3.50	0.217	< 0.010	171	3,790	0.023	< 0.10	< 10	1.45	< 0.50	2.2
GH_MW-MC-1D	GH_MW-MC-1D-190130	2019 01 30	119	2.0	< 0.10	0.49	630	< 0.020	< 0.050	71	< 0.0050	25.4	< 0.10	< 0.10	< 0.20	93	< 0.050	68.0	13.6	148	< 0.0050	5.46	< 0.50	1.21	< 0.050	< 0.010	31.7	360	0.024	< 0.10	< 0.30	0.103	< 0.50	1.1
	GH_MW-MC-1D_04-18-2019	2019 04 18	121	6.0	0.11	0.44	546	< 0.020	< 0.050	69	< 0.0050	26.2	< 0.10	< 0.10	< 0.20	61	< 0.050	61.4	13.4	152	< 0.0050	6.68	< 0.50	1.26	< 0.050	< 0.010	33.0	393	0.027	0.63	< 0.30	0.171	< 0.50	2.2
	GH_MW-MC-1C_04-18-2019	Duplicate	121	5.5	< 0.10	0.47	529	< 0.020	< 0.050	72	< 0.0050	26.1	< 0.10	< 0.10	< 0.20	62	< 0.050	60.0	13.5	152	< 0.0050	6.56	< 0.50	1.25	< 0.050	< 0.010	32.0	393	0.024	0.56	< 0.30	0.186	< 0.50	2.3
	QA/QC RPD%		0	9	*	*	3	*	*	4	*	0	*	*	*	2	*	2	1	0	*	2	*	1	*	*	3	0	*	12	*	8	*	*
	GH_MW-MC-1D_WG_2019_06_28_NP	2019 06 28	127	2.8	< 0.10	0.80	652	< 0.020	< 0.050	87	< 0.0050	28.5	< 0.10	< 0.10	< 0.20	86	< 0.050	73.6	16.3	171	< 0.0050	7.48	< 0.50	1.64	< 0.050	< 0.010	46.2	428	0.032	< 0.10	< 0.30	0.107	< 0.50	< 1.0
	GH_MW-MC-1D_WG_2019_08_20_NP	2019 08 20	137	1.7	< 0.10	0.71	816	< 0.020	< 0.050	81	< 0.0050	30.8	< 0.10	< 0.10	< 0.20	68	< 0.050	80.1	14.7	126	< 0.0050	6.45	< 0.50	1.36	< 0.050	< 0.010	42.9	417	0.026	< 0.10	< 0.30	0.060	< 0.50	1.2
	GH_MW-MC-1D_WG_2019_10_28_NP	2019 10 28	131	1.7	< 0.10	0.67	737	< 0.020	< 0.050	72	< 0.0050	29.3	< 0.10	< 0.10	0.21	67	< 0.050	75.9	14.1	137	< 0.0050	6.03	< 0.50	1.20	< 0.050	< 0.010	37.5	383	0.027	0.11	< 0.30	0.077	< 0.50	< 1.0
	GH_MW-MC-1D_WG_2019_12_10_NP	2019 12 10	127	1.3	< 0.10	0.80	778	< 0.020	< 0.050	81	< 0.0050	27.4	< 0.10	< 0.10	< 0.20	102	< 0.050	79.8	14.3	135	< 0.0050	6.46	< 0.50	1.28	< 0.050	< 0.010	39.3	420	0.030	< 0.10	< 0.30	0.069	< 0.50	< 1.0
GH_MW-MC-1S	GH_MW-MC-1S-190130	2019 01 30	157	< 1.0	< 0.10	< 0.10	51.4	< 0.020	< 0.050	< 10	0.0052	43.8	0.23	< 0.10	0.27	< 10	< 0.050	2.0	11.5	0.18	< 0.0050	0.921	< 0.50	0.31	1.38	< 0.010	0.807	187	< 0.010	< 0.10	< 0.30	0.729	< 0.50	< 1.0
	GH_MW-MC-1S_04-18-2019	2019 04 18	162	3.4	< 0.10	< 0.10	55.0	< 0.020	< 0.050	< 10	< 0.0050	45.8	0.27	< 0.10	0.28	< 10	< 0.050	2.2	11.8	0.56	< 0.0050	0.996	< 0.50	0.34	1.52	< 0.010	1.26	210	< 0.010	< 0.10	< 0.30	0.733	< 0.50	2.1
	GH_MW-MC-1S_WG_2019-06-26_NP	2019 06 26	155	< 1.0	< 0.10	0.12	54.3	< 0.020	< 0.050	< 10	< 0.0050	46.0	0.17	< 0.10	< 0.20	< 10	< 0.050	2.1	9.81	< 0.10	< 0.0050	1.06	< 0.50	0.38	0.963	< 0.010	0.723	195	< 0.010	< 0.10	< 0.30	0.668	< 0.50	< 1.0
	GH_MW-MC-1S_WG_2019_08_19_NP	2019 08 19	146	1.1	< 0.10	< 0.10	48.7	< 0.020	< 0.050	< 10	< 0.0050	42.2	0.27	< 0.10	< 0.20	< 10	< 0.050	2.0	9.92	< 0.10	< 0.0050	1.14	< 0.50	0.39	0.687	< 0.010	0.690	199	< 0.010	< 0.10	< 0.30	0.645	< 0.50	< 1.0
	GH_MW-MC-1S_WG_2019_10_29_NP	2019 10 29	180	< 1.0	< 0.10	< 0.10	54.4	< 0.020	< 0.050	< 10	< 0.0050	53.3	0.24	< 0.10	0.32	< 10	< 0.050	1.6	11.3	< 0.10	< 0.0050	1.08	< 0.50	0.36	0.914	< 0.010	0.660	209	< 0.010	< 0.10	< 0.30	0.701	< 0.50	< 1.0
	GH_MW-MC-1S_WG_2019_12_10_NP	2019 12 10	152	1.0	< 0.10	< 0.10	47.8	< 0.020	< 0.050	< 10	0.0052	41.8	0.25	< 0.10	< 0.20	< 10	< 0.050	1.7	11.6	< 0.10	< 0.0050	0.980	< 0.50	0.35	0.993	< 0.010	0.749	189	< 0.010	< 0.10	< 0.30	0.752	< 0.50	< 1.0
GH_MW-MC-2D	GH_MW-MC-2D-190129	2019 01 29	28.5	38.7	1.49	17.5	86.4	< 0.10	< 0.25	*655*	< 0.025	6.03	< 0.50	< 0.50	< 1.0	< 50	< 0.25	947	3.25	52.8	< 0.0050	8.98	< 2.5	2.82	11.4	< 0.050	424	129	< 0.050	< 0.50	< 1.5	2.68	< 2.5	< 5.0
	GH_MW-MC-2D_04-18-2019	2019 04 18	19.7	41.8	0.95	18.5	65.1	< 0.10	< 0.25	*726*	< 0.025	3.72	< 0.50	< 0.50	< 1.0	< 50	< 0.25	1,020	2.39	35.3	< 0.0050	4.27	< 2.5	2.26	18.9	< 0.050	465	138	< 0.050	< 0.50	< 1.5	1.52	< 2.5	< 5.0
	GH_MW-MC-2D_WG_2019-06-26_NP	2019 06 26	17.3	59.2	0.87	24.5	60.7	< 0.10	< 0.25	*801*	< 0.025	3.12	< 0.50	< 0.50	< 1.0	58	< 0.25	1,060	2.31	25.1	< 0.0050	2.85	< 2.5	1.92	1.98	< 0.050	454	154	< 0.050	< 0.50	< 1.5	1.17	< 2.5	< 5.0
	GH_MW-MC-2D_WG_2019_08_19_NP	2019 08 19	17.3	35.0	0.73	15.3	63.7	< 0.10	< 0.25	*704*	< 0.025	3.01	< 0.50	< 0.50	< 1.0	< 50	< 0.25	999	2.36	31.1	< 0.0050	1.71	< 2.5	1.79	9.80	< 0.050	461	167	< 0.050	< 0.50	< 1.5	0.967	< 2.5	< 5.0
	GH_MW-MC-2D_WG_2019_10_28_NP	2019 10 28	34.2	29.6	0.63	11.2	90.6	< 0.10	< 0.25	*691*	< 0.025	7.18	0.80	< 0.50	< 1.0	< 50	< 0.25	966	3.95	106	< 0.0050	2.28	< 2.5	2.37	3.44	< 0.050	410	179	< 0.050	< 0.50	< 1.5	1.53	< 2.5	< 5.0
	GH_MW-MC-2D_WG_2019_12_10_NP	2019 12 10	23.9	15.8	< 0.50	5.80	98.1	< 0.10	< 0.25	*750*	< 0.025	4.38	< 0.50	< 0.50	< 1.0	< 50	< 0.25	1,040	3.14	26.5	< 0.0050	1.36	< 2.5	2.19	***21.0***	< 0.050	453	168	< 0.050	< 0.50	< 1.5	0.878	< 2.5	< 5.0
GH_MW-MC-2S	GH_MW-MC-2S-190129	2019 01 29	374	2.2	0.16	0.25	125	< 0.020	< 0.050	27	0.0588	96.6	0.23	0.21	0.36	< 10	< 0.050	25.2	32.3	30.0	< 0.0050	0.942	1.32	1.28	2.70	< 0.010	14.5	296	0.018	< 0.10	< 0.30	1.23	< 0.50	1.2
	MW19-A-190129	Duplicate	373	1.9	0.16	0.25	129	< 0.020	< 0.050	27	0.0644	96.3	0.19	0.19	0.37	< 10	< 0.050	25.6	32.3	29.2	< 0.0050	0.962	1.29	1.26	2.60	< 0.010	14.1	301	0.016	< 0.10	< 0.30	1.20	< 0.50	1.3
	QA/QC RPD%		0	*	*	*	3	*	*	*	9	0	*	*	*	*	*	2	0	3	*	2	*	2	4	*	3	2	*	*	*	2	*	*
	GH_MW-MC-2S_04-18-2019	2019 04 18	309	3.4	0.15	0.27	105	< 0.020	< 0.050	31	0.0391	80.3	0.27	0.13	0.56	< 10	< 0.050	24.6	25.3	22.5	< 0.0050	1.36	1.30	1.38	4.99	< 0.010	14.3	278	0.015	< 0.10	< 0.30	1.19	< 0.50	1.9
	GH_MW-MC-2S_WG_2019-06-26_NP	2019 06 26	304	2.6	0.17	0.30	103	< 0.020	< 0.050	28	0.0289	84.1	0.11	0.11	0.36	< 10	< 0.050	21.5	22.8	25.9	< 0.0050	1.50	0.99	1.26	3.41	< 0.010	15.1	251	0.016	< 0.10	< 0.30	1.07	< 0.50	< 1.0
	GH_MW-MC-2S_WG_2019_08_19_NP	2019 08 19	284	2.6	0.13	0.22	105	< 0.020	< 0.050	25	0.0331	72.9	0.14	< 0.10	0.38	< 10	< 0.050	23.0	24.8	16.9	< 0.0050	1.26	0.90	1.22	2.42	< 0.010	18.4	262	0.016	< 0.10	< 0.30	1.14	< 0.50	< 1.0
	GH_MW-MC10-A_WG_2019_08_19_NP	Duplicate	285	2.9	0.13	0.24	104	< 0.020	< 0.050	27	0.0314	73.0	0.15	< 0.10	0.39	< 10	< 0.050	23.6	24.8	17.4	< 0.0050	1.27	0.91	1.20	2.75	< 0.010	18.6	266	0.014	< 0.10	< 0.30	1.15	< 0.50	< 1.0
	QA/QC RPD%		0	*	*	*	1	*	*	*	5	0	*	*	*	*	*	3	0	3	*	1	*	2	13	*	1	2	*	*	*	1	*	*
	GH_MW-MC-2S_WG_2019_10_28_NP	2019 10 28	360	17.0	0.16	0.18	120	< 0.020	< 0.050	30	0.0494	97.6	0.17	< 0.10	0.50	< 10	< 0.050	26.2	28.2	19.9	< 0.0050	1.15	0.89	1.29	2.11	< 0.010	19.1	288	0.017	< 0.10	< 0.30	1.20	< 0.50	1.2
	GH_MW_MC10-A_WG_2019_10_28_NP	Duplicate	372	4.4	0.14	0.20	121	< 0.020	< 0.050	30	0.0597	99.2	0.16	< 0.10	0.49	< 10	< 0.050	26.2	30.2	18.8	< 0.0050	1.14	0.94	1.36	2.15	< 0.010	20.1	293	0.014	< 0.10	< 0.30	1.18	< 0.50	1.1
	QA/QC RPD%		3	*	*	*	1	*	*	*	19	2	*	*	*	*	*	0	7	6	*	1	*	5	2	*	5	2	*	*	*	2	*	*
	GH_MW-MC-2S_WG_2019_12_09_NP	2019 12 09	344	3.9	0.11	0.18	128	< 0.020	< 0.050	30	0.0586	90.3	0.24	< 0.10	0.44	< 10	< 0.050	25.5	28.7	3.74	< 0.0050	1.06	< 0.50	1.33	2.09	< 0.010	20.2	302	0.013	< 0.10	< 0.30	1.25	< 0.50	1.8
	GH_MW_MC10-A_WG_2019_12_09_NP	Duplicate	345	4.3	0.11	0.16	127	< 0.020	< 0.050	29	0.0616	90.0	0.23	< 0.10	0.44	< 10	< 0.050	26.5	29.2	3.86	< 0.0050	1.04	< 0.50	1.34	1.90	< 0.010	19.9	302	0.013	0.14	< 0.30	1.29	< 0.50	2.2
	QA/QC RPD%		0	*	*	*	1	*	*	*	5	0	*	*	*	*	*	4	2	3	*	2	*	1	10	*	1	0	*	*	*	3	*	*

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[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.

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 3d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (GHO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness 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
			Dissolved Metals																															
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
Elk River Valley (* denotes well Part of Study Area 4, ** denotes well is part of background)																																		
GH_GA-MW-4*	GH_GA-MW-4_WG_2019-01-01_NP	2019 03 04	190	< 3.0	0.12	< 0.10	66.1	< 0.020	< 0.050	18	0.0051	47.9	0.19	< 0.10	0.84	< 10	< 0.050	17.4	17.0	< 0.10	< 0.0050	1.84	< 0.50	0.974	1.74	< 0.010	4.86	153	< 0.010	< 0.10	< 10	1.30	< 0.50	< 1.0
	GH_GA-MW-4_WG_2019-04-01_NP	2019 04 29	191	< 3.0	0.12	< 0.10	74.0	< 0.020	< 0.050	11	0.0056	46.8	0.21	< 0.10	< 0.50	< 10	< 0.050	17.7	18.1	< 0.10	< 0.0050	1.90	< 0.50	0.905	1.74	< 0.010	5.29	178	< 0.010	< 0.10	< 10	1.41	< 0.50	< 1.0
	GH_GA-MW-4_WG_2019-07-01_NP	2019 09 19	227	< 3.0	0.16	< 0.10	84.9	< 0.020	< 0.050	12	0.0075	54.6	0.19	< 0.10	0.62	< 10	< 0.050	18.4	21.9	0.10	< 0.0050	1.78	< 0.50	1.13	2.58	< 0.010	5.38	201	< 0.010	0.10	< 10	1.68	< 0.50	< 1.0
	GH_GA-MW-4_WG_2019-10-01_NP	2019 12 09	243	< 3.0	0.12	0.10	83.3	< 0.020	< 0.050	13	0.0106	58.8	0.21	< 0.10	3.39	< 10	0.110	17.7	23.3	< 0.10	< 0.0050	1.66	< 0.50	1.11	1.85	< 0.010	6.17	193	< 0.010	< 0.10	< 10	1.37	< 0.50	2.5
	GH_GWD2_WG_2019-10-01_NP	Duplicate	230	< 3.0	0.11	< 0.10	80.2	< 0.020	< 0.050	15	0.0072	56.5	0.18	< 0.10	0.45	< 10	< 0.050	17.2	21.6	< 0.10	< 0.0050	1.68	< 0.50	1.04	1.86	< 0.010	6.18	193	< 0.010	< 0.10	< 10	1.31	< 0.50	< 1.0
	QA/QC RPD%		5	*	*	*	4	*	*	*	*	4	*	*	*	*	*	3	8	*	*	1	*	7	1	*	0	0	*	*	*	4	*	*
GH_GA-MW-2*	GH_GA-MW-2_WG_2019-01-01_NP	2019 03 06	512	< 3.0	1.80	0.29	46.8	< 0.020	< 0.050	22	< 0.060	138	< 0.10	0.35	6.60	< 10	< 0.050	18.2	40.3	73.9	< 0.0050	*49.5*	5.55	1.16	18.4	< 0.010	9.27	559	< 0.010	< 0.10	< 10	6.43	< 0.50	8.3
	GH_GA-MW-2_WG_2019-04-01_NP	2019 05 23	512	< 3.0	1.94	0.25	47.5	< 0.020	< 0.050	25	< 0.060	141	< 0.10	0.46	3.74	< 10	< 0.050	17.6	38.8	88.1	< 0.0050	*55.9*	6.73	1.25	11.1	< 0.010	9.43	596	< 0.010	< 0.10	< 10	6.63	< 0.50	8.8
	GH_GA-MW-2_WG_2019-07-01_NP	2019 09 19	529	< 3.0	1.70	0.21	45.7	< 0.020	< 0.050	20	< 0.060	140	< 0.10	0.45	11.7	< 10	< 0.050	17.0	43.7	81.1	< 0.0050	*44.8*	6.91	1.36	17.9	< 0.010	10.1	625	0.010	< 0.10	< 10	7.96	< 0.50	10.1
	GH_GA-MW-2_WG_2019-10-01_NP	2019 11 27	598	< 3.0	1.90	0.23	41.6	< 0.020	< 0.050	22	0.0618	160	< 0.10	0.32	4.45	< 10	< 0.050	18.4	48.5	61.1	< 0.0050	*30.3*	5.29	1.37	***34.7***	< 0.010	10.3	585	0.013	< 0.10	< 10	7.21	< 0.50	8.0
GH_GA-MW-3*	GH_GA-MW-3_WG_2019-01-01_NP	2019 03 06	245	< 3.0	< 0.10	< 0.10	96.3	< 0.020	< 0.050	289	< 0.0050	43.4	0.13	< 0.10	< 0.50	< 10	< 0.050	95.4	33.2	8.12	< 0.0050	< 0.050	< 0.50	2.41	1.33	< 0.010	36.5	2,260	< 0.010	< 0.10	< 10	0.034	< 0.50	< 1.0
	GH_GA-MW-3_WG_2019-04-01_NP	2019 05 29	288	< 3.0	< 0.10	0.17	88.5	< 0.020	< 0.050	239	< 0.0050	55.3	0.15	< 0.10	< 0.50	< 10	< 0.050	84.7	36.3	7.52	< 0.0050	< 0.050	< 0.50	2.35	9.26	< 0.010	34.7	2,100	< 0.010	< 0.10	< 10	0.201	< 0.50	< 1.0
	GH_GA-MW-3_WG_2019-07-01_NP	2019 09 23	362	< 3.0	< 0.10	< 0.10	90.9	< 0.020	< 0.050	221	< 0.0050	72.7	< 0.10	< 0.10	< 0.20	11	< 0.050	83.3	43.7	6.05	< 2.5[a]	0.060	< 0.50	2.33	***21.1***	< 0.010	32.6	2,120	< 0.010	< 0.10	< 10	0.334	< 0.50	5.4
	GH_GA-MW-3_WG_2019-10-01_NP	2019 12 09	377	< 3.0	< 0.10	< 0.10	95.4	< 0.020	< 0.050	242	< 0.0050	75.3	0.15	< 0.10	< 0.20	< 10	< 0.050	92.7	45.9	5.69	< 0.0050	0.101	< 0.50	2.51	11	< 0.010	36.9	2,240	< 0.010	< 0.10	< 10	0.273	< 0.50	< 1.0
GH_MW-UTC-A	GH_MW-UTC_1D_WG_2019-01-01_NP	2019 03 27	10.0	20.2	< 0.10	1.78	58.8	< 0.020	< 0.050	*855*	0.0114	2.74	0.86	< 0.10	< 0.50	222	< 0.050	1,060	0.77	19.0	< 0.0050	*18.7*	5.04	0.966	0.583	0.011	395	162	< 0.010	< 0.10	< 10	5.64	2.60	1.7
	GH_GHER2_WG_2019-01-01_NP	Duplicate	10.2	23.4	< 0.10	1.84	59.6	< 0.020	< 0.050	*831*	0.0139	2.77	1.02	< 0.10	< 0.50	215	< 0.050	1,050	0.78	19.2	< 0.0050	*18.0*	5.25	1.01	0.921	< 0.010	400	160	< 0.010	< 0.10	< 10	5.54	2.64	1.5
	QA/QC RPD%		2	15	*	3	1	*	*	3	*	1	17	*	*	3	*	1	1	1	*	4	4	4	45	*	1	1	*	*	*	2	2	*
	GH_MW-UTC-1D_WG_2019-04-01_NP	2019 05 30	9.13	17.4	< 0.10	2.34	54.0	< 0.020	< 0.050	*897*	0.0129	2.52	0.70	0.11	< 0.50	168	< 0.050	996	0.69	16.3	< 0.0050	*16.5*	7.02	0.889	0.891	< 0.010	398	151	< 0.010	< 0.10	< 10	4.71	2.15	< 1.0
	GH_MW-UTC-1D_WG_2019-07-01_NP	2019 09 18	8.34	17.8	< 0.10	1.52	55.6	< 0.020	< 0.050	*863*	0.0089	2.30	0.76	< 0.10	< 0.50	158	< 0.050	1,070	0.63	15.7	< 0.0050	*16.9*	3.45	0.807	0.814	< 0.010	360	170	< 0.010	0.11	< 10	4.18	2.11	1.1
GH_MW-UTC-B	GH_MW-UTC_1S_WG_2019-01-01_NP	2019 03 27	257	< 3.0	< 0.10	0.16	88.3	< 0.020	< 0.050	89	0.0113	70.1	< 0.10	0.11	< 0.50	12	< 0.050	40.5	19.9	16.4	< 0.0050	1.50	0.53	1.35	1.79	< 0.010	17.3	1,120	< 0.010	< 0.10	< 10	0.369	< 0.50	3.6
	GH_MW-UTC-1S_WG_2019-04-01_NP	2019 05 30	228	< 3.0	< 0.10	0.13	73.7	< 0.020	< 0.050	86	< 0.0050	59.8	< 0.10	< 0.10	< 0.50	22	< 0.050	37.4	19.2	13.0	< 0.0050	1.40	0.94	1.15	1.81	< 0.010	17.1	932	< 0.010	< 0.10	< 10	0.299	< 0.50	3.6
	GH_MW-UTC-1S_WG_2019-07-01_NP	2019 09 18	236	< 3.0	< 0.10	0.10	74.7	< 0.020	< 0.050	83	0.0062	63.9	0.10	< 0.10	< 0.50	14	< 0.050	36.6	18.5	6.87	< 0.0050	1.54	< 0.50	1.19	1.76	0.044	15.3	1,100	< 0.010	< 0.10	< 10	0.290	< 0.50	3.2
	GH_MW-UTC-1B_WG_2019-10-01_NP	2019 11 25	221	< 3.0	< 0.10	0.14	73.3	< 0.020	< 0.050	83	0.0082	60.7	< 0.10	< 0.10	< 0.20	< 10	< 0.050	34.4	17.0	5.56	< 0.0050	1.46	< 0.50	1.13	2.46	< 0.010	13.7	948	< 0.010	< 0.10	< 10	0.295	< 0.50	2.5
	GH_GWD3_WG_2019-10-01_NP	Duplicate	223	< 3.0	< 0.10	0.13	72.9	< 0.020	< 0.050	83	0.0133	60.9	< 0.10	< 0.10	< 0.20	< 10	< 0.050	35.9	17.2	5.28	< 0.0050	1.40	< 0.50	1.14	2.37	< 0.010	14.0	918	< 0.010	< 0.10	< 10	0.286	< 0.50	2.7
	QA/QC RPD%		1	*	*	*	1	*	*	0	*	0	*	*	*	*	*	4	1	5	*	4	*	1	4	*	2	3	*	*	*	3	*	*
GH_MW-ERSC-1*	GH_MW-ERSC-1_WG_2019-01-01_NP	2019 03 07	705	< 3.0	< 0.10	0.11	210	< 0.020	< 0.050	12	0.0662	164	0.22	< 0.10	2.16	< 10	< 0.050	14.9	71.7	6.29	< 0.0050	1.29	1.10	1.08	***73.2***	< 0.010	7.02	592	0.030	< 0.10	< 10	1.84	< 0.50	2.6
	GH_MW-ERSC-1_WG_2019-04-01_NP	2019 05 29	323	< 3.0	0.11	0.12	106	< 0.020	< 0.050	12	0.0285	76.8	0.19	< 0.10	5.33	< 10	< 0.050	9.1	31.8	1.32	< 0.0050	1.95	0.73	0.794	16.6	< 0.010	3.93	253	0.019	< 0.10	< 10	1.06	< 0.50	1.6
	GH_GWD2_WG_2019-04-01_NP	Duplicate	325	< 3.0	0.12	0.10	104	< 0.020	< 0.050	< 10	0.0344	77.9	0.29	< 0.10	6.05	< 10	< 0.050	9.4	31.6	1.24	< 0.0050	2.00	0.75	0.795	16.2	< 0.010	4.00	270	0.017	0.11	< 10	1.11	< 0.50	2.0
	QA/QC RPD%		1	*	*	*	2	*	*	*	19	1	*	*	13	*	*	3	1	6	*	3	*	0	2	*	2	7	*	*	*	5	*	*
	GH_MW-ERSC-1_WG_2019-07-01_NP	2019 09 23	348	< 3.0	0.15	0.59	179	< 0.020	< 0.050	22	< 0.0050	92.0	0.15	0.29	0.40	398	< 0.050	13.0	28.6	55.4	< 2.5[a]	5.00	5.33	0.907	1.82	< 0.010	5.43	382	< 0.010	0.21	< 10	0.811	< 0.50	2.3
	GH_MW-ERSC-1_WG_2019-10-01_NP	2019 12 11	444	< 3.0	< 0.10	0.18	154	< 0.020	< 0.050	15	0.0580	123	0.18	< 0.10	1.49	14	< 0.050	9.9	33.0	8.14	< 0.0050	4.22	1.85	0.859	***23.9***	< 0.010	4.50	334	0.025	< 0.10	< 10	1.31	< 0.50	2.6
Blanks																																		
Field Blank																																		
GH_POTW06	GH_GHLRP3_WG_2019-01-01_NP	2019 01 15	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	23	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	0.0053	< 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
GH_MW-UTC-A	GH_GHLRP2_WG_2019-01-01_NP	2019 03 27	< 0.50	< 3.0	< 0.10	< 0.10	0.17	< 0.020	< 0.050	25	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 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
GH_MW-GHC-A	GH_GHLRP1_WG_2019-01-01_NP	2019 03 28	< 0.50	< 3.0	< 0.10	< 0.10	5.55	< 0.020	< 0.050	22	< 0.0050	0.129	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	0.16	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	0.502	0.23	< 0.010	0.31	< 10	< 0.010	< 0.50	< 1.0
GH_MW-MC-1D	GH_MW-19-A_04-18-2019	2019 04 18	< 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	< 0.10	< 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
GH_POTW10	GH_GHLRP3_WG_2019-04-01_NP	2019 04 24	< 0.50	< 3.0	< 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	< 0.10	< 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
GH_MW-GHC-A	GH_GHLRP1_WG_2019-04-01_NP	2019 04 25	< 0.50	< 3.0	< 0.10	< 0.10	0.22	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 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
GH_MW-ERSC-1	GH_GWB2_WG_2019-04-01_NP	2019 05 29	< 0.50	3.0	< 0.10	< 0.10	2.73	< 0.020	< 0.050	< 10	< 0.0050	0.164	0.17	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	0.515	0.27	< 0.010	0.36	< 10	< 0.010	< 0.50	< 1.0
GH_GA-MW-1	GH_GWB1_WG_2019-07-01_NP	2019 07 30	< 0.50	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
GH_POTW10	GH_GWB2_WG_2019-07-01_NP	2019 08 22	< 0.50	< 3.0	< 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	< 0.10	< 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
GH_MW-RLP-1D	GH_GWB3_WG_2019-07-01_NP	2019 09 24	<0.50	-	-	-	-	-	-	-	-	<0.050	-	-	-	-	-	-	<0.0050	-	-	-	-	<0.050	-	-	<0.050	-	-	-	-	-	-	-
GH_MW-GHC-B	GH_GWB1_WG_2019-10-01_NP	2019 11 20	< 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
GH_MW-UTC-B	GH_GWB3_WG_2019-10-01_NP	2019 11 25	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	0.38	< 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
GH_GA-MW-4	GH_GWB2_WG_2019-10-01_NP	2019 12 09	< 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

Data provided by Teck Coal Ltd.

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

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

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

[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.

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 3d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (GHO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness mg/L	Dissolved Metals Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium 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
Blanks																																		
Filter Blank																																		
	GH_MW_MC10-D_WG_2019_08_19_NP	2019 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	< 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
	GH_MW_MC10-D_WG_2019_10_28_NP	2019 10 28	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	0.25	< 10	< 0.050	< 1.0	< 0.0050	0.13	< 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
	GH_MW_MC10-D_WG_2019_12_09_NP	2019 12 09	< 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
Trip Blank																																		
	GH_TRP1_WG_2019-01-01_NP	2019 03 25	< 0.50	< 3.0	< 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	< 0.10	< 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
	GH_TRIPGW_WG_2019-04-01_NP	2019 04 25	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	0.057	< 0.10	< 0.10	< 0.50	< 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
	GH_TRIPGW_WG_2019-07-01_NP	2019 07 30	< 0.50	< 3.0	< 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	< 0.10	< 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
	GH_TRIPGW_WG_2019-10-01_NP	2019 11 20	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	0.53	< 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
	GH_MW_MC10-C_WG_2019_12_09_NP	2019 12 09	< 0.50	< 1.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	1.26	< 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

Data provided by Teck Coal Ltd.

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

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

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

[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.

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

Table 3e: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (GHO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
Guidelines for Canadian Drinking Water Quality (DW)				50
SPO			Elk River [GH_ER1 (E206661)	19
Compliance Point			Elk River [GH_ERC (E300090)]	15
			Fording River [GH_FR1 (0200378)]	80
Fording River Valley (Porter Creek Drainage) (^ denotes well part of Study Area 1)				
GH_MW-PC^	GH_MW-PC_WG_2019-01-01_NP	2019 03 25	GH_FR1 (0200378)	**60**
	GH_MW-PC_WG_2019-04-01_NP	2019 06 05	GH_FR1 (0200378)	**83.3**
	GH_MW-PC_WG_2019-07-01_NP	2019 09 16	GH_FR1 (0200378)	**76.4**
	GH_MW-PC_WG_2019-10-01_NP	2019 12 12	GH_FR1 (0200378)	**80.5**
Fording River Valley (Greenhills Creek Drainage) (+ denotes well part of Study Area 3)				
GH_POTW17+	GH_POTW17_WG_2019-07-01_NP	2019 08 22	GH_FR1 (0200378)	10.3
Elk River Valley (* denotes well Part of Study Area 4, ** denotes well is part of background)				
GH_MW-MC-2D	GH_MW-MC-2D-190129	2019 01 29	GH_ERC (E300090)	11.4
	GH_MW-MC-2D_04-18-2019	2019 04 18	GH_ERC (E300090)	18.9
	GH_MW-MC-2D_WG_2019_12_10_NP	2019 12 10	GH_ERC (E300090)	21.0
GH_GA-MW-2*	GH_GA-MW-2_WG_2019-01-01_NP	2019 03 06	GH_ERC (E300090)	18.4
	GH_GA-MW-2_WG_2019-04-01_NP	2019 05 23	GH_ERC (E300090)	11.1
	GH_GA-MW-2_WG_2019-07-01_NP	2019 09 19	GH_ERC (E300090)	17.9
	GH_GA-MW-2_WG_2019-10-01_NP	2019 11 27	GH_ERC (E300090)	34.7
GH_GA-MW-3*	GH_GA-MW-3_WG_2019-07-01_NP	2019 09 23	GH_ERC (E300090)	21.1
	GH_GA-MW-3_WG_2019-10-01_NP	2019 12 09	GH_ERC (E300090)	11
GH_MW-ERSC-1*	GH_MW-ERSC-1_WG_2019-01-01_NP	2019 03 07	GH_ER1 (E206661)	**73.2**
	GH_MW-ERSC-1_WG_2019-04-01_NP	2019 05 29	GH_ER1 (E206661)	16.6
	GH_GWD2_WG_2019-04-01_NP	2019 05 29	GH_ER1 (E206661)	16.2
	GH_MW-ERSC-1_WG_2019-10-01_NP	2019 12 11	GH_ER1 (E206661)	23.9

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

BOLD Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
SHADED Concentration greater than SPO by Area/Compliance Point by Area

Table 4a: Summary of Groundwater Monitoring Program Locations, Well Installation Details and Hydrogeological Information (EVO)

Area	Well ID	Monitoring Program[a]	Well Type	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 Creek / Harmer Creek	EV_GV3gw	SSGMP, RGMP	Monitoring	656580	5522255	-	1307.96	0.91	25.0	60	22.85	24.38	Silty Gravel	-	-
Elk River Proximal to EVO	EV_BALgw	SSGMP	Monitoring	653121	5517271	1181.00	1182.00	1.00	12.7	60	10.50	12.70	Bedrock	10.4	-
	EV_LSgw	SSGMP, RGMP	Monitoring	653274	5514731	1133.00	1133.93	0.93	10.7	60	5.18	6.71	Sand and Gravel	-	1.0E-03
	EV_GCgw	SSGMP	Monitoring	653061	5513870	1131.24	1131.96	0.72	15.6	60	12.55	15.60	Silty Clay	-	4.0E-06
	EV_OCgw	SSGMP, RGMP	Monitoring	652480	5512671	1126.00	1126.89	0.89	15.5	60	11.58	14.63	Sand	14.5	7.0E-07
Erickson Creek	EV_WF_SW	SSGMP	Monitoring	659208	5513023	1679.25	1678.57	0.68	163	152	151.5	159.4	Waste Rock[c]	-	-
	EV_ECgw	SSGMP, RGMP	Monitoring	660795	5506384	1327.00	1327.74	0.74	11.0	60	2.59	4.12	Sand/Clay and Sand	-	1.0E-08
Michel Creek	EV_RCgw	SSGMP, RGMP	Supply	655902	5509299	-	-	-	6.1	-	-	-	Sand and Gravel	-	-
	EV_MW_GT1A	SSGMP	Monitoring	655651	5509291	1156.515	1157.442	0.927	67.2	60	62.18	63.7	Gravel, some sand	64.92	5.90E-04
	EV_MW_GT1B	SSGMP	Monitoring	655651	5509290	1156.52	1157.46	0.94	67.2	60	2.74	4.27	Sand and gravel, silty sand	-	6.6E-05
	EV_WH50gw	RGMP	Supply	655600	5509407	-	-	-	-	-	-	-	-	-	-
	EV_MW_BC1A	SSGMP	Monitoring	655665	5509503	1156.27	1157.09	0.81	27.9	60	22.86	24.38	Sand and gravel, some silt	25.60	8.4E-04
	EV_MW_BC1B	SSGMP	Monitoring	655665	5509503	1156.27	1157.09	0.82	27.9	60	3.35	4.88	Fill, sand and gravel	-	-
	EV_BCgw	SSGMP, RGMP	Monitoring	655381	5509659	1153.00	1153.86	0.86	23.2	60	17.77	20.82	Gravel	-	1.0E-04
	EV_BRgw	RGMP	Supply	655059	5510196	-	-	-	-	-	-	-	-	-	-
	EV_MW_MC2A	SSGMP	Monitoring	654758	5510530	1146.99	1147.95	0.96	55.8	60	51.66	53.22	Sand and gravel	54.25	9.8E-04
	EV_MW_MC2B	SSGMP	Monitoring	654758	5510530	1146.99	1147.97	0.98	55.8	60	4.88	6.40	Gravel, silt	-	2.0E-04
	EV_HW1[b]	Supplemental Well for RGMP	Supply	654786	5510528	-	-	-	6.1	-	-	-	-	-	-
	EV_MW_MC1A	SSGMP	Monitoring	654903	5510593	1147.63	1148.59	0.96	32.0	60	24.99	26.52	Sand and gravel	30.18	5.7E-04
	EV_MW_MC1B	SSGMP	Monitoring	654903	5510593	1147.63	1148.585	0.954	32.0	60	3.35	4.88	Sand and gravel	-	1.4E-04
	EV_MW_AQ1	SSGMP	Monitoring	654573	5511292	1173.96	1174.862	0.906	22.3	60	16.15	17.68	Gravel, some sand	19.8	2.2E-04
	EV_MW_AQ2	SSGMP	Monitoring	653854	5511872	1150.69	1151.673	0.984	18.6	60	13.41	14.94	Sand and gravel	15.85	1.7E-05
	EV_MW_SPR1A	SSGMP	Monitoring	653947	5511277	1137.38	1138.248	0.872	53.3	60	41.15	42.67	Silty sand	50.29	2.6E-05
	EV_MW_SPR1B	SSGMP	Monitoring	653947	5511277	1137.38	1138.247	0.871	53.3	60	25.3	26.52	Gravel, sand and silt	-	4.1E-06
	EV_MW_SPR1C	SSGMP	Monitoring	653946	5511278	1137.27	1138.188	0.918	5.2	60	3.66	5.18	Sand and gravel	-	2.4E-04
	EV_MCgwS	RGMP	Monitoring	653476	5511624	1131.00	1131.96	0.96	10.7	60	5.79	7.32	Clayey Silt	-	1.9E-06
	EV_MCgwD	SSGMP, RGMP	Monitoring	653476	5511624	1131.00	1131.84	0.84	47.6	60	24.50	27.55	Sand and Clay	-	2.8E-07
	EV_MW_MC3	SSGMP	Monitoring	653667	5510983	1137.93	1138.815	0.89	21.0	60	16.15	17.68	Gravel, some silt	17.68	6.4E-06
	EV_MW_MC4	SSGMP	Monitoring	653309	5512280	1144.35	1145.308	0.963	26.2	60	13.41	14.94	Silty sand	24.99	3.2E0-4
Elk River Distal to EVO	EV_ER1gwS	RGMP	Monitoring	651374	5510955	1115.25	1115.96	0.71	17.6	60	14.56	17.61	Sand and Gravel	-	7.0E-04
	EV_ER1gwD	RGMP	Monitoring	651379	5510952	1115.20	1115.91	0.71	30.8	60	25.82	28.87	Sand/Silty Sand	27.9	9.0E-04

Notes:

[a] SSGMP denotes EVO Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.

[b] EV_HW1 is also referred to as EV_HM1 and EV_Harmer Well in other sources.

[c] 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 4b: Summary of Groundwater Level 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	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		m/m	Direction	Quarter	
Grave Creek / Harmer Creek	EV_GV3gw	1307.05	1307.96	0.91	2019-01-15	10.95	1297.01				Q1, Q2, Q3, Q4	Bladder
					2019-05-06	10.83	1297.14					
					2019-07-10	10.83	1297.13					
					2019-10-31	10.97	1296.99					
Elk River Proximal to EVO	EV_BALgw	1181.00	1182.00	1.00	2019-01-22	12.23	1169.77				-	Bladder
					2018-03-13	12.09	1169.91					
					2019-05-06	12.10	1169.91					
					2019-07-10	12.07	1169.93					
					2019-11-06	12.03	1169.97					
	EV_LSgw	1133.00	1133.93	0.93	2019-01-22	4.61	1129.32				Q1, Q2, Q3, Q4	Peristaltic
					2019-05-09	4.41	1129.52					
					2019-07-10	4.15	1129.78					
					2019-11-05	4.46	1129.47					
	EV_GCgw	1131.24	1131.96	0.72	2019-01-22	2.85	1129.11				Q1, Q2, Q3, Q4	Peristaltic
					2019-05-09	2.55	1129.41					
					2019-07-12	2.31	1129.66					
					2019-11-05	2.54	1129.42					
	EV_OCgw	1126.00	1126.89	0.89	2019-01-23	3.77	1123.12				Q1, Q2, Q3, Q4	Peristaltic
					2019-05-21	3.61	1123.28					
					2019-07-15	3.74	1123.15					
					2019-11-05	3.88	1123.01					
Erickson Creek	EV_WF_SW	1679.25	1678.57	0.68	2019-02-27	135.69	1542.88				-	Hydrasleeve
					2019-06-06	138.70	1539.87					
					2019-08-28	163.58	1514.99					
					2019-11-19	150.06	1528.51					
	EV_ECgw	1327.00	1327.74	0.74	2019-01-15	1.46	1326.28				Q1, Q2, Q3, Q4	Peristaltic
					2019-05-13	1.36	1326.38					
					2019-07-09	1.01	1326.74					
					2019-08-19	0.99	1326.76					
					2019-10-28	1.06	1326.68					
Michel Creek	EV_RCgw	-	-	-	-	-	-	-	-	-	-	Distribution System
	EV_MW_GT1A	1156.52	1157.44	0.93	2019-03-05	3.56	1153.88	EV_MW_GT1A and EV_MW_GT1B	-0.015	Downward	-	Peristaltic
					2019-06-11	3.22	1154.22		-0.008	Downward		
					2019-08-26	3.65	1153.79		-0.011	Downward		
					2019-11-13	3.68	1153.76		-0.012	Downward		
	EV_MW_GT1B	1156.52	1157.46	0.94	2019-03-05	2.68	1154.77				Q2, Q3, Q4	Peristaltic
					2019-06-11	2.77	1154.69					
					2019-08-26	3.00	1154.46					
					2019-11-13	2.96	1154.50					
	EV_WH50gw	-	-	-	-	-	-	-	-	-	-	Peristaltic
	EV_MW_BC1A	1156.27	1157.09	0.81	2019-03-05	4.64	1152.45	EV_MW_BC1A and EV_MW_BC1B	-0.025	Downward	Q2, Q3, Q4	Peristaltic
					2019-06-11	4.04	1153.05		-0.024	Downward		
					2019-08-20	4.61	1152.47		-0.027	Downward		
					2019-11-13	4.71	1152.37		-0.035	Downward		
	EV_MW_BC1B	1156.27	1157.09	0.82	2019-03-05	4.14	1152.95				Q2, Q3, Q4	Peristaltic
					2019-06-11	3.58	1153.51					
					2019-08-20	4.09	1153.00					
					2019-11-19	4.03	1153.06					

Notes:
TOC denotes top of casing.
masl denotes meters above sea level.
mbtoc denotes meters below top of casing.
"-" denotes data not available.
Quarter is represented as Q1, Q2, Q3, Q4.

Table 4b: Summary of Groundwater Level 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	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		m/m	Direction	Quarter	
Michel Creek	EV_BCgw	1153.00	1153.86	0.86	2019-01-23	3.25	1150.62				Q1, Q2, Q3, Q4	Peristaltic
					2019-05-09	2.74	1151.12					
					2019-07-09	2.89	1150.98					
					2019-10-31	3.15	1150.71					
	EV_BRgw	-	-	-	-	-	-	-	-	-	Q4	Peristaltic
	EV_MW_MC2A	1146.99	1147.95	0.96	2019-03-04	4.08	1143.87	EV_MW_MC2A and EV_MW_MC2B	0.009	Upward	-	Peristaltic
					2019-06-11	3.72	1144.23		0.009	Upward		
					2019-08-20	4.00	1143.95		0.011	Upward		
					2019-11-13	4.02	1143.94		0.011	Upward		
	EV_MW_MC2B	1146.99	1147.97	0.98	2019-03-04	4.52	1143.45				Q2, Q3, Q4	Peristaltic
					2019-06-11	4.15	1143.82					
					2019-08-20	4.55	1143.42					
					2019-11-13	4.56	1143.41					
	EV_HW1	-	-	-	-	-	-	-	-	-	-	Distribution System
	EV_MW_MC1A	1147.63	1148.59	0.96	2019-03-05	4.25	1144.34	EV_MW_MC1A and EV_MW_MC1B	-0.026	Downward	-	Peristaltic
					2019-06-11	3.91	1144.68		-0.027	Downward		
					2019-08-21	4.18	1144.41		-0.037	Downward		
					2019-11-14	4.24	1144.35		-0.025	Downward		
	EV_MW_MC1B	1147.63	1148.59	0.95	2019-03-05	3.68	1144.91				-	Peristaltic
					2019-06-11	3.32	1145.26					
					2019-08-21	3.37	1145.22					
					2019-11-14	3.69	1144.89					
	EV_MW_AQ1	1173.96	1174.86	0.91	2019-03-06	16.67	1158.20				Q2, Q3, Q4	Q1: Submersible Q2, Q3, Q4: Bladder
					2019-06-13	16.70	1158.16					
					2019-08-26	16.81	1158.05					
					2019-11-19	16.81	1158.05					
	EV_MW_AQ2	1150.69	1151.67	0.98	2019-03-07	13.68	1137.99				-	Q1, Q2: Submersible Q3, Q4: Bladder
					2019-06-13	13.73	1137.94					
					2019-09-09	13.74	1137.93					
					2019-11-19	13.76	1137.91					
	EV_MW_SPR1A	1137.38	1138.25	0.87	2019-03-06	3.73	1134.51	EV_MW_SPR1A and EV_MW_SPR1B	-0.010	Downward	-	Q1: Submersible Q2, Q3, Q4: Peristaltic
					2019-06-12	3.37	1134.87		-0.018	Downward		
					2019-08-22	3.71	1134.54		-0.021	Downward		
					2019-11-14	3.77	1134.48		-0.022	Downward		
	EV_MW_SPR1B	1137.38	1138.25	0.87	2019-03-04	3.58	1134.67	EV_MW_SPR1B and EV_MW_SPR1C	0.014	Upward	Q2, Q3, Q4	Peristaltic
					2019-06-12	3.09	1135.16		0.022	Upward		
					2019-08-22	3.38	1134.86		0.022	Upward		
					2019-11-14	3.42	1134.83		0.022	Upward		
	EV_MW_SPR1C	1137.27	1138.19	0.92	2019-03-04	3.83	1134.36	EV_MW_SPR1A and EV_MW_SPR1C	0.004	Upward	Q2, Q3, Q4	Peristaltic
					2019-06-12	3.50	1134.69		0.005	Upward		
					2019-08-22	3.79	1134.40		0.004	Upward		
					2019-11-14	3.82	1134.36		0.003	Upward		

Notes:

TOC denotes top of casing.

masl denotes meters above sea level.

mbtoc denotes meters below top of casing.

"-" denotes data not available.

Quarter is represented as Q1, Q2, Q3, Q4.

Table 4b: Summary of Groundwater Level 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	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	m	yyyy-mm-dd	mbtoc	masl		m/m	Direction	Quarter	
Michel Creek	EV_MCgwD	1131.00	1131.84	0.84	2019-01-30	3.97	1127.87	EV_MCgwS and EV_MCgwD	-0.051	Downward	Q1, Q2, Q3, Q4	Bladder
					2019-03-13	3.86	1127.98		-	-		
					2019-05-08	3.31	1128.54		-0.056	Downward		
					2019-07-09	3.27	1128.57		-0.046	Downward		
					2019-11-04	3.67	1128.17		-0.045	Downward		
	EV_MCgwS	1131.00	1131.96	0.96	2019-01-30	3.10	1128.87				Q1, Q2, Q3, Q4	Peristaltic
					2019-05-08	2.34	1129.63					
					2019-07-09	2.49	1129.47					
					2019-11-04	2.91	1129.06					
	EV_MW_MC3	1137.93	1138.82	0.89	2019-03-06	5.05	1133.77				Q2, Q3, Q4	Peristaltic
					2019-06-12	4.56	1134.25					
					2019-08-20	5.06	1133.76					
					2019-11-12	5.13	1133.68					
	EV_MW_MC4	1144.35	1145.31	0.963	2019-03-06	15.81	1129.49				-	Q1, Q2: Submersible Q3, Q4: Bladder
					2019-06-13	15.77	1129.53					
					2019-08-27	15.90	1129.41					
					2019-11-14	15.99	1129.32					
Elk River Distal to EVO	EV_ER1gwD	1115.20	1115.91	0.71	2019-01-31	5.15	1110.76	EV_ER1gwS and EV_ER1gwD	0.024	Upward	-	Bladder
					2019-05-08	4.63	1111.28		0.024	Upward		
					2019-07-15	4.45	1111.46		0.024	Upward		
					2019-11-07	5.23	1110.68		0.016	Upward		
	EV_ER1gwS	1115.25	1115.96	0.71	2019-01-31	5.48	1110.48				Q1, Q2, Q3, Q4	Peristaltic
					2019-05-08	4.96	1111.00					
					2019-07-15	4.78	1111.18					
					2019-11-07	5.46	1110.50					

Notes:

TOC denotes top of casing.

masl denotes meters above sea level.

mbtoc denotes meters below top of casing.

"-" denotes data not available.

Quarter is represented as Q1, Q2, Q3, Q4.

Table 4c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (EVO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date	Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Suspended Solids	Total Dissolved Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bromide	Chloride	Fluoride	Sulfate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Total Organic Carbon	Dissolved Organic Carbon
		(yyyy mm dd)	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[d]	1,280-4,290[d]	1.31-18.5[e]	400	0.2-2[f]	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
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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-429[d]	0.365-1.77[e] (15C assumed)	3	0.02-0.04[f]	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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	0.4-1.7[d]	n/a	5.68-24.5[e] (15C assumed)	32.8	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
Grave Creek / Harmer Creek (Study Area 7)																													
EV_GV3gw	EV_GV3GW_WG_2019-01_NP	2019 01 15	2.1	7.53	3.51	642	76.4	8.23	361	612	< 1.0	413	0.41	204	204	< 1.0	< 1.0	< 0.050	1.56	0.489	137	0.0247	0.133	< 0.0010	0.056	0.0018	< 0.0020	< 0.50	< 0.50
	EV_GV3GW_WG_2019-04_NP	2019 05 06	6.4	7.41	3.3	639	103.3	7.99	335	589	< 1.0	393	< 0.10	199	199	< 1.0	< 1.0	< 0.050	1.62	0.517	142	< 0.0050	0.130	< 0.0010	0.089	0.0017	0.0025	< 0.50	< 0.50
	EV_EC5GW_WG_2019-04_NP	Duplicate	-	-	-	-	-	8.30	336	605	< 1.0	388	< 0.10	205	205	< 1.0	< 1.0	< 0.050	1.59	0.511	142	< 0.0050	0.129	< 0.0010	< 0.050	0.0011	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	4	0	3	*	1	*	3	3	*	*	*	*	1	0	*	*	*	*	*	*	*	*
	EV_GV3GW_WG_2019_Q3_NP	2019 07 10	8.2	7.29	2.72	629	52.8	8.13	343	634	< 1.0	384	0.12	212	212	< 1.0	< 1.0	< 0.050	1.62	0.512	144	< 0.0050	0.134	< 0.0010	< 0.050	0.0016	< 0.0020	< 0.50	< 0.50
	EV_GV3GW_WG_2019_Q4_NP	2019 10 31	3.3	7.55	2.75	629	47.4	8.03	333	577	< 1.0	393	< 0.10	204	204	< 1.0	< 1.0	< 0.050	1.69	0.511	147	< 0.0050	0.164	0.0095	< 0.050	0.0019	< 0.0020	< 0.50	< 0.50
Elk River Proximal to EVO (Study Area 8)																													
EV_BALgw	EV_BALGW_WG_2019-01_NP	2019 01 22	1.5	7.28	2	757	125.2	7.87	372	734	88.3	491	62.8	330	330	< 1.0	< 1.0	< 0.050	1.54	0.234	94.8	0.0161	0.0469	< 0.0010	0.146	0.0027	0.0705	1.40	1.51
	EV_BALGW_WG_2019-03-13 _NP	2019 03 13	4.5	7.25	3.82	756	109.9	7.69	362	775	54.3	506	37.3	340	340	< 1.0	< 1.0	< 0.050	1.69	0.305	106	0.0167	0.0375	0.0013	0.224	0.0018	0.0351	2.54	2.06
	EV_BALGW_WG_2019-04_NP	2019 05 06	12.4	7.07	2.06	785	102.4	7.90	343	726	4.7	448	2.82	339	339	< 1.0	< 1.0	< 0.050	1.71	0.242	94.8	0.0071	0.0366	< 0.0010	0.073	0.0018	0.0083	1.34	1.63
	EV_BALGW_WG_2019_Q3_NP	2019 07 10	14.8	7	3.01	782	-47.9	8.16	359	719	13.5	443	4.28	301	301	< 1.0	< 1.0	< 0.050	1.77	0.243	97.6	0.141	0.0186	0.0015	0.417	< 0.0010	0.0258	< 0.50	< 0.50
	EV_BALGW_WG_2019_Q4_NP	2019 11 06	5	7.12	0.82	668	-54.6	7.81	376	675	5.9	481	4.98	353	353	< 1.0	< 1.0	< 0.050	1.80	0.245	96.4	0.160	0.0267	0.0034	0.211	0.0020	0.0096	1.54	1.49
EV_LSgw	EV_LSGW_WG_2019-01_NP	2019 01 22	8.5	7.28	0.2	986	-55.4	8.19	571	968	11.4	583	19.8	511	511	< 1.0	< 1.0	< 0.25	9.0	0.30	72.8	0.110	< 0.025	< 0.0050	0.179	< 0.0010	0.0137	2.26	2.24
	EV_LSGW_WG_2019-04_NP	2019 05 09	7.6	7.14	0.29	999	-81.4	8.27	527	957	8.5	539	31.1	481	481	< 1.0	< 1.0	0.059	8.48	0.269	75.9	0.139	< 0.0050	< 0.0010	0.223	< 0.0010	0.0214	1.86	1.82
	EV_LSGW_WG_2019_Q3_NP	2019 07 10	13.2	7.04	0.29	1,055	-96.8	8.01	597	1,030	7.0	545	34.2	573	573	< 1.0	< 1.0	< 0.25	9.4	0.30	69.5	0.152	< 0.025	< 0.0050	0.252	< 0.0010	0.0280	2.20	2.07
	EV_LSGW_WG_2019_Q4_NP	2019 11 05	10.4	7.09	0.53	1,023	-87.1	8.12	597	867	7.2	569	29.4	528	528	< 1.0	< 1.0	< 0.25	9.0	0.22	62.7	0.166	< 0.025	< 0.0050	0.268	< 0.0010	0.0198	1.98	2.09
EV_GCgw	EV_GCGW_WG_2019-01_NP	2019 01 22	5.4	7.67	0.13	432.5	-44.5	8.23	232	434	18.5	292	11.9	177	177	< 1.0	< 1.0	< 0.050	4.01	0.501	58.5	0.0226	0.0071	< 0.0010	0.053	< 0.0010	0.0122	0.82	0.71
	EV_EC5GW_WG_2019-01_NP	Duplicate	-	-	-	-	-	8.18	231	431	17.0	295	13.4	164	164	< 1.0	< 1.0	< 0.050	4.05	0.504	58.6	0.0299	0.0085	< 0.0010	0.105	< 0.0010	0.0124	1.09	0.76
	QA/QC RPD%		-	-	-	-	-	1	0	1	8	1	12	8	8	*	*	*	1	1	0	*	*	*	*	*	2	*	*
	EV_GCGW_WG_2019-04_NP	2019 05 09	8.2	7.44	0.23	457.8	-72.2	8.21	227	449	3.8	278	3.50	169	169	< 1.0	< 1.0	< 0.050	4.56	0.462	65.3	0.0267	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0033	< 0.50	< 0.50
	EV_GCGW_WG_2019_Q3_NP	2019 07 12	12.1	7.37	0.88	456.1	-150.9	8.26	231	456	1.8	259	2.29	181	181	< 1.0	< 1.0	< 0.050	4.72	0.429	68.3	0.0204	< 0.0050	< 0.0010	0.067	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_EC5GW_WG_2019_Q3_NP	Duplicate	-	-	-	-	-	8.25	231	453	1.9	260	1.75	178	178	< 1.0	< 1.0	< 0.050	4.82	0.441	69.1	0.0197	< 0.0050	< 0.0010	0.074	< 0.0010	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	0	1	*	0	27	2	2	*	*	*	2	3	1	*	*	*	*	*	*	*	*
	EV_GCGW_WG_2019_Q4_NP	2019 11 05	5.1	7.57	0.51	412.7	-131.2	8.19	214	363	3.0	276	5.19	170	170	< 1.0	< 1.0	< 0.050	3.72	0.503	52.8	0.0366	0.0059	< 0.0010	0.078	< 0.0010	0.0041	1.00	< 0.50
EV_OCgw**	EV_OCGW_WG_2019-01_NP	2019 01 23	6.7	8.04	0.26	474.1	-141.7	8.22	161	465	4.3	302	4.09	183	183	< 1.0	< 1.0	< 0.050	2.09	*1.21*	68.4	0.104	< 0.0050	< 0.0010	0.162	0.0085	0.0223	0.56	< 0.50
	EV_MC5GW_WG_2019-01_NP	Duplicate	-	-	-	-	-	8.28	163	470	4.8	287	4.82	181	181	< 1.0	< 1.0	< 0.050	2.11	*1.21*	68.1	0.107	< 0.0050	< 0.0010	0.196	0.0084	0.0200	0.64	0.64
	QA/QC RPD%		-	-	-	-	-	1	1	1	*	5	16	1	1	*	*	*	*	0	0	3	*	*	*	1	11	*	*
	EV_OCGW_WG_2019-04_NP	2019 05 21	6.6	7.73	0.28	457	-75	8.45	149	479	4.3	250	2.20	190	184	5.6	< 1.0	< 0.050	2.11	*1.27*	59.0	0.0541	0.0079	0.0072	0.057	0.0074	0.0145	0.87	0.67
	EV_MC5GW_WG_2019-04_NP	Duplicate	-	-	-	-	-	8.42	149	466	3.5	257	1.52	182	178	4.4	< 1.0	< 0.050	2.10	*1.26*	58.7	0.0394	0.0076	0.0076	0.052	0.0070	0.0194	1.04	0.80
	QA/QC RPD%		-	-	-	-	-	0	0	3	*	3	37	4	3	*	*	*	*	1	1	31	*	5	*	6	29	*	*
	EV_MC6GW_WG_2019_Q4_NP	2019 11 05	-	-	-	-	-	**6.32**	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	EV_OCGW_WG_2019_Q3_NP	2019 07 15	10.9	7.77	0.36	461.1	-152.4	8.25	155	464	4.7	256	2.98	190	190	< 1.0	< 1.0	< 0.050	1.96	*1.08*	61.1	0.0694	< 0.0050	< 0.0010	0.112	0.0082	0.0149	< 0.50	< 0.50
	EV_MC5GW_WG_2019_Q3_NP	Duplicate	-	-	-	-	-	8.26	158	470	5.3	256	3.63	190	190	< 1.0	< 1.0	< 0.050	1.94	*1.05*	61.3	0.0666	< 0.0050	0.0011	0.088	0.0079	0.0151	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	2	1	*	0	20	0	0	*	*	*	*	3	0	4	*	*	*	4	1	*	*
	EV_OCGW_WG_2019_Q4_NP	2019 11 05	6.8	7.96	0.54	420.4	-150	8.25	151	443	4.6	315	4.66	177	177	< 1.0	< 1.0	< 0.050	2.29	*1.30*	76.4	0.0739	< 0.0050	< 0.0010	0.137	0.0076	0.0240	< 0.50	< 0.50
	EV_MC5GW_WG_2019_Q4_NP	Duplicate	-	-	-	-	-	8.28	153	443	4.6	302	4.34	184	184	< 1.0	< 1.0	< 0.050	2.29	*1.33*	76.5	0.0764	< 0.0050	< 0.0010	0.158	0.0074	0.0246	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	0	*	4	7	4	4	*	*	*	*	2	0	3	*	*	*	3	2	*	*

Data provided by Teck Coal Ltd.

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

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

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water, shown here for comparison purposes only.

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.

[d] Standard/guideline varies with Hardness.

[e] Standard/guideline varies with pH and Temperature.

[f] Standard/guideline varies with Chloride.

RED	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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

Table 4c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients 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	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bromide	Chloride	Fluoride	Sulfate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	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[d]	1,280-4,290[d]	1.31-18.5[e]	400	0.2-2[f]	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
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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-429[d]	0.365-1.77[e] (15C assumed)	3	0.02-0.04[f]	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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	0.4-1.7[d]	n/a	5.68-24.5[e] (15C assumed)	32.8	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
Erickson Creek (Study Area 10)																													
EV_WF_SW**	EV_WF_SW_WG_2019-01_NP	2019 02 27	4.6	8.84	2.71	511	-4.4	8.08	268	508	15.4	352	17.8	73.5	73.5	< 1.0	< 1.0	< 0.050	2.99	0.091	180	0.185	< 0.0050	< 0.0010		< 0.0010	0.0116	2.44	2.21
	EV_WF_SW_WG_2019-04_NP	2019 06 05	8.2	8.27	3.24	625	-6.2	8.24	255	531	22.8	326	25.1	76.9	76.9	< 1.0	< 1.0	< 0.050	3.27	0.094	186	0.163	0.0817	0.0029		< 0.0010	0.0121	4.09	2.57
	EV_WF_SW_WG_2019_Q3_NP	2019 08 28	10.5	**9.56**	2.1	361.4	63.3	8.07	165	351	15.3	212	14.2	31.9	31.9	< 1.0	< 1.0	< 0.050	2.51	0.046	132	0.227	0.0145	0.0129		< 0.0010	0.0101	2.50	1.27
	EV_WF_SW_WG_2019_Q4_NP	2019 11 20	6.7	8.99	3.02	422.2	0.8	8.16	187	383	7.8	261	8.35	39.3	39.3	< 1.0	< 1.0	< 0.050	2.68	0.056	161	0.191	< 0.0050	0.0010		< 0.0010	0.0090	2.10	2.32
EV_ECgw	EV_ECGW_WG_2019-01_NP	2019 01 16	2.6	7.93	4.08	427.4	133	8.09	171	392	221	289	173	217	217	< 1.0	< 1.0	< 0.050	0.67	0.843	25.7	0.166	0.0579	0.0052	0.406	0.0138	0.291	< 2.5	1.23
	EV_ECGW_WG_2019-04_NP	2019 05 15	5.6	7.8	3.78	422.7	149.6	8.36	172	413	1,520	225	2,000	448	445	2.8	< 1.0	< 0.050	0.57	0.766	28.0	0.0059	0.0796	0.0049	0.80	< 0.0050	0.714	10	1.56
	EV_ECGW_WG_2019-Q3_NP	2019 07 11	9.7	7.73	0.78	422.4	156.9	8.51	162	423	252	273	234	255	248	7.4	< 1.0	< 0.050	0.54	0.814	27.0	0.115	0.0204	0.0018	0.489	0.0089	0.366	< 5.0	0.52
	EV_ECGW_WG_2019-08_NP	2019 08 21	9.8	9.26	3.36	426.1	186.4	8.10	161	403	62.2	227	70.4	214	214	< 1.0	< 1.0	< 0.050	< 0.50	0.787	26.7	0.132	0.0519	0.0047	0.189	0.0123	0.121	1.37	0.88
	EV_ECGW_WG_2019_Q4_NP	2019 10 30	5	7.25	1.69	346.3	147.8	8.12	165	379	191	267	185	224	224	< 1.0	< 1.0	< 0.050	0.59	0.831	26.0	0.125	0.0618	0.0049	0.54	0.0118	0.458	2.87	0.99
Michel Creek (Study Area 9)																													
EV_RCgw	EV_RCSGW_WG_2019-01_NP	2019 01 22	16.1	7.03	3.78	2,380	191.6	7.99	1,670	2,380	2.2	2,240	0.22	285	285	< 1.0	< 1.0	1.09	13.1	0.18	1,140	< 0.0050	31.0	< 0.0050	0.068	0.0028	0.0040	1.32	1.49
	EV_RCSGW_WG_2019-04_NP	2019 05 06	19.5	6.9	4.84	2,531	212.3	7.64	1,570	2,380	2.1	2,200	0.60	259	259	< 1.0	< 1.0	0.56	17.8	0.19	1,290	< 0.0050	38.2	< 0.0050	< 0.050	0.0031	0.0026	1.26	1.36
	EV_RCSGW_WG_2019-Q3_NP	2019 07 11	25.5	6.95	2.79	2,400	228.8	8.31	1,570	2,390	1.2	2,120	< 0.10	319	314	5.8	< 1.0	0.68	8.4	0.12	1,170	0.0056	32.6	< 0.0050	< 0.050	0.0028	0.0037	1.10	1.04
	EV_RCSGW_WG_2019-08_NP	2019 08 21	22.8	8.01	7.02	2,458	188.8	8.04	1,590	2,320	< 1.0	2,300	0.15	275	275	< 1.0	< 1.0	< 0.50	16.4	< 0.20	1,180	0.0207	33.3	< 0.010	0.252	0.0021	0.0021	1.19	1.36
	EV_RCSGW_WG_2019-Q4_NP	2019 10 29	12.87	7.48	8.77	3,028	303.2	8.20	1,740	2,100	2.6	2,310	0.14	273	273	< 1.0	< 1.0	0.51	14.4	0.20	1,220	0.0090	33.3	< 0.0050	< 0.050	0.0027	0.0025	2.39	1.02
EV_MW_GT1A	EV_MW_GC1-A_WG_Q1-2019_NP	2019 03 05	4.1	7.75	0.18	527.1	-285	8.10	282	542	5.3	313	2.61	183	183	< 1.0	< 1.0	< 0.050	2.22	0.104	107	0.143	< 0.0050	0.0041	0.165	0.0075	0.0145	0.72	0.80
	EV_MW_GC1-A_WG_Q2-2019_NP	2019 06 11	7.5	7.26	0.05	1,131	-41.5	8.21	282	535	< 1.0	337	0.78	205	205	< 1.0	< 1.0	0.073	2.41	0.161	104	0.101	< 0.0050	< 0.0010	0.137	0.0050	0.0046	0.91	0.75
	EV_MW_GT1-A_WG_2019_Q3_NP	2019 08 26	9	7.28	0.38	564	-52.9	8.02	300	536	< 1.0	355	0.93	198	198	< 1.0	< 1.0	0.099	2.72	0.154	115	0.0973	< 0.0050	< 0.0010	0.118	0.0038	0.0048	1.03	1.00
	EV_MW_GT1A_WG_2019_Q4_NP	2019 11 13	5.2	7.66	0.44	555	-164	8.34	292	497	1.8	347	2.23	188	185	3.4	< 1.0	0.084	2.70	0.114	119	0.0903	< 0.0050	< 0.0010	0.087	0.0015	0.0075	0.67	0.71
EV_MW_GT1B	EV_MW_GC1-B_WG_Q1-2019_NP	2019 03 05	0	7.81	10.7	886.1	33.2	8.10	497	881	2.8	618	1.11	195	195	< 1.0	< 1.0	0.95	5.6	0.10	270	0.0172	5.07	0.0114	0.164	0.0079	0.0090	0.62	0.63
	EV_MW_GC1-B_WG_Q2-2019_NP	2019 06 11	8.92	7.58	6.76	1,472	135	8.10	399	781	< 1.0	566	0.37	160	160	< 1.0	< 1.0	1.29	5.29	0.186	254	< 0.0050	4.26	< 0.0010	0.056	0.0080	0.0067	1.24	1.11
	EV_MW_GT1-B_WG_2019_Q3_NP	2019 08 26	13.7	7.31	4.35	1,830	214.7	7.95	1,080	1,740	< 1.0	1,450	0.12	231	231	< 1.0	< 1.0	1.49	13.8	0.21	840	0.187	17.4	< 0.0050	< 0.25	0.0101	0.0041	1.07	1.00
	EV_EC5GW_WG_2019-08-26_NP	Duplicate	-	-	-	-	-	7.96	1,070	1,740	< 1.0	1,480	0.11	229	229	< 1.0	< 1.0	1.54	13.5	0.21	829	< 0.0050	17.2	< 0.0050	< 0.25	0.0100	0.0034	0.84	0.79
	QA/QC RPD%		-	-	-	-	-	0	1	0	*	2	*	1	1	*	*	3	2	0	1	*	1	*	*	1	*	*	*
	EV_MW_GT1B_WG_2019_Q4_NP	2019 11 13	4.3	7.49	8.52	1,920	105.9	8.25	1,220	1,630	3.2	1,760	1.75	246	246	< 1.0	< 1.0	1.05	45.0	0.20	954	0.0248	16.9	< 0.0050	< 0.050	0.0089	0.0111	0.73	0.79
EV_WH50gw	EV_WH50GW_WG_2019-01_NP	2019 01 23	7.6	7.73	8.87	632	89	8.15	363	629	< 1.0	449	0.84	176	176	< 1.0	< 1.0	0.535	3.63	0.144	158	0.0331	2.46	< 0.0010	0.554	0.0078	0.0118	< 0.50	< 0.50
	EV_WH50GW_WG_2019-04_NP	2019 05 21	4.7	7.71	7.9	659.4	106.2	8.31	179	357	1.3	194	0.79	137	136	1.2	< 1.0	< 0.050	1.60	0.163	52.1	0.0062	0.590	< 0.0010	0.149	0.0052	0.0076	1.29	1.44
	EV_WH50GW_WG_2019-Q3_NP	2019 07 11	8.8	7.9	6.7	348.2	158.2	8.50	175	345	1.7	195	1.47	144	139	5.8	< 1.0	< 0.050	1.03	0.145	45.3	< 0.0050	0.414	< 0.0010	0.194	0.0057	0.0072	0.64	0.63
	EV_WH50GW_WG_2019-08_NP	2019 08 21	9.9	7.65	4.43	465.9	102.6	8.10	238	451	< 1.0	271	3.58	155	155	< 1.0	< 1.0	0.069	1.83	0.145	87.5	0.142	1.11	< 0.0010	0.220	0.0053	0.0092	1.07	1.07
	EV_WH50GW_WG_2019_Q4_NP	2019 11 07	9.6	7.78	6.36	420	45.9	8.30	240	401	5.3	310	14.6	167	167	< 1.0	< 1.0	< 0.050	2.36	0.113	96.8	< 0.0050	1.26	< 0.0010	0.376	0.0029	0.0170	< 0.50	< 0.50
EV_MW_BC1A	EV_MW_BC1-A_WG_Q1-2019_NP	2019 03 05	5.86	6.74	2.65	1,109	61.5	7.76	1,140	1,820	478	1,430	411	275	275	< 1.0	< 1.0	4.97	24.7	0.12	753	0.0214	15.3	0.0269	0.883	< 0.0010	0.689	1.37	0.86
	EV_MW_BC1-A_WG_Q2-2019_NP	2019 06 11	9.7	6.83	4.98	3,816	75.4	8.16	1,100	1,810	27.8	1,510	24.9	276	276	< 1.0	< 1.0	4.06	25.1	0.28	798	0.0064	16.2	< 0.0050	< 0.25	0.0097	0.037	1.73	< 0.50
	EV_MW_BC1-A_WG-2019_NP_Q3_NP	2019 08 20	11.4	7.16	2.75	1,867	104.7	8.15	1,140	1,840	23.8	1,550	23.3	260	260	< 1.0	< 1.0	3.00	29.6	0.20	882	0.0084	17.8	0.0060	< 0.25	0.0080	0.074	1.39	1.19
	EV_MW_BC1A_WG_2019_Q4_NP	2019 11 13	6.3	7.12	0.45	1,726	49.8	8.09	1,270	1,560	218	1,700	183	260	260	< 1.0	< 1.0	1.85	33.5	0.21	898	0.0124	18.9	< 0.0050	0.620	0.0017	0.425	< 2.5	0.77

Data provided by Teck Coal Ltd.

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

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

\- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water, shown here for comparison purposes only.

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.

[d] Standard/guideline varies with Hardness.

[e] Standard/guideline varies with pH and Temperature.

[f] Standard/guideline varies with Chloride.

RED	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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

Table 4c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (EVO)

			Field Parameters					Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (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	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P 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[d]	1,280-4,290[d]	1.31-18.5[e]	400	0.2-2[f]	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
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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-429[d]	0.365-1.77[e] (15C assumed)	3	0.02-0.04[f]	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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	0.4-1.7[d]	n/a	5.68-24.5[e] (15C assumed)	32.8	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
Michel Creek (Study Area 9)																													
EV_MW_BC1B	EV_MW_BC1-B_WG_Q1-2019_NP	2019 03 05	3.17	6.78	8.04	1,154	113.2	7.80	1,270	1,990	2.7	1,650	0.36	257	257	< 1.0	< 1.0	6.54	25.2	0.24	893	0.0301	18.4	0.0189	< 0.050	0.0137	0.0140	0.61	0.84
	EV_MW_BC1-B_WG_Q2-2019_NP	2019 06 11	10.6	7	5.39	1,934	216.4	8.17	1,160	1,920	13.5	1,610	1.54	275	275	< 1.0	< 1.0	4.36	28.4	0.34	849	< 0.0050	18.0	0.0089	< 0.25	0.0247	0.033	0.60	0.63
	EV_MW_BC10-A_WG_Q2-2019_NP	2019 06 11	-	-	-	-	-	8.04	1,130	1,780	12.9	1,620	1.32	276	276	< 1.0	< 1.0	4.32	28.4	0.34	847	< 0.0050	17.9	0.0100	< 0.25	0.0200	0.026	< 0.50	0.54
	QA/QC RPD%		-	*	-	-	-	2	3	8	*	1	15	0	0	*	*	1	0	0	0	*	1	*	*	*	*	*	*
	EV_MW_BC1-B_WG_2019_NP_Q3_NP	2019 08 20	13.37	6.99	5.47	2,045	172.1	8.17	1,290	2,010	1.1	1,800	0.31	271	271	< 1.0	< 1.0	2.78	28.5	0.25	1,010	0.0199	20.0	< 0.0050	< 0.25	0.0232	0.027	0.56	0.68
	EV_MW_BC1B_WG_2019_Q4_NP	2019 11 13	7.1	7.12	7.26	2,196	158.7	8.20	1,410	1,830	4.1	1,900	2.27	244	244	< 1.0	< 1.0	1.41	40.1	0.29	1,040	0.0050	24.5	< 0.0050	< 0.050	0.0252	0.031	< 0.50	< 0.50
EV_BCgw	EV_BCGW_WG_2019-01_NP	2019 01 23	5.6	7.43	4.3	810	125.9	7.98	474	805	6.9	587	1.04	191	191	< 1.0	< 1.0	0.301	6.14	0.148	234	0.0259	4.02	< 0.0010	0.247	0.0039	0.0082	1.15	0.63
	EV_BCGW_WG_2019-04_NP	2019 05 09	7.2	7.22	3.84	960	130.7	8.19	519	954	1.5	671	1.26	198	198	< 1.0	< 1.0	0.708	8.64	0.153	301	< 0.0050	5.12	< 0.0010	0.234	0.0032	0.0039	< 0.50	< 0.50
	EV_BCGW_WG_2019_Q3_NP	2019 07 09	8.4	7.22	3.22	860	164.9	8.36	466	864	< 1.0	610	0.33	211	207	4.0	< 1.0	0.622	7.23	0.163	266	0.0058	4.07	< 0.0010	< 0.050	0.0037	< 0.010	< 0.50	< 0.50
	EV_BCGW_WG_2019_Q4_NP	2019 10 31	-	-	-	-	-	7.99	370	627	< 1.0	451	0.13	184	184	< 1.0	< 1.0	0.275	4.86	0.176	182	0.0054	2.34	< 0.0010	0.257	0.0041	0.0038	0.60	0.60
EV_BRgw	EV_BRGW_WG_2019-01_NP	2019 01 22	6.8	7.16	0.45	1,178	86.6	8.05	678	1,190	< 1.0	897	0.62	281	281	< 1.0	< 1.0	< 0.25	25.3	0.13	357	0.0061	4.80	0.0068	0.076	0.0023	0.0022	0.88	1.51
	EV_BRGW_WG_2019-04_NP	2019 05 21	7.4	6.99	0.72	1,160	82.3	8.21	633	1,170	1.7	803	0.85	269	269	< 1.0	< 1.0	< 0.25	26.9	0.13	389	< 0.0050	2.83	< 0.0050	0.068	0.0031	0.0043	0.62	0.78
	EV_BRGW_WG_2019_Q3_NP	2019 08 27	9.9	7.91	2.29	1,215	126.2	8.01	655	1,210	1.9	868	1.02	271	271	< 1.0	< 1.0	0.85	34.9	0.14	376	0.0135	5.72	0.0076	< 0.050	0.0023	< 0.0020	0.76	0.76
	EV_BRGW_WG_2019_Q4_NP	2019 11 07	7.7	7.19	2.71	1,044	123.6	8.09	669	1,030	< 1.0	950	0.98	275	275	< 1.0	< 1.0	0.83	40.1	< 0.10	378	< 0.0050	5.31	< 0.0050	< 0.050	0.0017	< 0.0020	< 0.50	< 0.50
EV_MW_MC2A	EV_MW_MC2-A_WG_Q1-2019_NP	2019 03 04	5.1	7.26	0.13	945	-76.2	7.59	402	914	13.1	499	22.7	390	390	< 1.0	< 1.0	< 0.25	82.5	0.26	5.8	< 0.0050	0.058	< 0.0050	0.802	< 0.0010	0.0167	0.73	0.54
	EV_MW_MC2-A_WG_Q2-2019_NP	2019 06 11	11.9	6.76	0.15	1,969	-59.3	8.24	389	900	3.7	492	18.7	399	399	< 1.0	< 1.0	< 0.25	78.7	0.29	< 1.5	0.899	0.118	< 0.0050	0.859	< 0.0010	0.0057	< 0.50	0.59
	EV_MW_MC2-A_WG_2019_NP_Q3_NP	2019 08 20	10.1	7.04	0.29	902	-37.2	8.23	371	856	< 1.0	508	9.45	384	384	< 1.0	< 1.0	< 0.050	61.3	0.331	< 0.30	0.889	< 0.0050	< 0.0010	0.922	< 0.0010	0.0061	< 0.50	< 0.50
	EV_MW_MC2A_WG_2019_Q4_NP	2019 11 13	5.6	7.21	0.31	823	-48.2	8.20	374	750	1.1	469	13.8	394	394	< 1.0	< 1.0	< 0.050	62.2	0.248	< 0.30	0.995	< 0.0050	0.0014	0.904	< 0.0010	0.0036	< 0.50	< 0.50
EV_MW_MC2B	EV_MW_MC2-B_WG_Q1-2019_NP	2019 03 04	4.8	7.29	1.8	1,245	7.1	8.08	675	1,200	< 16	893	0.73	241	241	< 1.0	< 1.0	0.41	26.1	0.14	408	0.222	9.53	< 0.0050	0.333	0.0036	0.0049	0.81	0.96
	EV_MW_MC2-C_WG_Q1-2019_NP	Duplicate	-	7.29	-	-	-	8.18	647	1,190	< 8.0	868	1.81	243	243	< 1.0	< 1.0	0.41	26.1	0.14	406	< 0.0050	9.53	< 0.0050	0.267	0.0032	0.0048	0.94	0.82
	QA/QC RPD%		-	*	-	-	-	1	4	1	*	3	85	1	1	*	*	0	0	0	0	*	0	*	*	*	*	*	*
	EV_MW_MC2-B_WG_Q2-2019_NP	2019 06 11	8.8	6.95	2.73	1,249	220	7.76	674	1,170	< 1.0	940	0.28	250	250	< 1.0	< 1.0	0.86	26.6	0.16	424	0.0090	8.74	< 0.0050	< 0.25	0.0029	0.0029	< 0.50	< 0.50
	EV_MW_MC2-B_WG_2019_NP_NP	2019 08 20	9.6	7.06	1.82	1,255	130.2	8.19	690	1,250	< 1.0	940	0.13	248	248	< 1.0	< 1.0	0.93	28.8	0.13	419	< 0.0050	8.33	< 0.0050	< 0.25	0.0039	0.0050	< 0.50	< 0.50
	EV_MW_MC2B_WG_2019_Q4_NP	2019 11 13	5.8	7.13	2.17	1,220	162.3	8.20	695	1,020	< 1.0	888	0.10	240	240	< 1.0	< 1.0	0.89	28.3	0.12	417	< 0.0050	7.80	< 0.0050	< 0.050	0.0035	0.0060	< 0.50	< 0.50
EV_HW1	EV_HW1_WG_2019-08_NP	2019 08 21	14.2	4.28	4.28	1,253	202.1	7.99	687	1,220	< 1.0	913	0.19	244	244	< 1.0	< 1.0	1.09	29.2	< 0.20	411	< 0.0050	8.47	< 0.010	0.338	0.0031	0.0035	< 0.50	< 0.50
	EV_HW1_WG_2019_Q4_NP	2019 11 04	18.8	7.31	3.81	1,051	177.7	7.57	685	1,080	< 1.0	920	0.16	235	235	< 1.0	< 1.0	0.98	28.4	0.18	400	< 0.0050	8.35	< 0.0050	< 0.050	0.0032	0.0031	< 0.50	< 0.50
EV_MW_MC1A	EV_MW_MC1-A_WG_Q1-2019_NP	2019 03 05	6.7	7.24	0.14	916	-19.3	7.83	409	936	173	520	146	387	387	< 1.0	< 1.0	0.36	82.3	0.18	< 1.5	1.75	< 0.025	0.0054	1.76	< 0.0010	0.17	1.62	1.24
	EV_MW_MC1-A_WG_Q2-2019_NP	2019 06 11	11.4	6.92	0.26	918	2.5	8.24	411	899	7.7	547	8.14	378	378	< 1.0	< 1.0	0.49	90.5	0.37	7.8	1.28	0.302	0.0086	1.59	0.0011	0.0078	1.39	1.62
	EV_MW_MC1-A_WG_2019_Q3_NP	2019 08 21	11.04	7.06	0.27	914	-14.1	8.01	394	877	1.7	523	< 0.10	367	367	< 1.0	< 1.0	0.628	88.0	0.386	< 0.30	1.48	< 0.0050	< 0.0010	1.57	0.0012	0.0041	1.02	1.07
	EV_MW_MC1A_WG_2019_Q4_NP	2019 11 14	7	7.07	0.4	910	-33.9	7.74	410	828	3.5	486	9.10	368	368	< 1.0	< 1.0	0.623	91.1	0.378	0.46	1.86	< 0.0050	< 0.0010	1.65	0.0021	0.0072	1.27	1.23
EV_MW_MC1B	EV_MW_MC1-B_WG_Q1-2019_NP	2019 03 05	5.41	6.67	0.3	585	-73.2	7.84	436	937	33.7	518	122	362	362	< 1.0	< 1.0	0.42	80.9	0.16	19.7	0.283	< 0.025	< 0.0050	0.298	< 0.0010	0.0279	1.81	1.91
	EV_MW_MC1-B_WG_Q2-2019_NP	2019 06 11	8.3	6.73	0.02	2,403	-123.9	8.21	515	1,100	34.5	683	163	381	381	< 1.0	< 1.0	0.85	91.9	0.28	120	0.290	0.165	< 0.0050	0.340	< 0.0010	0.019	2.45	2.34
	EV_MW_MC1-B _WG_2019_Q3_NP	2019 08 21	13.3	7.41	0.4	1,167	-107.5	7.93	552	1,080	29.2	701	167	404	404	< 1.0	< 1.0	1.07	*108*	0.271	60.1	0.317	< 0.0050	< 0.0010	0.364	< 0.0010	0.0272	1.96	1.97
	EV_MW_MC1B_WG_2019_Q4_NP	2019 11 14	8.5	7.08	0.32	1,132	-116.5	7.68	569	1,010	27.3	689	155	407	407	< 1.0	< 1.0	1.26	*120*	0.31	124	0.402	0.531	< 0.0050	0.398	< 0.0010	0.0237	1.78	1.73

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water, shown here for comparison purposes only.
[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.
[d] Standard/guideline varies with Hardness.
[e] Standard/guideline varies with pH and Temperature.
[f] Standard/guideline varies with Chloride.

RED	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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

Table 4c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters: Field Temperature (C)	pH (field) (pH)	Dissolved Oxygen (mg/L)	Field Conductivity (µS/cm)	Field ORP (mV)	Physical Parameters: pH (pH)	Hardness (mg/L)	Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	Dissolved Inorganics: Total Alkalinity (mg/L)	Alkalinity, Bicarbonate (as CaCO3) (mg/L)	Alkalinity, Carbonate (as CaCO3) (mg/L)	Alkalinity, Hydroxide (as CaCO3) (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Nutrients: Ammonia Nitrogen (mg/L)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Kjeldahl Nitrogen-N (mg/L)	Ortho-Phosphate (mg/L)	Total Phosphorous as P (mg/L)	Organics: 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[d]	1,280-4,290[d]	1.31-18.5[e]	400	0.2-2[f]	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
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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-429[d]	0.365-1.77[e] (15C assumed)	3	0.02-0.04[f]	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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	0.4-1.7[d]	n/a	5.68-24.5[e] (15C assumed)	32.8	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
Michel Creek (Study Area 9)																													
EV_MW_AQ1	EV_MW_AQ1_WG_Q1-2019_NP	2019 03 06	7.5	7.09	5.6	900	70.9	7.76	485	817	11.1	523	12.2	369	369	< 1.0	< 1.0	< 0.25	31.8	< 0.10	79.1	0.0060	0.213	< 0.0050	< 0.050	0.0139	0.0327	0.52	0.52
	EV_MW_AQ1-C_WG_Q1-2019_NP	Duplicate	-	7.09	-	-	-	7.55	489	833	10.5	523	11.7	369	369	< 1.0	< 1.0	< 0.25	32.0	< 0.10	78.6	< 0.0050	0.214	0.0104	< 0.050	0.0141	0.0299	0.57	< 0.50
	QA/QC RPD%		-	*	-	-	-	3	1	2	6	0	4	0	0	*	*	*	1	*	1	*	0	*	*	1	9	*	*
	EV_MW_AQ1_WG_Q2-2019_NP	2019 06 13	8	6.42	4.8	1,829	116.5	8.14	494	829	1.0	531	1.09	335	335	< 1.0	< 1.0	0.155	32.9	0.228	82.3	0.0068	0.236	< 0.0010	0.102	0.0156	0.0145	0.55	0.51
	EV_MW_BC10-A_WG_Q2-2019_NP_061	Duplicate	-	-	-	-	-	8.15	505	842	2.0	520	1.09	347	347	< 1.0	< 1.0	0.154	33.0	0.222	82.4	0.0069	0.230	< 0.0010	< 0.050	0.0140	0.019	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	2	2	*	2	0	4	4	*	*	*	0	3	0	*	3	*	*	11	27	*	*
	EV_MW_AQ1_WG_2019_Q3_NP	2019 08 26	11.1	6.97	4.53	866	209.4	7.80	441	830	1.5	477	2.33	372	372	< 1.0	< 1.0	0.150	32.4	0.231	81.2	0.0135	0.188	< 0.0010	< 0.050	0.0148	0.0070	0.94	0.91
	EV_MW_AQ1_WG_2019_Q4_NP	2019 11 19	1.5	7.05	7.73	859	192.1	8.11	474	842	< 1.0	502	0.78	360	360	< 1.0	< 1.0	0.126	31.5	0.252	77.7	< 0.0050	0.150	< 0.0010	< 0.050	0.0149	0.017	0.79	0.96
EV_MW_AQ2	EV_MW_AQ2_WG_Q1-2019_NP	2019 03 07	6.8	7.07	0.08	1,107	54	7.61	615	1,110	28.0	720	11.2	473	473	< 1.0	< 1.0	< 0.25	13.9	0.19	172	0.0742	< 0.025	< 0.0050	0.110	< 0.0010	0.0282	0.56	0.62
	EV_MW_AQ2_WG_Q2-2019_NP	2019 06 13	14.1	6.49	0.04	2,358	-31.2	8.07	637	1,070	4.3	747	7.90	439	439	< 1.0	< 1.0	< 0.25	14.8	0.21	168	0.0482	0.053	< 0.0050	0.070	< 0.0010	0.0027	0.57	< 0.50
	EV_MW_AQ2_WG_2019_Q3_NP	2019 09 09	7.71	6.83	0.28	1,099	1.2	7.97	589	1,090	< 1.0	727	6.72	490	490	< 1.0	< 1.0	< 0.25	14.2	0.18	158	0.0532	< 0.025	< 0.0050	0.079	0.0018	< 0.0020	0.99	0.94
	EV_MW_AQ2_WG_2019_Q4_NP	2019 11 19	6.7	6.97	0.4	1,080	-13.5	8.11	617	1,080	1.2	696	5.67	472	472	< 1.0	< 1.0	< 0.25	14.6	0.18	160	0.0544	< 0.025	< 0.0050	0.054	< 0.0010	< 0.0020	0.91	0.86
EV_MW_SPR1A	EV_MW_SC1-A_WG_Q1-2019_NP	2019 03 06	5.5	7.41	0.1	818	30	7.94	406	791	16.9	453	19.1	382	382	< 1.0	< 1.0	< 0.050	16.9	0.081	50.7	0.0917	< 0.0050	0.0045	0.136	0.0024	0.0462	2.37	2.17
	EV_MW_SC1-A_WG_Q2-2019_NP	2019 06 12	7.5	7.05	0.32	698	17.5	8.15	357	623	45.8	401	17.0	301	301	< 1.0	< 1.0	< 0.050	17.0	0.272	37.0	0.0805	< 0.0050	< 0.0010	0.134	< 0.0010	0.0360	1.77	1.83
	EV_MW_SC1-A_WG_2019_Q3_NP	2019 08 22	10.67	7.16	0.28	631	-40.3	8.04	336	642	2.0	342	3.95	329	329	< 1.0	< 1.0	< 0.050	15.5	0.226	24.7	0.0759	< 0.0050	< 0.0010	0.079	< 0.0010	0.0035	0.69	0.72
	EV_MW_SPR1A_WG_2019_Q4_NP	2019 11 14	5.1	7.24	0.46	631	-85.8	7.88	333	556	4.8	320	3.99	311	311	< 1.0	< 1.0	< 0.050	14.6	0.260	25.5	0.0879	< 0.0050	< 0.0010	0.088	0.0012	0.0041	< 0.50	< 0.50
EV_MW_SPR1B	EV_MW_SC1-B_WG_Q1-2019_NP	2019 03 04	5.1	7.78	0.17	531.6	-47.9	7.95	175	510	78.3	323	102	222	222	< 1.0	< 1.0	< 0.050	3.76	*1.14*	72.1	< 0.0050	0.0151	0.0036	0.359	0.0016	0.116	2.01	2.30
	EV_MW_SC1-B_WG_Q2-2019_NP	2019 06 12	12.3	7.46	0.36	1,169	-75.3	8.34	172	541	31.7	341	53.8	207	203	3.8	< 1.0	< 0.050	3.62	*1.27*	86.5	0.225	0.0053	< 0.0010	0.273	< 0.0010	0.0442	1.69	1.47
	EV_MW_SC1-B_WG_2019_Q3_NP	2019 08 22	10.1	7.86	0.25	486	-111.9	8.19	150	476	51.0	274	75.2	204	204	< 1.0	< 1.0	< 0.050	1.56	*1.20*	66.3	0.186	< 0.0050	< 0.0010	0.247	0.0013	0.0957	2.61	1.65
	EV_MW_SPR1B_WG_2019_Q4_NP	2019 11 14	4.6	7.79	0.31	452.4	-144.1	8.11	147	405	121	274	148	212	212	< 1.0	< 1.0	< 0.050	1.55	*1.29*	71.1	0.208	< 0.0050	< 0.0010	0.460	0.0018	0.188	3.63	1.53
EV_MW_SPR1C	EV_MW_SC1-C_WG_Q1-2019_NP	2019 03 04	3.9	7.6	4.47	747.4	-3.1	7.64	384	722	< 1.0	512	0.52	227	227	< 1.0	< 1.0	0.348	15.6	0.142	154	< 0.0050	1.91	0.0012	0.261	0.0032	0.0053	0.85	0.86
	EV_MW_SC1-C_WG_Q2-2019_NP	2019 06 12	5.4	6.96	3.35	1,070	63.3	8.34	261	498	< 1.0	301	0.28	209	204	4.8	< 1.0	0.067	6.21	0.183	58.3	0.0119	0.247	< 0.0010	0.051	0.0018	0.0030	1.39	1.63
	EV_MW_SC1-C_WG_2019_Q3_NP	2019 08 22	8.6	7.36	1.26	574	213.5	8.12	286	563	< 1.0	325	1.09	224	224	< 1.0	< 1.0	0.196	18.9	0.170	63.0	< 0.0050	0.412	< 0.0010	< 0.050	0.0036	0.0066	0.62	0.63
	EV_MW_SPR1C_WG_2019_Q4_NP	2019 11 14	6.9	7.27	1.93	666	133.6	7.88	341	585	1.4	394	< 0.10	230	230	< 1.0	< 1.0	0.271	21.9	0.172	102	< 0.0050	0.876	< 0.0010	0.167	0.0040	0.0026	0.74	0.72
	EV_MW_BC10A_WG_2019_Q4_NP	Duplicate	-	-	-	-	-	7.91	344	587	< 1.0	380	< 0.10	236	236	< 1.0	< 1.0	0.266	21.9	0.180	102	0.0132	0.876	< 0.0010	0.278	0.0041	0.0031	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	0	*	4	*	3	3	*	*	2	0	5	0	*	0	*	*	*	*	*	*
EV_MCgwS	EV_MCGWS_WG_2019-01_NP	2019 01 30	2.3	7.47	0.66	909	-99.7	8.10	357	848	7.5	546	24.8	260	260	< 1.0	< 1.0	< 0.25	32.4	0.48	168	0.181	< 0.025	< 0.0050	0.211	< 0.0010	< 0.0020	1.51	1.69
	EV_MCGWS_WG_2019-04_NP	2019 05 08	6.48	7.26	0.59	849	-116.3	8.13	361	849	8.4	504	27.2	255	255	< 1.0	< 1.0	0.148	35.5	0.451	154	0.138	0.0058	0.0028	0.33	< 0.0010	0.0083	1.39	1.50
	EV_MCGWS_WG_2019_Q3_NP	2019 07 09	7.6	7.31	0.97	826	-107.1	8.14	360	801	9.1	496	32.3	266	266	< 1.0	< 1.0	0.167	37.2	0.419	132	0.139	< 0.0050	< 0.0010	0.202	< 0.0010	0.0037	0.75	0.75
	EV_MCGWS_WG_2019_Q4_NP	2019 11 04	6.5	7.46	1.79	697	-77.5	7.68	393	734	8.5	482	25.6	264	264	< 1.0	< 1.0	0.154	36.0	0.468	126	0.152	0.0115	< 0.0010	0.191	< 0.0010	0.0076	1.12	1.08
EV_MCgwD	EV_MCGWD_WG_2019-01_NP	2019 01 30	4.4	7.55	1.03	573	132.8	8.10	232	557	519	443	829	298	298	< 1.0	< 1.0	< 0.050	3.71	1.00	66.8	0.130	0.0959	0.0019	0.73	0.0071	0.850	1.55	1.48
	EV_MCGWD_WG_2019-03-13 _NP	2019 03 13	3.8	7.35	1.29	544	68.8	8.08	240	546	94.6	315	48.8	240	240	< 1.0	< 1.0	< 0.050	4.86	*1.08*	52.9	0.118	0.0730	0.0243	0.299	0.0032	0.0623	1.20	1.19
	EV_MCGWD_WG_2019-04_NP	2019 05 08	8	7.43	1.25	547	-48.5	8.28	234	551	23.0	294	19.2	235	235	< 1.0	< 1.0	0.051	4.14	1.00	59.2	0.145	0.0070	0.0041	0.29	0.0020	0.0274	1.39	1.49
	EV_MCGWD_WG_2019_Q3_NP	2019 07 09	15.1	7.29	2.57	578	-98.6	8.49	223	568	19.4	312	20.0	252	243	9.4	< 1.0	< 0.050	1.48	*1.12*	74.6	0.238	0.0083	0.0038	0.350	0.0028	0.077	0.62	0.72
	EV_MCGWD_WG_2019_Q4_NP	2019 11 04	4.8	7.53	2.41	489.6	-88.6	7.80	239	505	4.3	318	9.00	234	234	< 1.0	< 1.0	< 0.050	1.80	*1.16*	65.6	0.275	< 0.0050	< 0.0010	0.313	0.0029	0.0258	1.52	1.13

Data provided by Teck Coal Ltd.

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

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

- Denotes analysis not conducted.

n/a Denotes no applicable standard/guideline.

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

** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

[a] Standard to protect freshwater aquatic life.

[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water, shown here for comparison purposes only.

[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.

[d] Standard/guideline varies with Hardness.

[e] Standard/guideline varies with pH and Temperature.

[f] Standard/guideline varies with Chloride.

RED	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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

Table 4c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (EVO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Parameters: Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	Field ORP mV	Physical Parameters: pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Dissolved Inorganics: Total Alkalinity mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	Nutrients: Ammonia Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P mg/L	Organics: 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[d]	1,280-4,290[d]	1.31-18.5[e]	400	0.2-2[f]	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
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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	150	n/a	128-429[d]	0.365-1.77[e] (15C assumed)	3	0.02-0.04[f]	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	n/a	n/a	n/a	n/a	n/a	n/a	n/a	600	0.4-1.7[d]	n/a	5.68-24.5[e] (15C assumed)	32.8	0.06-0.12[f]	n/a	n/a	n/a	n/a	n/a
Michel Creek (Study Area 9)																													
EV_MW_MC3	EV_MW_MC3_WG_Q1-2019_NP	2019 03 06	4.24	7.3	0.28	692	81	8.47	69.3	703	56.9	483	179	369	354	14.4	< 1.0	< 0.050	5.57	*1.95*	23.1	0.0221	0.0146	0.0066	0.251	0.0145	0.218	1.44	1.32
	EV_MW_MC3_WG_Q2-2019_NP	2019 06 12	10.2	7.72	0.42	779	94	8.37	143	768	35.2	468	38.4	344	335	8.6	< 1.0	0.082	12.4	*1.65*	63.3	0.0621	0.531	0.102	0.139	0.0109	0.0638	2.26	2.08
	EV_MW_MC3_WG_2019_NP_Q3_NP	2019 08 20	9.2	7.59	0.51	700	48.8	8.58	106	711	3.8	438	3.81	356	335	21.2	< 1.0	0.063	6.99	*1.68*	35.1	0.0383	0.124	0.0841	0.111	0.0015	0.038	1.24	1.40
	EV_EC5GW_WG_2019-08_NP	Duplicate	-	-	-	-	-	8.33	99.8	601	3.1	412	3.61	351	346	5.2	< 1.0	0.071	6.79	*1.65*	33.8	0.0435	0.115	0.0803	0.107	0.0179	0.036	1.19	1.22
	QA/QC RPD%		-	-	-	-	-	3	6	17	*	6	5	1	3	121	*	*	3	2	4	13	8	5	*	*	5	*	*
	EV_MW_MC3_WG_2019_Q4_NP	2019 11 12	2.6	7.79	0.56	609	1,320	8.27	119	585	3.7	389	4.10	317	317	< 1.0	< 1.0	0.093	6.11	*1.61*	41.4	0.0157	0.342	0.0769	0.151	0.0081	0.0182	0.83	0.78
EV_MW_MC4	EV_MW_MC4_WG_Q1-2019_NP	2019 03 06	6.1	7.27	0.35	941	33	7.84	500	916	80.5	570	71.8	358	358	< 1.0	< 1.0	< 0.25	33.9	< 0.10	117	0.0249	< 0.025	< 0.0050	0.113	< 0.0010	0.119	1.46	1.35
	EV_MW_MC4_WG_Q2-2019_NP	2019 06 13	10.4	6.63	0.87	1,909	-38.6	8.10	501	840	105	567	32.6	299	299	< 1.0	< 1.0	0.190	33.4	0.216	117	0.0121	0.0091	< 0.0010	0.077	< 0.0010	0.161	1.86	1.19
	EV_MW_MC4_WG_2019_Q3_NP	2019 08 27	9	7.04	1.23	900	16.3	8.03	469	889	2.4	553	4.99	350	350	< 1.0	< 1.0	0.175	30.9	0.218	113	0.0075	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0030	1.22	1.94
	EV_MW_MC4_WG_2019_Q4_NP	2019 11 14	6.9	7.14	1.05	888	-2.7	7.77	464	768	1.9	532	3.41	351	351	< 1.0	< 1.0	0.179	31.7	0.217	115	0.0131	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0035	1.14	1.15
Distal to EVO (Study Area 12)																													
EV_ER1gwS	EV_ER1GWS_WG_2019-01_NP	2019 01 31	3.09	7.65	9.63	541	161.7	8.19	277	526	< 1.0	328	1.25	188	188	< 1.0	< 1.0	0.057	6.71	0.166	88.7	0.0177	2.02	< 0.0010	0.195	0.0040	0.0045	< 0.50	< 0.50
	EV_ER1GWS_WG_2019-04_NP	2019 05 08	5.29	7.45	8.06	558	59.9	8.33	270	567	< 1.0	326	0.23	177	175	2.0	< 1.0	0.088	17.3	0.181	89.2	< 0.0050	1.81	< 0.0010	0.23	0.0025	0.0033	0.75	0.52
	EV_ER1GWS_WG_2019_Q3_NP	2019 07 15	9.3	7.35	7.43	442.2	221.8	8.15	226	442	1.1	248	0.17	172	172	< 1.0	< 1.0	< 0.050	6.94	0.172	51.9	< 0.0050	1.23	< 0.0010	0.173	0.0023	< 0.0020	< 0.50	< 0.50
	EV_ER1GWS_WG_2019_Q4_NP	2019 11 07	5.6	7.74	9.37	404.1	116.9	8.18	249	380	< 1.0	276	0.89	171	171	< 1.0	< 1.0	< 0.050	3.71	0.207	74.9	< 0.0050	1.86	< 0.0010	0.223	< 0.0010	0.0036	< 0.50	< 0.50
	EV_EC5GW_WG_2019_Q4_NP	Duplicate	-	-	-	-	-	8.29	254	381	2.0	284	0.83	177	177	< 1.0	< 1.0	< 0.050	3.63	0.207	76.1	0.0089	1.89	< 0.0010	0.197	0.0038	0.0028	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	1	2	0	*	3	7	3	3	*	*	*	2	0	2	*	2	*	*	*	*	*	*
EV_ER1gwD	EV_ER1GWD_WG_2019-01_NP	2019 01 31	3.3	7.73	8.08	497.7	173.5	8.26	256	469	5.9	282	5.24	196	196	< 1.0	< 1.0	< 0.050	4.78	0.203	62.9	0.0272	1.40	< 0.0010	0.201	0.0043	0.0081	< 0.50	< 0.50
	EV_ER1GWD_WG_2019-04_NP	2019 05 08	5.5	7.63	7.12	462.2	194.4	8.32	238	461	7.5	260	2.88	177	175	1.6	< 1.0	< 0.050	5.06	0.231	54.4	0.0216	1.22	< 0.0010	< 0.20	0.0022	0.0072	0.59	0.66
	EV_ER1GWD_WG_2019_Q3_NP	2019 07 15	15.8	7.32	4.52	460.9	157.5	8.15	252	460	4.7	240	1.56	228	228	< 1.0	< 1.0	< 0.050	6.53	0.208	22.6	< 0.0050	0.394	< 0.0010	0.204	< 0.0010	< 0.0020	1.27	< 0.50
	EV_ER1GWD_WG_2019_Q4_NP	2019 11 07	4.2	7.6	5.17	391.8	43.9	8.25	253	366	22.5	240	11.7	217	217	< 1.0	< 1.0	< 0.050	6.95	0.266	23.9	< 0.0050	0.394	< 0.0010	0.194	0.0018	0.0279	< 0.50	< 0.50
Blanks																													
Field Blanks																													
EV_GCgw	EV_EC6GW_WG_2019-01_NP	2019 01 22	-	-	-	-	-	5.46	13.8	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	0.0058	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_OCgw	EV_MC6GW_WG_2019-01_NP	2019 01 23	-	-	-	-	-	5.39	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	0.0331	< 0.0050	< 0.0010	0.067	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_GV3gw	EV_EC6GW_WG_2019-04_NP	2019 05 06	-	-	-	-	-	5.43	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 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_2019-04_NP	2019 05 21	-	-	-	-	-	5.48	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_BC1B	EV_MW_BC10-B_WG_Q2-2019_NP	2019 06 11	-	-	-	-	-	5.68	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	2.59
EV_GCgw	EV_EC6GW_WG_2019_Q3_NP	2019 07 12	-	-	-	-	-	5.61	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 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_2019_Q3_NP	2019 07 15	-	-	-	-	-	5.39	< 0.50	< 2.0	< 1.0	< 10	0.19	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_MC3	EV_EC6GW_WG_2019-08_NP	2019 08 20	-	-	-	-	-	5.35	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_GT1B	EV_EC6GW_WG_2019-08-26_NP	2019 08 26	-	-	-	-	-	5.63	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 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_2019_Q4_NP	2019 11 05	-	-	-	-	-	6.32	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_ER1gwS	EV_EC6GW_WG_2019_Q4_NP	2019 11 07	-	-	-	-	-	5.49	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
EV_MW_SPR1C	EV_MW_BC10B_WG_2019_Q4_NP	2019 11 14	-	-	-	-	-	5.55	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
Trip Blanks																													
	EV_EC7GW_WG_2019-01_NP	2019 01 22	-	-	-	-	-	5.44	-	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	0.0275	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	-
	EV_MC7GW_WG_2019-01_NP	2019 01 23	-	-	-	-	-	5.38	-	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	0.0936	< 0.0050	< 0.0010	0.117	< 0.0010	0.0022	< 0.50	-
	EV_EC7GW_WG_2019_Q3_NP	2019 07 12	-	-	-	-	-	5.55	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

[a] Standard to protect freshwater aquatic life.
[b] Guideline to protect freshwater aquatic life, long-term average (i.e. "chronic"). Guideline for surface water, shown here for comparison purposes only.
[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.
[d] Standard/guideline varies with Hardness.
[e] Standard/guideline varies with pH and Temperature.
[f] Standard/guideline varies with Chloride.

RED	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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

Table 4d: 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	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]
				Dissolved Metals																														
			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[d]	n/a	10[e]	40	20-90[d]	n/a	40-160[d]	n/a	n/a	n/a	0.25	10,000	250-1,500[d]	n/a	20	0.5-15[d]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[e]	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[h]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[e]	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[e]	20[f]	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
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	n/a	9	n/a	1,000	0.13	n/a	1,200	0.018-0.44[d]	n/a	1[e]	4	0.2-2.2[g]	n/a	3-14[d]	n/a	n/a	767-1,784.2[d]	0.02[k]	1,000	25-150[d]	n/a	2	0.05-1.5[d]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-141[d]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	67-100[h]	n/a	5	n/a	n/a	n/a	n/a	0.04-1.6[d]	n/a	n/a	110	0.2-13.8[g]	350	3-286[d]	n/a	n/a	815-3,390[d]	n/a	2,000	n/a	n/a	n/a	0.1-3[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-166.5[d]
Grave Creek / Harmer Creek (Study Area 7)																																		
EV_GV3gw	EV_GV3GW_WG_2019-01_NP	2019 01 15	361	< 3.0	< 0.10	< 0.10	19.0	< 0.020	< 0.050	14	0.0095	88.7	0.24	< 0.10	< 0.50	< 10	< 0.050	15.9	33.8	0.17	< 0.0050	0.963	< 0.50	1.24	3.85	< 0.010	3.56	585	< 0.010	< 0.10	< 10	1.77	< 0.50	< 1.0
	EV_GV3GW_WG_2019-04_NP	2019 05 06	335	< 3.0	< 0.10	< 0.10	17.0	< 0.020	< 0.050	13	0.0066	84.3	0.21	< 0.10	< 0.50	10	< 0.050	15.1	30.2	0.18	< 0.0050	1.03	< 0.50	0.972	3.7	< 0.010	3.16	586	< 0.010	< 0.10	< 10	1.86	< 0.50	< 1.0
	EV_EC5GW_WG_2019-04_NP	Duplicate	336	< 3.0	< 0.10	< 0.10	17.2	< 0.020	< 0.050	12	0.0058	85.9	0.21	< 0.10	< 0.50	< 10	< 0.050	15.2	29.5	0.11	< 0.0050	1.02	< 0.50	0.955	4.1	< 0.010	3.12	584	< 0.010	< 0.10	< 10	1.85	< 0.50	< 1.0
	QA/QC RPD%		0	*	*	*	1	*	*	*	*	2	*	*	*	*	*	1	2	*	*	1	*	2	*	*	1	0	*	*	*	1	*	*
	EV_GV3GW_WG_2019_Q3_NP	2019 07 10	343	< 3.0	< 0.10	< 0.10	17.8	< 0.020	< 0.050	14	0.0085	85.3	0.25	< 0.10	0.56	< 10	< 0.050	16.4	31.7	< 0.10	< 0.0050	0.936	< 0.50	0.993	4.01	< 0.010	3.20	566	< 0.010	< 0.10	< 10	1.70	< 0.50	< 1.0
	EV_GV3GW_WG_2019_Q4_NP	2019 10 31	333	< 3.0	< 0.10	< 0.10	18.5	< 0.020	< 0.050	11	0.0061	82.0	0.20	< 0.10	< 0.20	< 10	< 0.050	14.6	31.1	< 0.10	< 0.0050	0.894	< 0.50	0.928	4.02	< 0.010	3.29	521	< 0.010	< 0.10	< 10	1.68	< 0.50	< 1.0
Elk River Proximal to EVO (Study Area 8)																																		
EV_BALGW	EV_BALGW_WG_2019-01_NP	2019 01 22	372	< 3.0	0.15	0.15	33.3	< 0.020	< 0.050	178	0.0060	95.1	< 0.10	0.11	1.69	< 10	< 0.050	116	32.6	8.54	< 0.0050	0.531	0.92	2.79	0.672	< 0.010	33.5	2,300	< 0.010	< 0.10	< 10	0.153	< 0.50	4.6
	EV_BALGW_WG_2019-03-13 _NP	2019 03 13	362	< 3.0	0.13	0.17	32.7	< 0.020	< 0.050	179	0.0098	92.1	0.36	0.16	1.84	< 10	< 0.050	119	32.0	11.6	< 0.0050	0.677	1.44	2.67	0.663	< 0.010	33.9	2,260	< 0.010	< 0.10	< 10	0.152	< 0.50	4.2
	EV_BALGW_WG_2019-04_NP	2019 05 06	343	< 3.0	< 0.10	< 0.10	31.3	< 0.020	< 0.050	179	0.0077	91.3	< 0.10	< 0.10	0.91	27	< 0.050	113	27.9	6.30	< 0.0050	0.293	0.57	2.56	0.184	< 0.010	31.6	2,380	< 0.010	< 0.10	< 10	0.136	< 0.50	1.7
	EV_BALGW_WG_2019_Q3_NP	2019 07 10	359	< 3.0	< 0.10	0.19	34.1	< 0.020	< 0.050	179	< 0.0050	93.4	< 0.10	0.17	< 0.50	98	< 0.050	127	30.5	29.9	< 0.0050	0.332	0.56	2.69	0.102	< 0.010	33.5	2,330	< 0.010	< 0.10	< 10	0.113	< 0.50	2.4
	EV_BALGW_WG_2019_Q4_NP	2019 11 06	376	< 3.0	< 0.10	0.18	37.6	< 0.020	< 0.050	168	0.0051	96.1	< 0.10	0.49	0.35	206	< 0.050	118	32.9	88.7	< 0.0050	0.300	1.20	2.98	0.105	< 0.010	37.4	2,340	< 0.010	< 0.10	< 10	0.126	< 0.50	6.0
EV_LSgw	EV_LSGW_WG_2019-01_NP	2019 01 22	571	< 3.0	< 0.10	1.30	178	< 0.020	< 0.050	42	< 0.0050	109	< 0.10	0.95	< 0.50	1,470	< 0.050	58.4	72.8	*920*	< 0.0050	2.19	3.60	3.61	0.102	< 0.010	8.92	446	0.034	< 0.10	< 10	2.59	< 0.50	1.6
	EV_LSGW_WG_2019-04_NP	2019 05 09	527	< 3.0	< 0.10	1.21	173	< 0.020	< 0.050	32	< 0.0050	96.7	< 0.10	1.24	< 0.50	2,690	< 0.050	49.9	69.5	*1,040*	< 0.0050	2.37	4.17	3.12	0.104	< 0.010	8.70	443	0.035	< 0.10	< 10	1.88	< 0.50	1.6
	EV_LSGW_WG_2019_Q3_NP	2019 07 10	597	3.4	< 0.10	1.90	202	< 0.020	< 0.050	52	< 0.0050	115	< 0.10	1.21	< 0.50	2,800	< 0.050	71.3	75.4	*1,110*	< 0.0050	2.57	4.33	3.89	0.075	< 0.010	9.67	484	0.040	< 0.10	< 10	1.77	< 0.50	1.4
	EV_LSGW_WG_2019_Q4_NP	2019 11 05	597	< 3.0	< 0.10	1.90	212	< 0.020	< 0.050	48	< 0.0050	117	< 0.10	1.39	< 0.20	2,200	< 0.050	66.7	74.1	*1,280*	< 0.0050	2.48	4.52	4.43	0.084	< 0.010	10.2	494	0.041	< 0.10	< 10	1.84	< 0.50	1.7
EV_GCgw	EV_GCGW_WG_2019-01_NP	2019 01 22	232	< 3.0	< 0.10	1.73	75.3	< 0.020	< 0.050	14	< 0.0050	62.1	< 0.10	0.22	< 0.50	150	< 0.050	7.9	18.7	86.3	< 0.0050	2.39	0.69	0.786	< 0.050	< 0.010	3.96	261	0.029	< 0.10	< 10	1.17	< 0.50	2.5
	EV_EC5GW_WG_2019-01_NP	Duplicate	231	< 3.0	< 0.10	1.64	74.5	< 0.020	< 0.050	13	0.0074	62.2	< 0.10	0.22	< 0.50	151	< 0.050	7.7	18.4	89.2	< 0.0050	2.45	0.69	0.784	< 0.050	< 0.010	3.93	267	0.030	< 0.10	< 10	1.16	< 0.50	3.0
	QA/QC RPD%		0	*	*	5	1	*	*	*	*	0	*	*	*	1	*	3	2	3	*	2	*	0	*	*	1	2	*	*	*	1	*	*
	EV_GCGW_WG_2019-04_NP	2019 05 09	227	< 3.0	< 0.10	1.90	67.2	< 0.020	< 0.050	12	< 0.0050	61.0	< 0.10	0.20	< 0.50	188	< 0.050	7.0	18.2	93.9	< 0.0050	2.32	0.66	0.712	< 0.050	< 0.010	3.93	254	0.022	< 0.10	< 10	1.14	< 0.50	1.7
	EV_GCGW_WG_2019_Q3_NP	2019 07 12	231	< 3.0	< 0.10	1.98	68.5	< 0.020	< 0.050	12	< 0.0050	62.2	< 0.10	0.20	< 0.50	273	< 0.050	7.6	18.5	95.9	< 0.0050	2.50	< 0.50	0.750	< 0.050	< 0.010	4.09	260	0.020	< 0.10	< 10	1.21	< 0.50	< 1.0
	EV_EC5GW_WG_2019_Q3_NP	Duplicate	231	< 3.0	< 0.10	2.01	67.4	< 0.020	< 0.050	12	< 0.0050	61.9	< 0.10	0.21	< 0.50	282	< 0.050	7.6	18.4	91.9	< 0.0050	2.43	< 0.50	0.727	< 0.050	< 0.010	4.11	254	0.020	< 0.10	< 10	1.20	< 0.50	< 1.0
	QA/QC RPD%		0	*	*	2	2	*	*	*	*	0	*	*	*	3	*	0	1	4	*	3	*	3	*	*	0	2	*	*	*	1	*	*
	EV_GCGW_WG_2019_Q4_NP	2019 11 05	214	< 3.0	< 0.10	2.53	70.4	< 0.020	< 0.050	16	< 0.0050	58.1	< 0.10	0.13	0.34	363	< 0.050	8.3	16.7	65.2	< 0.0050	2.68	< 0.50	0.852	< 0.050	< 0.010	3.79	238	< 0.010	< 0.10	< 10	1.03	< 0.50	1.5
EV_OCgw**	EV_OCGW_WG_2019-01_NP	2019 01 23	161	< 3.0	< 0.10	1.36	53.8	< 0.020	< 0.050	122	0.0088	30.9	< 0.10	< 0.10	< 0.50[i]	252	< 0.050	25.0	20.4	81.1	< 0.00050	*14.8*	< 0.50	1.58	< 0.050	< 0.010	50.7	442	< 0.010	< 0.10	< 10	1.15	< 0.50	< 1.0
	EV_MC5GW_WG_2019-01_NP	Duplicate	163	< 3.0	< 0.10	1.38	55.6	< 0.020	< 0.050	121	0.0104	31.9	< 0.10	< 0.10	< 0.50[i]	258	< 0.050	25.0	20.2	82.4	< 0.00050	*15.1*	< 0.50	1.60	< 0.050	< 0.010	51.7	442	< 0.010	< 0.10	< 10	1.13	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	1	3	*	*	1	*	3	*	*	*	2	*	0	1	2	*	2	*	1	*	*	2	0	*	*	*	2	*	*
	EV_OCGW_WG_2019-04_NP	2019 05 21	149	< 3.0	< 0.10	1.46	55.2	< 0.020	< 0.050	117	0.0118	27.5	< 0.10	0.26	< 0.50[i]	55	< 0.050	24.2	19.4	82.5	< 0.00050	*15.5*	< 0.50	1.59	< 0.050	< 0.010	42.9	424	< 0.010	< 0.10	< 10	1.26	< 0.50	1.7
	EV_MC5GW_WG_2019-04_NP	Duplicate	149	< 3.0	< 0.10	1.43	51.6	< 0.020	< 0.050	116	0.0119	27.8	< 0.10	0.26	< 0.50	53	< 0.050	24.4	19.4	79.2	< 0.00050	*15.7*	< 0.50	1.54	< 0.050	< 0.010	41.7	429	< 0.010	< 0.10	< 10	1.26	< 0.50	1.3
	QA/QC RPD%		0	*	*	2	7	*	*	1	*	1	*	*	*	4	*	1	0	4	*	1	*	3	*	*	3	1	*	*	*	0	*	*
	EV_OCGW_WG_2019_Q3_NP	2019 07 15	155	< 3.0	< 0.10	1.75	60.1	< 0.020	< 0.050	122	< 0.0050	29.0	< 0.10	0.29	< 0.50	326	< 0.050	23.6	20.1	122	< 0.00050	*14.4*	< 0.50	1.64	0.091	< 0.010	48.0	386	< 0.010	< 0.10	< 10	1.15	< 0.50	< 1.0
	EV_MC5GW_WG_2019_Q3_NP	Duplicate	158	< 3.0	< 0.10	1.77	57.6	< 0.020	< 0.050	129	< 0.0050	30.1	< 0.10	0.28	< 0.50	316	< 0.050	25.2	20.1	119	< 0.00050	*15.3*	< 0.50	1.64	0.061	< 0.010	48.0	409	< 0.010	< 0.10	< 10	1.20	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	1	4	*	*	6	*	4	*	*	*	3	*	7	0	2	*	6	*	0	*	*	0	6	*	*	*	4	*	*
	EV_OCGW_WG_2019_Q4_NP	2019 11 05	151	< 3.0	< 0.10	1.46	59.4	< 0.020	< 0.050	123	< 0.0050	29.2	< 0.10	0.12	0.26	142	< 0.050	26.8	19.1	101	< 0.00050	*15.1*	< 0.50	1.67	< 0.050	< 0.010	54.0	423	< 0.010	< 0.10	< 10	1.14	< 0.50	< 1.0
	EV_MC5GW_WG_2019_Q4_NP	Duplicate	153	< 3.0	< 0.10	1.45	59.3	< 0.020	< 0.050	125	< 0.0050	29.8	< 0.10	0.12	< 0.20	154	< 0.050	27.2	19.1	103	< 0.00050	*14.9*	< 0.50	1.70	< 0.050	< 0.010	54.4	411	< 0.010	< 0.10	< 10	1.15	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	1	0	*	*	2	*	2	*	*	*	8	*	1	0	2	*	1	*	2	1	*	*	3	*	*	*	1	*	*
Erickson Creek (Study Area 10)																																		
EV_WF_SW**	EV_WF_SW_WG_2019-01_NP	2019 02 27	268	< 3.0	< 0.10	< 0.10	4.50	< 0.020	< 0.050	< 10	0.0051	17.9	< 0.10	< 0.10	< 0.50	320	< 0.050	12.5	54.1	*323*	< 0.0050	0.865	< 0.50	2.40	< 0.050	< 0.010	4.22	12.1	< 0.010	0.21	< 10	0.046	< 0.50	< 1.0
	EV_WF_SW_WG_2019-04_NP	2019 06 05	255	< 3.0	< 0.10	< 0.10	4.46	< 0.020	< 0.050	< 10	0.0084	18.0	< 0.10	< 0.10	< 0.50	103	< 0.050	12.5	51.0	*368*	< 0.0050	0.548	< 0.50	2.82	0.052	< 0.010	4.28	10.2	< 0.010	< 0.10	< 10	0.015	< 0.50	< 1.0
	EV_WF_SW_WG_2019_Q3_NP	2019 08 28	165	< 3.0	< 0.10	0.14	5.97	< 0.020	< 0.050	< 10	< 0.0050	11.0	< 0.10	< 0.10	< 0.50	< 10	< 0.050	7.9	33.4	68.0	< 0.0050	0.623	< 0.50	2.70	0.077	< 0.010	5.04	7.33	< 0.010	0.15	< 10	< 0.010	< 0.50	< 1.0
	EV_WF_SW_WG_2019_Q4_NP	2019 11 20	187	< 3.0	0.14	0.13	6.85	< 0.020	< 0.050	< 10	< 0.0050	12.1	< 0.10	< 0.10	0.74	29	< 0.050	9.3	38.0	*207*	< 0.0050	0.587	< 0.50	2.75	< 0.050	< 0.010	4.70	8.07	< 0.010	0.17	< 10	< 0.010	< 0.50	< 1.0
EV_ECgw	EV_ECGW_WG_2019-01_NP	2019 01 16	171	< 3.0	< 0.10	0.39	54.0	< 0.020	< 0.050	118	0.0158	37.8	< 0.10	0.30	0.83	< 10	< 0.050	10.8	18.5	179	0.0063	*14.6*	1.61	0.992	0.072	< 0.010	26.7	449	0.028	< 0.10	< 10	1.24	< 0.50	2.1
	EV_ECGW_WG_2019-04_NP	2019 05 15	172	5.6	0.25	0.30	42.0	< 0.020	< 0.050	102	0.0283	38.2	< 0.40	0.28	0.83	< 10	< 0.050	11.9	18.5	126	0.133	*13.2*	1.63	0.922	0.534	< 0.010	26.4	394	0.017	< 0.10	< 10	2.54	< 0.50	1.0
	EV_ECGW_WG_2019-Q3_NP	2019 07 11	162	< 3.0	0.45	0.28	47.9	< 0.020	< 0.050	119	0.0278	38.0	< 0.10	0.28	0.59	< 10	0.086	12.1	16.3	148	< 0.0050	*14.8*	1.84	1.70	0.206	< 0.010	32.5	442	0.041	0.50	< 10	1.79	< 0.50	< 2.0
	EV_ECGW_WG_2019-08_NP	2019 08 21	161	< 3.0	0.21	0.34	52.4	< 0.020	< 0.050	129	0.0229	35.6	< 0.10	0.29	0.98	< 10	< 0.050	11.7	17.6	148	< 0.0050	*13.7*	1.32	1.10	0.195	< 0.010	30.4	404	0.041	0.13	< 10	1.78	< 0.50	< 1.0
	EV_ECGW_WG_2019_Q4_NP	2019 10 30	165	3.9	0.14	0.36	57.1	< 0.020	< 0.050	136	0.0383	37.2	< 0.10	0.31	1.01	12	0.161	11.5	17.5	128	< 0.0050	*13.2*	3.53	1.62	1.39	< 0.020	31.9	395	0.034	0.13	< 10	1.65	< 0.50	12.2

Data provided by Teck Coal Ltd.
All terms defined within the body of SNCLavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

RED	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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"). Guideline for surface water, shown here for comparison purposes only.
[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.
[d] Standard/guideline varies with Hardness.
[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[f] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[g] Guideline is temperature, pH, DOC and hardness dependent.
[h] Standard varies with pH.
[i] Laboratory detection limit exceeds regulatory standard/guideline.
[j] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[k] 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.

Table 4d: 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 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[j] µg/L
				Dissolved Metals																														
BC Standard																																		
CSR Aquatic Life (AW)[a]			n/a	n/a	90	50	10,000	1.5	n/a	12,000	0.5-4[d]	n/a	10[e]	40	20-90[d]	n/a	40-160[d]	n/a	n/a	n/a	0.25	10,000	250-1,500[d]	n/a	20	0.5-15[d]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[e]	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[h]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[e]	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[e]	20[f]	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
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	n/a	9	n/a	1,000	0.13	n/a	1,200	0.018-0.44[d]	n/a	1[e]	4	0.2-2.2[g]	n/a	3-14[d]	n/a	n/a	767-1,784.2[d]	0.02[k]	1,000	25-150[d]	n/a	2	0.05-1.5[d]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-141[d]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	67-100[h]	n/a	5	n/a	n/a	n/a	n/a	0.04-1.6[d]	n/a	n/a	110	0.2-13.8[g]	350	3-286[d]	n/a	n/a	815-3,390[d]	n/a	2,000	n/a	n/a	n/a	0.1-3[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-166.5[d]
Michel Creek (Study Area 9)																																		
EV_RCgw	EV_RCSGW_WG_2019-01_NP	2019 01 22	1,670	< 3.0	0.17	< 0.10	37.3	< 0.020	< 0.050	22	0.214	351	< 0.10	0.13	52.4	< 10	0.432	73.6	192	1.79	< 0.0050	1.28	5.62	4.07	***217***	< 0.010	6.39	432	< 0.010	< 0.10	< 10	7.97	< 0.50	386
	EV_RCSGW_WG_2019-04_NP	2019 05 06	1,570	< 3.0	< 0.20	< 0.20	37.2	< 0.040	< 0.10	< 20	0.257	354	< 0.20	< 0.20	61.7	< 20	0.32	59.3	168	2.21	< 0.0050	1.36	3.2	3.20	***220***	< 0.020	7.21	410	< 0.020	< 0.20	< 10	7.52	< 1.0	194
	EV_RCSGW_WG_2019-Q3_NP	2019 07 11	1,570	< 3.0	< 0.20	< 0.20	35.5	< 0.040	< 0.10	< 20	0.277	343	< 0.20	< 0.20	**118**	< 20	0.54	63.2	173	7.31	< 0.0050	1.37	4.4	3.16	***215***	< 0.020	4.92	410	< 0.020	< 0.20	< 10	6.89	< 1.0	275
	EV_RCSGW_WG_2019-08_NP	2019 08 21	1,590	< 3.0	0.22	< 0.10	37.1	< 0.020	< 0.050	17	0.325	330	0.13	0.15	66.1	< 10	0.300	63.6	186	9.63	< 0.0050	1.38	8.42	3.40	***257***	< 0.010	5.54	382	0.015	< 0.10	< 10	7.95	< 0.50	478
	EV_RCSGW_WG_2019-Q4_NP	2019 10 29	1,740	< 3.0	< 0.20	< 0.20	38.6	< 0.040	< 0.10	22	0.278	378	0.23	< 0.20	65.4	< 20	0.23	90.2	193	1.24	< 0.0050	1.31	2.6	3.97	***251***	< 0.020	7.33	446	< 0.020	< 0.20	< 10	7.48	< 1.0	441
EV_MW_GT1A	EV_MW_GC1-A_WG_Q1-2019_NP	2019 03 05	282	< 3.0	0.46	0.66	79.0	< 0.020	< 0.050	14	< 0.0050	73.8	< 0.10	< 0.10	< 0.50	28	< 0.050	10.5	23.8	86.2	< 0.0050	1.53	0.51	0.884	0.418	< 0.010	2.76	134	< 0.010	< 0.10	< 10	1.43	0.74	< 1.0
	EV_MW_GC1-A_WG_Q2-2019_NP	2019 06 11	282	< 3.0	0.11	0.74	64.6	< 0.020	< 0.050	12	< 0.0050	75.0	< 0.10	< 0.10	< 0.50	104	< 0.050	9.8	22.9	98.8	< 0.0050	1.02	< 0.50	0.888	< 0.050	< 0.010	2.90	122	< 0.010	< 0.10	< 10	1.18	< 0.50	< 1.0
	EV_MW_GT1-A_WG_2019_Q3_NP	2019 08 26	300	< 3.0	< 0.10	0.59	71.3	< 0.020	< 0.050	11	< 0.0050	81.4	< 0.10	< 0.10	< 0.50	133	< 0.050	10.0	23.5	96.4	< 0.0050	0.874	< 0.50	0.870	< 0.050	< 0.010	2.78	140	< 0.010	< 0.10	< 10	0.950	< 0.50	< 1.0
	EV_MW_GT1A_WG_2019_Q4_NP	2019 11 13	292	< 3.0	< 0.10	0.87	59.1	< 0.020	< 0.050	13	< 0.0050	77.4	< 0.10	< 0.10	< 0.20	256	< 0.050	9.3	23.9	90.6	< 0.0050	1.05	< 0.50	0.797	< 0.050	< 0.010	3.03	124	< 0.010	< 0.10	< 10	0.733	< 0.50	< 1.0
EV_MW_GT1B	EV_MW_GC1-B_WG_Q1-2019_NP	2019 03 05	497	< 3.0	0.63	0.23	26.5	< 0.020	< 0.050	18	0.0481	101	0.40	< 0.10	< 0.50	< 10	0.059	37.2	59.6	0.84	< 0.0050	3.09	7.64	2.47	***39.6***	< 0.010	4.49	258	< 0.010	< 0.10	< 10	3.84	< 0.50	2.5
	EV_MW_GC1-B_WG_Q2-2019_NP	2019 06 11	399	< 3.0	0.85	0.23	35.8	< 0.020	< 0.050	18	0.0709	79.3	0.17	0.11	< 0.50	< 10	< 0.050	39.6	48.9	0.47	< 0.0050	3.30	6.99	2.64	***34.3***	< 0.010	3.67	253	0.010	< 0.10	< 10	3.07	< 0.50	2.0
	EV_MW_GT1-B_WG_2019_Q3_NP	2019 08 26	1,080	< 3.0	1.87	0.22	74.8	< 0.020	< 0.050	42	0.189	201	0.11	0.19	< 0.50	< 10	< 0.050	148	140	0.20	< 0.0050	7.84	21.3	6.45	***161***	< 0.010	7.76	699	0.032	< 0.10	< 10	*10.4*	< 0.50	6.2
	EV_EC5GW_WG_2019-08-26_NP	Duplicate	1,070	< 3.0	1.94	0.23	75.6	< 0.020	< 0.050	40	0.212	199	0.14	0.18	< 0.50	< 10	< 0.050	141	138	0.16	< 0.0050	7.98	21.3	6.47	***161***	< 0.010	7.61	726	0.031	< 0.10	< 10	9.94	< 0.50	6.2
	QA/QC RPD%		1	*	4	*	1	*	*	*	11	1	*	*	*	*	*	5	1	*	*	2	0	0	0	*	2	4	*	*	*	5	*	0
	EV_MW_GT1B_WG_2019_Q4_NP	2019 11 13	1,220	< 3.0	1.30	0.16	57.7	< 0.020	< 0.050	32	0.173	225	< 0.10	0.24	0.43	< 10	< 0.050	171	161	< 0.10	< 0.0050	7.30	20.4	5.62	***122***	< 0.010	18.9	819	0.018	< 0.10	< 10	*12.5*	< 0.50	5.9
EV_WH50gw	EV_WH50GW_WG_2019-01_NP	2019 01 23	363	< 3.0	0.18	0.12	126	< 0.020	< 0.050	11	0.0327	86.9	0.13	< 0.10	< 0.50	17	< 0.050	15.4	35.5	2.03	< 0.0050	1.38	< 0.50	1.10	16.2	< 0.010	4.10	208	< 0.010	< 0.10	< 10	1.86	< 0.50	1.1
	EV_WH50GW_WG_2019-04_NP	2019 05 21	179	< 3.0	0.21	< 0.10	60.5	< 0.020	< 0.050	< 10	0.0102	44.7	< 0.10	< 0.10	< 0.50	23	< 0.050	7.1	16.4	4.35	< 0.0050	1.24	< 0.50	0.685	5.04	< 0.010	2.42	113	< 0.010	< 0.10	< 10	0.791	< 0.50	< 1.0
	EV_WH50GW_WG_2019-Q3_NP	2019 07 11	175	< 3.0	0.17	0.13	67.5	< 0.020	< 0.050	12	0.0146	45.1	< 0.10	< 0.10	0.98	15	< 0.050	7.6	15.3	2.97	< 0.0050	1.31	< 0.50	0.770	4.13	< 0.010	2.14	110	< 0.010	< 0.10	< 10	0.705	< 0.50	< 3.0
	EV_WH50GW_WG_2019-08_NP	2019 08 21	238	< 3.0	0.17	0.10	95.8	< 0.020	< 0.050	12	0.0186	58.8	< 0.10	< 0.10	< 0.50	27	< 0.050	10.3	22.1	4.55	< 0.0050	1.24	< 0.50	1.00	10.3	< 0.010	2.83	140	< 0.010	< 0.10	< 10	1.03	< 0.50	< 1.0
	EV_WH50GW_WG_2019_Q4_NP	2019 11 07	240	< 3.0	0.20	< 0.10	101	< 0.020	< 0.050	12	0.0294	60.6	< 0.10	< 0.10	0.43	199	< 0.050	12.2	21.5	29.3	< 0.0050	1.24	< 0.50	1.04	10.8	< 0.010	2.84	153	< 0.010	< 0.10	< 10	1.12	< 0.50	< 1.0
EV_MW_BC1A	EV_MW_BC1-A_WG_Q1-2019_NP	2019 03 05	1,140	< 3.0	1.12	0.28	55.1	< 0.020	< 0.050	42	0.0463	227	< 0.10	9.72	< 0.50	112	< 0.050	147	140	*323*	< 0.0050	7.01	24.2	5.18	***97.5***	< 0.010	10.7	853	< 0.010	< 0.10	< 10	8.23	< 0.50	11.5
	EV_MW_BC1-A_WG_Q2-2019_NP	2019 06 11	1,100	< 3.0	0.87	0.24	52.9	< 0.020	< 0.050	42	0.188	215	0.11	1.25	< 0.50	10	< 0.050	158	138	19.3	< 0.0050	7.41	3.63	5.71	***133***	< 0.010	10.0	840	0.011	< 0.10	< 10	8.76	< 0.50	5.0
	EV_MW_BC1-A_WG-2019_NP_Q3_NP	2019 08 20	1,140	19.4	0.98	0.29	52.4	< 0.020	< 0.050	54	0.183	225	0.15	2.13	< 0.50	106	0.108	157	141	44.8	< 0.0050	6.23	5.34	5.74	***146***	< 0.010	9.99	838	< 0.010	< 0.10	< 10	8.28	< 0.50	7.2
	EV_MW_BC1A_WG_2019_Q4_NP	2019 11 13	1,270	143	1.00	0.55	57.0	< 0.020	< 0.050	58	0.225	249	0.28	3.46	0.86	567	0.395	179	158	98.4	0.0098	5.28	11.6	6.63	***158***	< 0.010	12.9	957	0.012	< 0.10	< 10	7.17	1.36	16.6
EV_MW_BC1B	EV_MW_BC1-B_WG_Q1-2019_NP	2019 03 05	1,270	< 3.0	1.28	0.31	35.7	< 0.020	< 0.050	38	0.207	239	0.11	1.20	< 0.50	< 10	< 0.050	166	163	99.4	< 0.0050	*10.4*	6.26	5.72	***120***	< 0.010	9.24	819	0.049	< 0.10	< 10	*12.2*	< 0.50	4.7
	EV_MW_BC1-B_WG_Q2-2019_NP	2019 06 11	1,160	< 3.0	1.79	0.22	41.1	< 0.020	< 0.050	51	0.322	211	0.12	0.43	< 0.50	< 10	< 0.050	171	154	2.60	< 0.0050	9.46	5.45	7.56	***152***	< 0.010	11.0	790	0.028	< 0.10	< 10	*10.1*	< 0.50	6.2
	EV_MW_BC10-A_WG_Q2-2019_NP	2019 06 11	1,130	< 3.0	1.72	0.19	41.6	< 0.020	< 0.050	49	0.292	201	< 0.10	0.43	< 0.50	< 10	< 0.050	165	153	2.71	< 0.0050	9.19	5.45	7.39	***149***	< 0.010	11.0	735	0.026	0.24	< 10	10.0	< 0.50	8.3
	QA/QC RPD%		3	*	*	*	1	*	*	4	*	5	*	*	*	*	*	4	1	4	*	3	0	2	2	*	0	7	*	*	*	1	*	*
	EV_MW_BC1-B_WG_2019_NP_Q3_NP	2019 08 20	1,290	< 3.0	1.65	0.24	45.0	< 0.020	< 0.050	59	0.329	234	0.14	0.31	< 0.50	< 10	< 0.050	196	172	4.60	< 0.0050	8.47	4.71	7.74	***179***	< 0.010	10.5	872	0.048	< 0.10	< 10	8.78	< 0.50	7.0
	EV_MW_BC1B_WG_2019_Q4_NP	2019 11 13	1,410	< 3.0	1.52	0.24	40.7	< 0.020	< 0.050	45	0.301	255	0.11	0.25	0.99	< 10	< 0.050	202	187	0.87	< 0.0050	*10.4*	3.88	6.97	***219***	< 0.010	15.4	959	0.037	0.17	< 10	*12.5*	< 0.50	7.0
EV_BCgw	EV_BCGW_WG_2019-01_NP	2019 01 23	474	< 3.0	0.11	0.12	40.0	< 0.020	< 0.050	16	0.0431	112	0.13	< 0.10	< 0.50	< 10	< 0.050	25.6	47.0	< 0.10	< 0.0050	0.941	0.50	1.23	***24.9***	< 0.010	5.02	222	0.013	< 0.10	< 10	1.48	< 0.50	1.6
	EV_BCGW_WG_2019-04_NP	2019 05 09	519	< 3.0	0.12	0.11	45.0	< 0.020	< 0.050	16	0.0453	118	0.17	< 0.10	< 0.50	< 10	< 0.050	31.2	54.5	0.21	< 0.0050	0.893	0.53	1.42	***38.5***	< 0.010	5.60	240	0.015	< 0.10	< 10	1.77	< 0.50	1.7
	EV_BCGW_WG_2019_Q3_NP	2019 07 09	466	< 3.0	0.10	0.13	44.2	< 0.020	< 0.050	15	0.0382	111	0.12	< 0.10	0.54	< 10	< 0.050	28.7	45.9	< 0.10	< 0.0050	0.904	< 0.50	1.29	***30.2***	< 0.010	4.98	216	0.013	< 0.10	< 10	1.71	< 0.50	1.9
	EV_BCGW_WG_2019_Q4_NP	2019 10 31	370	4.0	0.13	0.11	37.8	< 0.020	< 0.050	13	0.0385	90.8	0.13	< 0.10	1.23	< 10	< 0.050	20.8	34.7	< 0.10	< 0.0050	1.01	3.70	1.00	17.7	< 0.010	4.03	163	0.012	< 0.10	< 10	1.25	< 0.50	19.5
EV_BRGW	EV_BRGW_WG_2019-01_NP	2019 01 22	678	< 3.0	0.11	< 0.10	68.0	< 0.020	< 0.050	40	0.0537	172	0.15	< 0.10	< 0.50	24	< 0.050	53.3	60.3	3.48	< 0.0050	0.588	2.12	2.19	***25.4***	< 0.010	9.39	355	< 0.010	< 0.10	< 10	1.72	< 0.50	3.0
	EV_BRGW_WG_2019-04_NP	2019 05 21	633	< 3.0	0.14	< 0.10	61.9	< 0.020	< 0.050	39	0.0438	163	< 0.10	< 0.10	< 0.50	34	< 0.050	47.8	54.6	4.54	< 0.0050	0.619	1.71	2.15	13.3	< 0.010	8.15	354	< 0.010	< 0.10	< 10	1.59	< 0.50	6.1
	EV_BRGW_WG_2019_Q3_NP	2019 08 27	655	< 3.0	< 0.10	< 0.10	63.9	< 0.020	< 0.050	40	0.0537	170	< 0.10	< 0.10	< 0.50	< 10	< 0.050	50.4	55.8	9.63	< 0.0050	0.605	1.53	2.12	***38.3***	< 0.010	8.31	352	< 0.010	< 0.10	< 10	1.82	< 0.50	3.8
	EV_BRGW_WG_2019_Q4_NP	2019 11 07	669	< 3.0	0.10	< 0.10	64.2	< 0.020	< 0.050	43	0.0669	177	0.12	< 0.10	0.44	< 10	< 0.050	57.5	55.2	3.37	< 0.0050	0.608	1.75	2.21	***30.7***	< 0.010	8.80	379	< 0.010	< 0.10	< 10	1.76	< 0.50	4.6
EV_MW_MC2A	EV_MW_MC2-A_WG_Q1-2019_NP	2019 03 04	402	< 3.0	0.42	2.67	5,450	< 0.020	< 0.050	60	< 0.0050	106	< 0.10	< 0.10	< 0.50	1,220	< 0.050	219	33.4	62.5	< 0.0050	0.650	0.75	3.81	< 0.050	< 0.010	37.4	1,410	< 0.010	< 0.10	< 10	0.129	< 0.50	4.1
	EV_MW_MC2-A_WG_Q2-2019_NP	2019 06 11	389	< 3.0	< 0.10	1.50	5,590	< 0.020	< 0.050	64	< 0.0050	99.6	< 0.10	< 0.10	< 0.50	1,070	< 0.050	227	34.1	57.7	< 0.0050	0.286	< 0.50	3.85	< 0.050	< 0.010	41.7	1,420	< 0.010	< 0.10	< 10	0.048	< 0.50	4.1
	EV_MW_MC2-A_WG_2019_NP_Q3_NP	2019 08 20	371	< 3.0	< 0.10	0.71	4,930	< 0.020	< 0.050	73	< 0.0050	95.0	< 0.10	< 0.10	< 0.50	937	< 0.050	236	32.6	51.9	< 0.0050	0.364	< 0.50	3.65	< 0.050	< 0.010	43.7	1,380	< 0.010	< 0.10	< 10	0.078	< 0.50	3.5
	EV_MW_MC2A_WG_2019_Q4_NP	2019 11 13	374	< 3.0	< 0.10	0.97	5,010	< 0.020	< 0.050	76	< 0.0050	95.4	< 0.10	< 0.10	< 0.20	1,130	< 0.050	261	33.0	52.8	< 0.0050	0.279	< 0.50	3.83	< 0.050	< 0.010	48.5	1,500	< 0.010	< 0.10	< 10	0.054	< 0.50	3.9
EV_MW_MC2B	EV_MW_MC2-B_WG_Q1-2019_NP	2019 03 04	675	< 3.0	< 0.10	< 0.10	53.5	< 0.020	< 0.050	25	0.110	169	0.14	< 0.10	< 0.50	45	< 0.050	55.8	61.2	0.24	< 0.0050	0.580	0.64	2.16	***51.9***	< 0.010	11.3	339	< 0.010	< 0.10	< 10	1.48	< 0.50	2.4
	EV_MW_MC2-C_WG_Q1-2019_NP	Duplicate	647	< 3.0	0.10	0.11	54.1	< 0.020	< 0.050	24	0.0966	160	0.18	< 0.10	< 0.50	< 10	< 0.050	51.2	60.2	0.88	< 0.0050	0.561	0.75	2.18	***50.4***	< 0.010	10.8	348	< 0.010	< 0.10	< 10	1.50	< 0.50	12.9
	QA/QC RPD%		4	*	*	*	1	*	*	*	13	5	*	*	*	*	*	9	2	*	*	3	*	1	3	*	5	3	*	*	*	1	*	*
	EV_MW_MC2-B_WG_Q2-2019_NP	2019 06 11	674	< 3.0	0.10	0.12	56.2	< 0.020	< 0.050	26	0.114	161	0.19	< 0.10	< 0.50	< 10	< 0.050	53.2	66.1	< 0.10	< 0.0050	0.641	0.63	2.31	***56.5***	< 0.010	11.3	342	0.011	< 0.10	< 10	1.62	< 0.50	1.6
	EV_MW_MC2-B_WG_2019_NP_NP	2019 08 20	690	< 3.0	0.11	0.11	57.1	< 0.020	< 0.050	27	0.114	163	0.14	< 0.10	< 0.50	< 10	< 0.050	51.8	68.8	< 0.10	< 0.0050	0.590	0.74	2.23	***54.4***	< 0.010	11.4	353	0.011	< 0.10	< 10	1.64	< 0.50	1.3
	EV_MW_MC2B_WG_2019_Q4_NP	2019 11 13	695	< 3.0	< 0.10	0.10	53.1	< 0.020	< 0.050	27	0.105	163	0.15	< 0.10	0.26	< 10	< 0.050	55.8	69.6	< 0.10	< 0.0050	0.560	0.71	2.13	***62***	< 0.010	11.9	349	< 0.010	< 0.10	< 10	1.45	< 0.50	1.3

Data provided by Teck Coal Ltd.
All terms defined within the body of SNCLavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

RED Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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"). Guideline for surface water, shown here for comparison purposes only.
[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.
[d] Standard/guideline varies with Hardness.
[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[f] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[g] Guideline is temperature, pH, DOC and hardness dependent.
[h] Standard varies with pH.
[i] Laboratory detection limit exceeds regulatory standard/guideline.
[j] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[k] 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.

Table 4d: 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 mg/L	Dissolved Metals: Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium 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[j] 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[d]	n/a	10[e]	40	20-90[d]	n/a	40-160[d]	n/a	n/a	n/a	0.25	10,000	250-1,500[d]	n/a	20	0.5-15[d]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[e]	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[h]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[e]	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[e]	20[f]	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
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	n/a	9	n/a	1,000	0.13	n/a	1,200	0.018-0.44[d]	n/a	1[e]	4	0.2-2.2[g]	n/a	3-14[d]	n/a	n/a	767-1,784.2[d]	0.02[k]	1,000	25-150[d]	n/a	2	0.05-1.5[d]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-141[d]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	67-100[h]	n/a	5	n/a	n/a	n/a	n/a	0.04-1.6[d]	n/a	n/a	110	0.2-13.8[g]	350	3-286[d]	n/a	n/a	815-3,390[d]	n/a	2,000	n/a	n/a	n/a	0.1-3[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-166.5[d]
Michel Creek (Study Area 9)																																		
EV_HW1	EV_HW1_WG_2019-08_NP	2019 08 21	687	4.4	0.11	< 0.10	57.0	< 0.020	< 0.050	24	0.0846	162	0.18	< 0.10	40.2	< 10	0.129	53.6	68.4	0.34	< 0.0050	0.663	0.90	2.30	***54.7***	< 0.010	11.6	361	0.019	< 0.10	< 10	1.69	< 0.50	40.4
	EV_HW1_WG_2019_Q4_NP	2019 11 04	685	< 3.0	0.13	0.12	64.3	< 0.020	< 0.050	29	0.0831	157	0.13	< 0.10	39.5	< 10	0.201	56.8	70.8	0.38	< 0.0050	0.653	0.98	2.40	***58.8***	< 0.010	11.7	333	0.025	< 0.10	< 10	1.69	< 0.50	41.6
EV_MW_MC1A	EV_MW_MC1-A_WG_Q1-2019_NP	2019 03 05	409	< 3.0	1.61	2.53	**11,400**	< 0.020	< 0.050	75	0.0077	102	< 0.10	0.24	< 0.50	211	< 0.050	149	37.5	153	< 0.0050	7.08	1.07	5.53	0.235	< 0.010	23.3	1,600	< 0.010	< 0.10	< 10	4.55	0.51	10.3
	EV_MW_MC1-A_WG_Q2-2019_NP	2019 06 11	411	< 3.0	0.36	2.88	**11,200**	< 0.020	< 0.050	76	< 0.0050	108	< 0.10	< 0.10	< 0.50	536	< 0.050	156	34.6	139	< 0.0050	1.11	< 0.50	5.09	< 0.050	< 0.010	23.8	1,730	< 0.010	< 0.10	< 10	1.27	0.52	7.1
	EV_MW_MC1-A_WG_2019_Q3_NP	2019 08 21	394	< 3.0	0.21	2.10	**10,500**	< 0.040	< 0.10	78	< 0.010	101	< 0.20	< 0.20	< 0.50	592	< 0.10	163	34.8	120	< 0.0050	0.54	< 1.0	4.43	< 0.10	< 0.020	21.5	1,690	< 0.020	< 0.20	< 10	0.756	< 1.0	7.4
	EV_MW_MC1A_WG_2019_Q4_NP	2019 11 14	410	< 3.0	0.17	1.49	**10,600**	< 0.020	< 0.050	74	< 0.0050	106	< 0.10	< 0.10	0.29	737	< 0.050	153	35.0	121	< 0.0050	0.405	< 0.50	4.92	< 0.050	< 0.010	21.9	1,910	< 0.010	< 0.10	< 10	0.618	< 0.50	4.8
EV_MW_MC1B	EV_MW_MC1-B_WG_Q1-2019_NP	2019 03 05	436	< 3.0	< 0.10	3.99	1,010	< 0.020	< 0.050	43	< 0.0050	112	< 0.10	0.20	< 0.50	*9,120*	< 0.050	143	38.0	*423*	< 0.0050	2.24	0.60	3.13	< 0.050	0.016	21.7	747	< 0.010	< 0.10	< 10	0.586	< 0.50	1.1
	EV_MW_MC1-B_WG_Q2-2019_NP	2019 06 11	515	< 3.0	< 0.10	4.29	1,120	< 0.020	< 0.050	45	< 0.0050	132	< 0.10	0.22	< 0.50	*11,000*	< 0.050	130	44.9	*522*	< 0.0050	2.06	0.59	3.72	0.056	< 0.010	29.0	857	< 0.010	< 0.10	< 10	0.620	< 0.50	1.2
	EV_MW_MC1-B _WG_2019_Q3_NP	2019 08 21	552	< 3.0	< 0.10	5.11	1,090	< 0.020	< 0.050	69	< 0.0050	143	< 0.10	0.15	< 0.50	*11,900*	< 0.050	154	47.4	*508*	< 0.0050	2.25	0.52	4.11	0.065	< 0.010	26.8	911	< 0.010	< 0.10	< 10	0.657	< 0.50	1.1
	EV_MW_MC1B_WG_2019_Q4_NP	2019 11 14	569	< 3.0	< 0.10	5.28	1,020	< 0.020	< 0.050	59	0.0062	150	< 0.10	0.23	< 0.20	*12,400*	< 0.050	164	47.3	*562*	< 0.0050	2.50	0.66	4.08	< 0.050	< 0.010	25.9	961	< 0.010	< 0.10	< 10	0.669	< 0.50	< 1.0
EV_MW_AQ1	EV_MW_AQ1_WG_Q1-2019_NP	2019 03 06	485	< 3.0	< 0.10	0.15	187	< 0.020	< 0.050	28	0.0580	116	< 0.10	< 0.10	< 0.50	< 10	< 0.050	22.5	47.1	18.0	< 0.0050	0.527	0.59	1.55	3.17	< 0.010	5.24	362	< 0.010	< 0.10	< 10	0.499	< 0.50	< 1.0
	EV_MW_AQ1-C_WG_Q1-2019_NP	Duplicate	489	< 3.0	< 0.10	0.16	182	< 0.020	< 0.050	27	0.0596	117	< 0.10	< 0.10	< 0.50	< 10	< 0.050	23.1	47.9	18.5	< 0.0050	0.535	0.62	1.55	3.29	< 0.010	5.24	368	< 0.010	< 0.10	< 10	0.510	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	*	3	*	*	*	3	1	*	*	*	*	*	3	2	3	*	2	*	0	4	*	0	2	*	*	*	2	*	*
	EV_MW_AQ1_WG_Q2-2019_NP	2019 06 13	494	< 3.0	< 0.10	0.14	188	< 0.020	< 0.050	24	0.0404	117	0.12	< 0.10	< 0.50	< 10	< 0.050	21.2	49.1	0.79	< 0.0050	0.349	< 0.50	1.61	3.49	< 0.010	5.36	360	< 0.010	< 0.10	< 10	0.461	< 0.50	< 1.0
	EV_MW_BC10-A_WG_Q2-2019_NP_06	Duplicate	505	< 3.0	< 0.10	0.15	187	< 0.020	< 0.050	25	0.0478	120	0.14	< 0.10	< 0.50	< 10	0.051	21.7	50.0	0.71	< 0.0050	0.350	< 0.50	1.62	3.52	< 0.010	5.47	365	< 0.010	< 0.10	< 10	0.450	< 0.50	< 1.0
	QA/QC RPD%		2	*	*	*	1	*	*	*	17	3	*	*	*	*	*	2	2	11	*	0	*	1	1	*	2	1	*	*	*	2	*	*
	EV_MW_AQ1_WG_2019_Q3_NP	2019 08 26	441	< 3.0	< 0.10	0.13	181	< 0.020	< 0.050	21	0.0470	104	< 0.10	< 0.10	1.49	< 10	0.086	20.0	43.9	0.34	< 0.0050	0.321	< 0.50	1.55	3.16	< 0.010	4.45	350	< 0.010	< 0.10	< 10	0.465	< 0.50	3.2
	EV_MW_AQ1_WG_2019_Q4_NP	2019 11 19	474	< 3.0	< 0.10	0.12	168	< 0.020	< 0.050	25	0.0404	116	0.11	< 0.10	2.77	< 10	0.157	21.5	44.8	0.30	< 0.0050	0.350	0.86	1.61	2.46	< 0.010	4.73	373	< 0.010	< 0.10	< 10	0.440	< 0.50	6.4
EV_MW_AQ2	EV_MW_AQ2_WG_Q1-2019_NP	2019 03 07	615	< 3.0	< 0.10	0.14	18.6	< 0.020	< 0.050	110	< 0.0050	146	0.17	< 0.10	< 0.50	609	< 0.050	59.4	60.5	50.2	< 0.0050	0.422	0.58	1.94	< 0.050	< 0.010	18.7	1,150	< 0.010	< 0.10	< 10	0.098	< 0.50	< 1.0
	EV_MW_AQ2_WG_Q2-2019_NP	2019 06 13	637	< 3.0	< 0.10	0.15	18.8	< 0.020	< 0.050	103	0.0113	154	< 0.10	< 0.10	< 0.50	597	< 0.050	57.6	61.6	57.1	< 0.0050	0.226	0.75	2.04	< 0.050	< 0.010	20.9	1,200	< 0.010	< 0.10	< 10	0.102	< 0.50	5.0
	EV_MW_AQ2_WG_2019_Q3_NP	2019 09 09	589	< 3.0	< 0.10	0.15	18.1	< 0.020	< 0.050	99	< 0.0050	138	< 0.10	< 0.10	< 0.50	601	< 0.050	57.5	59.3	69.9	< 0.0050	0.894	0.75	1.91	< 0.050	< 0.010	19.7	1,180	< 0.010	< 0.10	< 10	0.105	< 0.50	< 1.0
	EV_MW_AQ2_WG_2019_Q4_NP	2019 11 19	617	< 3.0	< 0.10	0.14	18.2	< 0.020	< 0.050	103	< 0.0050	154	< 0.10	< 0.10	< 0.20	576	< 0.050	55.6	56.4	81.0	< 0.0050	0.317	0.61	2.00	< 0.050	< 0.010	18.4	1,230	< 0.010	< 0.10	< 10	0.114	< 0.50	< 1.0
EV_MW_SPR1A	EV_MW_SC1-A_WG_Q1-2019_NP	2019 03 06	406	< 3.0	0.57	1.17	307	< 0.020	< 0.050	35	0.0151	104	< 0.10	0.86	< 0.50	24	< 0.050	23.3	35.2	*451*	< 0.0050	2.39	2.34	2.67	0.533	< 0.010	19.6	396	0.021	< 0.10	< 10	5.37	< 0.50	< 1.0
	EV_MW_SC1-A_WG_Q2-2019_NP	2019 06 12	357	< 3.0	< 0.10	1.36	412	< 0.020	< 0.050	27	< 0.0050	91.0	< 0.10	0.57	< 0.50	343	< 0.050	17.6	31.5	*339*	< 0.0050	1.68	1.40	2.38	0.077	< 0.010	12.7	333	< 0.010	< 0.10	< 10	3.03	< 0.50	< 1.0
	EV_MW_SC1-A_WG_2019_Q3_NP	2019 08 22	336	< 3.0	< 0.10	1.33	404	< 0.020	< 0.050	24	< 0.0050	86.2	< 0.10	0.54	< 0.50	490	< 0.050	15.2	29.3	*317*	< 0.0050	1.29	1.46	2.25	< 0.050	< 0.010	7.65	297	< 0.010	< 0.10	< 10	2.03	< 0.50	< 1.0
	EV_MW_SPR1A_WG_2019_Q4_NP	2019 11 14	333	< 3.0	< 0.10	0.94	403	< 0.020	< 0.050	24	< 0.0050	86.2	< 0.10	0.58	0.23	223	< 0.050	15.9	28.5	*308*	< 0.0050	1.35	1.75	2.00	< 0.050	< 0.010	4.91	299	< 0.010	< 0.10	< 10	1.50	< 0.50	< 1.0
EV_MW_SPR1B	EV_MW_SC1-B_WG_Q1-2019_NP	2019 03 04	175	< 3.0	1.38	0.70	60.8	< 0.020	< 0.050	124	0.0184	43.0	< 0.10	0.23	< 0.50	< 10	< 0.050	15.4	16.5	82.3	< 0.0050	*23.9*	0.99	1.89	1.95	< 0.010	41.6	489	0.041	< 0.10	< 10	7.12	< 0.50	1.5
	EV_MW_SC1-B_WG_Q2-2019_NP	2019 06 12	172	< 3.0	0.44	0.85	54.7	< 0.020	< 0.050	145	0.0061	39.6	< 0.10	0.16	< 0.50	43	< 0.050	14.3	17.7	95.0	< 0.0050	*22.7*	0.66	1.75	0.163	< 0.010	49.7	505	0.011	< 0.10	< 10	4.78	< 0.50	5.2
	EV_MW_SC1-B_WG_2019_Q3_NP	2019 08 22	150	< 3.0	0.16	0.72	43.0	< 0.020	< 0.050	142	< 0.0050	35.0	< 0.10	0.15	< 0.50	83	< 0.050	11.2	15.3	109	< 0.0050	*25.5*	< 0.50	1.39	< 0.050	< 0.010	49.5	470	< 0.010	0.10	< 10	2.58	< 0.50	1.1
	EV_MW_SPR1B_WG_2019_Q4_NP	2019 11 14	147	< 3.0	< 0.10	0.52	39.9	< 0.020	< 0.050	144	< 0.020	34.8	< 0.10	< 0.10	< 0.20	125	< 0.050	11.8	14.6	82.1	< 0.0050	*26.5*	< 0.50	1.31	0.145	< 0.010	50.8	531	< 0.010	0.47	< 10	2.08	< 0.50	< 1.0
EV_MW_SPR1C	EV_MW_SC1-C_WG_Q1-2019_NP	2019 03 04	384	< 3.0	< 0.10	< 0.10	159	< 0.020	< 0.050	14	0.0554	103	0.11	< 0.10	< 0.50	< 10	< 0.050	14.7	30.6	0.54	< 0.0050	0.711	< 0.50	1.23	16.8	< 0.010	5.65	213	< 0.010	< 0.10	< 10	1.18	< 0.50	< 1.0
	EV_MW_SC1-C_WG_Q2-2019_NP	2019 06 12	261	< 3.0	< 0.10	0.11	106	< 0.020	< 0.050	13	0.0382	68.7	0.16	< 0.10	< 0.50	< 10	< 0.050	11.6	21.7	0.20	< 0.0050	0.789	< 0.50	1.03	4.62	< 0.010	4.51	148	< 0.010	< 0.10	< 10	0.942	< 0.50	< 1.0
	EV_MW_SC1-C_WG_2019_Q3_NP	2019 08 22	286	11.7	0.11	< 0.10	129	< 0.020	< 0.050	16	0.0487	75.6	0.18	< 0.10	< 0.50	15	< 0.050	13.1	23.7	3.24	< 0.0050	0.911	< 0.50	1.16	5.34	< 0.010	5.30	161	< 0.010	< 0.10	< 10	1.04	< 0.50	< 1.0
	EV_MW_SPR1C_WG_2019_Q4_NP	2019 11 14	341	< 3.0	0.11	< 0.10	144	< 0.020	< 0.050	17	0.0553	90.6	< 0.10	< 0.10	0.31	< 10	< 0.050	15.5	27.8	0.14	< 0.0050	0.782	< 0.50	1.25	8.12	< 0.010	5.69	201	< 0.010	< 0.10	< 10	1.09	< 0.50	< 1.0
	EV_MW_BC10A_WG_2019_Q4_NP	Duplicate	344	< 3.0	0.12	< 0.10	145	< 0.020	< 0.050	16	0.0549	92.5	< 0.10	< 0.10	0.32	< 10	< 0.050	15.8	27.5	0.16	< 0.0050	0.770	< 0.50	1.24	8.39	< 0.010	5.59	204	< 0.010	0.18	< 10	1.07	< 0.50	< 1.0
	QA/QC RPD%		1	*	*	*	1	*	*	*	1	2	*	*	*	*	*	2	1	*	*	2	*	1	3	*	2	1	*	*	*	2	*	*
EV_MCgwS	EV_MCGWS_WG_2019-01_NP	2019 01 30	357	< 3.0	< 0.10	1.01	27.9	< 0.020	< 0.050	30	< 0.0050	88.2	< 0.10	0.17	< 0.50	1,630	< 0.050	22.9	33.2	141	< 0.00050	3.38	< 0.50	1.79	0.214	< 0.010	50.6	315	< 0.010	< 0.10	< 10	2.31	< 0.50	< 1.0
	EV_MCGWS_WG_2019-04_NP	2019 05 08	361	< 3.0	< 0.10	1.13	24.1	< 0.020	< 0.050	25	< 0.0050	91.3	< 0.10	0.11	< 0.50	1,760	< 0.050	21.4	32.3	130	< 0.00050	2.76	1.29	1.67	0.052	< 0.010	42.7	329	< 0.010	< 0.10	< 10	1.99	< 0.50	< 1.0
	EV_MCGWS_WG_2019_Q3_NP	2019 07 09	360	< 3.0	< 0.10	1.48	24.6	< 0.020	< 0.050	25	< 0.0050	93.2	< 0.10	< 0.10	< 0.50	2,050	< 0.050	22.5	30.8	125	< 0.00050	3.92	0.54	1.64	0.056	< 0.010	33.1	309	< 0.010	< 0.10	< 10	2.05	< 0.50	< 1.0
	EV_MCGWS_WG_2019_Q4_NP	2019 11 04	393	< 3.0	< 0.10	1.58	26.3	< 0.020	< 0.050	27	< 0.0050	101	< 0.10	0.11	< 0.20	2,100	< 0.050	24.7	34.3	141	< 0.0050	5.01	0.89	1.95	< 0.050	< 0.010	38.3	335	< 0.010	< 0.10	< 10	2.05	< 0.50	< 1.0
EV_MCgwD	EV_MCGWD_WG_2019-01_NP	2019 01 30	232	< 3.0	0.12	0.48	72.5	< 0.020	< 0.050	74	0.0677	49.7	0.12	0.38	1.21	61	< 0.050	8.4	26.2	*214*	< 0.00050	*14.7*	4.72	1.51	0.129	< 0.010	28.7	478	0.076	< 0.10	< 10	2.78	< 0.50	8.4
	EV_MCGWD_WG_2019-03-13 _NP	2019 03 13	240	5.0	0.13	0.59	71.1	< 0.020	< 0.050	75	0.0724	53.0	< 0.10	0.26	2.13	14	< 0.050	9.2	26.1	*215*	< 0.00050	*14.2*	5.24	1.51	0.152	< 0.010	24.8	502	0.059	< 0.10	< 10	2.49	< 0.50	17.1
	EV_MCGWD_WG_2019-04_NP	2019 05 08	234	17.6	0.10	0.80	67.1	< 0.020	< 0.050	69	0.0121	50.5	0.15	0.58	0.63	213	< 0.050	8.2	26.2	*371*	< 0.00050	*14.1*	5.28	1.50	0.073	< 0.010	27.5	476	0.020	< 0.10	< 10	2.61	< 0.50	6.3
	EV_MCGWD_WG_2019_Q3_NP	2019 07 09	223	< 3.0	< 0.10	1.34	55.2	< 0.020	< 0.050	73	< 0.010	49.1	< 0.10	0.57	< 0.50	755	< 0.050	8.1	24.2	*466*	< 0.00050	*18.5*	2.61	1.37	< 0.050	< 0.010	37.1	505	< 0.010	< 0.10	< 10	3.05	< 0.50	2.1
	EV_MCGWD_WG_2019_Q4_NP	2019 11 04	239	< 3.0	< 0.10	1.66	59.3	< 0.020	< 0.050	73	< 0.0050	51.4	< 0.10	0.63	0.21	1,050	< 0.050	8.6	26.8	*508*	< 0.0050	*18.9*	3.96	1.45	< 0.050	< 0.010	38.5	542	< 0.010	0.11	< 10	3.01	< 0.50	5.9

Data provided by Teck Coal Ltd.
All terms defined within the body of SNCLavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

RED Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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"). Guideline for surface water, shown here for comparison purposes only.
[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.
[d] Standard/guideline varies with Hardness.
[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[f] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[g] Guideline is temperature, pH, DOC and hardness dependent.
[h] Standard varies with pH.
[i] Laboratory detection limit exceeds regulatory standard/guideline.
[j] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[k] 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.

Table 4d: 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 mg/L	Dissolved Metals: Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium 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[j] 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[d]	n/a	10[e]	40	20-90[d]	n/a	40-160[d]	n/a	n/a	n/a	0.25	10,000	250-1,500[d]	n/a	20	0.5-15[d]	n/a	n/a	3	n/a	1,000	85	n/a	75-2,400[d]
CSR Irrigation Watering (IW)			n/a	5,000	n/a	100	n/a	100	n/a	500	5	n/a	5[e]	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[h]
CSR Livestock Watering (LW)			n/a	5,000	n/a	25	n/a	100	n/a	5,000	80	1,000	50[e]	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[e]	20[f]	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
BCWQG Aquatic Life Long-term Average (AW)[b]			n/a	n/a	9	n/a	1,000	0.13	n/a	1,200	0.018-0.44[d]	n/a	1[e]	4	0.2-2.2[g]	n/a	3-14[d]	n/a	n/a	767-1,784.2[d]	0.02[k]	1,000	25-150[d]	n/a	2	0.05-1.5[d]	n/a	n/a	0.8	n/a	n/a	8.5	n/a	7.5-141[d]
BCWQG Aquatic Life Short-term Maximum (AW)[c]			n/a	67-100[h]	n/a	5	n/a	n/a	n/a	n/a	0.04-1.6[d]	n/a	n/a	110	0.2-13.8[g]	350	3-286[d]	n/a	n/a	815-3,390[d]	n/a	2,000	n/a	n/a	n/a	0.1-3[d]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	33-166.5[d]
Michel Creek (Study Area 9)																																		
EV_MW_MC3	EV_MW_MC3_WG_Q1-2019_NP	2019 03 06	69.3	313	0.37	1.50	229	< 0.020	< 0.050	107	0.0847	16.9	0.40	0.18	< 0.50	127	0.093	132	6.60	56.1	0.0066	*31.3*	0.96	1.14	1.12	< 0.010	153	129	0.021	0.10	10	1.99	1.22	1.3
	EV_MW_MC3_WG_Q2-2019_NP	2019 06 12	143	4.0	0.11	1.07	159	< 0.020	< 0.050	95	0.0205	34.4	< 0.10	< 0.10	< 0.50	< 10	< 0.050	130	14.0	39.3	< 0.0050	*20.5*	< 0.50	0.932	4.92	< 0.010	129	185	0.012	0.11	< 10	0.854	< 0.50	1.1
	EV_MW_MC3_WG_2019_NP_Q3_NP	2019 08 20	106	9.5	0.10	1.29	265	< 0.020	< 0.050	98	< 0.020	24.4	< 0.10	< 0.10	< 0.50	19	< 0.050	123	10.9	40.7	< 0.0050	*23.4*	< 0.50	0.809	2.6	< 0.010	135	172	< 0.010	< 0.10	< 10	0.812	< 0.50	< 1.0
	EV_EC5GW_WG_2019-08_NP	Duplicate	99.8	3.7	0.13	1.43	300	< 0.020	< 0.050	91	< 0.020	23.3	< 0.10	< 0.10	< 0.50	18	< 0.050	125	10.1	42.3	< 0.0050	*24.6*	< 0.50	0.819	2.67	< 0.010	136	182	< 0.010	< 0.10	< 10	0.795	< 0.50	< 1.0
	QA/QC RPD%		6	*	*	10	12	*	*	7	*	5	*	*	*	*	*	2	8	4	*	5	*	1	3	*	1	6	*	*	*	2	*	*
	EV_MW_MC3_WG_2019_Q4_NP	2019 11 12	119	3.1	0.12	0.75	117	< 0.020	< 0.050	69	< 0.030	30.2	< 0.10	< 0.10	0.24	< 10	< 0.050	75.2	10.5	25.4	< 0.0050	*32.8*	< 0.50	0.920	4.11	< 0.010	108	143	< 0.010	0.14	< 10	1.08	< 0.50	1.1
EV_MW_MC4	EV_MW_MC4_WG_Q1-2019_NP	2019 03 06	500	< 3.0	0.49	2.95	102	< 0.020	< 0.050	44	0.0091	136	< 0.10	0.40	< 0.50	230	< 0.050	26.4	39.0	65.8	< 0.0050	2.85	2.64	2.36	0.111	< 0.010	10.4	681	0.012	< 0.10	< 10	2.43	< 0.50	2.2
	EV_MW_MC4_WG_Q2-2019_NP	2019 06 13	501	< 3.0	< 0.10	1.25	112	< 0.020	< 0.050	41	0.0058	134	1.11	0.45	< 0.50	325	< 0.050	22.4	40.1	71.9	< 0.0050	2.59	3.12	2.34	< 0.050	< 0.010	9.24	659	0.011	< 0.10	< 10	1.58	< 0.50	19.7
	EV_MW_MC4_WG_2019_Q3_NP	2019 08 27	469	5.6	< 0.10	0.51	111	< 0.020	< 0.050	38	< 0.0050	127	< 0.10	0.48	< 0.50	361	< 0.050	21.8	36.8	69.5	< 0.0050	3.38	2.53	2.29	< 0.050	< 0.010	7.78	628	0.015	< 0.10	< 10	1.51	< 0.50	3.4
	EV_MW_MC4_WG_2019_Q4_NP	2019 11 14	464	< 3.0	< 0.10	0.45	108	< 0.020	< 0.050	38	< 0.0050	124	< 0.10	0.50	< 0.20	393	< 0.050	21.4	37.4	66.7	< 0.0050	3.22	3.65	2.31	< 0.050	< 0.010	8.14	598	0.016	< 0.10	< 10	1.24	< 0.50	3.6
Elk River Distal to EVO (Study Area 12)																																		
EV_ER1gwS	EV_ER1GWS_WG_2019-01_NP	2019 01 31	277	< 3.0	< 0.10	0.11	116	< 0.020	< 0.050	< 10	0.0105	75.4	0.29	< 0.10	0.52	< 10	< 0.050	6.9	21.5	0.12	< 0.0050	0.960	< 0.50	0.694	11.1	< 0.010	5.26	207	< 0.010	< 0.10	< 10	1.11	< 0.50	< 2.0
	EV_ER1GWS_WG_2019-04_NP	2019 05 08	270	< 3.0	< 0.10	0.11	114	< 0.020	< 0.050	< 10	0.0126	71.8	0.29	< 0.10	< 0.50	< 10	< 0.050	7.7	22.2	< 0.10	< 0.0050	0.910	< 0.50	0.802	11.2	< 0.010	8.50	213	< 0.010	< 0.10	< 10	1.09	< 0.50	< 1.0
	EV_ER1GWS_WG_2019_Q3_NP	2019 07 15	226	< 3.0	< 0.10	0.12	98.0	< 0.020	< 0.050	< 10	< 0.010	62.3	0.21	< 0.10	< 0.50	< 10	< 0.050	6.7	17.2	< 0.10	< 0.0050	1.01	< 0.50	0.783	6.43	< 0.010	5.36	164	< 0.010	< 0.10	< 10	0.835	< 0.50	< 1.0
	EV_ER1GWS_WG_2019_Q4_NP	2019 11 07	249	< 3.0	< 0.10	0.14	104	< 0.020	< 0.050	< 10	0.0105	67.3	0.30	< 0.10	0.31	< 10	< 0.050	7.0	19.6	< 0.10	< 0.0050	1.22	< 0.50	0.720	10.3	< 0.010	3.36	198	< 0.010	< 0.10	< 10	1.12	< 0.50	< 1.0
	EV_EC5GW_WG_2019_Q4_NP	Duplicate	254	< 3.0	< 0.10	0.12	109	< 0.020	< 0.050	< 10	0.0096	68.5	0.24	< 0.10	0.34	< 10	< 0.050	7.2	20.2	< 0.10	< 0.0050	1.24	< 0.50	0.746	10.2	< 0.010	3.53	198	< 0.010	< 0.10	< 10	1.14	< 0.50	1.3
	QA/QC RPD%		2	*	*	*	5	*	*	*	*	2	*	*	*	*	*	3	3	*	*	2	*	4	1	*	5	0	*	*	*	2	*	*
EV_ER1gwD	EV_ER1GWD_WG_2019-01_NP	2019 01 31	256	8.2	< 0.10	0.11	84.4	< 0.020	< 0.050	< 10	< 0.0050	67.3	0.46	< 0.10	< 0.50	< 10	< 0.050	6.4	21.4	0.53	< 0.0050	1.31	< 0.50	0.635	7.69	< 0.010	3.17	207	< 0.010	< 0.10	< 10	1.35	< 0.50	< 1.0
	EV_ER1GWD_WG_2019-04_NP	2019 05 08	238	9.8	< 0.10	0.11	77.9	< 0.020	< 0.050	< 10	< 0.0050	60.1	0.59	< 0.10	< 0.50	< 10	< 0.050	6.7	21.4	1.55	< 0.0050	1.36	< 0.50	0.605	7.28	< 0.010	3.26	195	< 0.010	< 0.10	< 10	1.33	< 0.50	< 1.0
	EV_ER1GWD_WG_2019_Q3_NP	2019 07 15	252	6.3	< 0.10	< 0.10	91.8	< 0.020	< 0.050	< 10	< 0.0050	67.2	0.61	< 0.10	< 0.50	< 10	< 0.050	6.7	20.4	20.7	< 0.0050	1.66	< 0.50	0.683	1.29	< 0.010	3.12	197	0.011	< 0.10	< 10	1.41	< 0.50	< 1.0
	EV_ER1GWD_WG_2019_Q4_NP	2019 11 07	253	7.0	< 0.10	0.12	98.0	< 0.020	< 0.050	10	< 0.0050	67.1	1.76	< 0.10	0.33	< 10	< 0.050	7.3	20.7	10.4	< 0.0050	1.71	< 0.50	0.738	1.44	< 0.010	3.25	199	< 0.010	< 0.10	< 10	1.43	< 0.50	< 1.0
Blanks																																		
Field Blanks																																		
EV_GCgw	EV_EC6GW_WG_2019-01_NP	2019 01 22	13.8	< 3.0	< 0.10	< 0.10	2.71	< 0.020	< 0.050	< 10	< 0.0050	4.02	< 0.10	< 0.10	< 0.50	14	< 0.050	< 1.0	0.91	6.59	< 0.0050	0.053	< 0.50	0.081	< 0.050	< 0.010	0.322	15.6	< 0.010	< 0.10	< 10	0.033	< 0.50	33.8
EV_OCgw	EV_MC6GW_WG_2019-01_NP	2019 01 23	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	0.105	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.00050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	< 0.050	< 0.20	< 0.010	< 0.10	< 10	< 0.010	< 0.50	3.7
EV_OCgw	EV_OCGW_WG_2019-01_FB-HG	2019 01 23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MCgwD	EV_MCGWD_WG_2019-01_FB-HG	2019 01 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MCgwS	EV_MCGWS_WG_2019-01_FB-HG	2019 01 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_MCgwD	EV_MCGWD_WG_2019-03-13 _FB-HG	2019 03 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_GV3gw	EV_EC6GW_WG_2019-04_NP	2019 05 06	< 0.50	< 3.0	< 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	< 0.10	< 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
EV_MCgwD	EV_MCGWD_WG_2019-04_FB-HG	2019 05 08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.00050	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_OCgw	EV_MC6GW_WG_2019-04_NP	2019 05 21	< 0.50	< 3.0	< 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	< 0.10	< 0.10	< 0.00050	< 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_MC-BC1B	EV_MW_BC10-B_WG_Q2-2019_NP	2019 06 11	< 0.50	< 3.0	< 0.10	< 0.10	0.47	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 10	< 0.050	< 1.0	< 0.10	< 0.10	< 0.0050	< 0.050	< 0.50	< 0.050	< 0.050	< 0.010	0.064	< 0.20	< 0.010	0.14	< 10	< 0.010	< 0.50	< 1.0
EV_GCgw	EV_EC6GW_WG_2019_Q3_NP	2019 07 12	< 0.50	< 3.0	< 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	< 0.10	< 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
EV_OCgw	EV_MC6GW_WG_2019_Q3_NP	2019 07 15	< 0.50	< 3.0	< 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	< 0.10	< 0.10	< 0.00050	< 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_MW_MC3	EV_EC6GW_WG_2019-08_NP	2019 08 20	< 0.50	< 3.0	< 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	< 0.10	< 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
EV_MW_GT1B	EV_EC6GW_WG_2019-08-26_NP	2019 08 26	< 0.50	< 3.0	< 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	< 0.10	< 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
EV_OCgw	EV_MC6GW_WG_2019_Q4_NP	2019 11 05	< 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	< 0.00050	< 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_ER1gwS	EV_EC6GW_WG_2019_Q4_NP	2019 11 07	< 0.50	< 3.0	< 0.10	< 0.10	0.29	< 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
EV_MW_SPR1C	EV_MW_BC10B_WG_2019_Q4_NP	2019 11 14	< 0.50	< 3.0	< 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	< 0.10	< 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
Trip Blanks																																		
	EV_EC7GW_WG_2019-01_NP	2019 01 22	-	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	< 0.0050	-	< 0.0050	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	EV_MC7GW_WG_2019-01_NP	2019 01 23	-	-	-	-	-	-	-	-	-	< 0.050	-	-	-	-	-	-	0.0050	-	-	-	-	< 0.050	-	-	< 0.050	-	-	-	-	-	-	-
	EV_EC7GW_WG_2019_Q3_NP	2019 07 12	< 0.50	< 3.0	< 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	< 0.10	< 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

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
\- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.
** Monitoring wells within 10m of high water mark, samples compared to CSR and BCWQG.

RED	Concentration greater than BCWQG Aquatic Life (AW) Short-term Maximum and/or Long-term Average 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"). Guideline for surface water, shown here for comparison purposes only.
[c] Guideline to protect freshwater aquatic life, short-term maximum (i.e. "acute"). Guideline for surface water, shown here for comparison purposes only.
[d] Standard/guideline varies with Hardness.
[e] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[f] Interim BC MoE Regional Background Estimate (Protocol 9 Determining Background Groundwater Quality).
[g] Guideline is temperature, pH, DOC and hardness dependent.
[h] Standard varies with pH.
[i] Laboratory detection limit exceeds regulatory standard/guideline.
[j] There is no Zinc standard specified for H > 400; therefore, the standard for H=300-<400 is applied as a conservative comparison.
[k] 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.

Table 4e: 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				
Guidelines for Canadian Drinking Water Quality (DW)				50
SPO			Elk River [EV_ER1 (0200393)]	19
Compliance Point			Michel Creek [EV_MC2 (E300091)]	28
Michel Creek (Study Area 9)				
EV_RCgw	EV_RCSGW_WG_2019-01_NP	2019 01 22	EV_MC2 (E3000091)	**217**
	EV_RCSGW_WG_2019-04_NP	2019 05 06	EV_MC2 (E3000091)	**220**
	EV_RCSGW_WG_2019-Q3_NP	2019 07 11	EV_MC2 (E3000091)	**215**
	EV_RCSGW_WG_2019-08_NP	2019 08 21	EV_MC2 (E3000091)	**257**
	EV_RCSGW_WG_2019-Q4_NP	2019 10 29	EV_MC2 (E3000091)	**251**
EV_MW_GT1B	EV_MW_GC1-B_WG_Q1-2019_NP	2019 03 05	EV_MC2 (E3000091)	39.6
	EV_MW_GC1-B_WG_Q2-2019_NP	2019 06 11	EV_MC2 (E3000091)	34.3
	EV_MW_GT1-B_WG_2019_Q3_NP	2019 08 26	EV_MC2 (E3000091)	**161**
	EV_EC5GW_WG_2019-08-26_NP	Duplicate	EV_MC2 (E3000091)	**161**
	QA/QC RPD%			0
	EV_MW_GT1B_WG_2019_Q4_NP	2019 11 13	EV_MC2 (E3000091)	**122**
EV_WH50gw	EV_WH50GW_WG_2019-01_NP	2019 01 23	EV_MC2 (E3000091)	16.2
	EV_WH50GW_WG_2019-08_NP	2019 08 21	EV_MC2 (E3000091)	10.3
	EV_WH50GW_WG_2019_Q4_NP	2019 11 07	EV_MC2 (E3000091)	10.8
EV_MW_BC1A	EV_MW_BC1-A_WG_Q1-2019_NP	2019 03 05	EV_MC2 (E3000091)	**97.5**
	EV_MW_BC1-A_WG_Q2-2019_NP	2019 06 11	EV_MC2 (E3000091)	**133**
	EV_MW_BC1-A_WG-2019_NP_Q3_NP	2019 08 20	EV_MC2 (E3000091)	**146**
	EV_MW_BC1A_WG_2019_Q4_NP	2019 11 13	EV_MC2 (E3000091)	**158**
EV_MW_BC1B	EV_MW_BC1-B_WG_Q1-2019_NP	2019 03 05	EV_MC2 (E3000091)	**120**
	EV_MW_BC1-B_WG_Q2-2019_NP	2019 06 11	EV_MC2 (E3000091)	**152**
	EV_MW_BC10-A_WG_Q2-2019_NP	2019 06 11	EV_MC2 (E3000091)	**149**
	QA/QC RPD%			2
	EV_MW_BC1-B_WG_2019_NP_Q3_NP	2019 08 20	EV_MC2 (E3000091)	**179**
	EV_MW_BC1B_WG_2019_Q4_NP	2019 11 13	EV_MC2 (E3000091)	**219**
EV_BCgw	EV_BCGW_WG_2019-01_NP	2019 01 23	EV_MC2 (E3000091)	24.9
	EV_BCGW_WG_2019-04_NP	2019 05 09	EV_MC2 (E3000091)	38.5
	EV_BCGW_WG_2019_Q3_NP	2019 07 09	EV_MC2 (E3000091)	30.2
	EV_BCGW_WG_2019_Q4_NP	2019 10 31	EV_MC2 (E3000091)	17.7
EV_BRGW	EV_BRGW_WG_2019-01_NP	2019 01 22	EV_MC2 (E3000091)	25.4
	EV_BRGW_WG_2019-04_NP	2019 05 21	EV_MC2 (E3000091)	13.3
	EV_BRGW_WG_2019_Q3_NP	2019 08 27	EV_MC2 (E3000091)	38.3
	EV_BRGW_WG_2019_Q4_NP	2019 11 07	EV_MC2 (E3000091)	30.7
EV_MW_MC2B	EV_MW_MC2-B_WG_Q1-2019_NP	2019 03 04	EV_MC2 (E3000091)	**51.9**
	EV_MW_MC2-C_WG_Q1-2019_NP	Duplicate	EV_MC2 (E3000091)	**50.4**
	QA/QC RPD%			3
	EV_MW_MC2-B_WG_Q2-2019_NP	2019 06 11	EV_MC2 (E3000091)	**56.5**
	EV_MW_MC2-B_WG_2019_NP_NP	2019 08 20	EV_MC2 (E3000091)	**54.4**
	EV_MW_MC2B_WG_2019_Q4_NP	2019 11 13	EV_MC2 (E3000091)	**62**
EV_HW1	EV_HW1_WG_2019-08_NP	2019 08 21	EV_MC2 (E3000091)	**54.7**
	EV_HW1_WG_2019_Q4_NP	2019 11 04	EV_MC2 (E3000091)	**58.8**
EV_MW_SPR1C	EV_MW_SC1-C_WG_Q1-2019_NP	2019 03 04	EV_ER1 (0200393)	16.8
Elk River Distal to EVO (Study Area 12)				
EV_ER1gwS	EV_ER1GWS_WG_2019-01_NP	2019 01 31	EV_ER1 (0200393)	11.1
	EV_ER1GWS_WG_2019-04_NP	2019 05 08	EV_ER1 (0200393)	11.2
	EV_ER1GWS_WG_2019_Q4_NP	2019 11 07	EV_ER1 (0200393)	10.3
	EV_EC5GW_WG_2019_Q4_NP	Duplicate	EV_ER1 (0200393)	10.2
	QA/QC RPD%			1

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
n/a Denotes no applicable standard/guideline.

BOLD	Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
SHADED	Concentration greater than SPO by Area/Compliance Point by Area

Table 5a: Summary of Groundwater Monitoring Program Locations, Well Installation Details and Hydrogeological Information (CMO)

Area	Well ID	Monitoring Program[a]	Well Type	Coordinates (UTM NAD 83)		Ground Elevation	TOC Elevation [b]	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	668566	5487348	1512.4	1513.32 [c]	0.92	28.5	51	16.9	20.0	Bedrock	3.2	-
	CM_MW4-DP	SSGMP	Monitoring			1512.4	1513.32 [c]	0.92		51	26.1	29.1	Bedrock		-
	CM_MW5-SH	SSGMP	Monitoring	669476	5487365	1541.0	1541.88	0.88	25.9	51	8.1	11.1	Gravel	18.0	1.5E-04
	CM_MW5-DP	SSGMP	Monitoring			1541.0	1541.90	0.90		51	23.8	26.9	Bedrock		2.5E-06
	CM_MW6-SH	SSGMP	Monitoring	670118	5486464	1579.7	1580.53	0.87	41.7	51	17.7	20.7	Well-graded Sand	22.6	< 1E-07
	CM_MW6-DP	SSGMP	Monitoring			1579.7	1580.53	0.87		51	38.7	41.7	Bedrock		2E-06
	CM_MW9	SSGMP	Monitoring	668563	5487346	1510.3	1510.27	0.88	3.7	51	1.5	2.4	Sand/Silt	2.4	-
Michel Creek Valley	CM_MW1-OB	SSGMP, RGMP	Monitoring	667957	5487526	1500.4	1501.21	0.77	37.2	51	2.9	4.4	Gravel and Silt	18.0	1.2E-04
	CM_MW1-SH	SSGMP, RGMP	Monitoring	667957	5487526	1500.4	1501.23	0.79		51	20.4	23.5	Bedrock		2.0E-07
	CM_MW1-DP	SSGMP, RGMP	Monitoring	667957	5487526	1500.4	1501.19	0.74		51	34.2	37.2	Bedrock		6.0E-06
	CM_MW2-SH	SSGMP	Monitoring	668327	5486758	1515.6	1516.45	0.89	4.9	51	3.8	5.3	Gravel	-	8.2E-05
	CM_MW7-SH	SSGMP	Monitoring	668833	5485920	1755.8	1756.55	0.78	78.3	51	47.6	50.6	Bedrock	31.7	3E-05
	CM_MW7-DP	SSGMP	Monitoring			1755.8	1756.56	0.79		51	64.5	67.5	Bedrock		3E-05
	CM_MW8	SSGMP	Monitoring	668878	5484957	1847.3	1848.00	0.69	104.0	51	97.9	104.0	Bedrock	2.2	5E-09
	CM_MW3-SH	SSGMP	Monitoring	668237	5482854	1573.4	1574.15	0.75	27.4	51	4.4	7.4	Gravel	6.7	3.9E-04
	CM_MW3-DP	SSGMP	Monitoring			1573.4	1574.16	0.76		51	14.0	17.1	Bedrock		1.0E-07
	CM_MW10	SSGMP	Monitoring	668582	5487630	1535.3	1535.27	0.93	23.9	51	21.0	22.6	Weathered bedrock	20.7	1.2×10^{-7}

Notes:

[a] SSGMP denotes CMO Site-Specific Groundwater Monitoring Program; RGMP denotes Regional Groundwater Monitoring Program.

[b] Top of casing is top of monitoring well PVC standpipe unless indicated otherwise (note c).

[c] Top of casing is top of steel protective casing.

masl denotes metres above sea level.

mbgs denotes metres below ground surface.

TOC denotes top of pipe casing.

"-" denotes data not available.

Table 5b: Summary of Groundwater Level and Sampling Information (CMO)

Area	Well ID	Ground Elevation	TOC Elevation (masl) [a]		Stick Up Height	Date of Static Water Level Measurement	Depth to Water	Potentiometric Elevation	Well Pairs	Calculated Vertical Gradient		Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	PVC	Steel	m	yyyy-mm-dd	mbtoc	masl		m/m	Direction	Quarter	
Corbin Creek Valley	CM_MW4-SH	1512.40	-	1513.32 [b]	0.92	2019-01-28	Artesian	> 1513.32					Discharge Spigot
						2019-06-05	Artesian	> 1513.32					
						2019-08-21	Artesian	> 1513.32					
						2019-11-04	Artesian	> 1513.32					
	CM_MW4-DP	1512.40	-	1513.32 [b]	0.92	2019-01-28	Artesian	> 1513.32					Discharge Spigot
						2019-06-05	Artesian	> 1513.32					
						2019-08-21	Artesian	> 1513.32					
						2019-11-04	Artesian	> 1513.32					
	CM_MW5-SH	1541.00	1541.88	1542.00	0.88	2019-01-29	7.39	1534.62	CM_MW5-SH and CM_MW5-DP	0.05	Downward	Q1, Q2, Q3, Q4	Bladder Pump
						2019-06-05	5.59	1536.42		0.06	Downward		
						2019-08-28	6.95	1534.94		0.05	Downward		
						2019-11-13	6.96	1534.92		0.05	Downward		
	CM_MW5-DP	1541.00	1541.90	1542.00	0.90	2019-01-29	8.16	1533.84				Q1, Q2, Q3, Q4	Bladder Pump
						2019-06-05	6.47	1535.53					
						2019-08-28	7.69	1534.21					
						2019-11-13	7.71	1534.19					
	CM_MW6-SH	1579.66	1580.53	1580.54	0.87	2019-01-28	7.61	1572.94	CM_MW6-SH and CM_MW6-DP	0.12	Upward		Bladder Pump
						2019-06-03	5.70	1574.84		0.09	Upward		
						2019-08-21	6.97	1573.56		0.12	Upward		
						2019-11-06	6.85	1573.68		0.11	Upward		
	CM_MW6-DP	1579.66	1580.53	1580.54	0.87	2019-01-28	5.18	1575.36					Bladder Pump
						2019-06-03	3.85	1576.69					
						2019-08-21	4.51	1576.02					
						2019-11-06	4.46	1576.07					
Michel Creek Valley	CM_MW1-OB	1500.44	1501.21	1501.29	0.77	2019-01-22	3.44	1497.85	CM_MW1-OB and CM_MW1-SH	0.05	Downward		Bladder Pump
						2019-06-04	3.32	1497.97		0.05	Downward		
						2019-08-29	3.35	1497.86		0.05	Downward		
						2019-11-01	3.27	1497.94		0.05	Downward		
	CM_MW1-SH	1500.44	1501.23	1501.29	0.79	2019-01-22	4.42	1496.87	CM_MW1-SH and CM_MW1-DP	0.04	Upward		Bladder Pump
						2019-06-04	4.20	1497.09		0.04	Upward		
						2019-08-29	4.24	1496.99		0.04	Upward		
						2019-11-01	4.17	1497.06		0.05	Upward		
	CM_MW1-DP	1500.44	1501.19	1501.29	0.74	2019-01-22	3.81	1497.48					Hydrasleeve
						2019-06-05	3.65	1497.64					
						2019-08-29	3.65	1497.54					
						2019-10-30	3.48	1497.71					
	CM_MW2-SH	1515.56	1516.45	1516.46	0.89	2019-01-24	3.33	1513.14					Bladder Pump
						2019-06-04	2.98	1513.48					
						2019-08-20	3.13	1513.32					
						2019-10-31	2.96	1513.49					
	CM_MW7-SH	1755.77	1756.55	1756.63	0.78	2019-01-21	38.24	1718.39	CM_MW7-SH and CM_MW7-DP	0.005	Upward		Hydrasleeve
						2019-06-05	33.51	1723.13		0.007	Upward		
						2019-09-09	33.91	1722.65		0.006	Upward		
						2019-10-30	33.20	1723.35		0.007	Upward		
	CM_MW7-DP	1755.77	1756.56	1756.63	0.79	2019-01-21	38.15	1718.49					Hydrasleeve
						2019-06-05	33.39	1723.24					
						2019-09-05	33.80	1722.76					
						2019-10-30	33.08	1723.48					
	CM_MW8	1847.31	1848.00	1847.99	0.69	2019-01-21	83.04	1764.96					Hydrasleeve
						2019-06-05	74.34	1773.65					
						2019-09-05	80.32	1767.67					
						2019-10-30	78.62	1769.38					
	CM_MW3-SH	1573.40	1574.15	1574.21	0.75	2019-01-24	3.09	1571.13	CM_MW3-SH and CM_MW3-DP	0.03	Upward		Bladder Pump
						2019-06-04	2.35	1571.86		0.02	Upward		
						2019-08-22	2.85	1571.30		0.03	Upward		
						2019-10-31	2.82	1571.33		0.03	Upward		
	CM_MW3-DP	1573.40	1574.16	1574.21	0.76	2019-01-24	2.76	1571.45					Bladder Pump
						2019-06-04	2.16	1572.06					
						2019-08-22	2.55	1571.61					
						2019-10-31	2.52	1571.64					
	CM_MW10	1535.27	1536.20	-	0.93	2019-11-14	13.77	1522.43					Bladder Pump

Notes:

[a] Measurement reference point revised from top of steel protective casing to top of PVC pipe starting Q3 2019 except where indicated otherwise (note b).
[b] Measurement reference point is top of steel protective casing for all measurements at this monitoring well.
masl denotes metres above sea level.
mbgs denotes metres below ground surface.
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.

Table 5c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (CMO)

			Field Parameters				Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P 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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.4[c]	4,000	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	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	600	1	1,000	n/a	1,000	10,000	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	250	1.5	500	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a
CM_MW1-DP	CM_MW1-DP_WG_2019-01-14_N	2019 01 22	1.46	7.25	2.59	1,334	8.30	142	1,260	14.5	715	14.3	344	342	2.8	< 1.0	0.81	*207*	0.22	2.0	0.562	< 0.025	< 0.0050	0.672	0.0041	0.0799	1.78	0.91
	CM_MW1-DP_WG_2019-04-08_N	2019 06 05	10.4	8.17	6.11	1,325	8.52	151	1,370	10.6	716	14.6	348	327	20.8	< 1.0	0.96	*238*	0.21	< 1.5	0.586	< 0.025	< 0.0050	1.15	0.0327	0.212	2.49	2.57
	CM_MW1-DP_WG_2019-07-08_N	2019 08 29	12.9	7.56	6.68	1,334	8.16	159	1,280	32.2	752	19.0	356	356	< 1.0	< 1.0	0.85	*228*	0.20	< 1.5	0.590	< 0.025	< 0.0050	0.754	0.0079	0.0560	1.26	1.19
	CM_MW1-DP_WG_2019-10-14_N	2019 11 01	5.3	7.73	2.50	1,317	8.07	159	1,280	5.5	748	6.48	360	360	< 1.0	< 1.0	0.77	*237*	0.21	4.3	0.595	0.363	< 0.0050	0.709	0.0252	0.0657	1.14	1.10
CM_MW1-OB	CM_MW1-OB_WG_2019-01-14_N	2019 01 22	0.77	6.97	8.98	1,482	7.85	637	1,440	1.2	979	0.36	264	264	< 1.0	< 1.0	< 0.25	*154*	0.12	300	0.0141	1.36	< 0.0050	0.137	0.0033	0.0041	0.83	0.93
	CM_MW1-OB_WG_2019-04-08_N	2019 06 04	5.7	7.04	5.75	1,247	8.20	589	1,280	1.2	805	1.08	244	244	< 1.0	< 1.0	< 0.25	*111*	< 0.10	292	0.0116	0.970	< 0.0050	0.190	0.0030	0.0034	< 0.50	< 0.50
	CM_NNP_WS_2019-04-08_N	Duplicate	-	-	-	-	8.22	582	1,280	< 1.0	813	0.51	242	242	< 1.0	< 1.0	< 0.25	*112*	< 0.10	283	0.0225	0.913	< 0.0050	0.313	0.0028	0.0030	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	0	1	0	*	1	72	1	1	*	*	*	1	*	3	*	6	*	*	*	*	*	*
	CM_MW1-OB_WG_2019-07-08_N	2019 08 29	13	7.04	7.13	1,235	7.91	593	1,200	< 1.0	843	0.13	318	318	< 1.0	< 1.0	< 0.25	62.9	0.11	310	0.0134	0.396	< 0.0050	0.134	0.0052	0.0064	1.21	0.93
	CM_MW1-OB_WG_2019-10-14_N	2019 11 01	3.83	7.13	6.77	1,387	8.04	650	1,070	< 1.0	913	< 0.10	309	309	< 1.0	< 1.0	< 0.25	*108*	0.11	302	0.0124	0.657	< 0.0050	0.102	0.0027	0.0024	< 0.50	< 0.50
	CM_NNP2_WS_2019-10-14_N	Duplicate	-	-	-	-	7.99	651	1,200	< 1.0	863	< 0.10	312	312	< 1.0	< 1.0	< 0.25	*106*	0.11	303	0.0172	0.636	< 0.0050	0.160	0.0032	0.0027	0.64	0.55
	QA/QC RPD%		-	-	-	-	1	0	11	*	6	*	1	1	*	*	*	2	*	0	*	6	*	*	*	*	*	*
CM_MW1-SH	CM_MW1-SH_WG_2019-01-14_N	2019 01 22	3.2	7.77	0.12	996	8.27	121	980	7.6	547	14.8	204	204	< 1.0	< 1.0	0.73	*184*	0.82	11.8	0.0491	0.030	< 0.0050	0.067	0.0017	0.0180	1.26	1.24
	CM_NNP_WS_2019-01-14_N	Duplicate	-	-	-	-	8.29	117	992	10.6	548	17.8	204	204	< 1.0	< 1.0	0.76	*185*	0.80	11.8	0.0573	< 0.025	< 0.0050	0.062	0.0016	0.0231	1.13	1.15
	QA/QC RPD%		-	-	-	-	0	3	1	33	0	18	0	0	*	*	4	1	*	0	*	6	*	*	*	25	*	*
	CM_MW1-SH_WG_2019-04-08_N	2019 06 04	6.58	7.99	0.02	957	8.42	127	1,010	5.6	486	9.92	203	193	10.6	< 1.0	0.747	*181*	0.816	11.1	0.0559	< 0.0050	< 0.0010	0.173	0.0018	0.0119	0.54	0.58
	CM_MW1-SH_WG_2019-07-08_N	2019 08 29	9.1	7.84	-0.11	1,007	8.15	113	988	1.3	555	3.64	202	202	< 1.0	< 1.0	0.842	*193*	0.837	9.54	0.0515	< 0.0050	< 0.0010	< 0.050	0.0036	0.0049	0.95	1.14
	CM_NNP_WS_2019-07-08_N	Duplicate	-	-	-	-	8.21	115	969	< 1.0	547	4.16	204	204	< 1.0	< 1.0	0.786	*194*	0.871	9.47	0.0500	< 0.0050	< 0.0010	0.057	0.0019	0.0067	1.10	1.27
	QA/QC RPD%		-	-	-	-	1	2	0	*	4	*	0	0	*	*	*	*	*	0	*	6	*	*	*	*	*	*
	CM_MW1-SH_WG_2019-10-14_N	2019 11 01	4.9	7.78	0.20	9.62	8.07	126	1,050	5.6	526	6.69	292	292	< 1.0	< 1.0	0.755	*191*	0.854	10.3	0.0551	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0081	0.54	< 0.50
CM_MW2-SH	CM_MW2-SH_WG_2019-01-14_N	2019 01 24	0.8	6.93	4.78	1,253	7.90	658	1,230	3.4	889	3.71	393	393	< 1.0	< 1.0	< 0.25	2.9	0.11	344	0.0298	0.131	< 0.0050	< 0.20	0.0027	0.0063	1.02	0.99
	CM_MW2-SH_WG_2019-04-08_N	2019 06 04	7.7	6.77	1.01	1,279	8.13	762	1,300	1.2	937	3.03	294	294	< 1.0	< 1.0	< 0.25	3.8	< 0.10	478	0.0143	0.120	< 0.0050	0.125	0.0018	0.0040	0.83	1.17
	CM_MW2-SH_WG_2019-07-08_N	2019 08 20	8.55	6.28	3.29	1,279	8.05	687	1,280	5.5	878	0.48	339	339	< 1.0	< 1.0	< 0.050	2.64	0.104	409	0.0070	0.0842	< 0.0010	< 0.050	0.0012	< 0.0020	1.20	1.25
	CM_MW2-SH_WG_2019-10-14_N	2019 10 31	3.96	6.92	3.19	1,276	8.00	644	1,100	< 1.0	844	0.11	394	394	< 1.0	< 1.0	< 0.25	7.0	< 0.10	347	< 0.0050	0.478	< 0.0050	0.103	0.0023	< 0.0020	1.09	1.09
CM_MW3-DP	CM_MW3-DP_WG_2019-01-14_N	2019 01 24	2.36	8.10	0.37	2,784	8.31	49.3	2,710	3.3	1,450	1.96	215	212	3.0	< 1.0	2.62	*743*	0.47	< 1.5	0.499	< 0.025	< 0.0050	0.62	0.0037	0.0097	< 0.50	< 0.50
	CM_MW3-DP_WG_2019-04-08_N	2019 06 04	4.8	8.14	-0.1	2,651	8.42	51.8	2,810	2.7	1,340	1.12	211	200	10.2	< 1.0	2.57	*749*	0.46	< 1.5	0.561	0.040	< 0.0050	0.623	< 0.0010	0.0089	< 0.50	< 0.50
	CM_MW3-DP_WG_2019-07-08_N	2019 08 22	9.2	7.1	0.49	2,106	8.34	49.4	2,830	< 1.0	1,500	0.20	212	208	3.8	< 1.0	2.74	*808*	0.52	< 1.5	0.651	< 0.025	< 0.0050	0.59	0.0052	0.0071	< 0.50	< 0.50
	CM_MW3-DP_WG_2019-10-14_N	2019 10 31	0.2	8.33	0.92	2,914	8.37	48.6	2,550	< 1.0	1,480	0.43	203	197	5.8	< 1.0	2.72	*801*	0.69	1.9	0.659	0.046	< 0.0050	0.639	0.0061	0.0085	< 0.50	< 0.50
CM_MW3-SH	CM_MW3-SH_WG_2019-01-14_N	2019 01 24	2.5	7.70	7.83	324.4	8.26	168	319	< 1.0	177	0.44	161	161	< 1.0	< 1.0	< 0.050	2.56	0.139	15.8	0.0345	0.0205	< 0.0010	< 0.20	0.0035	0.0048	1.65	0.57
	CM_NNP2-WG_2019-01-14_N	Duplicate	-	-	-	-	8.18	171	320	< 1.0	184	0.56	161	161	< 1.0	< 1.0	< 0.050	2.49	0.136	15.8	0.0214	0.0217	< 0.0010	< 0.20	0.0037	0.0039	0.50	0.51
	QA/QC RPD%		-	-	-	-	1	2	0	*	4	*	0	0	*	*	*	*	*	0	*	6	*	*	*	*	*	*
	CM_MW3-SH_WG_2019-04-08_N	2019 06 04	2.7	7.69	8.54	321.0	8.37	172	338	< 1.0	185	0.49	171	162	8.6	< 1.0	< 0.050	0.94	0.097	15.6	0.0281	0.0133	< 0.0010	< 0.050	0.0027	0.0034	0.99	1.10
	CM_NNP2_WS_2019-04-08_N	Duplicate	-	-	-	-	8.35	175	342	< 1.0	182	0.47	170	162	7.8	< 1.0	< 0.050	1.00	0.095	16.0	0.0115	0.0249	< 0.0010	0.124	0.0028	0.0033	0.99	1.11
	QA/QC RPD%		-	-	-	-	0	2	1	*	2	*	1	0	10	*	*	*	*	3	*	6	*	*	*	*	*	*
	CM_NNP2_WS_2019-07-08_N	2019 08 22	-	-	-	-	8.13	171	329	< 1.0	183	0.12	170	170	< 1.0	< 1.0	< 0.050	1.14	0.120	15.9	0.0101	0.0110	< 0.0010	< 0.20	< 0.0010	< 0.0020	0.79	0.68
	CM_MW3-SH_WG_2019-07-08_N	2019 08 22	4.8	7.56	7.2	326	8.14	169	337	< 1.0	189	< 0.10	168	168	< 1.0	< 1.0	< 0.050	1.15	0.122	15.9	0.0069	0.0103	< 0.0010	< 0.20	< 0.0010	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	0	1	2	*	3	*	1	1	*	*	*	*	*	0	*	6	*	*	*	*	*	*
	CM_MW3-SH_WG_2019-10-14_N	2019 10 31	2.70	7.61	7.06	368	8.19	185	331	3.8	208	3.68	180	180	< 1.0	< 1.0	< 0.050	1.36	0.109	17.7	< 0.0050	0.0148	< 0.0010	< 0.050	0.0031	0.0058	0.77	0.72
	CM_NNP_WS_2019-10-14_N	Duplicate	-	-	-	-	8.21	190	320	3.2	205	3.33	176	176	< 1.0	< 1.0	< 0.050	1.19	0.121	17.7	0.0052	0.0123	< 0.0010	< 0.050	0.0036	0.0063	0.67	0.64
	QA/QC RPD%		-	-	-	-	0	3	3	*	1	10	2	2	*	*	*	*	*	0	*	6	*	*	*	*	*	*

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 5c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (CMO)

			Field Parameters				Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P 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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.4[c]	4,000	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	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	600	1	1,000	n/a	1,000	10,000	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	250	1.5	500	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a
CM_MW4-DP	CM_MW4-DP_WG_2019-01-14_N	2019 01 28	1.70	8.10	6.30	2,361	8.70	20.2	2,330	1.3	1,390	3.39	765	707	58.0	< 1.0	1.35	*349*	0.50	< 1.5	0.491	< 0.025	< 0.0050	0.431	0.0102	0.0103	0.67	0.70
	CM_MW4-DP_WG_2019-04-08_N	2019 06 05	11.1	8.04	3.38	2,780	8.71	27.2	2,940	55.6	1,610	258	861	790	71.2	< 1.0	1.83	*473*	0.47	< 1.5	0.659	0.076	< 0.0050	1.19	0.0105	0.0206	< 10	0.79
	CM_MW4-DP_WG_2019-07-08_N	2019 08 21	12.26	7.68	4.33	2,114	8.60	26.7	2,810	2.0	1,580	5.65	868	818	50.8	< 1.0	2.03	*472*	0.36	4.9	0.589	0.308	< 0.0050	0.564	0.0098	0.0124	< 0.50	< 0.50
	CM_MW4-DP_WG_2019-10-14_N	2019 11 05	6.3	7.73	6.19	2,902	8.44	28.4	2,590	1.3	1,680	5.24	851	830	21.6	< 1.0	1.93	*489*	0.50	6.0	0.604	0.063	< 0.0050	0.614	0.0104	0.0135	< 0.50	< 0.50
CM_MW4-SH	CM_MW4-SH_WG_2019-01-14_N	2019 01 28	2.4	8.25	2.91	1,255	8.66	28.1	1,290	< 1.0	766	1.48	542	509	32.8	< 1.0	0.39	*104*	0.43	13.8	0.384	< 0.025	< 0.0050	0.294	0.0100	0.0088	0.80	0.89
	CM_MW4-SH_WG_2019-04-08_N	2019 06 05	10.86	8.39	3.39	1,374	8.71	25.9	1,450	3.5	814	10.5	599	553	45.8	< 1.0	0.44	*123*	0.46	< 1.5	0.443	< 0.025	< 0.0050	0.658	0.0109	0.0201	2.06	2.13
	CM_MW4-SH_WG_2019-07-08_N	2019 08 21	14.2	8.24	4.45	1,389	8.58	25.4	1,410	6.2	803	1.05	593	561	31.2	< 1.0	0.56	*135*	0.41	< 1.5	0.393	< 0.025	< 0.0050	0.412	0.0102	0.0105	< 0.50	< 0.50
	CM_MW4-SH_WG_2019-10-14_N	2019 11 04	8.2	8.06	4.96	1,519	8.24	27.2	1,330	6.0	874	12.6	614	614	< 1.0	< 1.0	0.50	*145*	0.36	< 1.5	0.450	< 0.025	< 0.0050	0.428	0.0114	0.0194	0.71	< 0.50
CM_MW5-DP	CM_MW5-DP_WG_2019-01-14_N	2019 01 29	4.1	7.25	0.27	751.3	8.21	282	717	3.6	391	17.1	421	421	< 1.0	< 1.0	< 0.050	8.90	0.298	3.78	0.633	< 0.0050	< 0.0010	0.577	< 0.0010	0.0020	< 0.50	< 0.50
	CM_MW5-DP_WG_2019-04-08_N	2019 06 05	9.3	7.37	0.03	705	8.07	277	666	9.4	420	15.1	378	378	< 1.0	< 1.0	< 0.050	10.3	0.332	1.12	0.702	0.0094	< 0.0010	0.942	< 0.0010	0.0091	1.68	1.80
	CM_MW5-DP_WG_2019-07-08_N	2019 08 28	11.1	8.01	0.08	724	8.21	289	724	6.7	399	14.4	412	412	< 1.0	< 1.0	< 0.050	9.73	0.326	0.46	0.651	< 0.0050	< 0.0010	0.627	< 0.0010	0.0028	< 0.50	< 0.50
	CM_MW5-DP_WG_2019-10-14_N	2019 11 13	4.41	8.10	0.65	749	8.23	266	602	4.4	433	18.9	381	381	< 1.0	< 1.0	< 0.050	10.0	0.354	0.41	0.607	< 0.0050	< 0.0010	0.660	< 0.0010	0.0048	< 0.50	< 0.50
CM_MW5-SH	CM_MW5-SH_WG_2019-01-14_N	2019 01 29	5.45	6.99	2.14	1,494	7.87	837	1,440	< 1.0	1,180	0.54	262	262	< 1.0	< 1.0	< 0.050	7.49	0.177	595	0.0098	4.78	< 0.0010	< 0.050	0.0050	0.0076	< 0.50	< 0.50
	CM_MW5-SH_WG_2019-04-08_N	2019 06 05	8.35	7.59	6.53	835	8.31	426	851	1.7	571	2.21	231	224	7.2	< 1.0	< 0.050	8.93	0.212	233	0.0218	1.99	< 0.0010	0.320	< 0.0010	0.0049	1.71	1.85
	CM_MW5-SH_WG_2019-07-08_N	2019 08 28	7.3	7.71	2.09	733	8.05	628	1,100	3.1	843	0.26	228	228	< 1.0	< 1.0	< 0.25	5.5	0.23	406	0.0065	2.65	< 0.0050	0.309	0.0055	0.0071	0.66	0.65
	CM_MW5-SH_WG_2019-10-14_N	2019 11 13	4.2	7.25	3.78	1,196	8.27	623	984	< 1.0	886	0.37	254	254	< 1.0	< 1.0	< 0.25	10.6	0.17	445	< 0.0050	2.61	< 0.0050	0.368	0.0054	0.0040	< 0.50	< 0.50
CM_MW6-DP	CM_MW6-DP_WG_2019-01-14_N	2019 01 28	2.2	8.28	0.12	1,307	8.69	44.2	1,280	< 1.0	786	4.04	694	645	48.6	< 1.0	< 0.25	36.4	0.51	5.8	0.450	< 0.025	< 0.0050	0.377	0.0222	0.0212	1.22	3.26
	CM_MW6-DP_WG_2019-04-08_N	2019 06 03	6.8	8.54	0	1,115	8.75	37.2	1,170	1.9	676	0.66	601	550	51.0	< 1.0	< 0.25	37.6	0.48	13.3	0.368	0.191	< 0.0050	0.383	< 0.0010	0.0096	1.06	2.54
	CM_MW6-DP_WG_2019-07-08_N	2019 08 21	11.88	7.17	0.24	899	8.58	37.7	1,200	4.1	725	0.70	633	601	32.2	< 1.0	0.167	36.7	0.464	8.77	0.401	0.0069	< 0.0010	0.446	0.0027	0.0121	1.36	1.34
	CM_MW6-DP_WG_2019-10-14_N	2019 11 06	4.0	8.20	0.18	1,220	8.47	39.8	1,050	4.6	756	3.21	622	597	25.0	< 1.0	0.128	37.5	0.507	8.22	0.414	< 0.0050	< 0.0010	0.434	0.0089	0.0182	1.12	1.24
CM_MW6-SH	CM_MW6-SH_WG_2019-01-14_N	2019 01 28	1.63	7.94	0.80	447	8.40	80.7	434	2.6	229	3.11	207	202	5.2	< 1.0	0.156	18.9	*1.60*	7.56	0.0340	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0040	2.30	2.37
	CM_MW6-SH_WG_2019-04-08_N	2019 06 03	7.09	8.06	1.55	433	8.38	80.5	453	1.2	239	3.88	205	198	6.2	< 1.0	0.088	18.5	*1.57*	5.61	0.0279	< 0.0050	< 0.0010	< 0.050	< 0.0010	0.0047	2.29	2.55
	CM_MW6-SH_WG_2019-07-08_N	2019 08 21	9.1	8.57	4.32	432.1	8.35	78.8	443	< 1.0	230	1.71	208	204	4.2	< 1.0	0.155	18.7	*1.52*	5.69	0.0202	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	2.65	2.92
	CM_MW6-SH_WG_2019-10-14_N	2019 11 06	2.82	8.35	3.87	473	8.38	79.1	385	1.1	257	2.19	202	194	8.0	< 1.0	0.127	19.1	*1.64*	5.65	0.0200	< 0.0050	< 0.0010	0.079	0.0012	0.0058	2.44	2.44
CM_MW7-DP	CM_MW7-DP_WG_2019-01-14_N	2019 01 21	5.47	6.92	4.64	2,255	7.47	1,440	2,050	6.3	1,970	2.98	402	402	< 1.0	< 1.0	< 0.25	< 2.5	0.12	1,010	0.0409	1.93	0.0617	0.143	< 0.0010	0.0095	0.72	0.57
	CM_MW7-DP_WG_2019-04-08_N	2019 06 05	11.6	6.87	4.20	2,248	7.90	1,460	2,330	5.6	2,010	2.16	347	347	< 1.0	< 1.0	< 0.25	2.9	0.12	1,190	0.0114	5.11	0.176	0.416	< 0.0010	0.0028	1.98	1.93
	CM_MW7-DP_WG_2019-09-05_N	2019 09 05	11.6	7.07	2.96	2,243	7.90	1,560	2,250	2,110	3.4	1.24	386	386	< 1.0	< 1.0	< 0.25	< 2.5	0.10	1,170	0.0062	2.95	0.196	0.460	< 0.0010	< 0.0020	< 0.50	< 0.50
	CM_MW7-DP_WG_2019-10-14_N	2019 11 01	3.72	7.05	7.96	2,313	7.94	1,560	1,500	3.3	2,020	0.48	407	407	< 1.0	< 1.0	< 0.25	2.6	0.12	1,150	< 0.0050	2.34	0.218	0.083	< 0.0010	< 0.0020	0.91	0.61
CM_MW7-SH	CM_MW7-SH_WG_2019-01-14_N	2019 01 21	6.4	7.03	4.85	819	7.81	391	745	67.7	528	35.3	281	281	< 1.0	< 1.0	< 0.25	12.5	0.26	153	0.0964	< 0.025	< 0.0050	0.247	0.0025	0.0152	2.76	2.15
	CM_MW7-SH_WG_2019-04-08_N	2019 06 05	11.26	7.87	6.94	791	7.89	411	758	36.2	515	23.4	295	295	< 1.0	< 1.0	0.058	13.9	0.277	155	0.0609	0.0237	< 0.0010	0.293	< 0.0010	0.0188	3.71	3.37
	CM_MW7-SH_WG_2019-09-09_N	2019 09 09	9.7	7.35	4.5	988	8.14	623	975	40.5	691	23.8	291	291	< 1.0	< 1.0	< 0.25	12.1	0.23	264	0.0787	< 0.025	< 0.0050	0.170	< 0.0010	0.0074	3.17	2.37
	CM_MW7-SH_WG_2019-10-14_N	2019 11 01	7.8	7.05	4.33	997	7.99	572	899	25.3	703	11.8	283	283	< 1.0	< 1.0	< 0.050	12.6	0.214	276	0.0940	0.0136	0.0028	0.133	< 0.0010	0.0096	3.10	2.07
CM_MW8	CM_MW8_WG_2019-01-14_N	2019 01 21	5.2	7.31	7.13	650.1	8.12	241	602	6.3	381	4.44	322	322	< 1.0	< 1.0	< 0.050	2.09	0.294	48.4	0.797	0.0106	0.0022	0.906	< 0.0010	0.0266	1.19	1.01
	CM_MW8_WG_2019-04-08_N	2019 06 05	10.2	7.39	7.39	742	8.18	345	701	6.5	444	13.1	282	282	< 1.0	< 1.0	< 0.050	1.03	0.263	94.3	0.982	0.0189	< 0.0010	1.45	< 0.0010	0.0290	1.95	0.75
	CM_MW8_WG_2019-09-05_N	2019 09 05	14.1	7.58	4	648	8.17	248	640	4.5	375	6.88	318	318	< 1.0	< 1.0	< 0.050	2.15	0.297	50.2	0.805	0.0684	0.0030	0.952	< 0.0010	0.0049	0.67	0.54
	CM_MW8_WG_2019-10-14_N	2019 11 01	2.84	7.41	8.00	662	8.15	269	593	7.1	379	11.1	316	316	< 1.0	< 1.0	< 0.050	1.75	0.294	52.5	0.897	0.0402	0.0020	0.974	< 0.0010	0.0204	0.68	0.57
CM_MW10	CM_MW10_WG_2019-10-14_N	2019 11 14	5.6	7.49	0.81	651.5	8.02	286	568	4.3	368	18.3	247	247	< 1.0	< 1.0	< 0.050	1.97	0.891	106	0.0901	0.453	0.0361	0.205	< 0.0010	< 0.0020	4.93	4.64

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 5c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (CMO)

			Field Parameters				Physical Parameters						Dissolved Inorganics								Nutrients						Organics	
Sample Location	Sample ID	Sample Date (yyyy mm dd)	Field Temperature C	pH (field) pH	Dissolved Oxygen mg/L	Field Conductivity µS/cm	pH pH	Hardness mg/L	Conductivity µS/cm	Total Suspended Solids mg/L	Total Dissolved Solids mg/L	Turbidity NTU	Total Alkalinity mg/L	Alkalinity, Bicarbonate (as CaCO3) mg/L	Alkalinity, Carbonate (as CaCO3) mg/L	Alkalinity, Hydroxide (as CaCO3) mg/L	Bromide mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	Ammonia, Total (as N) mg/L	Nitrate (as N) mg/L	Nitrite (as N) mg/L	Kjeldahl Nitrogen-N mg/L	Ortho-Phosphate mg/L	Total Phosphorous as P 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	1,500	2-3[b]	1,280-4,290[b]	1.31-18.4[c]	4,000	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	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	600	1	1,000	n/a	1,000	10,000	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	250	1.5	500	n/a	100	1,000	n/a	n/a	n/a	n/a	n/a
Blanks																												
Field Blanks																												
-	CM_NNT_WS_2019-01-14_N	2019 01 22	-	-	-	-	5.65	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	0.0088	< 0.0050	< 0.0010	< 0.050	0.0013	< 0.0020	< 0.50	< 0.50
CM_MW1-DP	CM_NNT_WS_2019-04-08_N	2019 06 05	-	-	-	-	5.39	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	0.0261	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW3-SH	CM_NNT_WS_2019-07-08_N	2019 08 22	-	-	-	-	5.67	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
CM_MW3-SH	CM_NNT_WS_2019-10-14_N	2019 10 31	-	-	-	-	5.37	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 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_2019-01-14_N	2019 01 28	-	-	-	-	5.45	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	CM_TRP_WS_2019-04-08_N	2019 06 04	-	-	-	-	5.51	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	0.142	< 0.0050	< 0.0010	0.202	< 0.0010	< 0.0020	< 0.50	< 0.50
	CM_TRP_WS_2019-07-08_N	2019 08 22	-	-	-	-	5.48	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.20	< 0.0010	< 0.0020	< 0.50	< 0.50
	CM_TRP_WS_2019-10-14_N	2019 11 01	-	-	-	-	5.50	< 0.50	< 2.0	< 1.0	< 10	< 0.10	< 1.0	< 1.0	< 1.0	< 1.0	< 0.050	< 0.50	< 0.020	< 0.30	< 0.0050	< 0.0050	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[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 5d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (CMO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Dissolved Metals																															
			Hardness 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
CM_MW1-DP	CM_MW1-DP_WG_2019-01-14_N	2019 01 22	142	4.0	< 0.20	1.72	**10,700**	< 0.040	< 0.10	233	< 0.010	28.8	< 0.20	0.59	< 0.50	516	< 0.10	671	17.1	125	< 0.0050	3.58	< 1.0	4.96	< 0.10	< 0.020	220	2,340	< 0.020	0.23	< 10	0.611	< 1.0	5.9
	CM_MW1-DP_WG_2019-04-08_N	2019 06 05	151	3.7	< 0.10	1.32	9,620	< 0.020	< 0.050	240	< 0.0050	32.1	< 0.10	0.58	< 0.50	< 10	< 0.050	688	17.1	130	< 0.0050	3.83	0.67	4.93	< 0.050	< 0.010	224	2,280	< 0.010	0.31	< 10	0.593	< 0.50	5.6
	CM_MW1-DP_WG_2019-07-08_N	2019 08 29	159	< 3.0	< 0.10	1.75	9,910	< 0.020	< 0.050	252	< 0.0050	32.2	0.13	0.57	< 0.50	53	< 0.050	720	19.1	124	< 0.0050	3.65	0.63	5.45	< 0.050	< 0.010	255	2,360	< 0.010	0.27	< 10	0.541	< 0.50	5.2
	CM_MW1-DP_WG_2019-10-14_N	2019 11 01	159	5.0	< 0.10	1.46	**12,200**	< 0.020	< 0.050	257	< 0.0050	31.7	< 0.10	0.50	0.76	16	< 0.050	774	19.4	117	< 0.0050	3.95	< 0.50	5.83	< 0.050	< 0.010	246	2,670	< 0.010	0.26	< 10	0.500	< 0.50	5.2
CM_MW1-OB	CM_MW1-OB_WG_2019-01-14_N	2019 01 22	637	< 3.0	< 0.10	0.12	109	< 0.020	< 0.050	29	0.0611	169	0.55	< 0.10	< 0.50	< 10	0.124	17.7	52.3	0.29	< 0.0050	0.273	0.84	1.87	4.56	< 0.010	67.9	438	0.014	< 0.10	< 10	1.38	< 0.50	14.9
	CM_MW1-OB_WG_2019-04-08_N	2019 06 04	589	< 3.0	< 0.10	0.10	65.1	< 0.020	< 0.050	28	0.0714	155	0.34	< 0.10	0.75	< 10	0.067	17.4	49.3	0.36	< 0.0050	0.234	0.75	1.81	3.82	< 0.010	56.5	367	0.019	< 0.10	< 10	1.26	< 0.50	16.5
	CM_NNP_WS_2019-04-08_N	Duplicate	582	3.2	< 0.10	0.12	64.7	< 0.020	< 0.050	28	0.0824	152	0.32	< 0.10	0.65	< 10	0.059	17.5	49.5	0.28	< 0.0050	0.229	0.63	1.80	3.73	< 0.010	57.6	362	0.023	< 0.10	< 10	1.26	< 0.50	15.0
	QA/QC RPD%		1	*	*	*	1	*	*	*	14	2	*	*	*	*	*	1	0	*	*	*	*	1	2	*	2	1	*	*	*	0	*	10
	CM_MW1-OB_WG_2019-07-08_N	2019 08 29	593	< 3.0	< 0.10	0.17	115	< 0.020	< 0.050	53	0.0691	147	0.52	< 0.10	2.78	< 10	0.079	29.7	54.7	0.27	< 0.0050	0.294	1.26	2.14	2.43	< 0.010	64.6	392	0.021	0.11	< 10	1.21	< 0.50	74.1
	CM_MW1-OB_WG_2019-10-14_N	2019 11 01	650	< 3.0	< 0.10	0.13	108	< 0.020	< 0.050	45	0.0808	168	0.38	< 0.10	0.65	< 10	< 0.050	26.4	55.6	0.15	< 0.0050	0.252	< 0.50	2.27	2.6	< 0.010	67.2	521	0.020	< 0.10	< 10	1.35	< 0.50	10.5
	CM_NNP2_WS_2019-10-14_N	Duplicate	651	< 3.0	< 0.10	0.13	107	< 0.020	< 0.050	46	0.0833	169	0.44	< 0.10	0.76	< 10	< 0.050	25.2	55.4	0.22	< 0.0050	0.244	< 0.50	2.27	2.39	< 0.010	67.9	514	0.018	0.22	< 10	1.40	< 0.50	13.1
	QA/QC RPD%		0	*	*	*	1	*	*	*	3	1	*	*	*	*	*	5	0	*	*	*	*	0	8	*	1	1	*	*	*	4	*	22
CM_MW1-SH	CM_MW1-SH_WG_2019-01-14_N	2019 01 22	121	3.0	< 0.10	1.93	335	< 0.020	< 0.050	58	< 0.030	29.9	< 0.10	0.25	< 0.50	576	< 0.050	19.7	11.4	169	< 0.0050	<u>*53.7*</u>	< 0.50	1.22	0.078	< 0.010	175	292	< 0.010	< 0.10	< 10	0.910	< 0.50	< 1.0
	CM_NNP_WS_2019-01-14_N	Duplicate	117	< 3.0	< 0.10	1.83	319	< 0.020	< 0.050	56	< 0.030	28.6	< 0.10	0.25	< 0.50	544	< 0.050	18.7	11.1	162	< 0.0050	<u>*54.5*</u>	< 0.50	1.16	0.085	< 0.010	168	291	< 0.010	< 0.10	< 10	0.873	< 0.50	< 1.0
	QA/QC RPD%		3	*	*	5	5	*	*	4	*	4	*	*	*	6	*	5	3	4	*	1	*	5	*	*	4	0	*	*	*	4	*	*
	CM_MW1-SH_WG_2019-04-08_N	2019 06 04	127	3.1	< 0.10	1.91	313	< 0.020	< 0.050	52	< 0.020	30.8	< 0.10	0.22	< 0.50	600	< 0.050	17.1	12.1	163	< 0.0050	*48.0*	< 0.50	1.21	< 0.050	0.016	167	292	< 0.010	0.12	< 10	0.881	< 0.50	< 1.0
	CM_MW1-SH_WG_2019-07-08_N	2019 08 29	113	< 3.0	< 0.10	2.04	322	< 0.020	< 0.050	57	< 0.020	27.0	< 0.10	0.18	< 0.50	473	< 0.050	20.7	11.0	143	< 0.0050	<u>*60.1*</u>	< 0.50	1.08	< 0.050	< 0.010	199	299	< 0.010	< 0.10	< 10	0.668	< 0.50	< 1.0
	CM_NNP_WS_2019-07-08_N	Duplicate	115	< 3.0	< 0.10	1.95	329	< 0.020	< 0.050	58	< 0.020	27.5	< 0.10	0.19	< 0.50	481	< 0.050	21.2	11.3	143	< 0.0050	<u>*58.9*</u>	< 0.50	1.08	0.138	< 0.010	200	293	< 0.010	< 0.10	< 10	0.682	< 0.50	< 1.0
	QA/QC RPD%		38	*	*	*	2	*	*	*	*	2	*	*	*	*	*	2	3	0	*	2	*	0	*	*	1	14	*	*	*	2	*	*
	CM_MW1-SH_WG_2019-10-14_N	2019 11 01	126	3.8	< 0.10	1.99	375	< 0.020	< 0.050	60	< 0.015	30.6	< 0.10	0.24	< 0.20	673	< 0.050	19.9	12.0	167	< 0.0050	<u>*54.0*</u>	< 0.50	1.17	< 0.050	< 0.010	176	354	< 0.010	< 0.10	< 10	0.664	< 0.50	< 1.0
CM_MW2-SH	CM_MW2-SH_WG_2019-01-14_N	2019 01 24	658	< 3.0	< 0.10	< 0.10	112	< 0.020	< 0.050	54	0.127	178	0.23	< 0.10	2.34	< 10	0.189	39.9	52.0	0.31	< 0.0050	0.303	0.64	1.61	0.1	< 0.010	48.2	540	0.010	< 0.10	< 10	0.184	< 0.50	10.9
	CM_MW2-SH_WG_2019-04-08_N	2019 06 04	762	< 3.0	< 0.10	< 0.10	117	< 0.020	< 0.050	38	0.139	210	0.20	< 0.10	0.68	< 10	0.199	27.2	57.9	0.16	< 0.0050	0.156	0.80	1.54	0.232	< 0.010	18.6	583	< 0.010	0.18	< 10	0.206	< 0.50	2.8
	CM_MW2-SH_WG_2019-07-08_N	2019 08 20	687	< 3.0	< 0.10	< 0.10	109	< 0.020	< 0.050	48	0.147	189	0.23	< 0.10	< 0.50	< 10	0.097	26.7	52.4	0.10	< 0.0050	0.128	0.82	1.62	0.162	< 0.010	27.9	551	0.011	< 0.10	< 10	0.213	< 0.50	1.9
	CM_MW2-SH_WG_2019-10-14_N	2019 10 31	644	< 3.0	< 0.10	< 0.10	103	< 0.020	< 0.050	54	0.123	182	0.14	< 0.10	0.59	< 10	0.078	33.9	45.8	< 0.10	< 0.0050	0.118	0.57	1.50	0.473	< 0.010	39.7	509	0.011	0.23	< 10	0.193	< 0.50	2.2
CM_MW3-DP	CM_MW3-DP_WG_2019-01-14_N	2019 01 24	49.3	6.5	< 0.20	0.61	775	< 0.040	< 0.10	*522*	< 0.010	12.3	< 0.20	< 0.20	< 0.50	37	< 0.10	1,240	4.51	35.8	< 0.0050	1.81	4.3	2.13	< 0.10	< 0.020	544	1,090	< 0.020	< 0.20	< 10	0.264	< 1.0	3.7
	CM_MW3-DP_WG_2019-04-08_N	2019 06 04	51.8	6.7	< 0.20	0.87	758	< 0.040	< 0.10	486	< 0.010	12.6	< 0.20	< 0.20	< 0.50	43	< 0.10	1,190	4.95	42.0	< 0.0050	2.54	3.6	2.41	< 0.10	< 0.020	570	1,060	< 0.020	< 0.20	< 10	0.461	< 1.0	2.2
	CM_MW3-DP_WG_2019-07-08_N	2019 08 22	49.4	7.5	< 0.20	0.87	805	< 0.040	< 0.10	*525*	< 0.010	11.8	< 0.20	< 0.20	< 0.50	25	< 0.10	1,250	4.82	41.3	< 0.0050	2.81	1.3	2.44	< 0.10	< 0.020	607	1,080	< 0.020	< 0.20	< 10	0.463	< 1.0	< 2.0
	CM_MW3-DP_WG_2019-10-14_N	2019 10 31	48.6	5.6	< 0.10	0.68	837	< 0.020	< 0.050	485	< 0.0050	12.1	< 0.10	< 0.10	< 0.20	34	< 0.050	1,270	4.50	36.3	< 0.0050	2.11	2.55	2.26	< 0.050	< 0.010	548	1,110	< 0.010	< 0.10	< 10	0.358	< 0.50	< 1.0
CM_MW3-SH	CM_MW3-SH_WG_2019-01-14_N	2019 01 24	168	< 3.0	< 0.10	0.12	81.4	< 0.020	< 0.050	19	0.0102	47.8	0.26	< 0.10	1.53	< 10	0.073	8.4	11.9	13.0	< 0.0050	1.06	< 0.50	0.716	0.248	< 0.010	4.67	275	< 0.010	< 0.10	< 10	0.208	< 0.50	16.3
	CM_NNP2-WG_2019-01-14_N	Duplicate	171	< 3.0	< 0.10	0.15	82.5	< 0.020	< 0.050	19	0.0117	48.6	0.24	< 0.10	1.58	< 10	0.066	8.5	12.2	12.9	< 0.0050	1.05	< 0.50	0.721	0.273	< 0.010	4.63	276	< 0.010	< 0.10	< 10	0.211	< 0.50	16.5
	QA/QC RPD%		2	*	*	*	1	*	*	*	*	2	*	*	3	*	*	1	2	1	*	1	*	1	*	*	1	0	*	*	*	1	*	1
	CM_MW3-SH_WG_2019-04-08_N	2019 06 04	172	< 3.0	< 0.10	0.11	77.2	< 0.020	< 0.050	19	0.0055	48.6	0.18	< 0.10	1.28	< 10	0.056	7.2	12.4	0.25	< 0.0050	0.606	< 0.50	0.643	0.263	< 0.010	3.91	257	< 0.010	0.24	< 10	0.205	< 0.50	14.2
	CM_NNP2_WS_2019-04-08_N	Duplicate	175	< 3.0	< 0.10	0.11	78.6	< 0.020	< 0.050	17	0.0060	50.1	0.15	< 0.10	1.29	< 10	0.058	6.9	12.2	0.26	< 0.0050	0.638	< 0.50	0.646	0.252	< 0.010	3.71	263	< 0.010	0.27	< 10	0.201	< 0.50	14.3
	QA/QC RPD%		2	*	*	*	2	*	*	*	*	3	*	*	1	*	*	4	2	*	*	5	*	0	4	*	5	2	*	*	*	2	*	1
	CM_MW3-SH_WG_2019-07-08_N	2019 08 22	169	< 3.0	< 0.10	0.11	84.2	< 0.020	< 0.050	23	0.0081	48.2	0.29	< 0.10	1.38	< 10	< 0.050	7.3	11.8	2.53	< 0.0050	0.746	< 0.50	0.707	0.313	< 0.010	4.02	255	< 0.010	< 0.10	< 10	0.214	< 0.50	9.9
	CM_NNP2_WS_2019-07-08_N	Duplicate	171	< 3.0	< 0.10	0.12	86.0	< 0.020	< 0.050	24	0.0076	48.8	0.30	< 0.10	1.38	< 10	< 0.050	7.0	11.9	2.60	< 0.0050	0.768	< 0.50	0.718	0.252	< 0.010	4.12	259	< 0.010	< 0.10	< 10	0.216	< 0.50	9.9
	QA/QC RPD%		38	*	*	*	2	*	*	*	*	1	*	*	*	*	*	4	1	3	*	3	*	2	*	*	2	2	*	*	*	1	*	*
	CM_MW3-SH_WG_2019-10-14_N	2019 10 31	185	< 3.0	< 0.10	0.11	91.2	< 0.020	< 0.050	25	0.0124	54.9	0.26	< 0.10	1.15	< 10	< 0.050	8.7	11.5	4.65	< 0.0050	0.689	< 0.50	0.684	0.266	< 0.010	4.03	274	< 0.010	0.15	< 10	0.207	< 0.50	5.3
	CM_NNP_WS_2019-10-14_N	Duplicate	190	< 3.0	< 0.10	0.10	87.4	< 0.020	< 0.050	24	0.0079	56.9	0.25	< 0.10	1.15	< 10	< 0.050	8.2	11.7	4.71	< 0.0050	0.728	< 0.50	0.690	0.217	< 0.010	3.96	282	< 0.010	< 0.10	< 10	0.199	< 0.50	5.0
	QA/QC RPD%		3	*	*	*	4	*	*	*	*	4	*	*	0	*	*	6	2	1	*	6	*	1	*	*	2	3	*	*	*	4	*	6

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[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.

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

Table 5d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (CMO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	Hardness mg/L	Dissolved Metals: Aluminum µg/L	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Bismuth µg/L	Boron µg/L	Cadmium µg/L	Calcium 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
CM_MW4-DP	CM_MW4-DP_WG_2019-01-14_N	2019 01 28	20.2	< 3.0	< 0.20	< 0.20	374	< 0.040	< 0.10	379	< 0.010	5.75	< 0.20	< 0.20	< 0.50	33	< 0.10	807	1.43	2.67	< 0.0050	0.82	< 1.0	1.05	< 0.10	< 0.020	573	787	< 0.020	< 0.20	< 10	< 0.020	< 1.0	< 2.0
	CM_MW4-DP_WG_2019-04-08_N	2019 06 05	27.2	< 3.0	< 0.10	< 0.10	503	< 0.020	< 0.050	394	< 0.0050	7.67	< 0.10	< 0.10	< 0.50	< 10	< 0.050	978	1.94	5.63	< 0.0050	0.613	< 0.50	1.44	< 0.050	< 0.010	684	1,110	< 0.010	< 0.10	< 10	0.043	0.65	< 1.0
	CM_MW4-DP_WG_2019-07-08_N	2019 08 21	26.7	< 3.0	< 0.20	< 0.20	495	< 0.040	< 0.10	419	< 0.010	7.49	< 0.20	< 0.20	< 0.50	< 20	< 0.10	907	1.94	3.99	< 0.0050	0.42	< 1.0	1.30	< 0.10	< 0.020	669	1,010	< 0.020	< 0.20	< 10	< 0.020	< 1.0	< 2.0
	CM_MW4-DP_WG_2019-10-14_N	2019 11 05	28.4	< 3.0	< 0.20	< 0.20	501	< 0.040	< 0.10	420	< 0.010	7.78	< 0.20	< 0.20	< 0.40	< 20	< 0.10	1,060	2.17	3.67	< 0.0050	0.46	< 1.0	1.31	< 0.10	< 0.020	757	1,100	< 0.020	< 0.20	< 10	0.025	< 1.0	< 2.0
CM_MW4-SH	CM_MW4-SH_WG_2019-01-14_N	2019 01 28	28.1	< 3.0	< 0.10	< 0.10	281	< 0.020	< 0.050	369	< 0.0050	7.09	< 0.10	< 0.10	< 0.50	31	< 0.050	398	2.52	6.94	< 0.0050	0.717	< 0.50	1.01	< 0.050	< 0.010	314	743	< 0.010	< 0.10	< 10	0.011	< 0.50	< 1.0
	CM_MW4-SH_WG_2019-04-08_N	2019 06 05	25.9	< 3.0	< 0.10	< 0.10	291	< 0.020	< 0.050	350	< 0.0050	6.58	< 0.10	< 0.10	< 0.50	< 10	< 0.050	435	2.29	4.88	< 0.0050	0.804	< 0.50	1.09	< 0.050	< 0.010	337	744	< 0.010	< 0.10	< 10	0.011	< 0.50	< 1.0
	CM_MW4-SH_WG_2019-07-08_N	2019 08 28	25.4	< 3.0	< 0.10	< 0.10	274	< 0.020	< 0.050	362	< 0.0050	6.41	< 0.10	< 0.10	< 0.50	23	< 0.050	412	2.29	4.17	< 0.0050	0.732	< 0.50	1.02	< 0.050	< 0.010	335	676	< 0.010	< 0.10	< 10	< 0.010	< 0.50	< 1.0
	CM_MW4-SH_WG_2019-10-14_N	2019 11 04	27.2	< 3.0	< 0.10	< 0.10	307	< 0.020	< 0.050	372	< 0.0050	6.82	< 0.10	< 0.10	< 0.20	< 10	< 0.050	455	2.46	5.38	< 0.0050	0.792	< 0.50	1.13	< 0.050	< 0.010	371	711	< 0.010	< 0.10	< 10	0.018	< 0.50	< 1.0
CM_MW5-DP	CM_MW5-DP_WG_2019-01-14_N	2019 01 29	282	< 3.0	< 0.10	0.13	1,110	< 0.020	< 0.050	133	< 0.0050	70.2	< 0.10	< 0.10	< 0.50	1,240	< 0.050	77.3	25.9	37.1	< 0.0050	1.33	2.05	3.29	0.05	< 0.010	70.3	1,870	< 0.010	< 0.10	< 10	0.133	< 0.50	1.2
	CM_MW5-DP_WG_2019-04-08_N	2019 06 05	277	< 3.0	< 0.10	0.11	1,130	< 0.020	< 0.050	124	< 0.0050	69.4	< 0.10	< 0.10	< 0.50	704	< 0.050	67.3	25.1	56.8	< 0.0050	0.805	0.84	3.49	0.086	< 0.010	60.5	1,910	< 0.010	< 0.10	< 10	0.141	< 0.50	5.0
	CM_MW5-DP_WG_2019-07-08_N	2019 08 28	289	< 3.0	< 0.10	0.11	1,270	< 0.020	< 0.050	130	< 0.0050	72.0	< 0.10	< 0.10	< 0.50	1,150	< 0.050	68.2	26.5	51.2	< 0.0050	1.71	0.82	3.60	< 0.050	< 0.020	65.6	2,020	< 0.010	< 0.10	< 10	0.117	< 0.50	1.2
	CM_MW5-DP_WG_2019-10-14_N	2019 11 13	266	< 3.0	< 0.10	0.13	1,080	< 0.020	< 0.050	122	< 0.0050	66.6	< 0.10	< 0.10	0.23	1,200	< 0.050	61.0	24.2	56.3	< 0.0050	1.58	1.26	3.41	< 0.050	< 0.010	58.6	1,940	< 0.010	0.11	< 10	0.158	< 0.50	1.5
CM_MW5-SH	CM_MW5-SH_WG_2019-01-14_N	2019 01 29	837	< 3.0	0.30	0.22	120	< 0.020	< 0.050	45	0.0468	190	0.13	< 0.10	< 0.50	< 10	< 0.050	27.2	88.2	< 0.10	< 0.0050	3.41	0.97	2.40	13.3	< 0.010	19.7	574	0.063	< 0.10	< 10	6.28	< 0.50	< 3.0
	CM_MW5-SH_WG_2019-04-08_N	2019 06 05	426	< 3.0	0.34	0.22	54.3	< 0.020	< 0.050	34	0.0333	97.0	0.27	< 0.10	1.35	< 10	0.083	17.6	44.6	0.36	< 0.0050	3.39	1.06	1.82	9.69	< 0.010	12.4	296	0.039	0.16	< 10	3.21	< 0.50	6.1
	CM_MW5-SH_WG_2019-07-08_N	2019 08 28	628	< 3.0	0.43	0.21	73.8	< 0.020	< 0.050	42	0.0429	140	0.24	< 0.10	< 0.50	< 10	< 0.050	26.2	67.9	0.21	< 0.0050	3.68	1.42	2.54	6.75	< 0.010	14.7	445	0.053	< 0.10	< 10	4.48	< 0.50	1.9
	CM_MW5-SH_WG_2019-10-14_N	2019 11 13	623	< 3.0	0.38	0.24	70.0	< 0.020	< 0.050	42	0.0449	143	0.23	< 0.10	0.96	< 10	< 0.050	30.6	64.5	0.55	< 0.0050	3.23	1.80	2.39	10	< 0.010	15.0	501	0.058	< 0.10	< 10	4.58	< 0.50	2.5
CM_MW6-DP	CM_MW6-DP_WG_2019-01-14_N	2019 01 28	44.2	< 3.0	< 0.10	0.53	318	< 0.020	< 0.050	330	< 0.0050	11.1	< 0.10	< 0.10	< 0.50	131	< 0.050	403	4.02	69.7	< 0.0050	6.41	< 0.50	1.98	0.11	< 0.010	325	935	< 0.010	< 0.10	< 10	1.07	< 0.50	< 1.0
	CM_MW6-DP_WG_2019-04-08_N	2019 06 03	37.2	< 3.0	< 0.10	0.20	301	< 0.020	< 0.050	284	< 0.0050	9.45	< 0.10	< 0.10	< 0.50	11	< 0.050	360	3.29	40.3	< 0.0050	3.41	< 0.50	1.92	0.139	< 0.010	287	844	< 0.010	< 0.10	< 10	0.571	< 0.50	< 1.0
	CM_MW6-DP_WG_2019-07-08_N	2019 08 21	37.7	< 3.0	< 0.10	0.40	285	< 0.020	< 0.050	321	< 0.0050	9.69	< 0.10	< 0.10	< 0.50	69	< 0.050	339	3.27	45.2	< 0.0050	3.66	< 0.50	1.89	0.36	< 0.010	293	835	< 0.010	0.15	< 10	0.886	< 0.50	< 1.0
	CM_MW6-DP_WG_2019-10-14_N	2019 11 06	39.8	5.4	< 0.10	0.51	334	< 0.020	< 0.050	315	< 0.0050	10.5	0.12	< 0.10	0.24	157	< 0.050	405	3.32	47.1	< 0.0050	3.42	< 0.50	2.07	0.076	< 0.010	312	954	< 0.010	0.14	< 10	0.766	< 0.50	< 1.0
CM_MW6-SH	CM_MW6-SH_WG_2019-01-14_N	2019 01 28	80.7	< 3.0	< 0.10	0.51	132	< 0.020	< 0.050	44	< 0.0050	19.8	< 0.10	0.22	< 0.50	124	< 0.050	41.8	7.59	*245*	< 0.0050	6.83	0.62	0.338	< 0.050	< 0.010	73.9	205	< 0.010	< 0.10	< 10	0.467	< 0.50	< 1.0
	CM_MW6-SH_WG_2019-04-08_N	2019 06 03	80.5	3.2	< 0.10	1.12	139	< 0.020	< 0.050	37	< 0.0050	19.9	2.14	0.19	< 0.50	391	< 0.050	34.1	7.51	*248*	< 0.0050	*10.8*	0.79	0.367	0.204	< 0.010	70.5	209	< 0.010	< 0.10	< 10	0.524	< 0.50	< 1.0
	CM_MW6-SH_WG_2019-07-08_N	2019 08 21	78.8	< 3.0	< 0.10	0.76	135	< 0.020	< 0.050	42	< 0.0050	19.2	< 0.10	0.14	< 0.50	214	< 0.050	39.6	7.51	*242*	< 0.0050	5.45	0.69	0.325	0.284	< 0.010	70.4	198	< 0.010	< 0.10	< 10	0.504	< 0.50	< 1.0
	CM_MW6-SH_WG_2019-10-14_N	2019 11 06	79.1	< 3.0	< 0.10	0.83	144	< 0.020	< 0.050	39	< 0.0050	19.6	< 0.10	0.13	< 0.20	333	< 0.050	42.7	7.30	*250*	< 0.0050	6.53	1.25	0.338	< 0.050	< 0.010	74.3	216	< 0.010	< 0.10	< 10	0.468	< 0.50	< 1.0
CM_MW7-DP	CM_MW7-DP_WG_2019-01-14_N	2019 01 21	1,440	< 3.0	0.26	< 0.20	16.0	< 0.040	< 0.10	65	0.153	357	0.73	0.73	< 0.50	< 20	< 0.10	54.4	133	*294*	< 0.0050	0.28	19.2	2.47	3.57	< 0.020	25.4	814	< 0.020	< 0.20	< 10	4.79	< 1.0	49.8
	CM_MW7-DP_WG_2019-04-08_N	2019 06 05	1,460	< 3.0	0.28	< 0.10	13.7	< 0.020	< 0.050	59	0.0933	359	0.36	1.01	< 0.50	< 10	< 0.050	58.1	136	*465*	< 0.0050	0.108	19.0	2.60	17.8	< 0.010	24.6	888	< 0.010	0.10	< 10	4.88	< 0.50	15.8
	CM_MW7-DP_WG_2019-09-05_N	2019 09 05	1,560	< 3.0	0.20	< 0.20	13.2	< 0.040	< 0.10	56	0.169	378	< 0.20	1.02	< 0.50	< 20	< 0.10	63.0	150	*375*	< 0.0050	< 0.10	17.7	2.71	14.2	< 0.020	25.6	905	< 0.020	< 0.20	< 10	5.48	< 1.0	5.6
	CM_MW7-DP_WG_2019-10-14_N	2019 11 01	1,560	< 3.0	0.28	< 0.10	15.7	< 0.020	< 0.050	62	0.330	383	0.46	0.96	0.77	< 10	< 0.050	63.4	146	*345*	< 0.0050	0.222	18.5	2.85	10.4	< 0.010	28.2	1,030	< 0.010	0.25	< 10	4.95	< 0.50	26.4
CM_MW7-SH	CM_MW7-SH_WG_2019-01-14_N	2019 01 21	391	< 3.0	< 0.10	1.09	30.2	< 0.020	< 0.050	27	0.0110	102	< 0.10	0.64	< 0.50	1,280	< 0.050	6.3	33.2	152	< 0.0050	1.66	1.33	1.55	< 0.050	< 0.010	19.5	403	< 0.010	< 0.10	< 10	1.22	< 0.50	10.5
	CM_MW7-SH_WG_2019-04-08_N	2019 06 05	411	< 3.0	< 0.10	0.35	30.4	< 0.020	< 0.050	32	0.0060	107	< 0.10	0.71	< 0.50	207	< 0.050	6.8	35.1	182	< 0.0050	1.47	1.33	1.65	0.057	< 0.010	18.0	402	< 0.010	< 0.10	< 10	1.06	< 0.50	5.7
	CM_MW7-SH_WG_2019-09-09_N	2019 09 09	623	< 3.0	< 0.10	0.54	31.1	< 0.020	< 0.050	24	< 0.0050	158	< 0.10	0.61	< 0.50	644	< 0.050	7.2	55.6	196	< 0.0050	1.03	1.27	1.79	< 0.050	< 0.010	16.1	512	< 0.010	< 0.10	< 10	0.863	< 0.50	3.1
	CM_MW7-SH_WG_2019-10-14_N	2019 11 01	572	< 3.0	< 0.10	0.42	36.2	< 0.020	< 0.050	46	0.0133	151	< 0.10	0.75	0.49	735	< 0.050	7.7	47.7	193	< 0.0050	1.47	1.31	1.90	< 0.050	< 0.010	19.4	556	< 0.010	0.11	< 10	0.988	< 0.50	6.8
CM_MW8	CM_MW8_WG_2019-01-14_N	2019 01 21	241	< 3.0	< 0.10	0.16	113	< 0.020	< 0.050	354	0.0428	67.0	0.22	0.47	0.54	< 10	< 0.050	65.4	17.8	188	< 0.0050	1.11	1.05	2.76	< 0.050	0.011	49.7	4,940	< 0.010	0.36	< 10	0.647	< 0.50	41.8
	CM_MW8_WG_2019-04-08_N	2019 06 05	345	5.2	< 0.10	0.10	84.5	< 0.020	< 0.050	265	< 0.0050	93.5	< 0.10	0.22	< 0.50	342	< 0.050	58.0	27.1	137	< 0.0050	0.414	< 0.50	2.96	0.055	< 0.010	37.9	5,600	< 0.010	0.30	< 10	0.217	< 0.50	5.7
	CM_MW8_WG_2019-09-05_N	2019 09 05	248	14.1	< 0.10	< 0.10	111	< 0.020	< 0.050	307	< 0.0050	67.7	0.19	0.48	< 0.50	12	< 0.050	68.7	19.2	*205*	< 0.0050	0.938	0.95	2.81	< 0.050	< 0.010	51.2	4,850	< 0.010	0.40	< 10	0.586	< 0.50	10.8
	CM_MW8_WG_2019-10-14_N	2019 11 01	269	< 3.0	< 0.10	0.12	110	< 0.020	< 0.050	310	< 0.0050	73.2	< 0.10	0.36	0.34	110	< 0.050	67.8	21.0	150	< 0.0050	0.665	< 0.50	2.91	< 0.050	< 0.010	49.4	5,790	< 0.010	0.25	< 10	0.354	< 0.50	11.9
CM_MW10	CM_MW10_WG_2019-10-14_N	2019 11 14	286	< 3.0	< 0.10	0.94	77.0	< 0.020	< 0.050	27	< 0.0050	74.1	< 0.10	0.65	< 0.20	1,200	0.073	12.9	24.5	176	< 0.0050	5.17	0.70	1.54	1.38	< 0.010	31.5	286	< 0.010	< 0.10	< 10	0.268	< 0.50	< 1.0
Blanks																																		
Field Blanks																																		
-	CM_NNT_WS_2019-01-14_N	2019 01 22	< 0.50	< 3.0	< 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	< 0.10	0.12	< 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
CM_MW1-DP	CM_NNT_WS_2019-04-08_N	2019 06 05	< 0.50	< 3.0	< 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	< 0.10	< 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
CM_MW3-SH	CM_NNT_WS_2019-07-08_N	2019 08 29	< 0.50	< 3.0	< 0.10	< 0.10	< 0.10	< 0.020	< 0.050	< 10	< 0.0050	< 0.050	< 0.10	< 0.10	< 0.50	< 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
CM_MW3-SH	CM_NNT_WS_2019-10-14_N	2019 10 31	< 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
Trip Blanks																																		
	CM_TRP_WG_2019-01-14_N	2019 01 28	< 0.50	< 3.0	< 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	< 0.10	< 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
	CM_TRP_WS_2019-04-08_N	2019 06 04	< 0.50	< 3.0	< 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	< 0.10	< 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
	CM_TRP_WS_2019-07-08_N	2019 08 22	< 0.50	< 3.0	< 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	< 0.10	< 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
	CM_TRP_WS_2019-10-14_N	2019 11 01	< 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

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[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.

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 5e: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (CMO)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
Guidelines for Canadian Drinking Water Quality (DW)				50
SPO				-
Compliance Point			Michel Creek [CM_MC2 (E258937)]	19
CM_MW5-SH	CM_MW5-SH_WG_2019-01-14_N	2019 01 29	CM_MC2 (E258937)	13.3
CM_MW7-DP	CM_MW7-DP_WG_2019-04-08_N	2019 06 05	CM_MC2 (E258937)	17.8
	CM_MW7-DP_WG_2019-09-05_N	2019 09 05	CM_MC2 (E258937)	14.2
	CM_MW7-DP_WG_2019-10-14_N	2019 11 01	CM_MC2 (E258937)	10.4

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
n/a Denotes no applicable standard/guideline.

BOLD Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
SHADED Concentration greater than SPO by Area/Compliance Point by Area

Table 6a: Summary of Groundwater Monitoring Program Locations, Well Installation Details and Hydrogeological Information (RDW)

Study Area	Well ID	Monitoring Program[a]	Well Type	Coordinates (UTM NAD 83)		LIDAR Ground Elevation	Ground Elevation	TOC Elevation	Stick Up Height	Drilled Depth	Well Diameter	Top of Screen Depth	Bottom of Screen Depth	Screened Foramtion	Depth to Bedrock	Hydraulic Conductivity
				Easting	Northing	masl	masl	masl	m	mbgs	mm	mbgs	mbgs		mbgs	m/s
4	RG_DW-01-03	RGMP	Supply	649089	5543336	1262.49	-	-	-	28.0	-	-	-	Sand and Gravel	-	-
	RG_DW-01-07	RGMP	Domestic	649737	5534118	1244.76	-	-	-	9.8	-	-	-	Sandy Gravel	-	-
7	RG_DW-02-20	RGMP	Domestic	652327	5522263	1169.15	-	-	-	18.3	-	-	-	-	-	-
9	RG_DW-03-01	RGMP	Domestic	653070	5511979	1127.54	-	-	-	15.2	-	14.02	15.24	Gravel	-	-
12	RG_DW-03-04	RGMP	Supply	651839	5510619	1113.23	1113.20	1114.15	0.95	41.5	254	24.20	32.40	Sandy Gravel	-	2.0E-03

Notes:

[a] RGMP denotes Regional Groundwater Monitoring Program.

TOC denotes top of casing.

masl denotes meters above sea level.

"-" denotes data not available.

Table 6b: Summary of Groundwater Level and Sampling Information (RDW)

Study Area	Well ID	Ground Elevation	TOC Elevation	Date of Static Water Level Measurement	Depth to Water	Water Level Elevation	Continuous Water Level Monitoring	Purging / Sampling Methodology
		masl	masl	yyyy-mm-dd	mbtoc	masl	Quarter	
4	RG_DW-01-03	-	-	-	-	-	-	Distribution Point
	RG_DW-01-07	-	-	-	-	-	-	Distribution Point
7	RG_DW-02-20	-	-	-	-	-	-	Distribution Point
9	RG_DW-03-01	-	-	-	-	-	-	Distribution Point
12	RG_DW-03-04	1113.20	1113.20	-	-	-	-	Distribution Point

Notes:

Quarter is represented as Q1, Q2, Q3, Q4.

TOC denotes top of casing.

masl denotes meters above sea level.

mbtoc denotes meters below top of casing.

"-" denotes data not available.

Table 6c: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Inorganics, Nutrients and Organics in Groundwater (RDW)

Sample Location	Sample ID	Sample Date	Field Parameters					Physical Parameters						Dissolved Inorganics									Nutrients						Organics	
			Field Temperature	pH (field)	Dissolved Oxygen	Field Conductivity	Field ORP	pH	Hardness	Conductivity	Total Dissolved Solids	Total Suspended Solids	Turbidity	Total Alkalinity	Alkalinity, Bicarbonate (as CaCO3)	Alkalinity, Carbonate (as CaCO3)	Alkalinity, Hydroxide (as CaCO3)	Bromide	Chloride	Fluoride	Sulfate	Ammonia Nitrogen	Nitrate Nitrogen	Nitrite Nitrogen	Kjeldahl Nitrogen-N	Ortho-Phosphate	Total Phosphorous as P	Total Organic Carbon	Dissolved Organic Carbon
		(yyyy mm dd)	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
Study Area 4																													
RG_DW-01-03	RG_DW-01-03_WP_Q1-2019_NP	2019 02 25	6.2	7.90	10.1	374.8	390.8	8.14	183	346	268	< 1.0	0.32	165	165	< 1.0	< 1.0	< 0.050	0.73	0.148	34.8	< 0.0050	0.683	< 0.0010	0.158	0.0021	0.0030	< 0.50	< 0.50
	RG_DW-01-03_WP_Q2-2019_NP	2019 05 27	6.7	7.76	11.02	380.7	257.4	8.44	182	375	218	< 1.0	0.17	149	145	4.2	< 1.0	< 0.050	0.88	0.153	41.6	< 0.0050	0.913	< 0.0010	0.248	0.0013	0.0022	< 0.50	< 0.50
	RG_DW-01-03_WP_Q3-2019_NP	2019 08 22	6.7	7.55	10.54	376.2	192.8	8.16	195	342	217	< 1.0	0.18	162	162	< 1.0	< 1.0	< 0.050	0.91	0.142	41.7	< 0.0050	0.935	< 0.0010	0.267	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_DW-01-03_WP_Q4-2019_NP	2019 11 25	6.1	7.67	10.37	611	214.6	8.15	178	343	195	< 1.0	0.35	152	152	< 1.0	< 1.0	< 0.050	0.97	0.145	37.8	< 0.0050	0.777	< 0.0010	0.205	0.0014	< 0.0020	< 0.50	< 0.50
RG_DW-01-07	RG_DW-01-07_WP_Q1-2019 _NP	2019 02 25	6.8	7.07	14.2	788	230.9	7.79	421	771	531	1.3	1.01	364	364	< 1.0	< 1.0	< 0.050	3.64	0.089	65.7	< 0.0050	0.681	< 0.0010	0.105	0.0022	0.0030	0.99	0.96
	RG_DW-01-07_WP_Q2-2019_NP	2019 05 27	6.4	6.94	7.45	818	250.6	8.04	410	695	468	< 1.0	0.42	302	302	< 1.0	< 1.0	< 0.050	11.2	0.087	65.7	< 0.0050	0.773	< 0.0010	0.149	0.0015	0.0030	0.88	0.93
	RG_DW-01-07_WP_Q3-2019_NP	2019 08 22	7.2	67.72	7.32	872	150.1	8.10	488	800	525	< 1.0	0.22	380	380	< 1.0	< 1.0	< 0.050	31.7	0.064	60.0	< 0.0050	0.910	0.0033	0.125	0.0013	< 0.0020	0.69	0.74
	RG_DW-01-07_WP_Q4-2019_NP	2019 11 25	6.6	6.96	10.28	1,413	113.4	7.78	466	785	472	< 1.0	0.41	382	382	< 1.0	< 1.0	< 0.050	24.4	0.072	60.2	0.0056	0.843	< 0.0010	0.235	0.0013	0.0035	0.88	< 0.50
Study Area 7																													
RG_DW-02-20	RG_DW-02-20_WP_Q1-2019_NP	2019 02 25	5.6	7.70	8.39	502.9	301.8	7.98	244	462	378	< 1.0	2.22	172	172	< 1.0	< 1.0	< 0.050	2.58	0.190	77.6	< 0.0050	2.76	< 0.0010	0.303	0.0019	< 0.0020	< 0.50	< 0.50
	RG_DW-D_WP_Q1-2019_NP	Duplicate	-	-	-	-	-	7.92	249	463	360	< 1.0	3.45	178	178	< 1.0	< 1.0	< 0.050	2.59	0.192	77.6	0.0521	2.76	< 0.0010	0.330	0.0013	0.0022	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	1	2	0	5	*	43	3	3	*	*	*	0	1	0	*	0	*	9	*	*	*	*
	RG_DW-02-20_WP_Q2-2019_NP	2019 05 27	9.3	7.48	9.13	515.5	248	8.36	257	504	311	< 1.0	0.84	168	166	2.4	< 1.0	< 0.050	3.22	0.181	87.0	< 0.0050	2.99	< 0.0010	0.121	0.0015	< 0.0020	< 0.50	< 0.50
	RG_DW-02-20_WP_Q3-2019_NP	2019 08 20	8.6	7.15	8.84	433.4	162.1	8.19	240	460	280	2.8	1.12	169	169	< 1.0	< 1.0	< 0.050	1.77	0.169	67.1	< 0.0050	2.22	< 0.0010	0.368	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_DW-02-40_WP_Q3-2019_NP	Duplicate	-	-	-	-	-	8.17	239	456	277	< 1.0	1.93	174	174	< 1.0	< 1.0	< 0.050	2.00	0.164	69.5	< 0.0050	2.19	< 0.0010	0.334	< 0.0010	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	0	1	1	*	53	3	3	*	*	*	*	3	4	*	1	*	10	*	*	*	*
	RG_DW-02-20_WP_Q4-2019_NP	2019 11 28	8.8	7.56	8.25	765	166.4	7.89	233	426	280	< 1.0	2.37	166	166	< 1.0	< 1.0	< 0.050	1.84	0.128	61.6	0.0057	2.17	< 0.0010	0.137	< 0.0010	< 0.0020	< 0.50	< 0.50
	RG_DW-02-40_WP_Q4-2019_NP-11-28	Duplicate	-	-	-	-	-	7.91	236	425	277	< 1.0	2.50	172	172	< 1.0	< 1.0	< 0.050	1.86	0.134	58.4	< 0.0050	2.18	< 0.0010	< 0.050	< 0.0010	< 0.0020	< 0.50	< 0.50
	QA/QC RPD%		-	-	-	-	-	0	1	0	1	*	5	4	4	*	*	*	*	5	5	*	0	*	*	*	*	*	*
Study Area 9																													
RG_DW-03-01	RG_DW-03-01_WP_Q1-2019_NP	2019 02 26	8.1	7.15	1.74	599	130.4	7.58	413	784	485	< 1.0	1.92	348	348	< 1.0	< 1.0	0.173	39.2	0.175	53.7	< 0.0050	0.161	< 0.0010	0.079	< 0.0010	< 0.0020	1.85	2.19
	RG_DW-03-01_WP_Q2-2019_NP	2019 05 28	8	6.96	2.43	664	131.0	8.29	437	840	474	1.2	2.34	340	337	3.0	< 1.0	0.108	35.9	0.179	76.6	< 0.0050	0.0140	< 0.0010	0.067	< 0.0010	< 0.0020	1.30	1.40
	RG_DW-03-01_WP_Q3-2019_NP	2019 08 20	7.8	6.76	1.68	782	-36.6	8.21	428	822	518	2.7	4.11	351	351	< 1.0	< 1.0	0.096	36.7	0.149	64.4	0.0056	0.0550	< 0.0010	0.085	< 0.0010	< 0.0020	1.22	0.87
Study Area 12																													
RG_DW-03-04	RG_DW-03-04_WP_Q1-2019_NP	2019 02 26	7.6	7.53	8.80	663.4	300.9	8.11	301	618	406	< 1.0	0.50	215	215	< 1.0	< 1.0	0.278	9.14	0.150	129	< 0.0050	1.95	< 0.0010	0.326	0.0033	0.0028	0.89	1.08
	RG_DW-03-04_WP_Q2-2019_NP	2019 05 28	6.0	7.42	10.6	562.1	219.6	8.31	269	561	323	< 1.0	2.43	177	174	3.2	< 1.0	0.117	15.0	0.153	95.9	< 0.0050	1.22	< 0.0010	0.173	0.0022	0.0045	0.79	0.88
	RG_DW-03-04_WP_Q3-2019_NP	2019 08 20	5.3	7.34	9.35	434.0	107.2	8.20	212	433	259	< 1.0	0.12	164	164	< 1.0	< 1.0	< 0.050	9.64	0.135	57.5	< 0.0050	0.662	< 0.0010	0.114	< 0.0010	< 0.0020	0.68	0.65
	RG_DW-03-04_WP_Q4-2019_NP	2019 11 29	7.4	7.58	7.77	862.0	82.4	7.96	249	485	311	< 1.0	0.19	170	170	< 1.0	< 1.0	< 0.050	7.66	0.160	80.8	< 0.0050	1.02	< 0.0010	0.325	0.0027	0.0030	1.11	1.13

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[a] Standard to protect freshwater aquatic life.
[b] Standard varies with Hardness.
[c] Standard varies with pH.
[d] Standard varies with Chloride.

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

Table 6d: Summary of Analytical Results Compared to Primary Screening Criteria for Dissolved Metals in Groundwater (RDW)

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[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
Study Area 4																																		
RG_DW-01-03	RG_DW-01-03_WP_Q1-2019_NP	2019 02 25	183	< 3.0	< 0.10	< 0.10	69.0	< 0.020	< 0.050	< 10	0.0054	52.8	0.23	< 0.10	0.70	< 10	< 0.050	2.4	12.4	< 0.10	< 0.0050	0.950	< 0.50	0.356	3.01	< 0.010	1.19	190	< 0.010	< 0.10	< 10	0.776	< 0.50	3.0
	RG_DW-01-03_WP_Q2-2019_NP	2019 05 27	182	< 3.0	< 0.10	< 0.10	79.4	< 0.020	< 0.050	< 10	0.0081	50.6	0.28	< 0.10	1.35	< 10	0.117	2.3	13.5	< 0.10	< 0.0050	0.991	< 0.50	0.423	4.18	< 0.010	1.37	211	< 0.010	< 0.10	< 10	0.823	< 0.50	8.9
	RG_DW-01-03_WP_Q3-2019_NP	2019 08 22	195	< 3.0	< 0.10	< 0.10	71.8	< 0.020	< 0.050	< 10	0.0077	55.2	0.34	< 0.10	0.68	< 10	0.057	2.4	13.9	< 0.10	< 0.0050	0.997	< 0.50	0.430	4.37	< 0.010	1.34	202	< 0.010	< 0.10	< 10	0.841	< 0.50	6.0
	RG_DW-01-03_WP_Q4-2019_NP	2019 11 25	178	< 3.0	< 0.10	< 0.10	71.4	< 0.020	< 0.050	< 10	0.0115	50.2	0.25	< 0.10	1.31	< 10	0.102	2.2	12.7	< 0.10	< 0.0050	0.959	< 0.50	0.392	3.56	< 0.010	1.15	188	< 0.010	< 0.10	< 10	0.797	< 0.50	23.1
RG_DW-01-07	RG_DW-01-07_WP_Q1-2019 _NP	2019 02 25	421	< 3.0	< 0.10	< 0.10	110	< 0.020	< 0.050	20	0.0374	107	0.22	< 0.10	2.02	< 10	0.130	6.9	37.3	0.21	< 0.0050	7.83	< 0.50	0.860	1.89	< 0.010	5.19	268	< 0.010	< 0.10	< 10	1.62	< 0.50	8.2
	RG_DW-01-07_WP_Q2-2019_NP	2019 05 27	410	< 3.0	< 0.10	< 0.10	126	< 0.020	< 0.050	17	0.0374	101	0.22	< 0.10	1.93	< 10	0.070	6.2	38.2	0.12	< 0.0050	3.96	< 0.50	0.897	2.07	< 0.010	6.02	290	< 0.010	< 0.10	< 10	1.66	< 0.50	6.4
	RG_DW-01-07_WP_Q3-2019_NP	2019 08 22	488	< 3.0	< 0.10	< 0.10	132	< 0.020	< 0.050	20	0.0444	119	0.17	< 0.10	1.12	< 10	0.110	7.3	46.1	0.23	< 0.0050	3.83	< 0.50	0.979	1.84	< 0.010	8.23	297	< 0.010	0.12	< 10	1.62	< 0.50	9.5
	RG_DW-01-07_WP_Q4-2019_NP	2019 11 25	466	< 3.0	< 0.10	< 0.10	126	< 0.020	< 0.050	18	0.0473	118	0.19	< 0.10	1.45	10	< 0.050	6.6	41.4	0.24	< 0.0050	3.88	0.51	0.980	1.61	< 0.010	7.27	286	0.011	< 0.10	< 10	1.51	< 0.50	4.9
Study Area 7																																		
RG_DW-02-20	RG_DW-02-20_WP_Q1-2019_NP	2019 02 25	244	< 3.0	< 0.10	< 0.10	80.0	< 0.020	< 0.050	< 10	0.0070	66.9	0.17	< 0.10	1.14	< 10	< 0.050	6.8	18.8	0.61	< 0.0050	1.01	< 0.50	0.520	12.4	< 0.010	2.40	220	< 0.010	< 0.10	< 10	0.998	< 0.50	5.5
	RG_DW-D_WP_Q1-2019_NP	Duplicate	249	< 3.0	< 0.10	< 0.10	84.5	< 0.020	< 0.050	< 10	0.0101	67.2	0.24	< 0.10	1.24	< 10	< 0.050	6.9	19.7	0.57	< 0.0050	0.997	< 0.50	0.554	13.1	< 0.010	2.51	228	< 0.010	< 0.10	< 10	1.03	< 0.50	5.2
	QA/QC RPD%		2	*	*	*	5	*	*	*	*	0	*	*	*	*	*	1	5	7	*	1	*	6	5	*	4	4	*	*	*	3	*	6
	RG_DW-02-20_WP_Q2-2019_NP	2019 05 27	257	< 3.0	< 0.10	< 0.10	89.4	< 0.020	< 0.050	< 10	0.0094	69.4	0.18	< 0.10	2.13	< 10	< 0.050	7.0	20.3	1.82	< 0.0050	0.972	< 0.50	0.629	14.5	< 0.010	2.82	245	< 0.010	< 0.10	< 10	1.09	< 0.50	5.6
	RG_DW-02-20_WP_Q3-2019_NP	2019 08 20	240	< 3.0	< 0.10	< 0.10	85.3	< 0.020	< 0.050	< 10	0.0071	63.0	0.19	< 0.10	5.48	< 10	0.143	6.7	20.2	1.10	< 0.0050	1.05	< 0.50	0.629	11.5	< 0.010	2.64	226	< 0.010	< 0.10	< 10	1.06	< 0.50	11.2
	RG_DW-02-40_WP_Q3-2019_NP	Duplicate	239	< 3.0	< 0.10	< 0.10	85.6	< 0.020	< 0.050	< 10	0.0092	63.9	0.25	< 0.10	5.37	< 10	0.129	7.2	19.3	1.23	< 0.0050	1.06	< 0.50	0.604	10.8	< 0.010	2.64	223	< 0.010	< 0.10	< 10	1.01	< 0.50	11.2
	QA/QC RPD%		0	*	*	*	0	*	*	*	*	1	*	*	2	*	*	7	5	11	*	1	*	4	6	*	0	1	*	*	*	5	*	0
	RG_DW-02-20_WP_Q4-2019_NP	2019 11 28	233	< 3.0	< 0.10	< 0.10	80.7	< 0.020	< 0.050	< 10	0.0062	61.3	0.14	< 0.10	3.56	< 10	0.066	6.4	19.4	0.93	< 0.0050	1.07	< 0.50	0.594	10.2	< 0.010	2.38	207	< 0.010	< 0.10	< 10	0.968	< 0.50	8.8
	RG_DW-02-40_WP_Q4-2019_NP-11-28	Duplicate	236	< 3.0	< 0.10	< 0.10	79.5	< 0.020	< 0.050	< 10	0.0061	61.3	0.15	< 0.10	3.58	< 10	0.064	6.5	20.1	0.95	< 0.0050	1.11	< 0.50	0.615	10.3	< 0.010	2.39	209	< 0.010	< 0.10	< 10	0.951	< 0.50	9.2
	QA/QC RPD%		1	*	*	*	1	*	*	*	*	0	*	*	1	*	*	2	4	2	*	4	*	3	1	*	0	1	*	*	*	2	*	4
Study Area 9																																		
RG_DW-03-01	RG_DW-03-01_WP_Q1-2019_NP	2019 02 26	413	< 3.0	< 0.10	< 0.10	124	< 0.020	< 0.050	34	0.0787	107	< 0.10	< 0.10	< 0.50	41	< 0.050	19.7	35.3	137	< 0.0050	3.07	2.37	2.13	0.227	< 0.010	14.5	408	0.106	< 0.10	< 10	0.947	< 0.50	1.3
	RG_DW-03-01_WP_Q2-2019_NP	2019 05 28	437	< 3.0	< 0.10	< 0.10	124	< 0.020	< 0.050	41	0.0911	114	< 0.10	< 0.10	< 0.50	74	< 0.050	20.4	36.9	159	< 0.0050	2.93	3.04	2.14	0.102	< 0.010	16.0	410	0.089	< 0.10	< 10	0.961	< 0.50	1.5
	RG_DW-03-01_WP_Q3-2019_NP	2019 08 20	428	< 3.0	< 0.10	< 0.10	115	< 0.020	< 0.050	44	0.0712	112	< 0.10	0.13	< 0.50	174	< 0.050	20.3	35.9	*204*	< 0.0050	2.88	2.59	2.08	0.155	< 0.010	15.0	425	0.100	< 0.10	< 10	1.06	< 0.50	1.8
Study Area 12																																		
RG_DW-03-04	RG_DW-03-04_WP_Q1-2019_NP	2019 02 26	301	< 3.0	0.11	< 0.10	171	< 0.020	< 0.050	10	0.0209	78.5	0.15	< 0.10	25.0	< 10	1.62	9.6	25.5	0.47	< 0.0050	1.05	12.0	0.974	15.8	< 0.010	6.03	188	< 0.010	< 0.10	< 10	1.14	< 0.50	31.8
	RG_DW-03-04_WP_Q2-2019_NP	2019 05 28	269	< 3.0	< 0.10	0.12	138	< 0.020	< 0.050	< 10	0.0123	70.1	0.13	< 0.10	< 0.50	< 10	< 0.050	9.0	22.8	0.31	< 0.0050	0.981	< 0.50	0.856	9.5	< 0.010	7.33	157	< 0.010	< 0.10	< 10	0.940	< 0.50	3.1
	RG_DW-03-04_WP_Q3-2019_NP	2019 08 20	212	< 3.0	0.10	< 0.10	108	< 0.020	< 0.050	< 10	0.0124	53.6	0.18	< 0.10	< 0.50	< 10	< 0.050	8.2	19.0	0.15	< 0.0050	1.11	0.65	0.798	5.88	< 0.010	6.76	118	< 0.010	< 0.10	< 10	0.878	< 0.50	3.7
	RG_DW-03-04_WP_Q4-2019_NP	2019 11 29	249	< 3.0	0.11	0.11	137	< 0.020	< 0.050	13	0.0108	63.3	0.14	< 0.10	0.43	< 10	< 0.050	9.9	22.1	< 0.10	< 0.0050	1.19	< 0.50	0.959	8.64	< 0.010	6.35	138	< 0.010	< 0.10	< 10	0.943	< 0.50	1.7

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

[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.

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

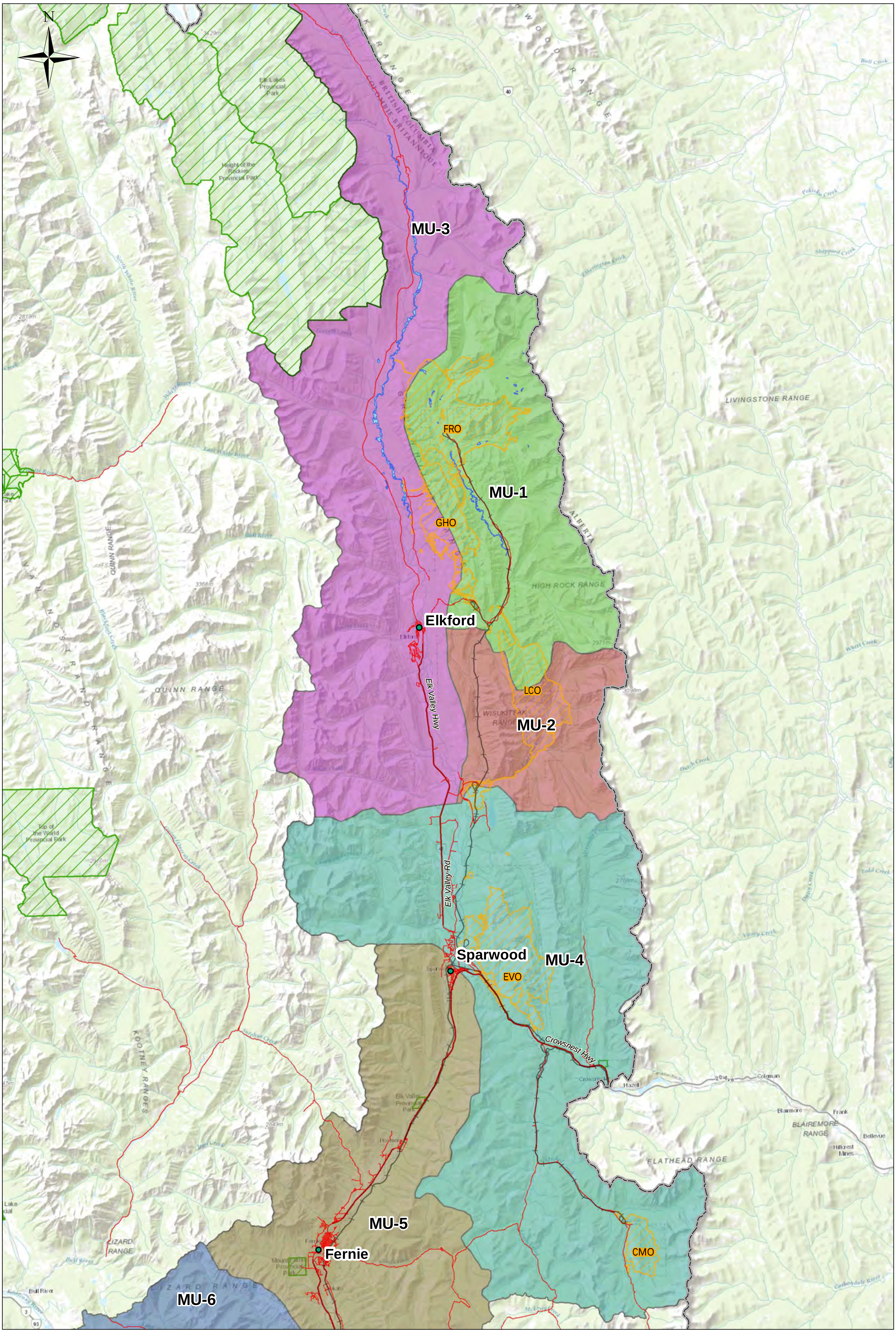
Table 6e: Summary of Analytical Results Compared to Secondary Screening Criteria for Selenium (RDW)

Sample Location	Sample ID	Sample Date (yyyy mm dd)	SPO/Compliance Point	Selenium µg/L
Groundwater Quality Benchmarks				
Guidelines for Canadian Drinking Water Quality (DW)				50
SPO			Elk River [EV_ER1 (0200393)]	19
Compliance Point				-
Study Area 7				
RG_DW02-20	RG_DW-02-20_WP_Q1-2019_NP	2019 02 25	EV_ER1 (0200393)	12.4
	RG_DW-D_WP_Q1-2019_NP	Duplicate	EV_ER1 (0200393)	13.1
	QA/QC RPD%			5
	RG_DW-02-20_WP_Q2-2019_NP	2019 05 27	EV_ER1 (0200393)	14.5
	RG_DW-02-20_WP_Q3-2019_NP	2019 08 20	EV_ER1 (0200393)	11.5
	RG_DW-02-40_WP_Q3-2019_NP	Duplicate	EV_ER1 (0200393)	10.8
	QA/QC RPD%			6
	RG_DW-02-20_WP_Q4-2019_NP	2019 11 28	EV_ER1 (0200393)	10.2
	RG_DW-02-40_WP_Q4-2019_NP-11-28	Duplicate	EV_ER1 (0200393)	10.3
	QA/QC RPD%			1
Study Area 12				
RG_DW-03-04	RG_DW-03-04_WP_Q1-2019_NP	2019 02 26	EV_ER1 (0200393)	15.8

Data provided by Teck Coal Ltd.
All terms defined within the body of SNC-Lavalin's report.
< Denotes concentration less than indicated detection limit or RPD less than indicated value.
- Denotes analysis not conducted.
n/a Denotes no applicable standard/guideline.
* RPDs are not calculated where one or more concentrations are less than five times RDL.

BOLD Concentration greater than or equal to Canadian Drinking Water Quality Drinking Water (DW) guideline.
SHADED Concentration greater than SPO by Area/Compliance Point by Area

Drawings



Legend

- BC-Alberta Border
- Rails
- Highway
- Secondary Road
- Mine Permitted Areas
- Surface Water
- Provincial Park

Management Units

- MU-1
- MU-2
- MU-3
- MU-4
- MU-5
- MU-6

Notes:
1. Original in colour.
2. Site location is approximate.

References:
1. Data provided by Teck Coal Ltd.
2. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 2 4 8 12 16 20 km

PROJECT LOCATION: Teck Coal Limited

CLIENT NAME: Elk Valley, BC

SNC·LAVALIN

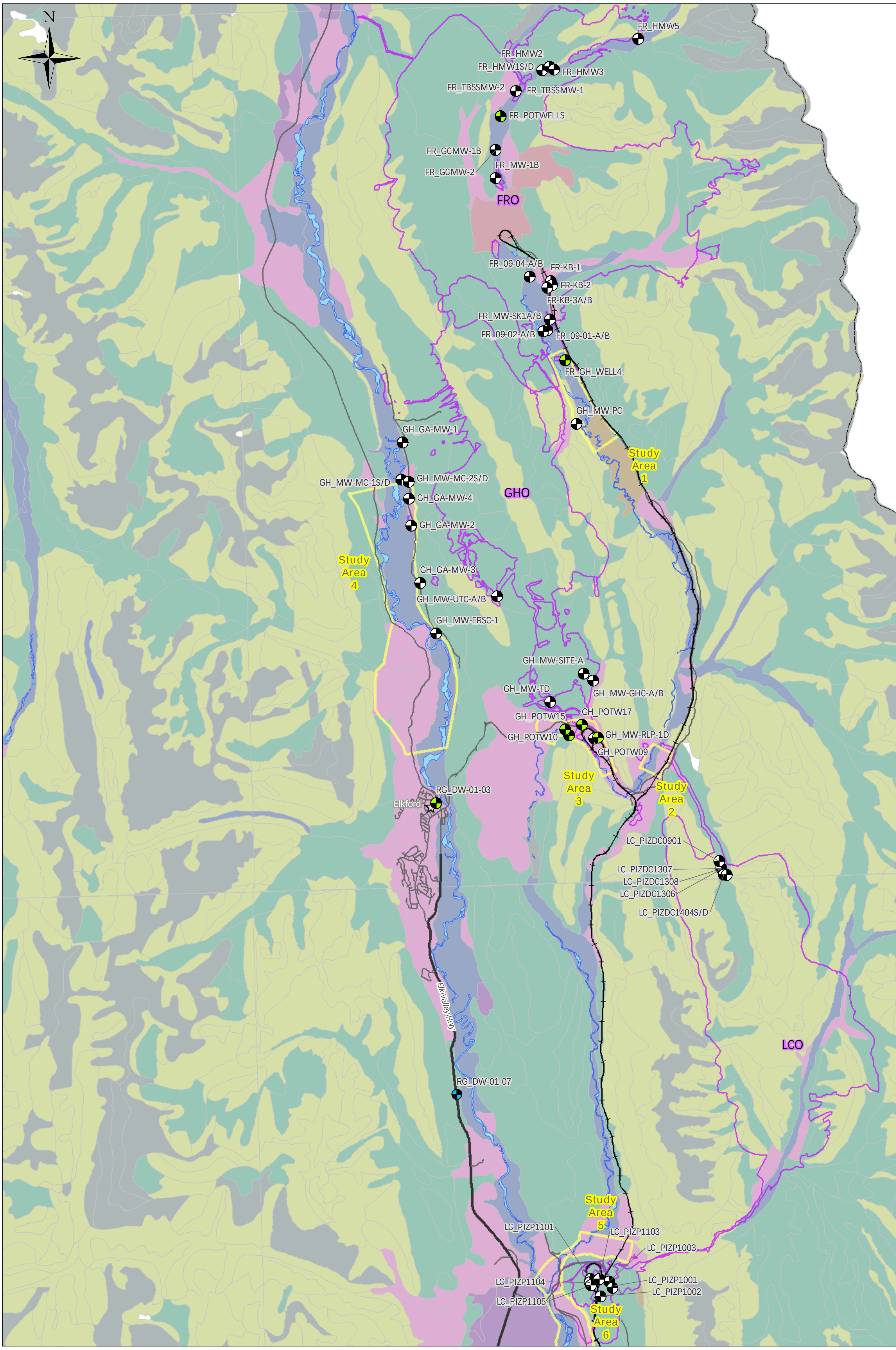
Site Location and Management Units

CHK'D: KC | DATE: 2020/03/25 | SCALE: 1:350,000 | Ref Num:

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | **DRAWING 1**

Project Path: \\Sll2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\671557

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GIS\GISCAD\Map Series\671557\1_SiteLocandMUs.mxd



Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well

Site Features
- Study Areas
- BC-Alberta Border
- Rails
- Highway
- Secondary Road
- Mine Permitted Areas
- Surface Water

Surficial Geology
- Anthropogenic
- Colluvium
- Fluvial
- Glaciofluvial
- Glaciolacustrine
- Rock Outcrop
- Till
- Organic Soil

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Data provided by Teck Coal Limited
2. Service Layer Credits:
3. George, H., W.A. Gorman, and D.F. VanDine, 1987. Late quaternary geology and geomorphology of the Elk Valley, southeastern British Columbia. Canadian Journal of Earth Science, 24, 741-751

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 0.75 1.5 3 4.5 6 7.5 km

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Limited

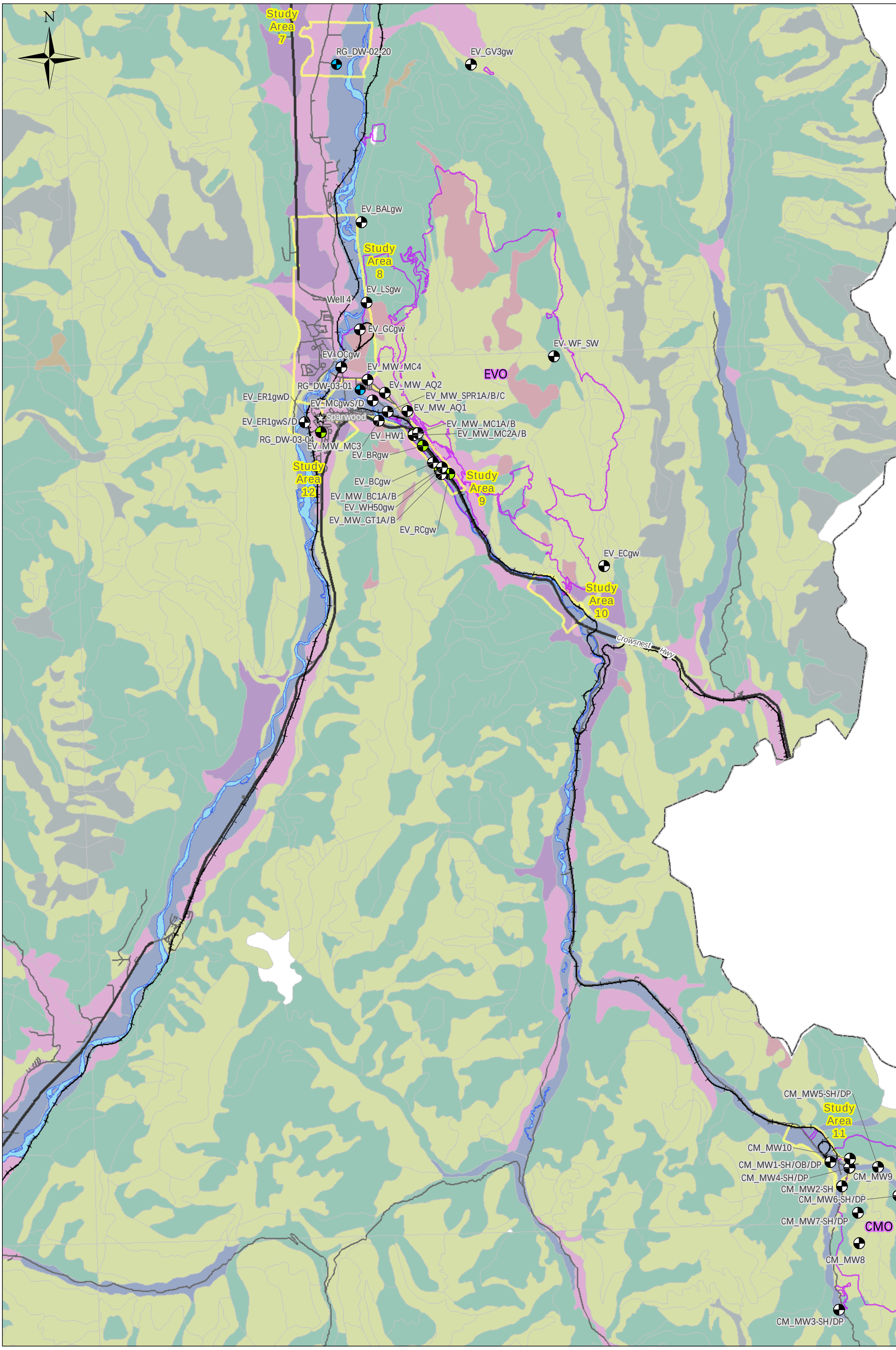
SNC·LAVALIN

Surficial Geology - North Half of Study Area

CHK'D: KC
DATE: 2020/03/27
SCALE: 1:120,000
Ref Num:
BY: AO
COORD SYS: NAD 1983 UTM Zone 11N
DRAWING 2

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GIS\CAD\Map Series\671557\2-3_SurficialGeology.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport



Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well

Site Features
- Study Areas
- BC-Alberta Border
- Rails
- Highway
- Secondary Road
- Mine Permitted Areas
- Surface Water

Surficial Geology
- Anthropogenic
- Colluvium
- Fluvial
- Glaciofluvial
- Glaciolacustrine
- Rock Outcrop
- Till
- Organic Soil

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Data provided by Teck Coal Limited
2. Service Layer Credits:
3. George, H., W.A. Gorman, and D.F. VanDine, 1987. Late quaternary geology and geomorphology of the Elk Valley, southeastern British Columbia. Canadian Journal of Earth Science, 24, 741-751

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 0.75 1.5 3 4.5 6 7.5 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

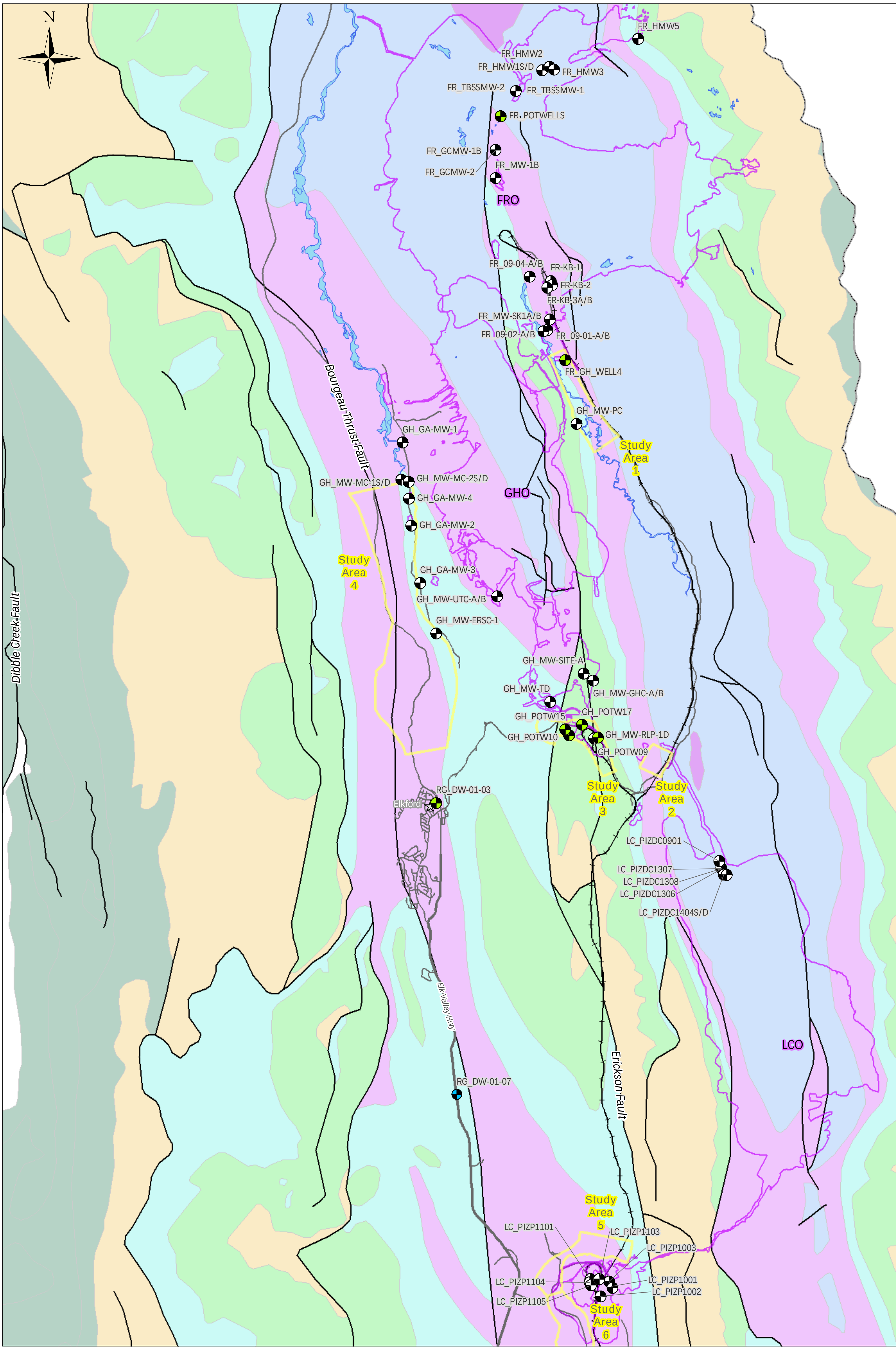
Surficial Geology- South Half of Study Area

CHK'D: KC | DATE: 2020/03/27 | SCALE: 1:120,000 | Ref Num:

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 3

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GIS\CAD\Map Series\671557\2-3_SurficialGeology.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GIS\Exports\661460_AnnualReport



Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well

Site Features
- BC-Alberta Border
- Study Areas
- Mine Permitted Areas
- Rails
- Highway
- Secondary Road
- Surface Water

Bedrock Geology
- Blairmore Group
- Kootenay Group
- Fernie Formation
- Spray River Group
- Rocky Mountain Formation
- Rundle Group
- Other
- Fault

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Limited
2. Service Layer Credits:
3. Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J., and Cooney, R.T. (2005): Geology of British Columbia, BC Ministry of Energy, Mines and Petroleum Resources, Geoscience Map 2005-3, (3 sheets), scale 1:1 000 000.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 0.5 1 2 3 4 5 km

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Limited

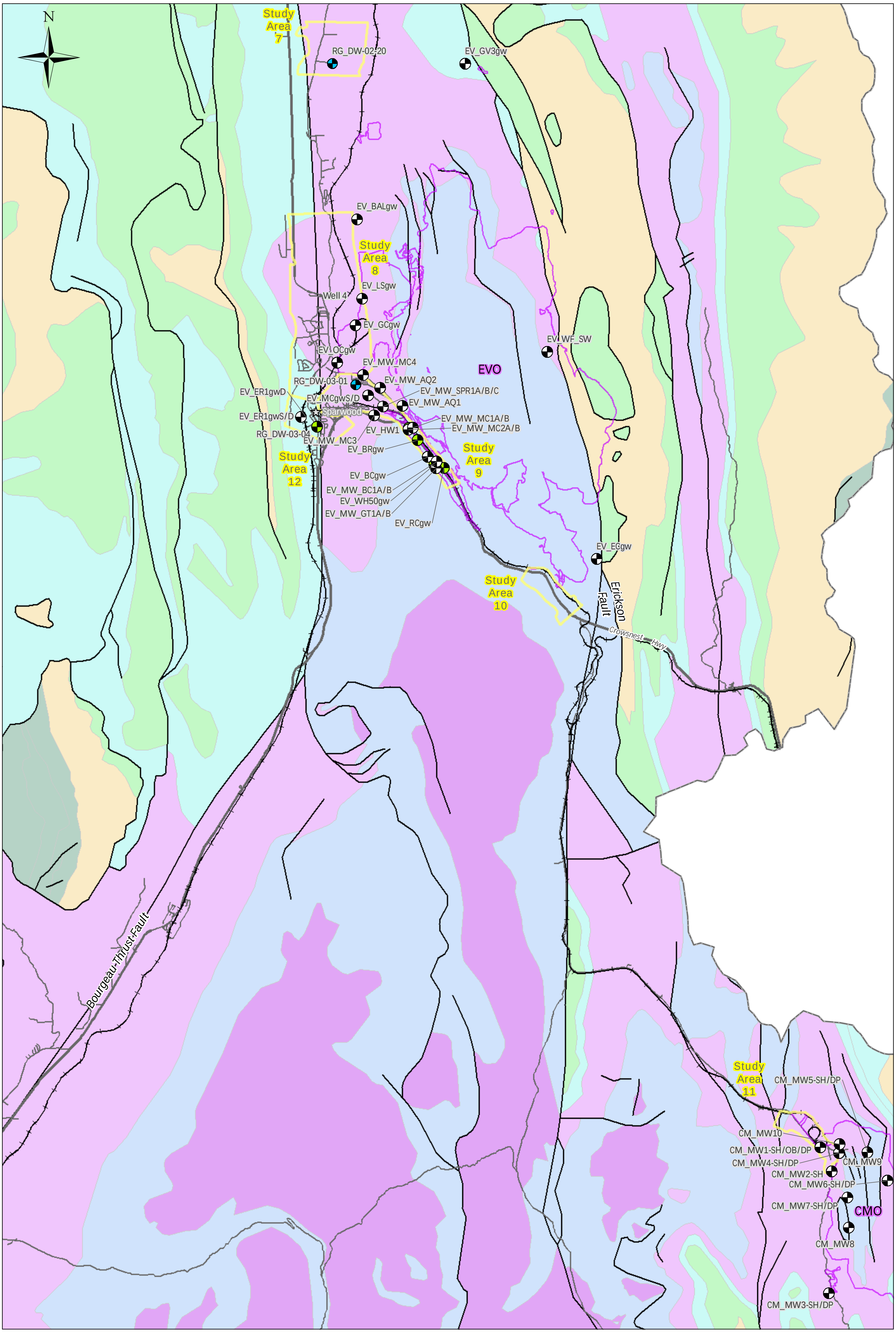
SNC·LAVALIN

Bedrock Geology - North Half of Study Area

CHK'D: KC | DATE: 2020/03/27 | SCALE: 1:120,000 | Ref Num: | REV: 1
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 4

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\4-5_Bedrock\Geology.mxd

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\671557



Groundwater Stations
- Monitoring Well
- Supply Well
- Domestic Well

Site Features
- BC-Alberta Border
- Study Areas
- Mine Permitted Areas
- Rails
- Highway
- Secondary Road
- Surface Water

Bedrock Geology
- Blairmore Group
- Kootenay Group
- Fernie Formation
- Spray River Group
- Rocky Mountain Formation
- Rundle Group
- Other
- Fault

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Data provided by Teck Coal Limited
2. Service Layer Credits:
3. Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J., and Cooney, R.T. (2005): Geology of British Columbia, BC Ministry of Energy, Mines and Petroleum Resources, Geoscience Map 2005-3, (3 sheets), scale 1:1 000 000.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 0.5 1 2 3 4 5 km

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

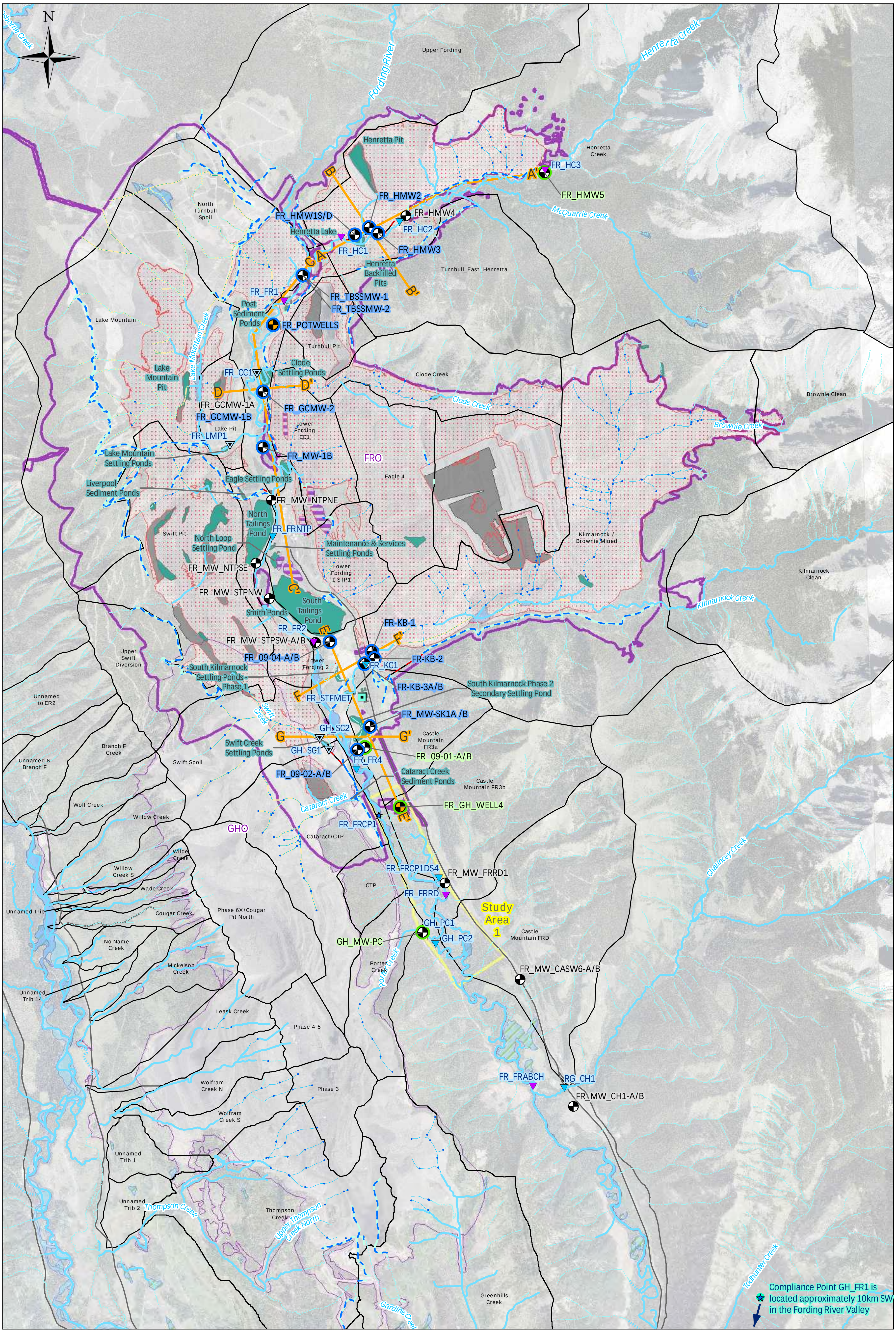
SNC·LAVALIN

Bedrock Geology - South Half of Study Area

CHK'D: KC	DATE: 2020/03/27	SCALE: 1:120,000	Ref Num:	REV: 1
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 5	

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\4-5_BedrockGeology.mxd

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\671557



Legend

Groundwater Stations	Surface Water Stations	Site Features	Water Features
Monitoring Well	Meteorological Station	Secondary Road	Intermittent Stream
Supply Well	Compliance Point	Geological Cross Sections	Ditch
Well included in the SSGMP	Receiving Environment	Tailings/Settling Pond	Indefinite Stream
Well included in both the RGMP and the SSGMP	Authorized Discharge	FRO Permitted Boundary	Stream
	Monitoring	GHO Permitted Boundary	Subsurface
		Watersheds	River Bed
		Study Areas	Wetland
		Pit	Culvert
		Stockpiles	Rock Drain
		Waste Dump (Spoils)	

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Monitoring wells without halos are not part of the SSGMP or RGMP and are monitored as part of other programs.

References:
1. Information provided by Teck Coal Limited.
2. Mapped Aquifers are from Water Resources Atlas (BC ENV)

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 0.5 1 2 3 Kilometers

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

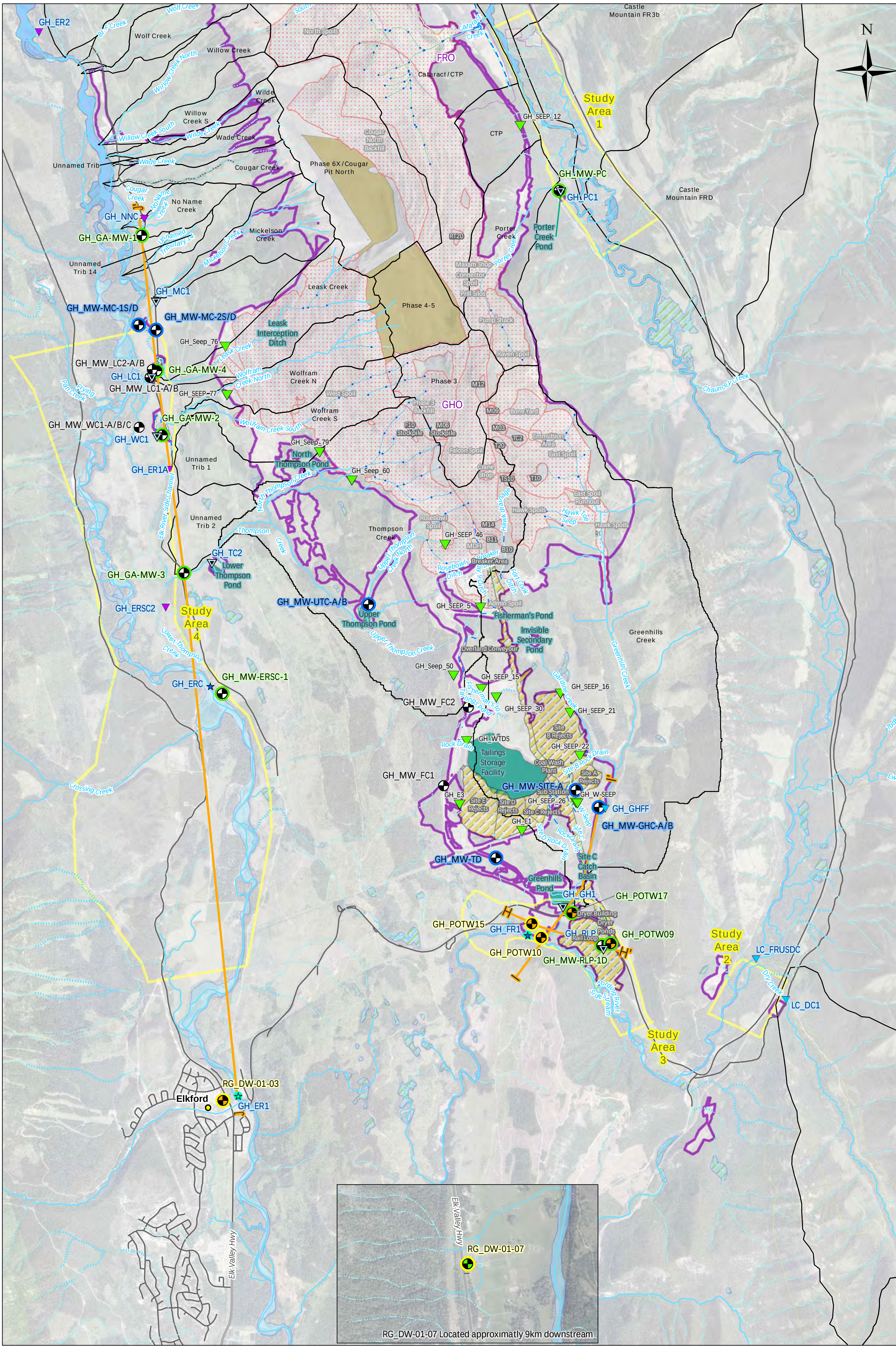
SNC·LAVALIN

Sample Location Plan - Fording River Operations

CHK'D: KM	DATE: 2020/03/27	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 6

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GIS\GISCAD\Map Series\671557\6-SampleLocPlanFRO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Legend

Groundwater Stations
- Domestic Well
- Monitoring Well
- Supply Well
- Well included in the SSGMP
- Well included in the RGMP
- Well included in both the RGMP and the SSGMP

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring
- Regional Seep Program

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Rock Drain
- River Bed
- Wetland
- Watersheds

Site Features
- Highway
- Secondary Road
- FRO Permitted Boundary
- GHO Permitted Boundary
- LCO Permitted Boundary
- Tailings/Settling Pond
- Pit
- Plant Site
- Waste Dump (Spoils)
- Study Areas
- Geological Cross Sections

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Monitoring wells without halos are not part of the SSGMP or RGMP and are monitored as part of other programs.

References:
1. Information provided by Teck Coal Limited
2. Mapped Aquifers are from Water Resources Atlas (BC ENV)

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 0.25 0.5 1 1.5 2 2.5 Kilometers

PROJECT LOCATION:
Greenhills Operations, BC

CLIENT NAME:
Teck Coal Limited

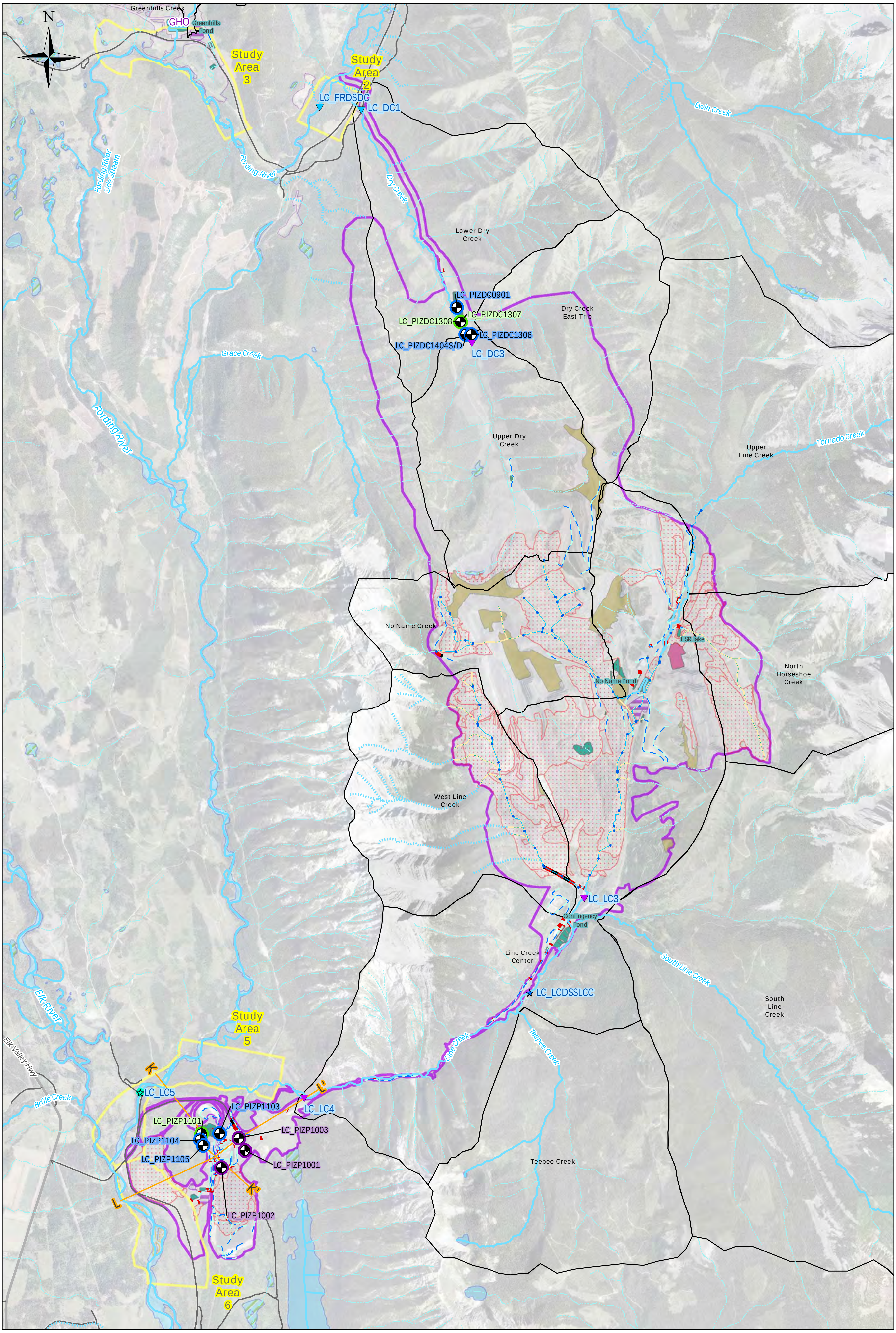
SNC·LAVALIN

Sample Location Plan - Greenhills Operations

CHK'D: KC	DATE: 2020/03/30	SCALE: 1:50,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 7

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\6715571 7-SampleLocPlanGHO.mxd

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\671557



Legend

Groundwater Stations
- Monitoring Well
- Supply Well
- Well included in the SSGMP
- Well included in the SSGMP – Monitoring only
- Well included in the RGMP
- Well included in both the RGMP and the SSGMP

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

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Island
- Lake
- River Bed
- Wetland
- Culvert
- Potable Waterline
- Rock Drain

Site Features
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- GHO Permitted Boundary
- LCO Permitted Boundary
- Tailings/Settling Pond
- Reservoir
- Geological Cross Sections
- Watersheds

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Ltd.
2. Mapped Aquifers are from Water Resources Atlas (BC ENV)

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 0.3 0.6 1.2 1.8 2.4 3 km

PROJECT LOCATION:
Teck Coal Limited

CLIENT NAME:
Line Creek Operations, Sparwood, BC

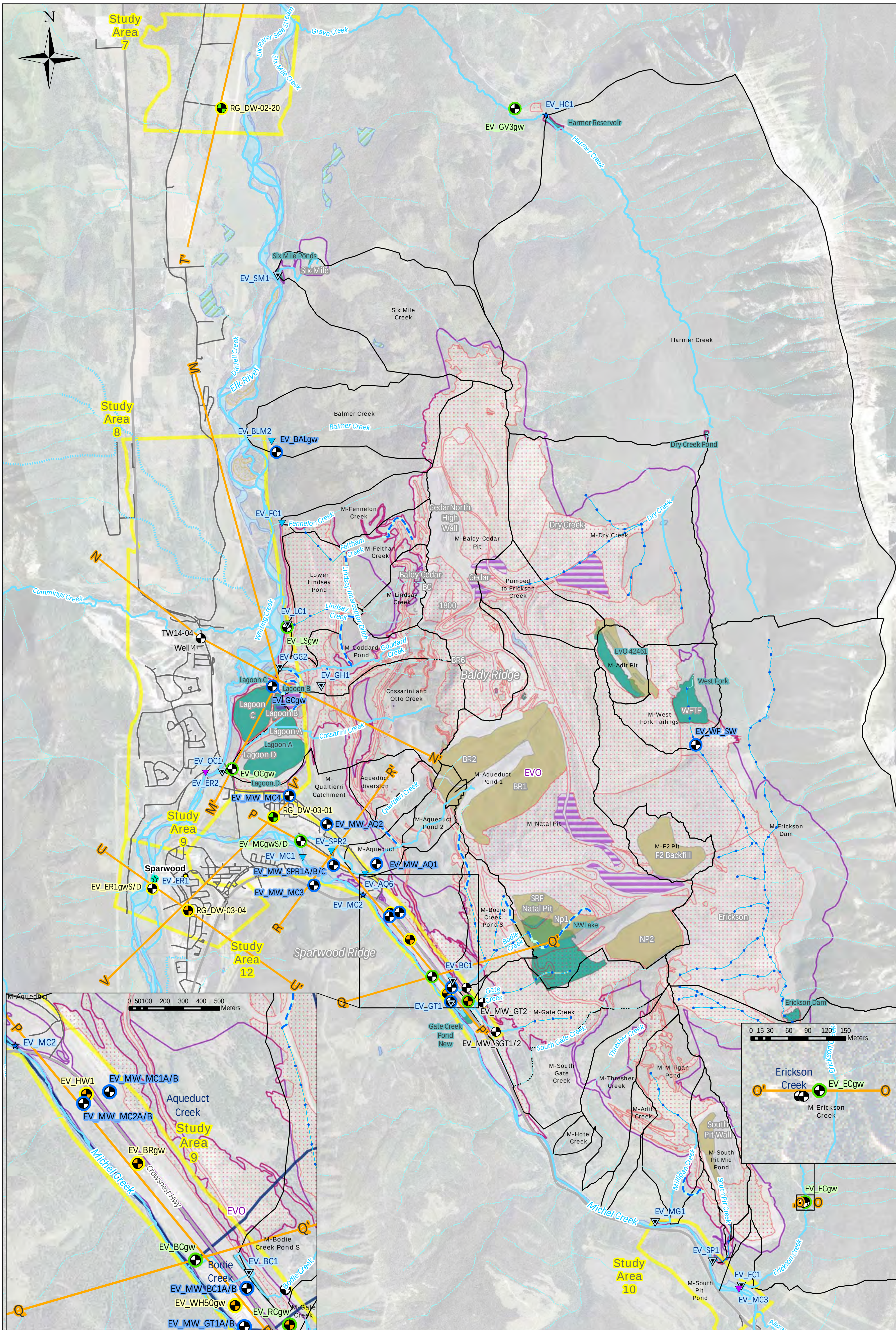
SNC·LAVALIN

Sample Location Plan - Line Creek Operations

CHK'D: CN	DATE: 2020/03/27	SCALE: 1:60,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 8

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\8-SampleLocPlanLCO.mxd

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\671557



Legend

Groundwater Stations
- Domestic Well
- Monitoring Well
- Supply Well
- Well included in the SSGMP
- Well included in the RGMP
- Well included in both the RGMP and the SSGMP

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Island
- Lake
- River Bed
- Wetland

Site Features
- Highway
- Secondary Road
- Rock Drain
- Pit
- Stockpiles
- Waste Spoil
- EVO Permitted Boundary
- Tailings/Settling Pond
- Reservoir
- Geological Cross Sections
- Study Areas
- Watersheds

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Previous sampling events at EV_HW1 may have been from EV_HM1. EV_HM1 and EV_HW1 are the same location with different sampling points. EV_HM1 reflects sampling from the well itself, whereas EV_HW1 is sampled from the Main Gate bathroom tap fed by this well.

References:
1. Information provided by Teck Coal Ltd.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 0.25 0.5 1 1.5 2 2.5 km

PROJECT LOCATION:
Teck Coal Limited

CLIENT NAME:
Elkview Operations, Sparwood, BC

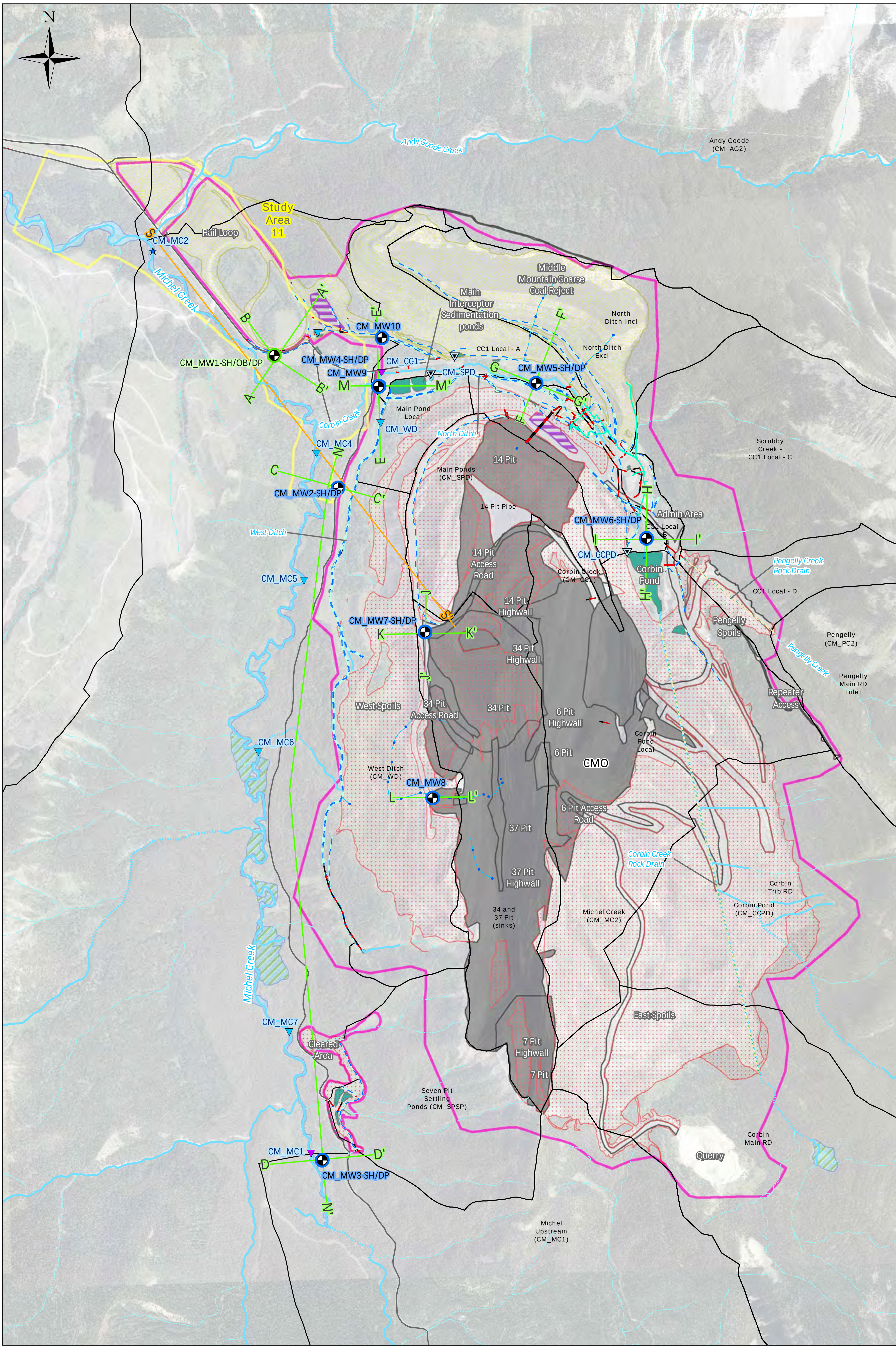
SNC·LAVALIN

Sample Location Plan - Elkview Operations

CHK'D: CN	DATE: 2020/03/31	SCALE: 1:50,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 9

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\9-SampleLocPlanEVO.mxd

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\671557



Groundwater Stations
- Monitoring Well
- Supply Well
- Well included in the SSGMP
- Well included in the RGMP
- Well included in both the RGMP and the SSGMP

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Geological Cross Section (re-produced from SRK (2018)
- Geological Cross Sections
- Secondary Road
- Tailings/Settling Pond
- CMO Permit Boundary
- Study Areas
- Plant Site
- Road
- Pit
- Stockpiles
- Waste Dump (Spoils)
- Watersheds

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Ltd.
2. Mapped Aquifers are from Water Resources Atlas (BC ENV)

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 100 200 400 600 800 1,000 Meters

PROJECT LOCATION:
Coal Mountain, BC

CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

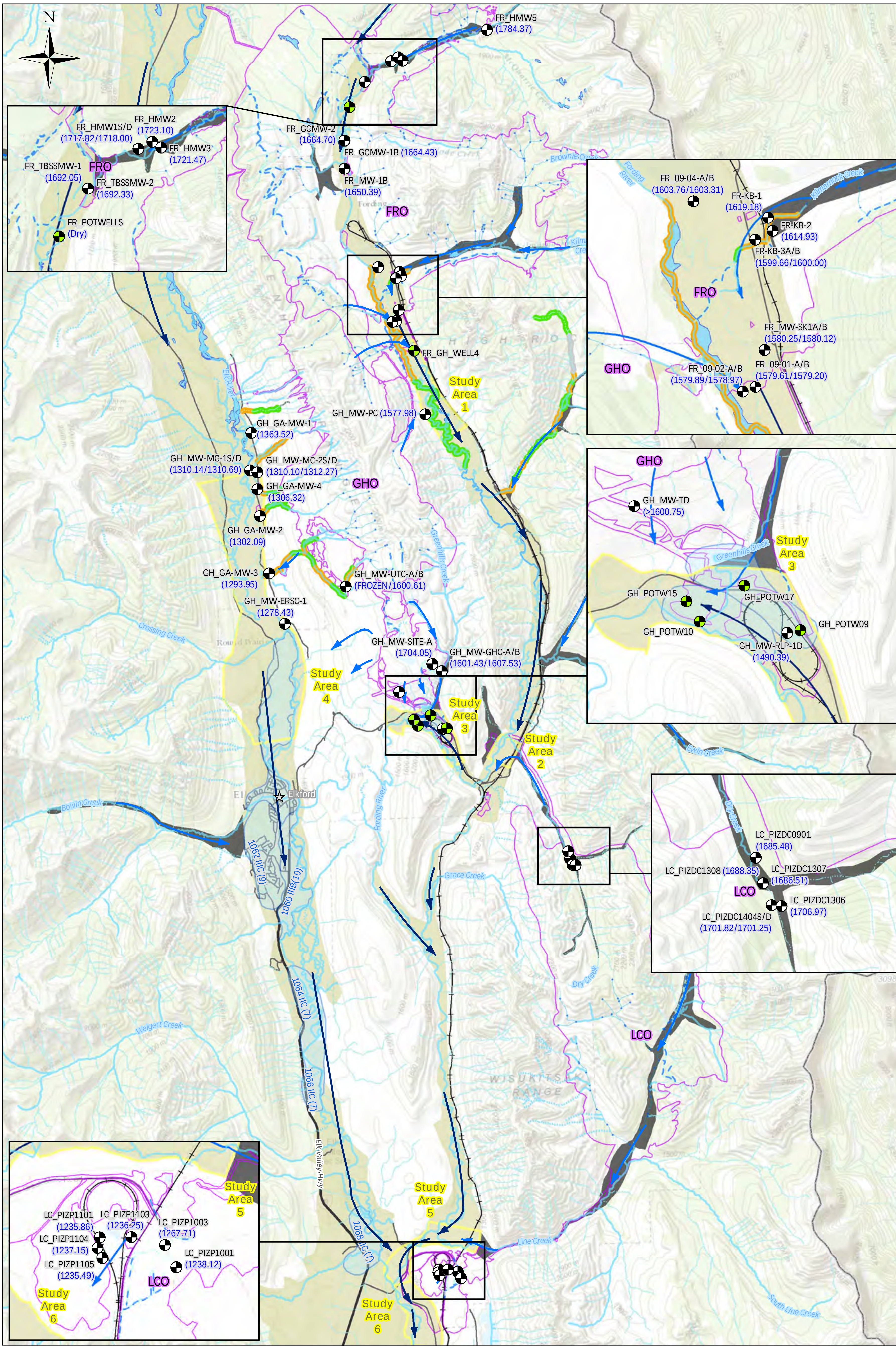
Sample Location Plan - Coal Mountain Operations

CHK'D: KC | DATE: 2020/03/27 | SCALE: 1:22,000 | Ref Num

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 10

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\10-SampleLocPlanCMO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Legend

- Monitoring Well
- Supply Well

Flow Accretion Result

- No Change
- Gaining
- Losing
- Inferred Valley-bottom Flow Direction
- Inferred Upland or Tributary Valley-bottom Groundwater Flow
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- BC-Alberta Border
- Study Areas
- Mapped Aquifers
- Mine Permitted Areas
- Rails
- Highway
- Secondary Road
- Surface Water
- Interpreted Tributary Valley-bottom Extent
- Interpreted Main Valley-bottom Extent
- 1150.71 Groundwater Elevation Q4 (masl)

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.

References:
1. Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2020-02-26 - DRAFT - SB

0 0.5 1 2 3 4 5 Kilometers

PROJECT LOCATION:
Elk Valley, BC

CLIENT NAME:
Teck Coal Limited

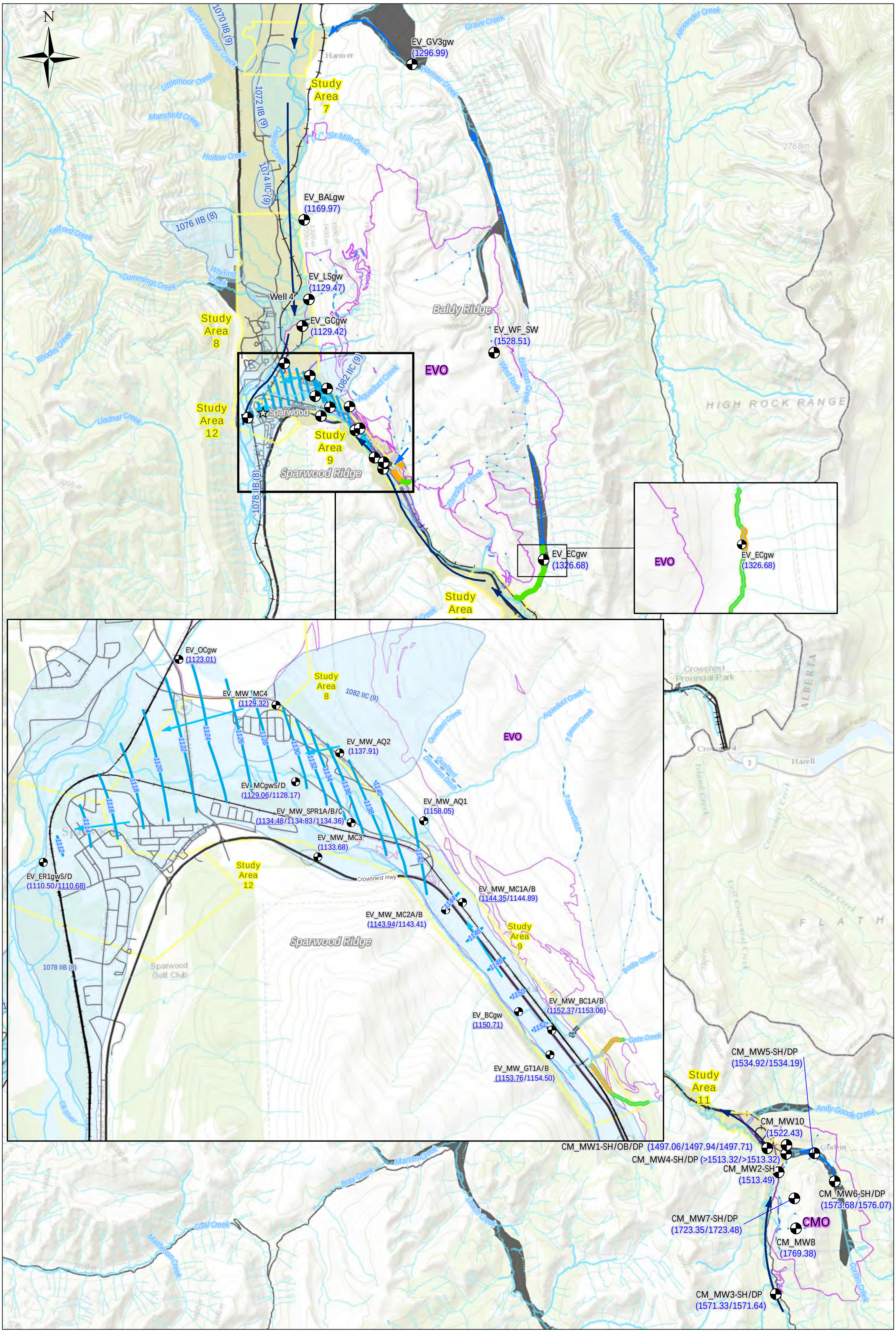
SNC·LAVALIN

Groundwater Elevations from Q4 and Conceptual Regional Groundwater Flow - North Half of Study Area

CHK'D: SB	DATE: 2020/03/30	SCALE: 1:120,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 11

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\671557

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\11_GroundwaterEle_FROGHO.mxd



Legend

- Monitoring Well
- **Flow Accretion Result**
- Uncertain
- No Change
- Gaining
- Losing
- Inferred Valley-bottom Flow Direction
- Inferred Upland or Tributary Valley-bottom Groundwater Flow
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- 1150.71 Groundwater Elevation Q4 (masl) - used for contouring
- 1150.71 Groundwater Elevation Q4 (masl) - not used for contouring
- Subsurface
- Inferred Groundwater Flow Direction
- Inferred Groundwater Contours
- BC-Alberta Border
- Study Areas
- Mapped Aquifers
- Mine Permitted Areas
- Rails
- Highway
- Secondary Road
- Interpreted Tributary Valley-bottom Extent
- Interpreted Main Valley-bottom Extent

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
3. Site location is approximate.
4. Flow accretion results for Bodie Creek, Gate Creek and Erickson Creek were obtained from Golder (2019d).

References:
1. Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Revisons:
0 - AO - 2020-02-26 - DRAFT - SB

0 0.5 1 2 3 4 5 Kilometers

PROJECT LOCATION: Elk Valley, BC

CLIENT NAME: Teck Coal Limited

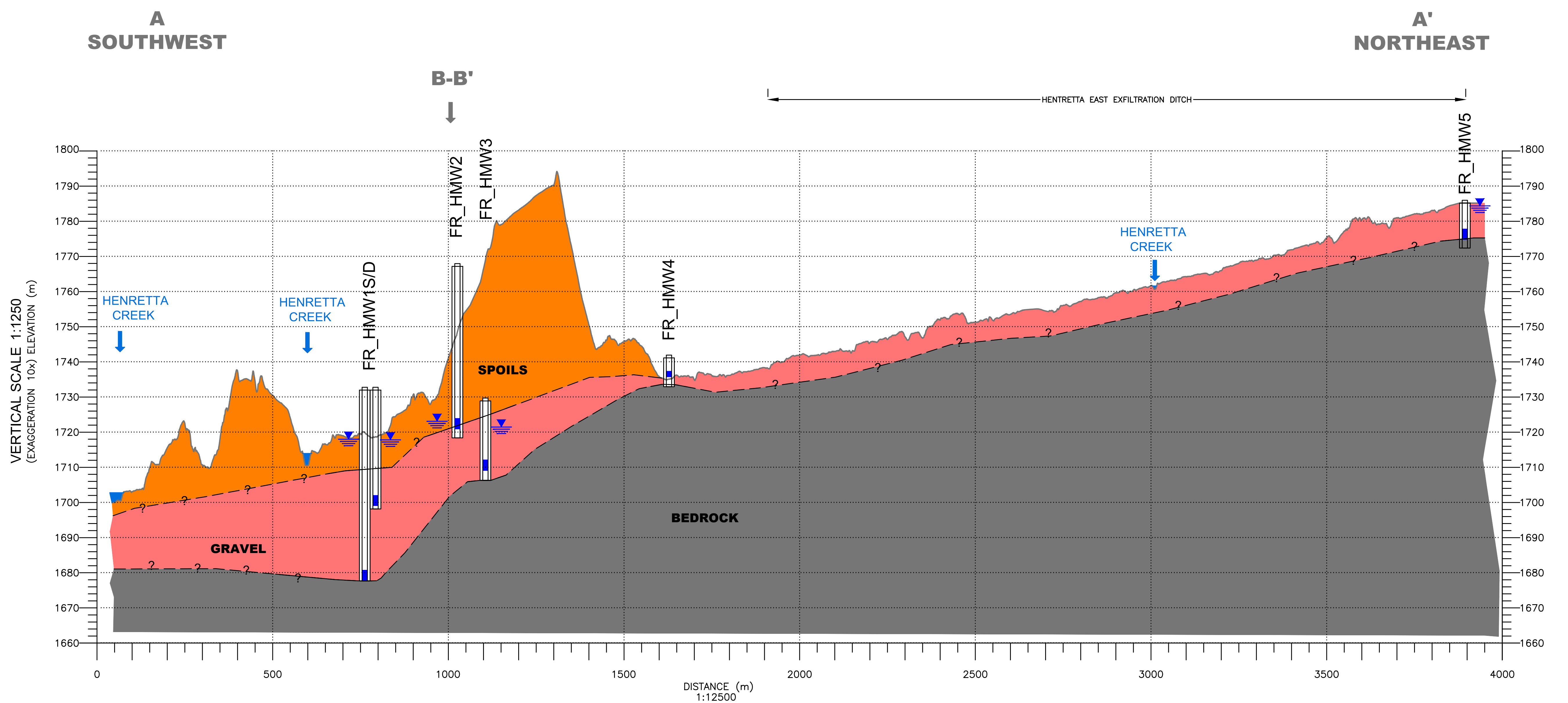
SNC·LAVALIN

Groundwater Elevations from Q4 and Conceptual Regional Groundwater Flow - South Half of Study Area

CHK'D: SB	DATE: 2020/03/30	SCALE: 1:120,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 12

Project Path: \\Sli2606\projects\Current Projects\Teck Coal Ltd\GISCAD\Exports\671557

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\12_GroundwaterEle_EVOCMO_v1.mxd



LEGEND

FILL
GRAVEL (COLLUVIUM)
SAND & GRAVEL
SAND
SILT
CLAY
BEDROCK
GRAVEL (FLUVIAL)
GRAVEL (SPOILS)
SILT, SAND, GRAVEL (TILL)

BOREHOLE LEGEND

—?— —?— UNCERTAIN STRATIGRAPHIC BOUNDARY
— — — — INFERRED STRATIGRAPHIC BOUNDARY
——— CERTAIN STRATIGRAPHIC BOUNDARY
GROUNDWATER ELEVATION (2019 Q4)

FR_TT44 (OS~70m)
WELL OFFSET FROM SECTION LINE
50 mmø SOLID PVC PIPE
50 mmø SLOTTED PVC 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. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020-03-25	ISSUED TO CLIENT	AJK	KM

CLIENT NAME: TECK COAL LIMITED
–

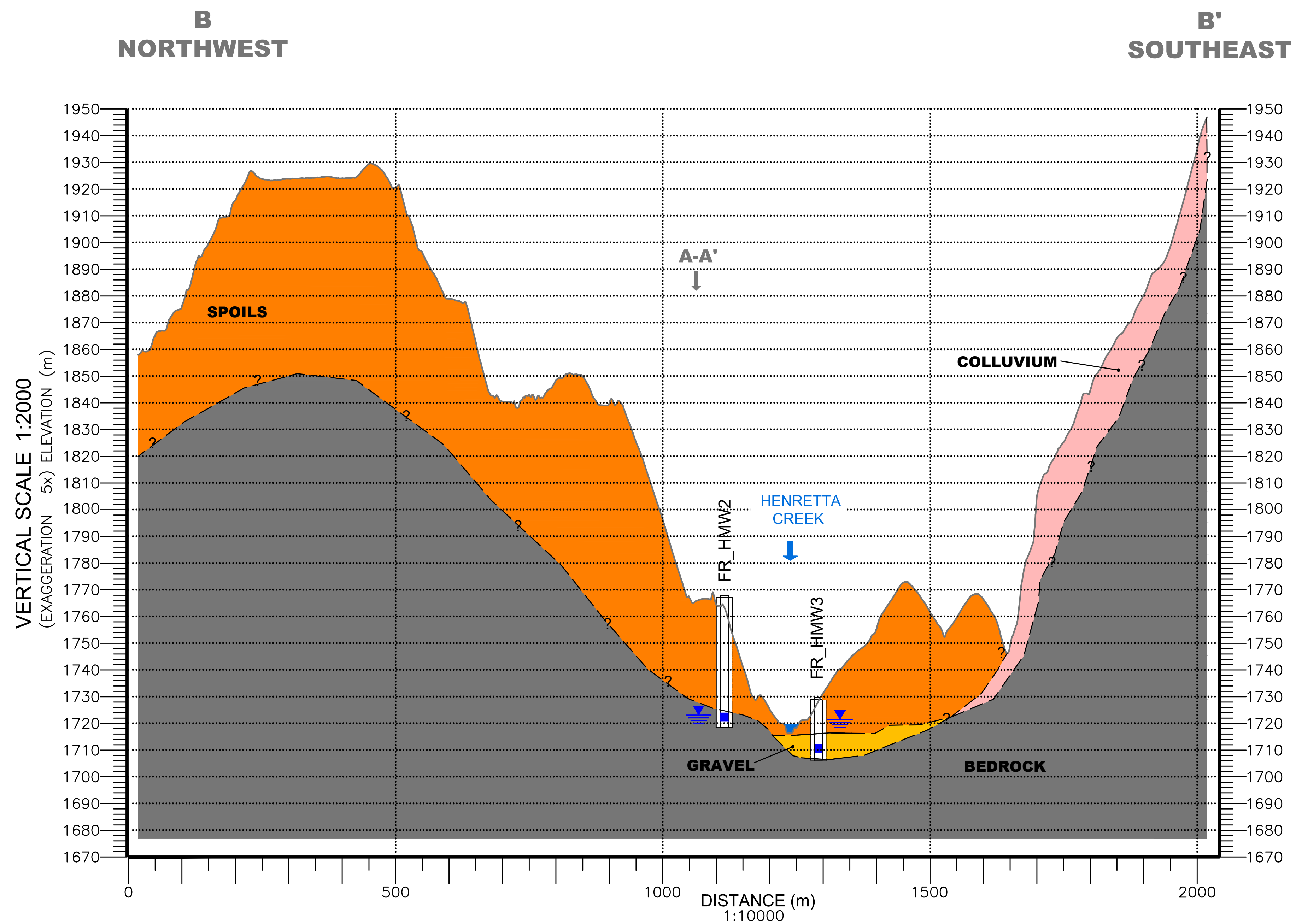
PROJECT LOCATION: FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE: **FORDING RIVER OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION A-A'**

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020-02-10	DWG No: REV.: 0
CHK'D: KM	PLOT: 20200324.1430	CADFILE: 671557-XR1	DRAWING 13

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557-XR1.DWG



LEGEND

- FILL
- GRAVEL (COLLUVIUM)
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK
- GRAVEL (FLUVIAL)
- GRAVEL (SPOILS)
- SILT, SAND, GRAVEL (TILL)

BOREHOLE LEGEND

- —?— —?— UNCERTAIN STRATIGRAPHIC BOUNDARY
- — — — — INFERRED STRATIGRAPHIC BOUNDARY
- ——— CERTAIN STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2019 Q4)

FR_TT44 (OS~70m)
WELL OFFSET FROM SECTION LINE
50 mmø SOLID PVC PIPE
50 mmø SLOTTED PVC 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. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	KM

CLIENT NAME:
TECK COAL LIMITED
–

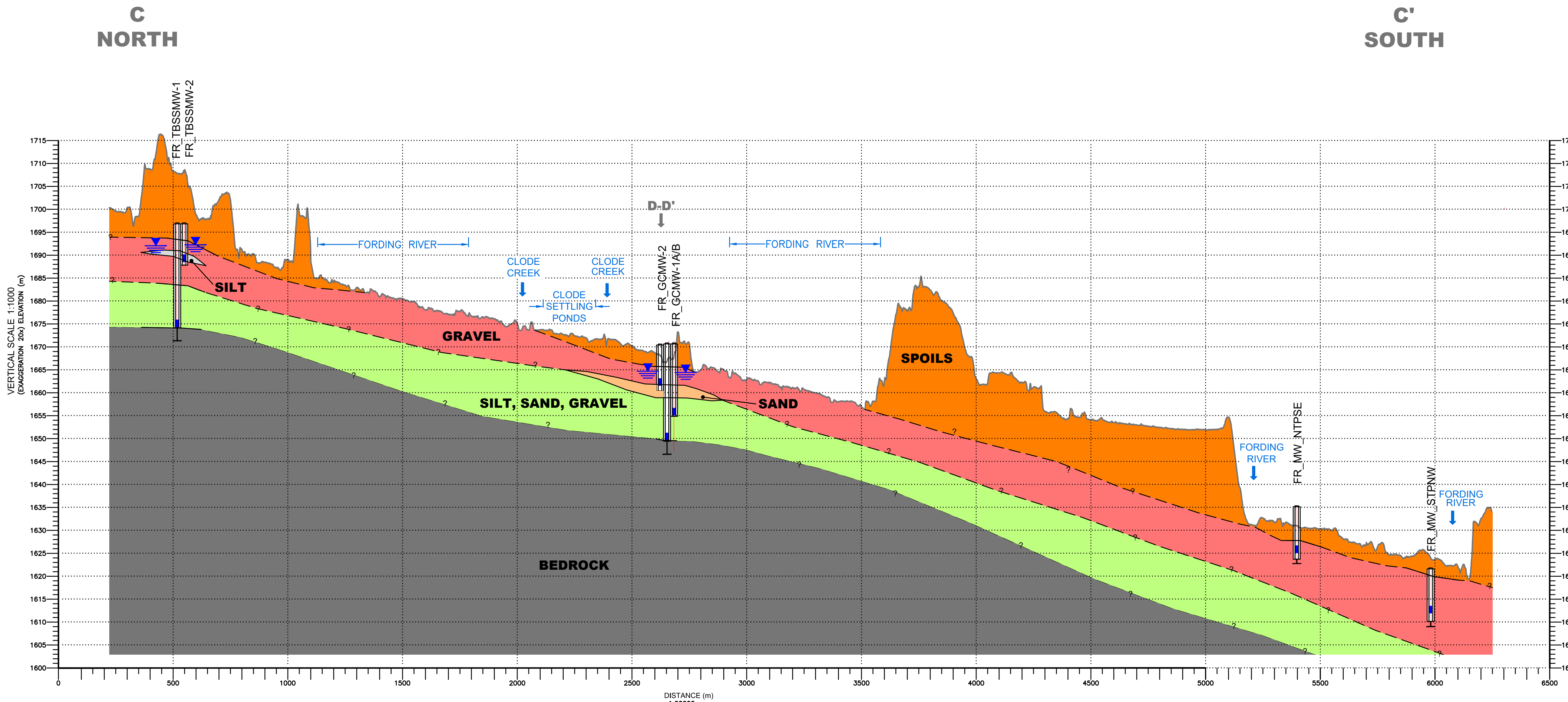
PROJECT LOCATION:
FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
FORDING RIVER OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION B-B'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KM	PLOT: 20200324.1431	CADFILE: 671557–XR1	DRAWING 14

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

- FILL
- GRAVEL (COLLUVIUM)
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK
- GRAVEL (FLUVIAL)
- GRAVEL (SPOILS)
- SILT, SAND, GRAVEL (TILL)

BOREHOLE LEGEND

- —?— —?— UNCERTAIN STRATIGRAPHIC BOUNDARY
- — — — — INFERRED STRATIGRAPHIC BOUNDARY
- ———— CERTAIN STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2019 Q4)

FR_TT44 (OS~70m) — WELL OFFSET FROM SECTION LINE
50 mmø SOLID PVC PIPE
50 mmø SLOTTED PVC 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. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	KM

CLIENT NAME: TECK COAL LIMITED
–

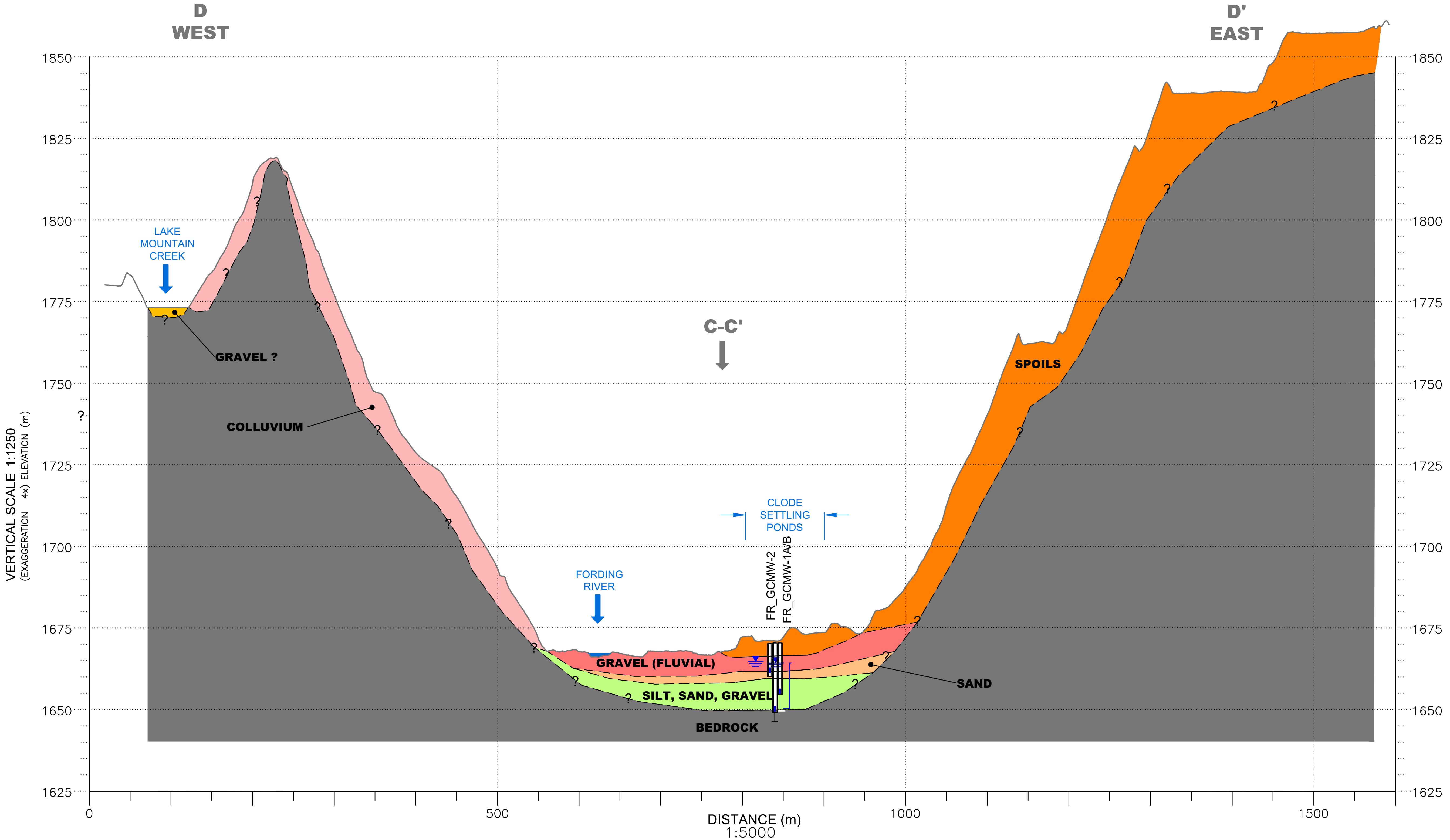
PROJECT LOCATION: FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE: **FORDING RIVER OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION C-C'**

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KM	PLOT: 20200324.1431	CADFILE: 671557–XR1	DRAWING 15

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

- FILL
- GRAVEL (COLLUVIUM)
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK
- GRAVEL (FLUVIAL)
- GRAVEL (SPOILS)
- SILT, SAND, GRAVEL (TILL)

BOREHOLE LEGEND

- —?— —?— UNCERTAIN STRATIGRAPHIC BOUNDARY
- — — — — INFERRED STRATIGRAPHIC BOUNDARY
- ——— CERTAIN STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2019 Q4)

FR_TT44 (OS~70m)

- WELL OFFSET FROM SECTION LINE
- 50 mmø SOLID PVC PIPE
- 50 mmø SLOTTED PVC 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. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	KM

CLIENT NAME: TECK COAL LIMITED
–

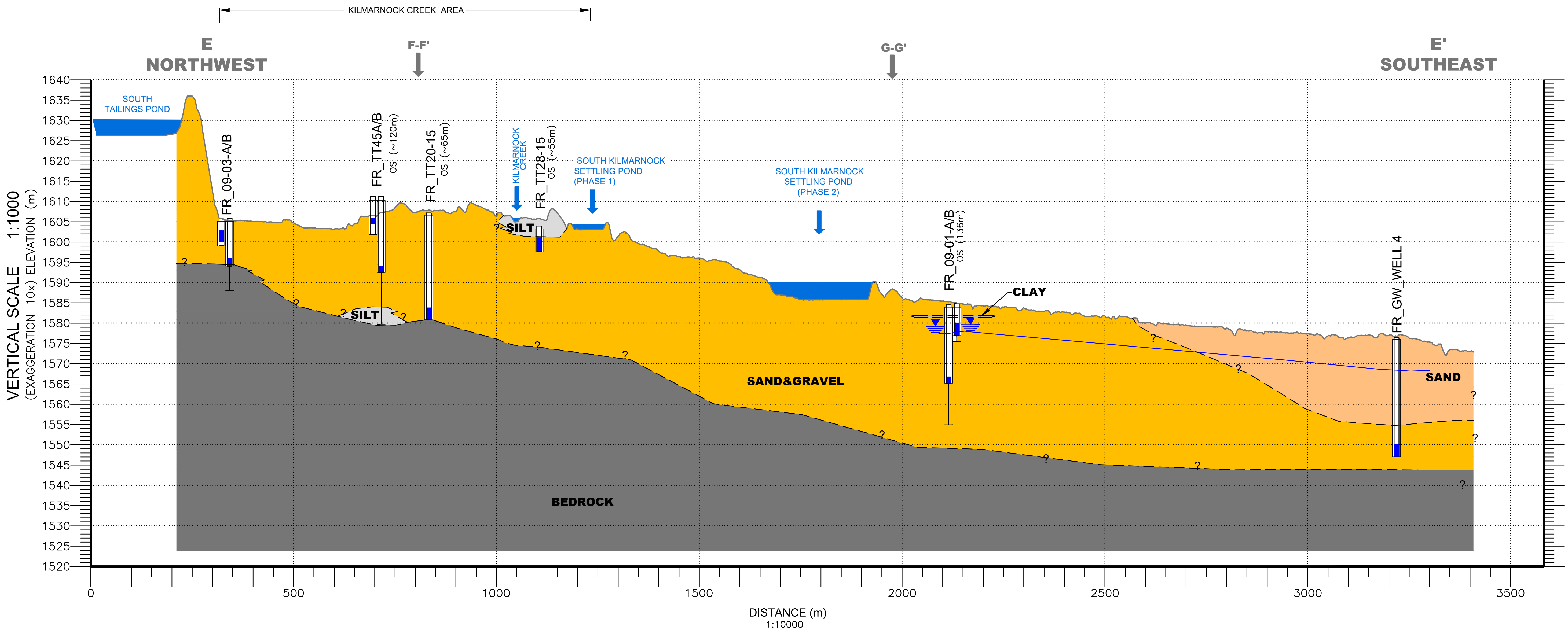
PROJECT LOCATION: FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE: **FORDING RIVER OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION D-D'**

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KM	PLOT: 20200324.1431	CADFILE: 671557–XR1	DRAWING 16

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

- FILL
- GRAVEL (COLLUVIUM)
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK
- GRAVEL (FLUVIAL)
- GRAVEL (SPOILS)
- SILT, SAND, GRAVEL (TILL)

—?— —?— UNCERTAIN STRATIGRAPHIC BOUNDARY

— — — — INFERRED STRATIGRAPHIC BOUNDARY

———— CERTAIN STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4)

BOREHOLE LEGEND

FR_TT44 (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	KM

CLIENT NAME: TECK COAL LIMITED

–

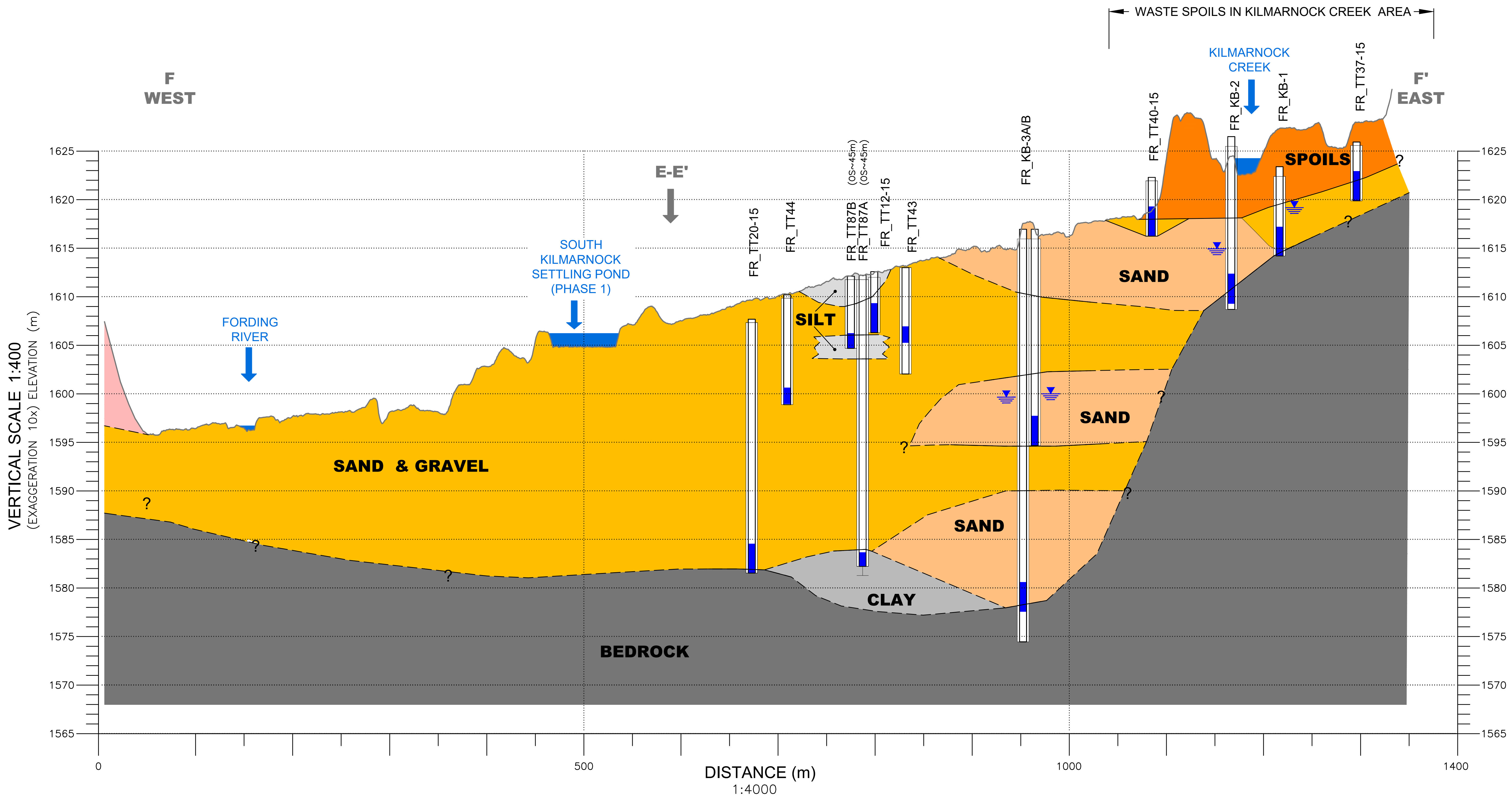
PROJECT LOCATION: FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE: **FORDING RIVER OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION E-E'**

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No:	REV.: 0
CHK'D: KM	PLOT: 20200324.1431	CADFILE: 671557–XR1	DRAWING 17	

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

- FILL
- GRAVEL (COLLUVIUM)
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK
- GRAVEL (FLUVIAL)
- GRAVEL (SPOILS)
- SILT, SAND, GRAVEL (TILL)

–?– –?– UNCERTAIN STRATIGRAPHIC BOUNDARY
– – – – INFERRED STRATIGRAPHIC BOUNDARY
——— CERTAIN STRATIGRAPHIC BOUNDARY
GROUNDWATER ELEVATION (2019 Q4)

BOREHOLE LEGEND

FR_TT44
(OS~70m)
WELL OFFSET FROM SECTION LINE
50 mmø SOLID PVC PIPE
50 mmø SLOTTED PVC 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. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	KM

CLIENT NAME:
TECK COAL LIMITED
–

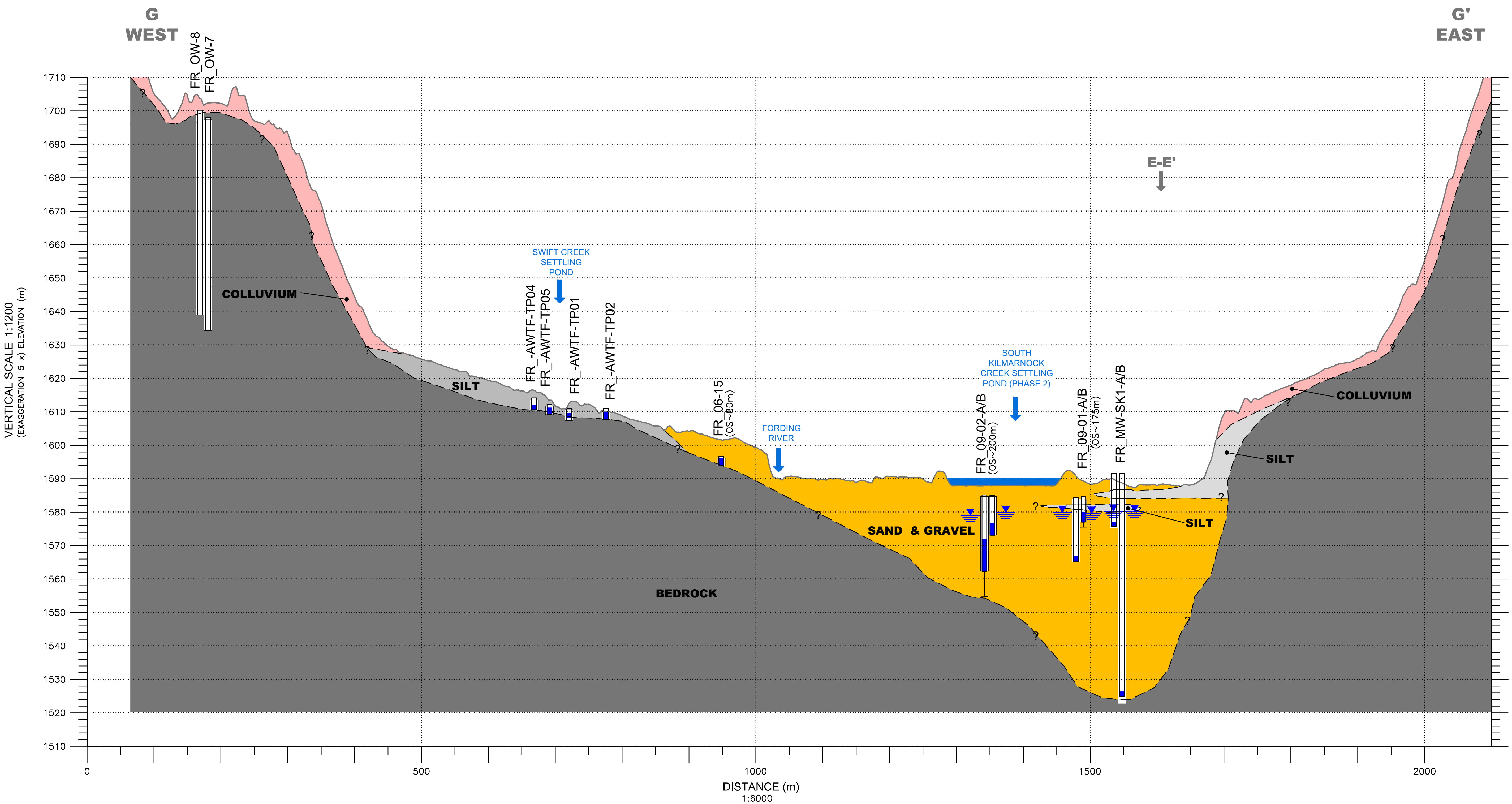
PROJECT LOCATION:
FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
FORDING RIVER OPERATIONS -
INFERRED GEOLOGICAL CROSS SECTION F-F'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KM	PLOT: 20200324.1431	CADFILE: 671557–XR1	DRAWING 18

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

- FILL
- GRAVEL (COLLUVIUM)
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK
- GRAVEL (FLUVIAL)
- GRAVEL (SPOILS)
- SILT, SAND, GRAVEL (TILL)

BOREHOLE LEGEND

- –?– –?– UNCERTAIN STRATIGRAPHIC BOUNDARY
- – – – INFERRED STRATIGRAPHIC BOUNDARY
- —— CERTAIN STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2019 Q4)

FR_TT44 (OS~70m)
- WELL OFFSET FROM SECTION LINE
- 50 mmø SOLID PVC PIPE
- 50 mmø SLOTTED PVC 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. FRO LOCAL DATUM USED (ELEVATIONS ARE +0.94m HIGHER THAN UTM NAD83.)
5. 2019 Q4 GROUNDWATER ELEVATIONS WERE ONLY AVAILABLE FOR SELECT WELLS AS SHOWN ON DRAWING.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	KM

CLIENT NAME:
TECK COAL LIMITED
–

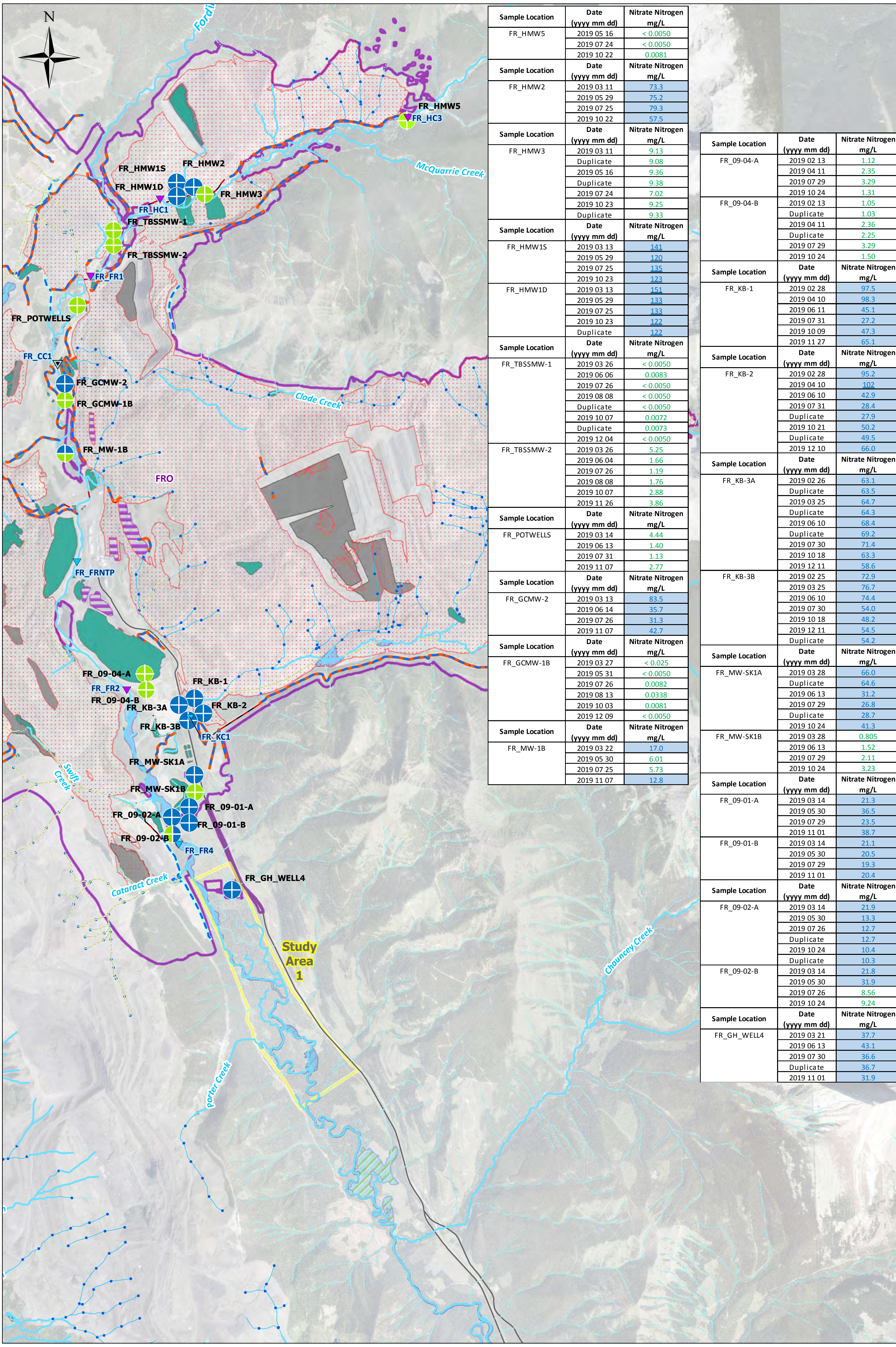
PROJECT LOCATION:
FORDING RIVER OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
FORDING RIVER OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION G-G'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KM	PLOT: 20200324.1431	CADFILE: 671557–XR1	DRAWING 19

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_HMW5	2019 05 16	< 0.0050
	2019 07 24	< 0.0050
	2019 10 22	0.0081

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_HMW2	2019 03 11	73.3
	2019 05 29	75.2
	2019 07 25	79.3
	2019 10 22	57.5

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_HMW3	2019 03 11	9.13
	Duplicate	9.08
	2019 05 16	9.36
	Duplicate	9.38
	2019 07 24	7.02
	2019 10 23	9.25
	Duplicate	9.33

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_HMW1S	2019 03 13	141
	2019 05 29	120
	2019 07 25	135
	2019 10 23	123
FR_HMW1D	2019 03 13	151
	2019 05 29	133
	2019 07 25	133
	2019 10 23	122
	Duplicate	122

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_TBSSMW-1	2019 03 26	< 0.0050
	2019 06 06	0.0083
	2019 07 26	< 0.0050
	2019 08 08	< 0.0050
	Duplicate	< 0.0050
	2019 10 07	0.0072
	Duplicate	0.0073
	2019 12 04	< 0.0050
FR_TBSSMW-2	2019 03 26	5.25
	2019 06 04	1.66
	2019 07 26	1.19
	2019 08 08	1.76
	2019 10 07	2.88
	2019 11 26	3.86

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_POTWELLS	2019 03 14	4.44
	2019 06 13	1.40
	2019 07 31	1.13
	2019 11 07	2.77

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_GCMW-2	2019 03 13	83.5
	2019 06 14	35.7
	2019 07 26	31.3
	2019 11 07	42.7

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_GCMW-1B	2019 03 27	< 0.025
	2019 05 31	< 0.0050
	2019 07 26	0.0082
	2019 08 13	0.0338
	2019 10 03	0.0081
	2019 12 09	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_MW-1B	2019 03 22	17.0
	2019 05 30	6.01
	2019 07 25	5.73
	2019 11 07	12.8

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_09-04-A	2019 02 13	1.12
	2019 04 11	2.35
	2019 07 29	3.29
	2019 10 24	1.31
FR_09-04-B	2019 02 13	1.05
	Duplicate	1.03
	2019 04 11	2.36
	Duplicate	2.25
	2019 07 29	3.29
	2019 10 24	1.50

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_KB-1	2019 02 28	97.5
	2019 04 10	98.3
	2019 06 11	45.1
	2019 07 31	27.2
	2019 10 09	47.3
	2019 11 27	65.1

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_KB-2	2019 02 28	95.2
	2019 04 10	102
	2019 06 10	42.9
	2019 07 31	28.4
	Duplicate	27.9
	2019 10 21	50.2
	Duplicate	49.5
	2019 12 10	66.0

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_KB-3A	2019 02 26	63.1
	Duplicate	63.5
	2019 03 25	64.7
	Duplicate	64.3
	2019 06 10	68.4
	Duplicate	69.2
	2019 07 30	71.4
	2019 10 18	63.3
	2019 12 11	58.6
FR_KB-3B	2019 02 25	72.9
	2019 03 25	76.7
	2019 06 10	74.4
	2019 07 30	54.0
	2019 10 18	48.2
	2019 12 11	54.5
	Duplicate	54.2

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_MW-SK1A	2019 03 28	66.0
	Duplicate	64.6
	2019 06 13	31.2
	2019 07 29	26.8
	Duplicate	28.7
	2019 10 24	41.3
FR_MW-SK1B	2019 03 28	0.805
	2019 06 13	1.52
	2019 07 29	2.11
	2019 10 24	3.23

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_09-01-A	2019 03 14	21.3
	2019 05 30	36.5
	2019 07 29	23.5
	2019 11 01	38.7
FR_09-01-B	2019 03 14	21.1
	2019 05 30	20.5
	2019 07 29	19.3
	2019 11 01	20.4

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_09-02-A	2019 03 14	21.9
	2019 05 30	13.3
	2019 07 26	12.7
	Duplicate	12.7
	2019 10 24	10.4
	Duplicate	10.3
FR_09-02-B	2019 03 14	21.8
	2019 05 30	31.9
	2019 07 26	8.56
	2019 10 24	9.24

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
FR_GH_WELL4	2019 03 21	37.7
	2019 06 13	43.1
	2019 07 30	36.6
	Duplicate	36.7
	2019 11 01	31.9

Legend

Surface Water Stations: Receiving Environment; Authorized Discharge; Monitoring

Site Features: Secondary Road; Tailings/Settling Pond; FRO Permitted Boundary; Study Areas; Pit; Stockpiles; Waste Dump (Spoils)

Water Features: Intermittent Stream; Stream Ditch; Stream; Subsurface; Lake; River Bed; Wetland; Culvert; Ditch; Rock Drain

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 Nitrogen mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

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

PROJECT LOCATION: Fording River Operations, BC

CLIENT NAME: Teck Coal Limited

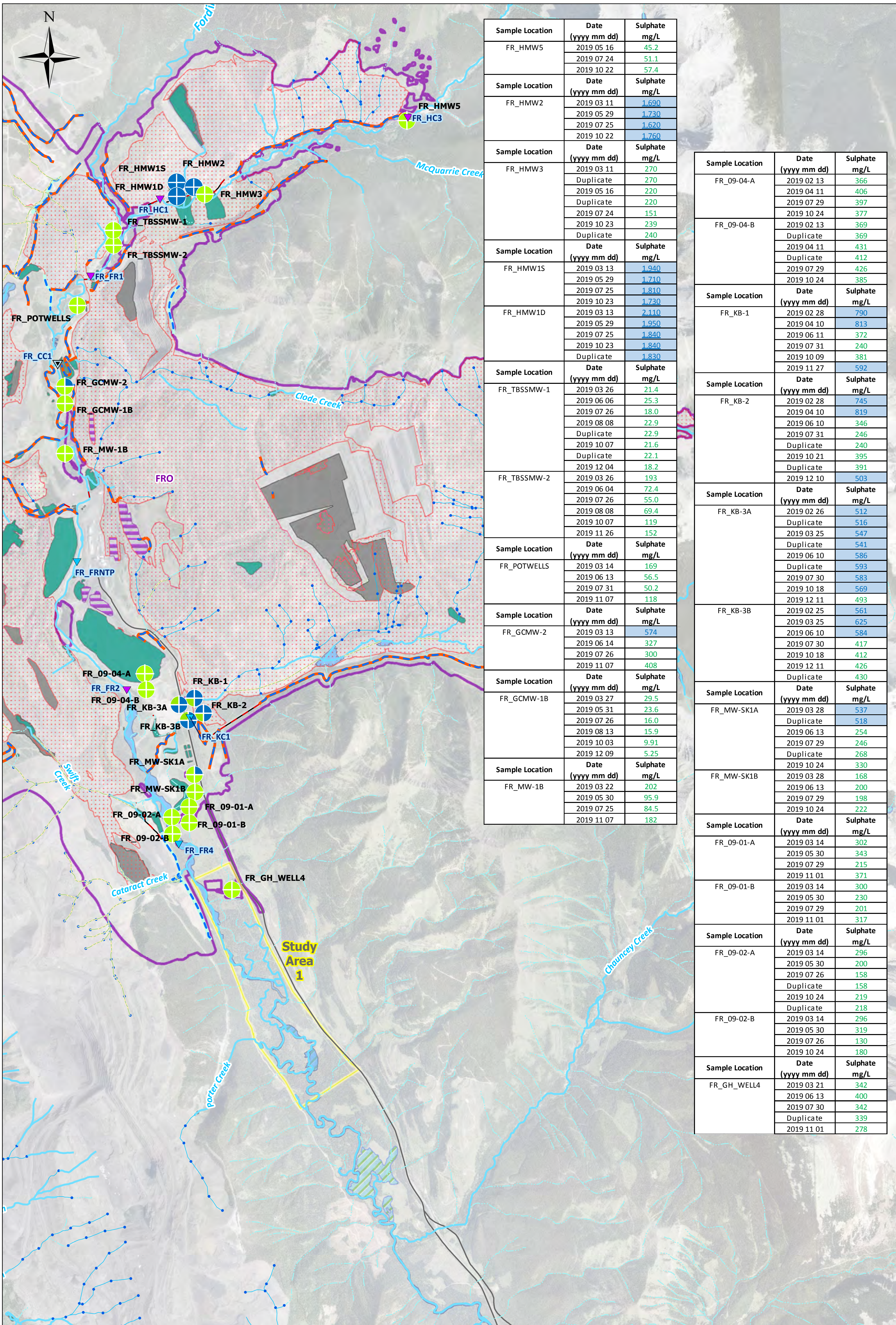
SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater - Fording River Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | **DRAWING 20**

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\20-NitFRO_1.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Sulphate mg/L
FR_HMW5	2019 05 16	45.2
	2019 07 24	51.1
	2019 10 22	57.4
FR_HMW2	2019 03 11	1,690
	2019 05 29	1,730
	2019 07 25	1,620
	2019 10 22	1,760
FR_HMW3	2019 03 11	270
	Duplicate	270
	2019 05 16	220
	Duplicate	220
	2019 07 24	151
	2019 10 23	239
	Duplicate	240
FR_HMW1S	2019 03 13	1,940
	2019 05 29	1,710
	2019 07 25	1,810
	2019 10 23	1,730
FR_HMW1D	2019 03 13	2,110
	2019 05 29	1,950
	2019 07 25	1,840
	2019 10 23	1,840
	Duplicate	1,830
FR_TBSSMW-1	2019 03 26	21.4
	2019 06 06	25.3
	2019 07 26	18.0
	2019 08 08	22.9
	Duplicate	22.9
	2019 10 07	21.6
	Duplicate	22.1
	2019 12 04	18.2
FR_TBSSMW-2	2019 03 26	193
	2019 06 04	72.4
	2019 07 26	55.0
	2019 08 08	69.4
	2019 10 07	119
	2019 11 26	152
FR_POTWELLS	2019 03 14	169
	2019 06 13	56.5
	2019 07 31	50.2
	2019 11 07	118
FR_GCMW-2	2019 03 13	574
	2019 06 14	327
	2019 07 26	300
	2019 11 07	408
FR_GCMW-1B	2019 03 27	29.5
	2019 05 31	23.6
	2019 07 26	16.0
	2019 08 13	15.9
	2019 10 03	9.91
	2019 12 09	5.25
FR_MW-1B	2019 03 22	202
	2019 05 30	95.9
	2019 07 25	84.5
	2019 11 07	182
FR_09-04-A	2019 02 13	366
	2019 04 11	406
	2019 07 29	397
	2019 10 24	377
FR_09-04-B	2019 02 13	369
	Duplicate	369
	2019 04 11	431
	Duplicate	412
	2019 07 29	426
	2019 10 24	385
FR_KB-1	2019 02 28	790
	2019 04 10	813
	2019 06 11	372
	2019 07 31	240
	2019 10 09	381
	2019 11 27	592
FR_KB-2	2019 02 28	745
	2019 04 10	819
	2019 06 10	346
	2019 07 31	246
	Duplicate	240
	2019 10 21	395
	Duplicate	391
	2019 12 10	503
FR_KB-3A	2019 02 26	512
	Duplicate	516
	2019 03 25	547
	Duplicate	541
	2019 06 10	586
	Duplicate	593
	2019 07 30	583
	2019 10 18	569
	2019 12 11	493
FR_KB-3B	2019 02 25	561
	2019 03 25	625
	2019 06 10	584
	2019 07 30	417
	2019 10 18	412
	2019 12 11	426
	Duplicate	430
FR_MW-SK1A	2019 03 28	537
	Duplicate	518
	2019 06 13	254
	2019 07 29	246
	Duplicate	268
	2019 10 24	330
FR_MW-SK1B	2019 03 28	168
	2019 06 13	200
	2019 07 29	198
	2019 10 24	222
FR_09-01-A	2019 03 14	302
	2019 05 30	343
	2019 07 29	215
	2019 11 01	371
FR_09-01-B	2019 03 14	300
	2019 05 30	230
	2019 07 29	201
	2019 11 01	317
FR_09-02-A	2019 03 14	296
	2019 05 30	200
	2019 07 26	158
	Duplicate	158
	2019 10 24	219
	Duplicate	218
FR_09-02-B	2019 03 14	296
	2019 05 30	319
	2019 07 26	130
	2019 10 24	180
FR_GH_WELL4	2019 03 21	342
	2019 06 13	400
	2019 07 30	342
	Duplicate	339
	2019 11 01	278

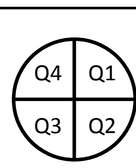
Legend

Surface Water Stations
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Secondary Road
- Tailings/Settling Pond
- FRO Permitted Boundary
- Study Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Stream Ditch
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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



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. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisions:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

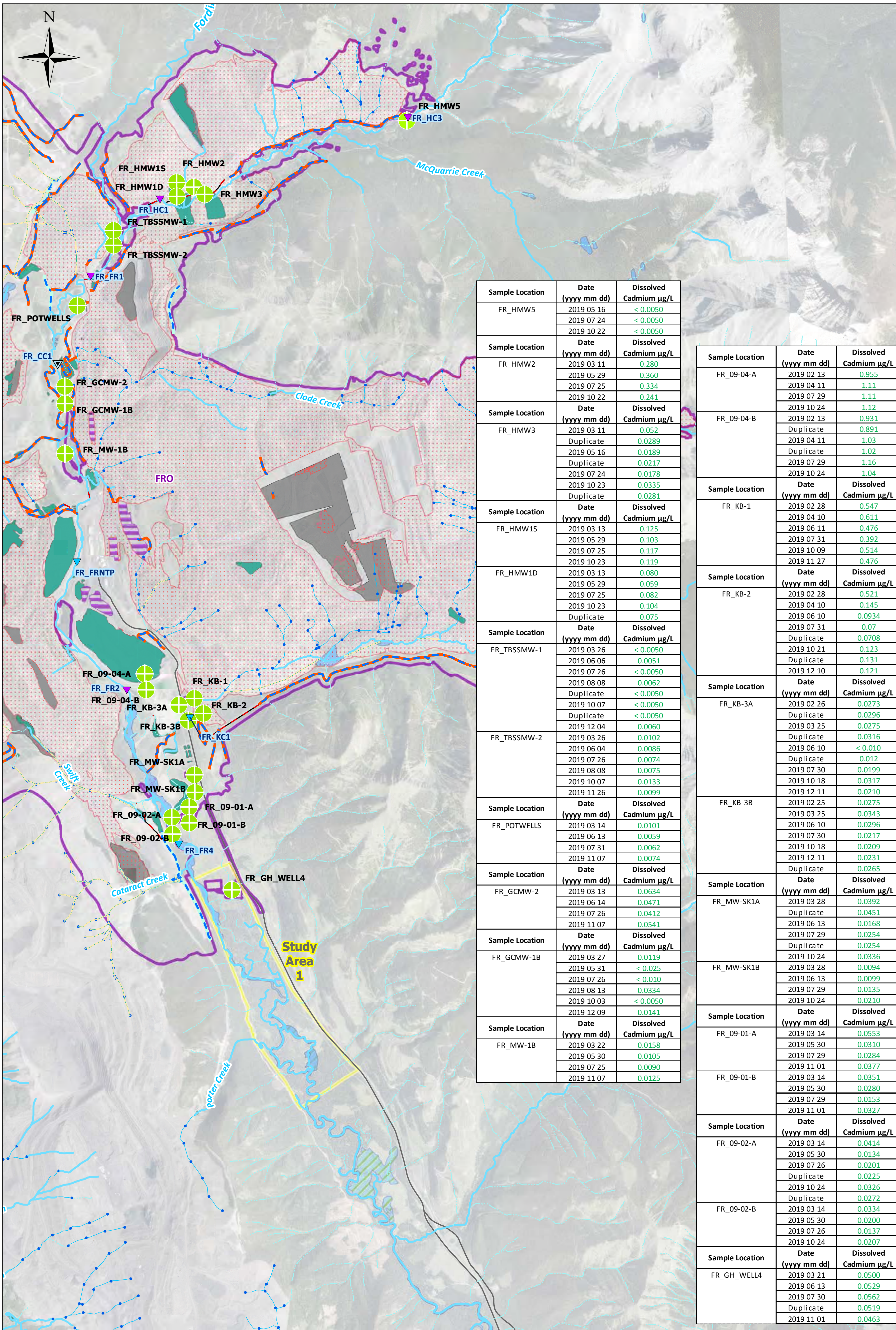
SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater - Fording River Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | **DRAWING 21**

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\21-SulFRO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
FR_HMW5	2019 05 16	< 0.0050
	2019 07 24	< 0.0050
	2019 10 22	< 0.0050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_HMW2	2019 03 11	0.280
	2019 05 29	0.360
	2019 07 25	0.334
	2019 10 22	0.241
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_HMW3	2019 03 11	0.052
	Duplicate	0.0289
	2019 05 16	0.0189
	Duplicate	0.0217
	2019 07 24	0.0178
	2019 10 23	0.0335
	Duplicate	0.0281
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_HMW1S	2019 03 13	0.125
	2019 05 29	0.103
	2019 07 25	0.117
	2019 10 23	0.119
FR_HMW1D	2019 03 13	0.080
	2019 05 29	0.059
	2019 07 25	0.082
	2019 10 23	0.104
	Duplicate	0.075
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_TBSSMW-1	2019 03 26	< 0.0050
	2019 06 06	0.0051
	2019 07 26	< 0.0050
	2019 08 08	0.0062
	Duplicate	< 0.0050
	2019 10 07	< 0.0050
	Duplicate	< 0.0050
	2019 12 04	0.0060
FR_TBSSMW-2	2019 03 26	0.0102
	2019 06 04	0.0086
	2019 07 26	0.0074
	2019 08 08	0.0075
	2019 10 07	0.0133
	2019 11 26	0.0099
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_POTWELLS	2019 03 14	0.0101
	2019 06 13	0.0059
	2019 07 31	0.0062
	2019 11 07	0.0074
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_GCMW-2	2019 03 13	0.0634
	2019 06 14	0.0471
	2019 07 26	0.0412
	2019 11 07	0.0541
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_GCMW-1B	2019 03 27	0.0119
	2019 05 31	< 0.025
	2019 07 26	< 0.010
	2019 08 13	0.0334
	2019 10 03	< 0.0050
	2019 12 09	0.0141
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_MW-1B	2019 03 22	0.0158
	2019 05 30	0.0105
	2019 07 25	0.0090
	2019 11 07	0.0125

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
FR_09-04-A	2019 02 13	0.955
	2019 04 11	1.11
	2019 07 29	1.11
	2019 10 24	1.12
FR_09-04-B	2019 02 13	0.931
	Duplicate	0.891
	2019 04 11	1.03
	Duplicate	1.02
	2019 07 29	1.16
	2019 10 24	1.04
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_KB-1	2019 02 28	0.547
	2019 04 10	0.611
	2019 06 11	0.476
	2019 07 31	0.392
	2019 10 09	0.514
	2019 11 27	0.476
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_KB-2	2019 02 28	0.521
	2019 04 10	0.145
	2019 06 10	0.0934
	2019 07 31	0.07
	Duplicate	0.0708
	2019 10 21	0.123
	Duplicate	0.131
	2019 12 10	0.121
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_KB-3A	2019 02 26	0.0273
	Duplicate	0.0296
	2019 03 25	0.0275
	Duplicate	0.0316
	2019 06 10	< 0.010
	Duplicate	0.012
	2019 07 30	0.0199
	2019 10 18	0.0317
	2019 12 11	0.0210
FR_KB-3B	2019 02 25	0.0275
	2019 03 25	0.0343
	2019 06 10	0.0296
	2019 07 30	0.0217
	2019 10 18	0.0209
	2019 12 11	0.0231
	Duplicate	0.0265
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_MW-SK1A	2019 03 28	0.0392
	Duplicate	0.0451
	2019 06 13	0.0168
	2019 07 29	0.0254
	Duplicate	0.0254
	2019 10 24	0.0336
FR_MW-SK1B	2019 03 28	0.0094
	2019 06 13	0.0099
	2019 07 29	0.0135
	2019 10 24	0.0210
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_09-01-A	2019 03 14	0.0553
	2019 05 30	0.0310
	2019 07 29	0.0284
	2019 11 01	0.0377
FR_09-01-B	2019 03 14	0.0351
	2019 05 30	0.0280
	2019 07 29	0.0153
	2019 11 01	0.0327
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_09-02-A	2019 03 14	0.0414
	2019 05 30	0.0134
	2019 07 26	0.0201
	Duplicate	0.0225
	2019 10 24	0.0326
	Duplicate	0.0272
FR_09-02-B	2019 03 14	0.0334
	2019 05 30	0.0200
	2019 07 26	0.0137
	2019 10 24	0.0207
Sample Location	**Date (yyyy mm dd)**	**Dissolved Cadmium µg/L**
FR_GH_WELL4	2019 03 21	0.0500
	2019 06 13	0.0529
	2019 07 30	0.0562
	Duplicate	0.0519
	2019 11 01	0.0463

Legend

Surface Water Stations: Receiving Environment; Authorized Discharge; Monitoring

Site Features: Secondary Road; Tailings/Settling Pond; FRO Permitted Boundary; Study Areas; Pit; Stockpiles; Waste Dump (Spoils)

Water Features: Intermittent Stream; Stream Ditch; Stream; Subsurface; Lake; River Bed; Wetland; Culvert; Ditch; Rock Drain

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	Dissolved Cadmium µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

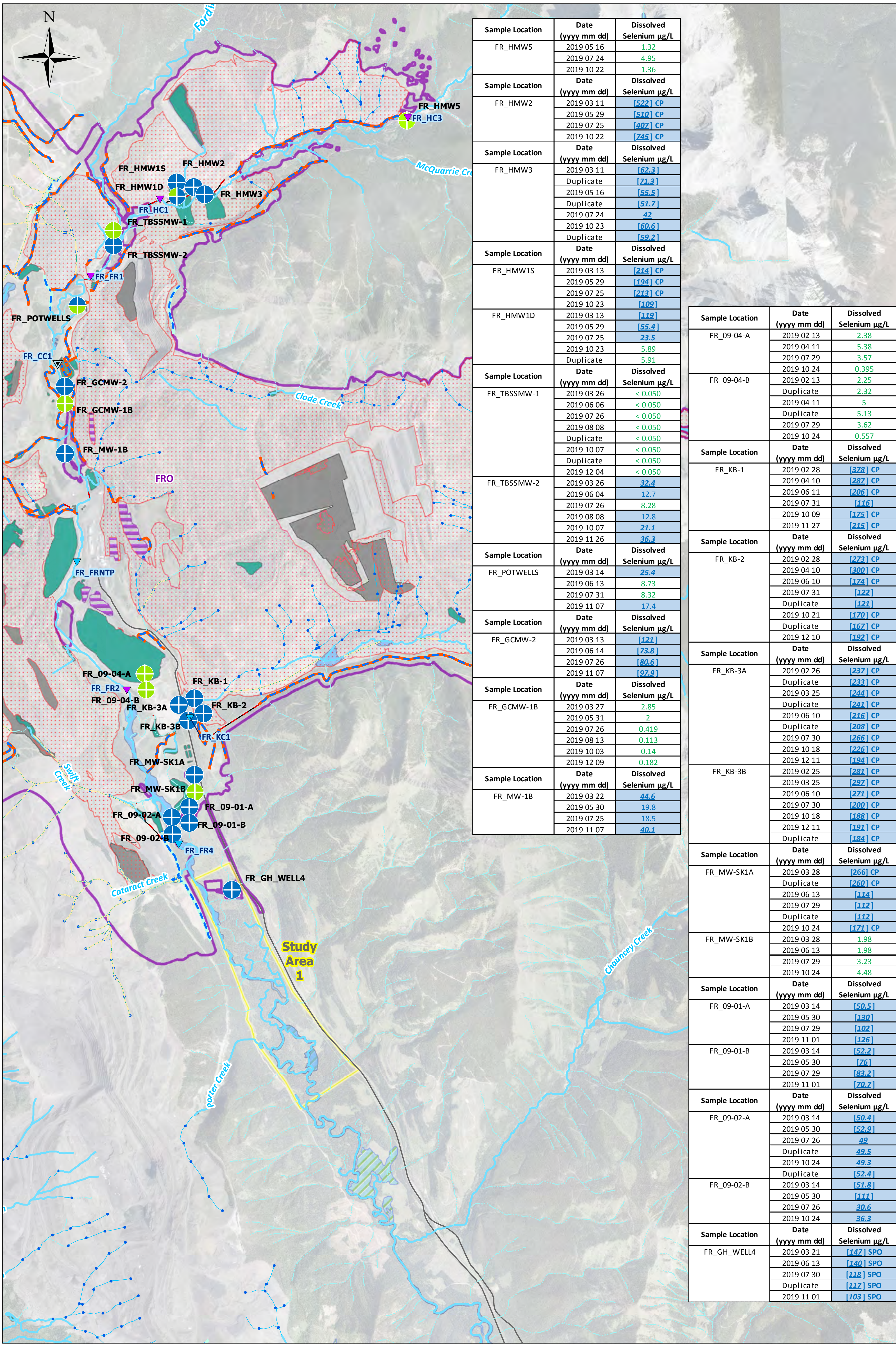
Spatial Distribution of Dissolved Cadmium in Groundwater - Fording River Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num:

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | **DRAWING 22**

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\22-CADFRO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_HMW5	2019 05 16	1.32
	2019 07 24	4.95
	2019 10 22	1.36

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_HMW2	2019 03 11	[522] CP
	2019 05 29	[510] CP
	2019 07 25	[407] CP
	2019 10 22	[745] CP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_HMW3	2019 03 11	[62.3]
	Duplicate	[71.3]
	2019 05 16	[55.5]
	Duplicate	[51.7]
	2019 07 24	42
	2019 10 23	[60.6]
	Duplicate	[59.2]

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_HMW1S	2019 03 13	[214] CP
	2019 05 29	[194] CP
	2019 07 25	[213] CP
	2019 10 23	[109]
FR_HMW1D	2019 03 13	[119]
	2019 05 29	[55.4]
	2019 07 25	23.5
	2019 10 23	5.89
	Duplicate	5.91

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_TBSSMW-1	2019 03 26	< 0.050
	2019 06 06	< 0.050
	2019 07 26	< 0.050
	2019 08 08	< 0.050
	Duplicate	< 0.050
	2019 10 07	< 0.050
	Duplicate	< 0.050
	2019 12 04	< 0.050
FR_TBSSMW-2	2019 03 26	32.4
	2019 06 04	12.7
	2019 07 26	8.28
	2019 08 08	12.8
	2019 10 07	21.1
	2019 11 26	36.3

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_POTWELLS	2019 03 14	25.4
	2019 06 13	8.73
	2019 07 31	8.32
	2019 11 07	17.4

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_GCMW-2	2019 03 13	[121]
	2019 06 14	[73.8]
	2019 07 26	[80.6]
	2019 11 07	[97.9]

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_GCMW-1B	2019 03 27	2.85
	2019 05 31	2
	2019 07 26	0.419
	2019 08 13	0.113
	2019 10 03	0.14
	2019 12 09	0.182

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_MW-1B	2019 03 22	44.6
	2019 05 30	19.8
	2019 07 25	18.5
	2019 11 07	40.1

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_09-04-A	2019 02 13	2.38
	2019 04 11	5.38
	2019 07 29	3.57
	2019 10 24	0.395
FR_09-04-B	2019 02 13	2.25
	Duplicate	2.32
	2019 04 11	5
	Duplicate	5.13
	2019 07 29	3.62
	2019 10 24	0.557

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_KB-1	2019 02 28	[378] CP
	2019 04 10	[287] CP
	2019 06 11	[206] CP
	2019 07 31	[116]
	2019 10 09	[175] CP
	2019 11 27	[215] CP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_KB-2	2019 02 28	[273] CP
	2019 04 10	[300] CP
	2019 06 10	[174] CP
	2019 07 31	[122]
	Duplicate	[121]
	2019 10 21	[170] CP
	Duplicate	[167] CP
	2019 12 10	[192] CP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_KB-3A	2019 02 26	[237] CP
	Duplicate	[233] CP
	2019 03 25	[244] CP
	Duplicate	[241] CP
	2019 06 10	[216] CP
	Duplicate	[208] CP
	2019 07 30	[266] CP
	2019 10 18	[226] CP
	2019 12 11	[194] CP
FR_KB-3B	2019 02 25	[281] CP
	2019 03 25	[297] CP
	2019 06 10	[271] CP
	2019 07 30	[200] CP
	2019 10 18	[188] CP
	2019 12 11	[191] CP
	Duplicate	[184] CP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_MW-SK1A	2019 03 28	[266] CP
	Duplicate	[260] CP
	2019 06 13	[114]
	2019 07 29	[112]
	Duplicate	[112]
	2019 10 24	[171] CP
FR_MW-SK1B	2019 03 28	1.98
	2019 06 13	1.98
	2019 07 29	3.23
	2019 10 24	4.48

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_09-01-A	2019 03 14	[50.5]
	2019 05 30	[130]
	2019 07 29	[102]
	2019 11 01	[126]
FR_09-01-B	2019 03 14	[52.2]
	2019 05 30	[76]
	2019 07 29	[83.2]
	2019 11 01	[70.7]

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_09-02-A	2019 03 14	[50.4]
	2019 05 30	[52.9]
	2019 07 26	49
	Duplicate	49.5
	2019 10 24	49.3
	Duplicate	[52.4]
FR_09-02-B	2019 03 14	[51.8]
	2019 05 30	[111]
	2019 07 26	30.6
	2019 10 24	36.3

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
FR_GH_WELL4	2019 03 21	[147] SPO
	2019 06 13	[140] SPO
	2019 07 30	[118] SPO
	Duplicate	[117] SPO
	2019 11 01	[103] SPO

Legend

Surface Water Stations
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Secondary Road
- Tailings/Settling Pond
- FRO Permitted Boundary
- Study Areas
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Stream Ditch
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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	Dissolved Selenium µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10
Secondary Screening Criteria	**Dissolved Selenium µg/L**
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective (Fording River)	63 SPO
Compliance Point (Fording River)	130 CP

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION:
Fording River Operations, BC

CLIENT NAME:
Teck Coal Limited

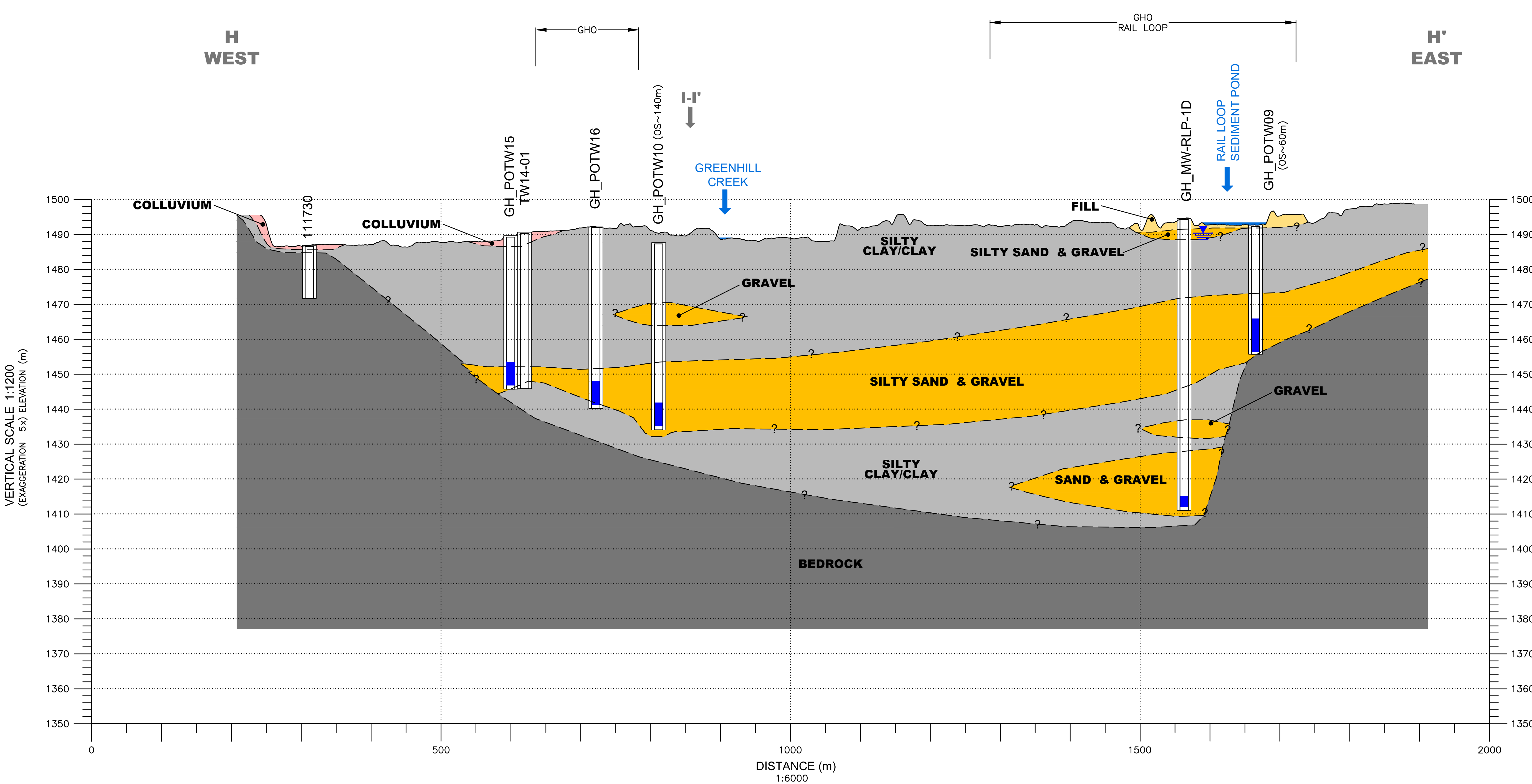
SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater - Fording River Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 23

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\23-SeIFRO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

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

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. DETAILED INSTALL RECORDS WERE NOT AVAILABLE FOR WELLS GH_POTW15, GH_POTW09 AND GH_POTW10. ESTIMATED 6m SCREEN.
5. 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	2020–03–25	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

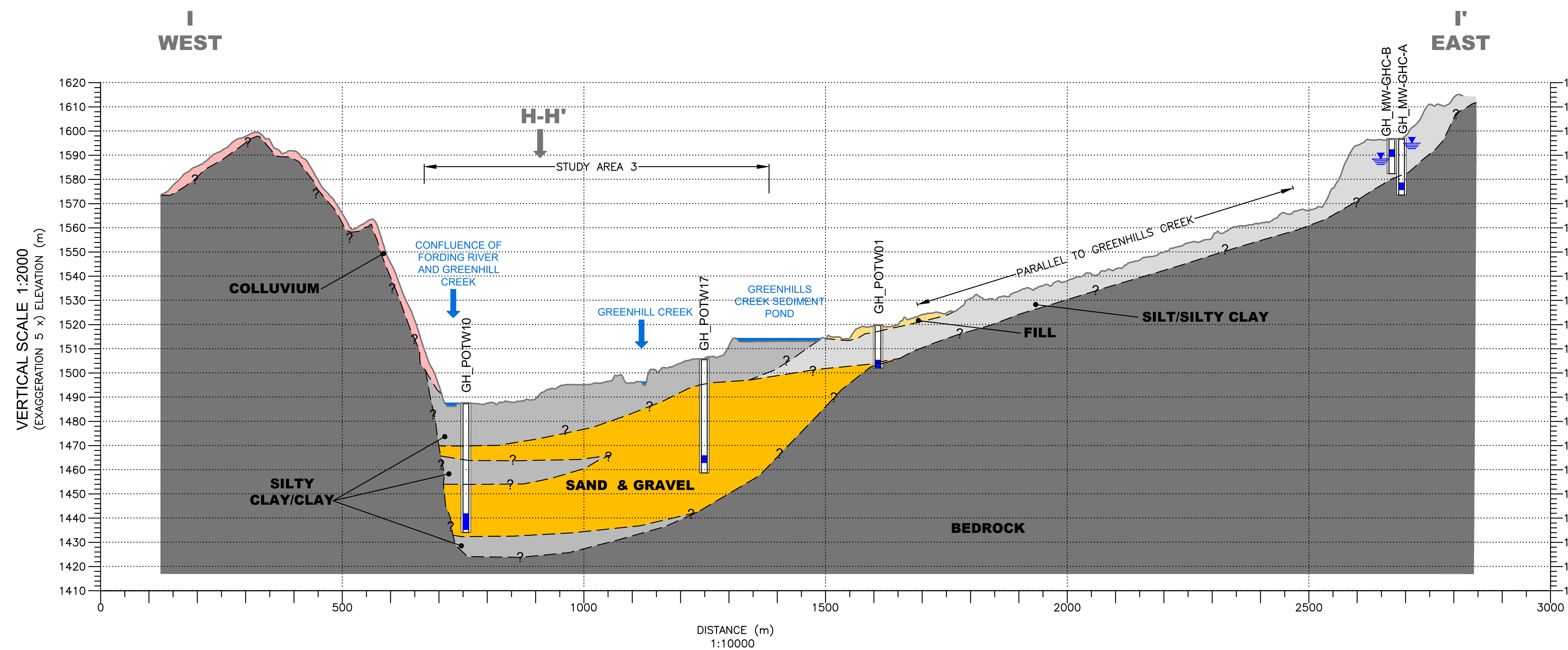
PROJECT LOCATION:
GREENHILLS OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
GREENHILLS OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION H-H'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KC	PLOT: 20200324.1432	CADFILE: 671557–XR1	DRAWING 24

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

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

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. DETAILED INSTALL RECORDS WERE NOT AVAILABLE FOR WELL GH_POTW01 AND GH_POTW10. ESTIMATED 6m SCREEN.
5. 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	2020–03–25	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

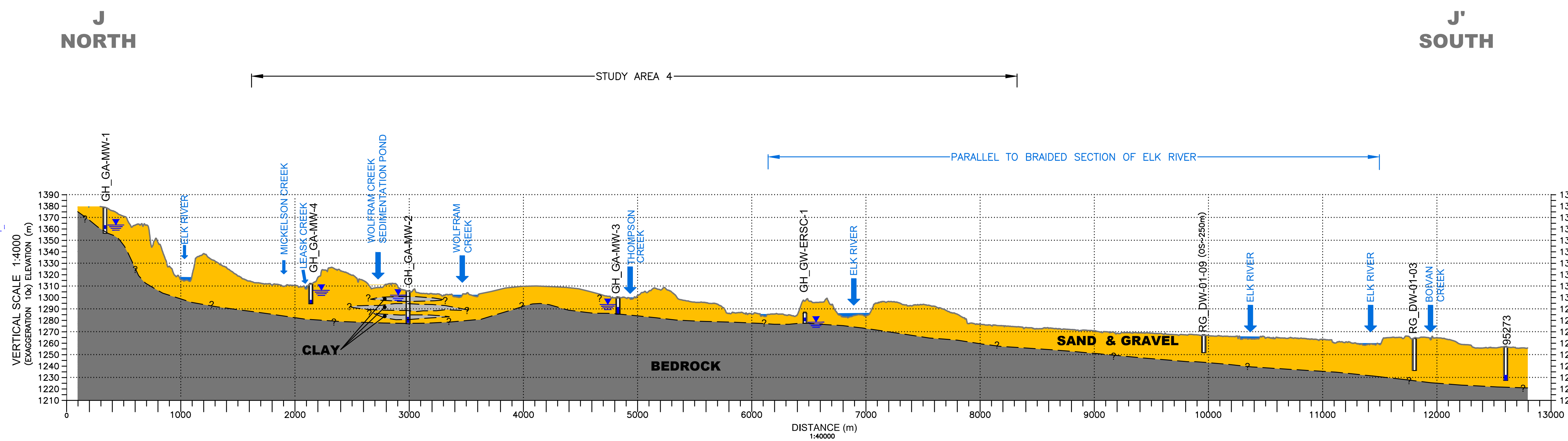
PROJECT LOCATION:
GREENHILLS OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
GREENHILLS OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION I-I'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KC	PLOT: 20200324.1432	CADFILE: 671557–XR1	DRAWING 25

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

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

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. 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	2020–03–25	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

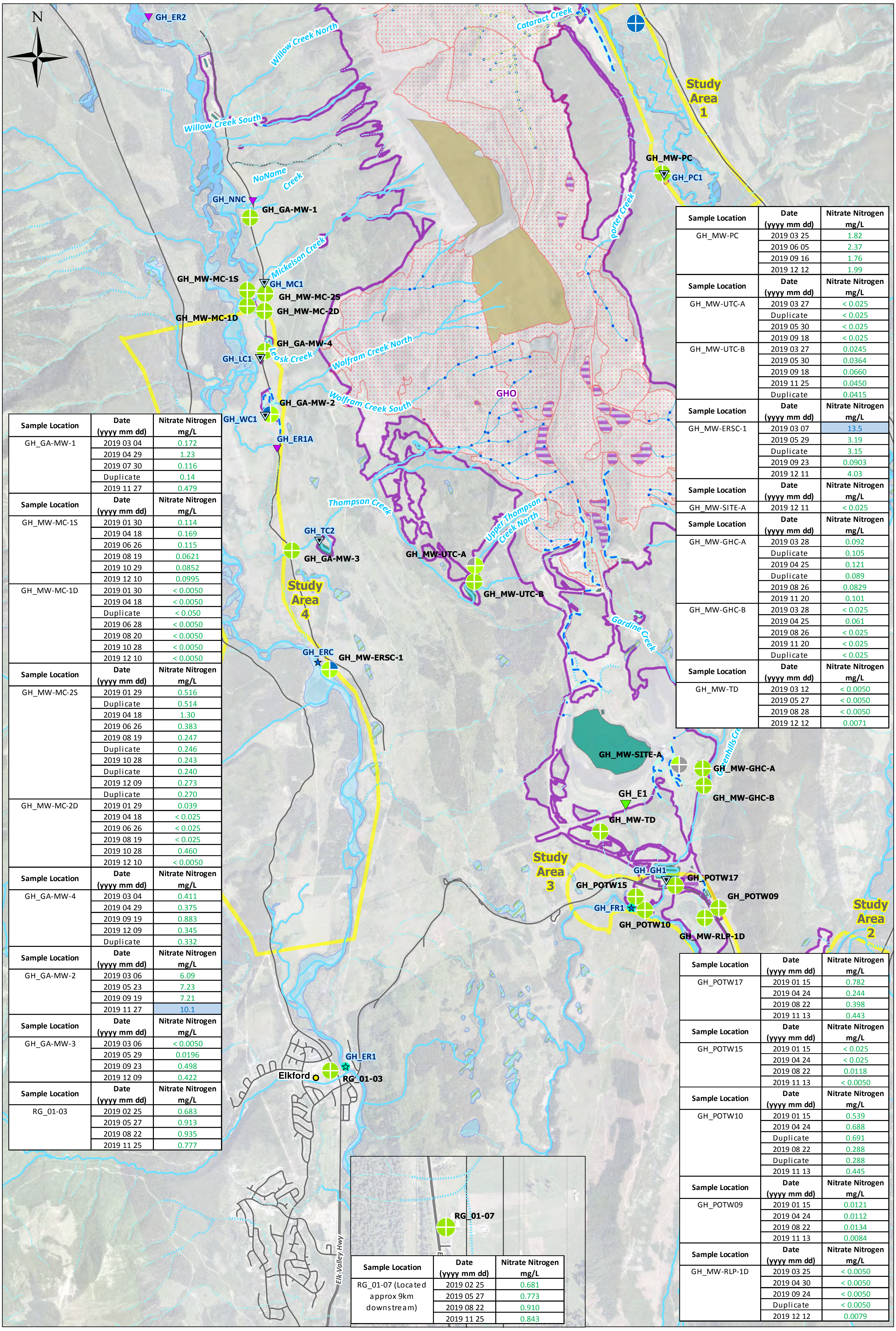
PROJECT LOCATION:
GREENHILLS OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
GREENHILLS OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION J-J'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KC	PLOT: 20200324.1432	CADFILE: 671557–XR1	DRAWING 26

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_GA-MW-1	2019 03 04	0.172
	2019 04 29	1.23
	2019 07 30	0.116
	Duplicate	0.14
	2019 11 27	0.479

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-MC-1S	2019 01 30	0.114
	2019 04 18	0.169
	2019 06 26	0.115
	2019 08 19	0.0621
	2019 10 29	0.0852
	2019 12 10	0.0995
GH_MW-MC-1D	2019 01 30	< 0.0050
	2019 04 18	< 0.0050
	Duplicate	< 0.050
	2019 06 28	< 0.0050
	2019 08 20	< 0.0050
	2019 10 28	< 0.0050
	2019 12 10	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-MC-2S	2019 01 29	0.516
	Duplicate	0.514
	2019 04 18	1.30
	2019 06 26	0.383
	2019 08 19	0.247
	Duplicate	0.246
	2019 10 28	0.243
	Duplicate	0.240
	2019 12 09	0.273
	Duplicate	0.270
GH_MW-MC-2D	2019 01 29	0.039
	2019 04 18	< 0.025
	2019 06 26	< 0.025
	2019 08 19	< 0.025
	2019 10 28	0.460
	2019 12 10	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_GA-MW-4	2019 03 04	0.411
	2019 04 29	0.375
	2019 09 19	0.883
	2019 12 09	0.345
	Duplicate	0.332

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_GA-MW-2	2019 03 06	6.09
	2019 05 23	7.23
	2019 09 19	7.21
	2019 11 27	10.1

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_GA-MW-3	2019 03 06	< 0.0050
	2019 05 29	0.0196
	2019 09 23	0.498
	2019 12 09	0.422

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
RG_01-03	2019 02 25	0.683
	2019 05 27	0.913
	2019 08 22	0.935
	2019 11 25	0.777

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-PC	2019 03 25	1.82
	2019 06 05	2.37
	2019 09 16	1.76
	2019 12 12	1.99

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-UTC-A	2019 03 27	< 0.025
	Duplicate	< 0.025
	2019 05 30	< 0.025
	2019 09 18	< 0.025
GH_MW-UTC-B	2019 03 27	0.0245
	2019 05 30	0.0364
	2019 09 18	0.0660
	2019 11 25	0.0450
	Duplicate	0.0415

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-ERSC-1	2019 03 07	13.5
	2019 05 29	3.19
	Duplicate	3.15
	2019 09 23	0.0903
	2019 12 11	4.03

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-SITE-A	2019 12 11	< 0.025

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-GHC-A	2019 03 28	0.092
	Duplicate	0.105
	2019 04 25	0.121
	Duplicate	0.089
	2019 08 26	0.0829
	2019 11 20	0.101
GH_MW-GHC-B	2019 03 28	< 0.025
	2019 04 25	0.061
	2019 08 26	< 0.025
	2019 11 20	< 0.025
	Duplicate	< 0.025

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-TD	2019 03 12	< 0.0050
	2019 05 27	< 0.0050
	2019 08 28	< 0.0050
	2019 12 12	0.0071

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_POTW17	2019 01 15	0.782
	2019 04 24	0.244
	2019 08 22	0.398
	2019 11 13	0.443

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_POTW15	2019 01 15	< 0.025
	2019 04 24	< 0.025
	2019 08 22	0.0118
	2019 11 13	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_POTW10	2019 01 15	0.539
	2019 04 24	0.688
	Duplicate	0.691
	2019 08 22	0.288
	Duplicate	0.288
	2019 11 13	0.445

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_POTW09	2019 01 15	0.0121
	2019 04 24	0.0112
	2019 08 22	0.0134
	2019 11 13	0.0084

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
GH_MW-RLP-1D	2019 03 25	< 0.0050
	2019 04 30	< 0.0050
	2019 09 24	< 0.0050
	Duplicate	< 0.0050
	2019 12 12	0.0079

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
RG_01-07 (Located approx 9km downstream)	2019 02 25	0.681
	2019 05 27	0.773
	2019 08 22	0.910
	2019 11 25	0.843

Legend

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Regional Seep Program

Site Features
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- Tailings/Settling Pond
- GHO
- Study Areas

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Rock Drain

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 Nitrogen mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
References:
1. Information provided by Teck Coal Limited.
Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION: Greenhills Operations, BC

CLIENT NAME: Teck Coal Limited

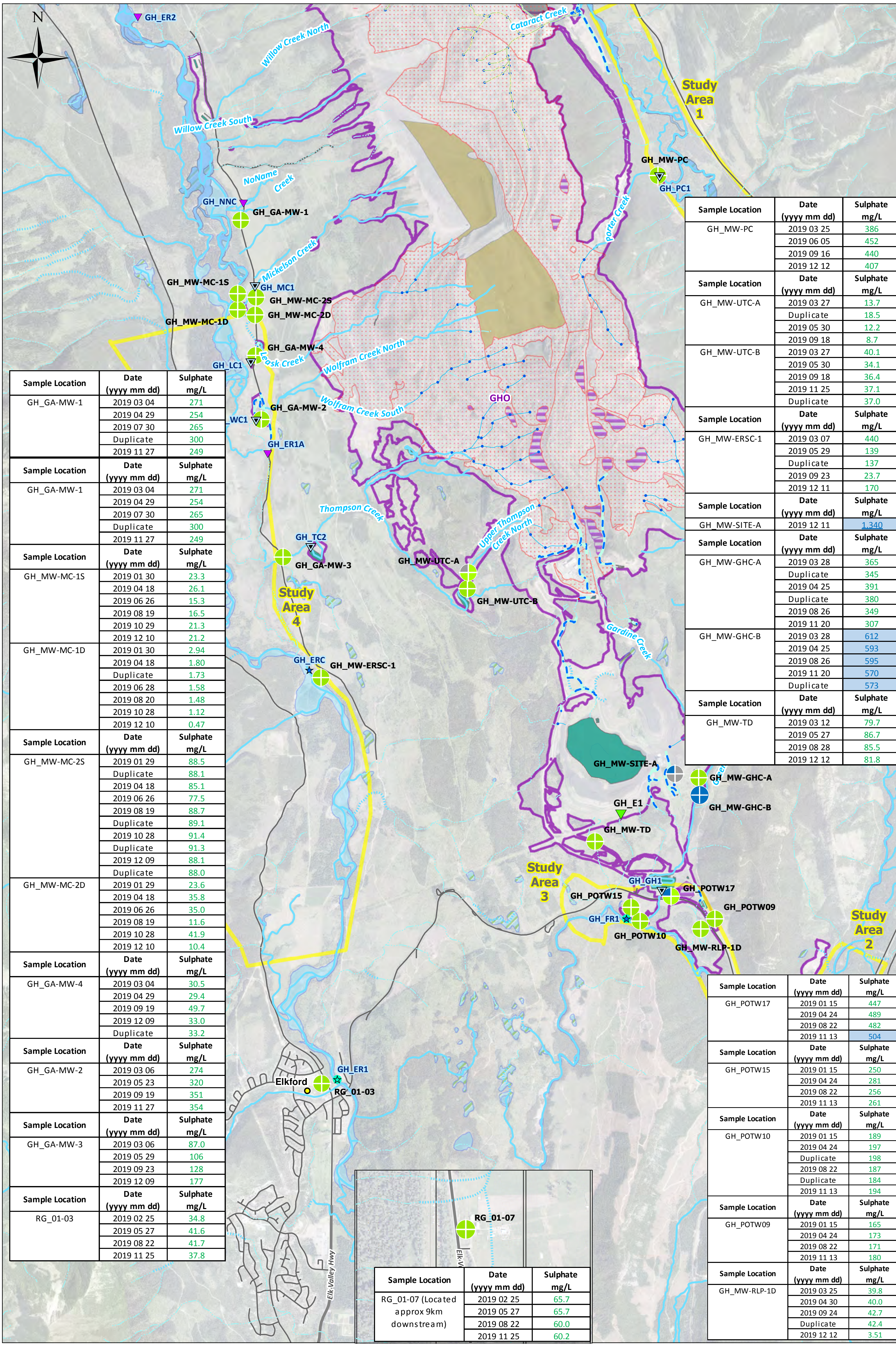
SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater - Greenhills Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 27

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\27-NitGHO_v1.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_GA-MW-1	2019 03 04	271
	2019 04 29	254
	2019 07 30	265
	Duplicate	300
	2019 11 27	249

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_GA-MW-1	2019 03 04	271
	2019 04 29	254
	2019 07 30	265
	Duplicate	300
	2019 11 27	249

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-MC-1S	2019 01 30	23.3
	2019 04 18	26.1
	2019 06 26	15.3
	2019 08 19	16.5
	2019 10 29	21.3
	2019 12 10	21.2
GH_MW-MC-1D	2019 01 30	2.94
	2019 04 18	1.80
	Duplicate	1.73
	2019 06 28	1.58
	2019 08 20	1.48
	2019 10 28	1.12
	2019 12 10	0.47

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-MC-2S	2019 01 29	88.5
	Duplicate	88.1
	2019 04 18	85.1
	2019 06 26	77.5
	2019 08 19	88.7
	Duplicate	89.1
	2019 10 28	91.4
	Duplicate	91.3
	2019 12 09	88.1
	Duplicate	88.0
GH_MW-MC-2D	2019 01 29	23.6
	2019 04 18	35.8
	2019 06 26	35.0
	2019 08 19	11.6
	2019 10 28	41.9
	2019 12 10	10.4

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_GA-MW-4	2019 03 04	30.5
	2019 04 29	29.4
	2019 09 19	49.7
	2019 12 09	33.0
	Duplicate	33.2

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_GA-MW-2	2019 03 06	274
	2019 05 23	320
	2019 09 19	351
	2019 11 27	354

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_GA-MW-3	2019 03 06	87.0
	2019 05 29	106
	2019 09 23	128
	2019 12 09	177

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
RG_01-03	2019 02 25	34.8
	2019 05 27	41.6
	2019 08 22	41.7
	2019 11 25	37.8

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-PC	2019 03 25	386
	2019 06 05	452
	2019 09 16	440
	2019 12 12	407

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-UTC-A	2019 03 27	13.7
	Duplicate	18.5
	2019 05 30	12.2
	2019 09 18	8.7
GH_MW-UTC-B	2019 03 27	40.1
	2019 05 30	34.1
	2019 09 18	36.4
	2019 11 25	37.1
	Duplicate	37.0

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-ERSC-1	2019 03 07	440
	2019 05 29	139
	Duplicate	137
	2019 09 23	23.7
	2019 12 11	170

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-SITE-A	2019 12 11	1,340

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-GHC-A	2019 03 28	365
	Duplicate	345
	2019 04 25	391
	Duplicate	380
	2019 08 26	349
	2019 11 20	307
GH_MW-GHC-B	2019 03 28	612
	2019 04 25	593
	2019 08 26	595
	2019 11 20	570
	Duplicate	573

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-TD	2019 03 12	79.7
	2019 05 27	86.7
	2019 08 28	85.5
	2019 12 12	81.8

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_POTW17	2019 01 15	447
	2019 04 24	489
	2019 08 22	482
	2019 11 13	504

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_POTW15	2019 01 15	250
	2019 04 24	281
	2019 08 22	256
	2019 11 13	261

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_POTW10	2019 01 15	189
	2019 04 24	197
	Duplicate	198
	2019 08 22	187
	Duplicate	184
	2019 11 13	194

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_POTW09	2019 01 15	165
	2019 04 24	173
	2019 08 22	171
	2019 11 13	180

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
GH_MW-RLP-1D	2019 03 25	39.8
	2019 04 30	40.0
	2019 09 24	42.7
	Duplicate	42.4
	2019 12 12	3.51

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
RG_01-07 (Located approx 9km downstream)	2019 02 25	65.7
	2019 05 27	65.7
	2019 08 22	60.0
	2019 11 25	60.2

Legend

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Regional Seep Program

Site Features
- Highway
- Secondary Road
- Tailings/Settling Pond
- GHO
- Pit
- Stockpiles
- Waste Spoil
- Study Areas
- Pit
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Rock Drain

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. Intended for illustration purposes only.
2. Original in colour.
References:
1. Information provided by Teck Coal Limited.
Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION:
Greenhills Operations, BC

CLIENT NAME:
Teck Coal Limited

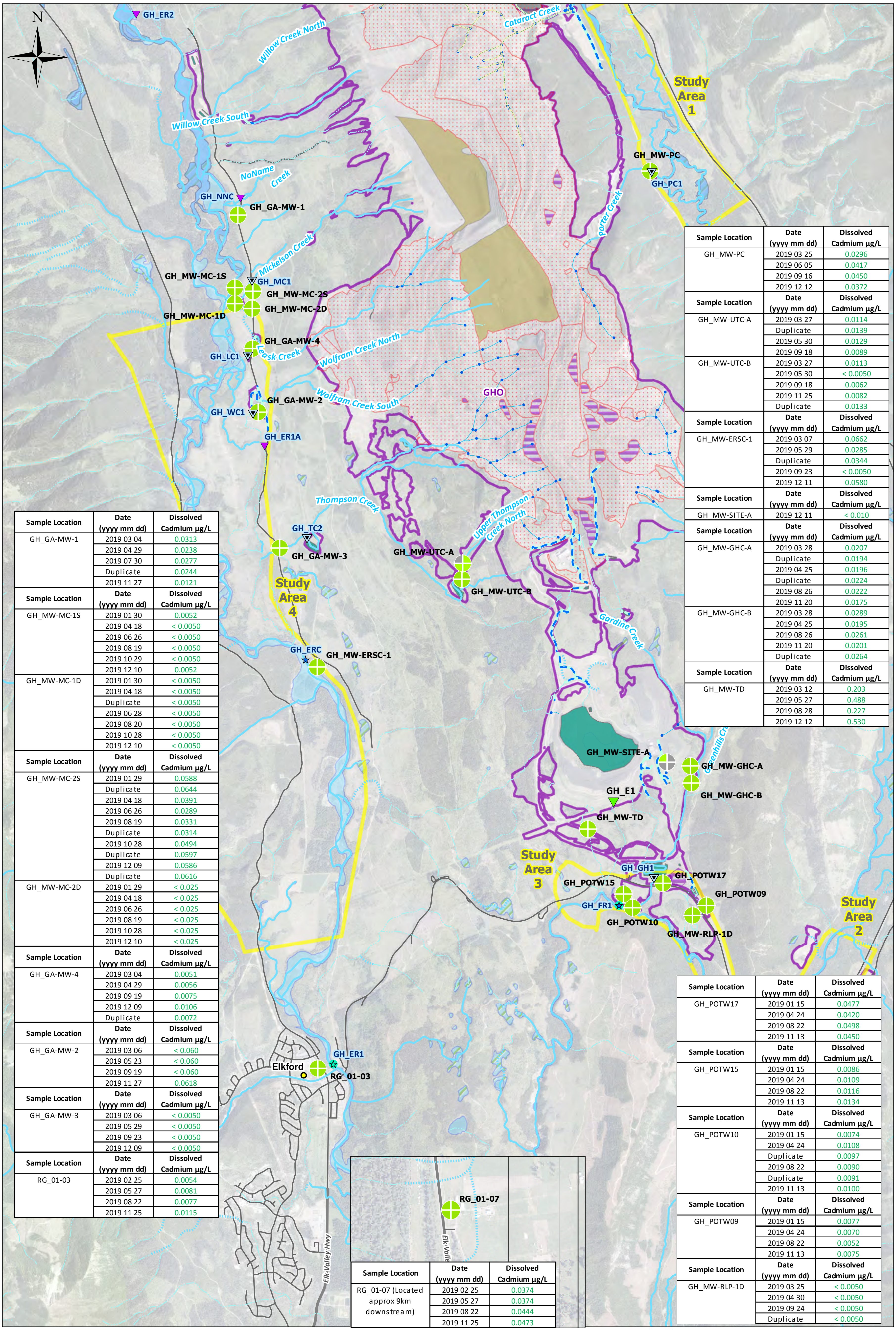
SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater - Greenhills Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 28

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\28-SulGHO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-PC	2019 03 25	0.0296
	2019 06 05	0.0417
	2019 09 16	0.0450
	2019 12 12	0.0372

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-UTC-A	2019 03 27	0.0114
	Duplicate	0.0139
	2019 05 30	0.0129
	2019 09 18	0.0089
GH_MW-UTC-B	2019 03 27	0.0113
	2019 05 30	< 0.0050
	2019 09 18	0.0062
	2019 11 25	0.0082
	Duplicate	0.0133

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-ERSC-1	2019 03 07	0.0662
	2019 05 29	0.0285
	Duplicate	0.0344
	2019 09 23	< 0.0050
	2019 12 11	0.0580

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-SITE-A	2019 12 11	< 0.010

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-GHC-A	2019 03 28	0.0207
	Duplicate	0.0194
	2019 04 25	0.0196
	Duplicate	0.0224
	2019 08 26	0.0222
	2019 11 20	0.0175
GH_MW-GHC-B	2019 03 28	0.0289
	2019 04 25	0.0195
	2019 08 26	0.0261
	2019 11 20	0.0201
	Duplicate	0.0264

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-TD	2019 03 12	0.203
	2019 05 27	0.488
	2019 08 28	0.227
	2019 12 12	0.530

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_GA-MW-1	2019 03 04	0.0313
	2019 04 29	0.0238
	2019 07 30	0.0277
	Duplicate	0.0244
	2019 11 27	0.0121

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-MC-1S	2019 01 30	0.0052
	2019 04 18	< 0.0050
	2019 06 26	< 0.0050
	2019 08 19	< 0.0050
	2019 10 29	< 0.0050
	2019 12 10	0.0052
GH_MW-MC-1D	2019 01 30	< 0.0050
	2019 04 18	< 0.0050
	Duplicate	< 0.0050
	2019 06 28	< 0.0050
	2019 08 20	< 0.0050
	2019 10 28	< 0.0050
	2019 12 10	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-MC-2S	2019 01 29	0.0588
	Duplicate	0.0644
	2019 04 18	0.0391
	2019 06 26	0.0289
	2019 08 19	0.0331
	Duplicate	0.0314
	2019 10 28	0.0494
	Duplicate	0.0597
	2019 12 09	0.0586
	Duplicate	0.0616
GH_MW-MC-2D	2019 01 29	< 0.025
	2019 04 18	< 0.025
	2019 06 26	< 0.025
	2019 08 19	< 0.025
	2019 10 28	< 0.025
	2019 12 10	< 0.025

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_GA-MW-4	2019 03 04	0.0051
	2019 04 29	0.0056
	2019 09 19	0.0075
	2019 12 09	0.0106
	Duplicate	0.0072

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_GA-MW-2	2019 03 06	< 0.060
	2019 05 23	< 0.060
	2019 09 19	< 0.060
	2019 11 27	0.0618

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_GA-MW-3	2019 03 06	< 0.0050
	2019 05 29	< 0.0050
	2019 09 23	< 0.0050
	2019 12 09	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
RG_01-03	2019 02 25	0.0054
	2019 05 27	0.0081
	2019 08 22	0.0077
	2019 11 25	0.0115

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
RG_01-07 (Located approx 9km downstream)	2019 02 25	0.0374
	2019 05 27	0.0374
	2019 08 22	0.0444
	2019 11 25	0.0473

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_POTW17	2019 01 15	0.0477
	2019 04 24	0.0420
	2019 08 22	0.0498
	2019 11 13	0.0450

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_POTW15	2019 01 15	0.0086
	2019 04 24	0.0109
	2019 08 22	0.0116
	2019 11 13	0.0134

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_POTW10	2019 01 15	0.0074
	2019 04 24	0.0108
	Duplicate	0.0097
	2019 08 22	0.0090
	Duplicate	0.0091
	2019 11 13	0.0100

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_POTW09	2019 01 15	0.0077
	2019 04 24	0.0070
	2019 08 22	0.0052
	2019 11 13	0.0075

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
GH_MW-RLP-1D	2019 03 25	< 0.0050
	2019 04 30	< 0.0050
	2019 09 24	< 0.0050
	Duplicate	< 0.0050

Legend

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Regional Seep Program

Site Features
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- Tailings/Settling Pond
- GHO
- Study Areas
- Pit
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Rock Drain

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	Dissolved Cadmium µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

Notes:
1. Intended for illustration purposes only.
2. Original in colour.
References:
1. Information provided by Teck Coal Limited.
Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION:
Greenhills Operations, BC

CLIENT NAME:
Teck Coal Limited

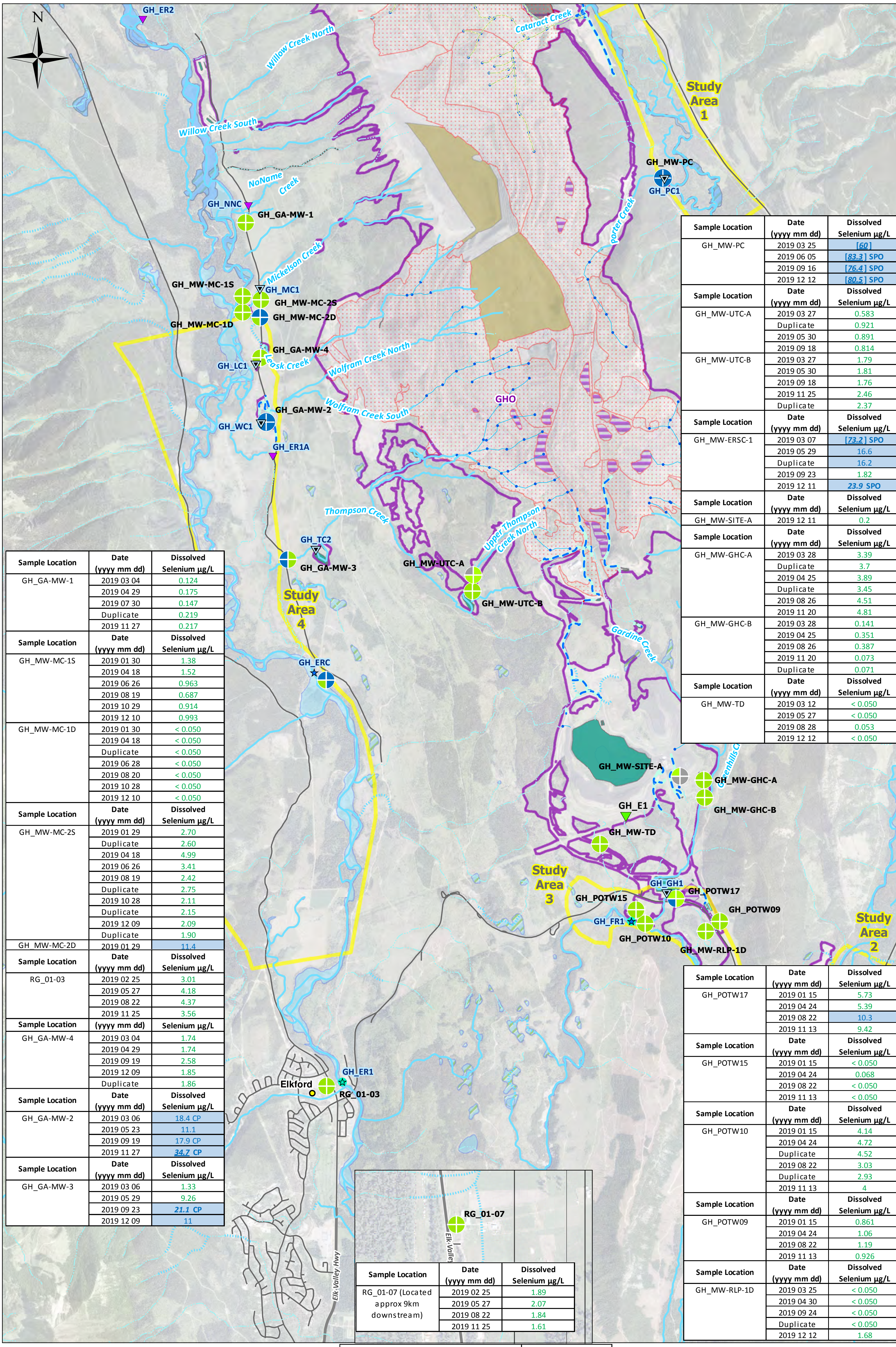
SNC·LAVALIN

Spatial Distribution of Dissolved Cadmium in Groundwater - Greenhills Operations

CHK'D: SB	DATE: 2020/03/30	SCALE: 1:50,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 29

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\29-CadGHO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_GA-MW-1	2019 03 04	0.124
	2019 04 29	0.175
	2019 07 30	0.147
	Duplicate	0.219
	2019 11 27	0.217

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-MC-1S	2019 01 30	1.38
	2019 04 18	1.52
	2019 06 26	0.963
	2019 08 19	0.687
	2019 10 29	0.914
	2019 12 10	0.993
GH_MW-MC-1D	2019 01 30	< 0.050
	2019 04 18	< 0.050
	Duplicate	< 0.050
	2019 06 28	< 0.050
	2019 08 20	< 0.050
	2019 10 28	< 0.050
	2019 12 10	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-MC-2S	2019 01 29	2.70
	Duplicate	2.60
	2019 04 18	4.99
	2019 06 26	3.41
	2019 08 19	2.42
	Duplicate	2.75
	2019 10 28	2.11
	Duplicate	2.15
	2019 12 09	2.09
	Duplicate	1.90
GH_MW-MC-2D	2019 01 29	11.4

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
RG_01-03	2019 02 25	3.01
	2019 05 27	4.18
	2019 08 22	4.37
	2019 11 25	3.56

Sample Location	(yyyy mm dd)	Selenium µg/L
GH_GA-MW-4	2019 03 04	1.74
	2019 04 29	1.74
	2019 09 19	2.58
	2019 12 09	1.85
	Duplicate	1.86

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_GA-MW-2	2019 03 06	18.4 CP
	2019 05 23	11.1
	2019 09 19	17.9 CP
	2019 11 27	*34.7* CP

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_GA-MW-3	2019 03 06	1.33
	2019 05 29	9.26
	2019 09 23	*21.1* CP
	2019 12 09	11

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-PC	2019 03 25	[60]
	2019 06 05	[83.3] SPO
	2019 09 16	[76.4] SPO
	2019 12 12	[80.5] SPO

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-UTC-A	2019 03 27	0.583
	Duplicate	0.921
	2019 05 30	0.891
	2019 09 18	0.814
GH_MW-UTC-B	2019 03 27	1.79
	2019 05 30	1.81
	2019 09 18	1.76
	2019 11 25	2.46
	Duplicate	2.37

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-ERSC-1	2019 03 07	[73.2] SPO
	2019 05 29	16.6
	Duplicate	16.2
	2019 09 23	1.82
	2019 12 11	*23.9* SPO

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-SITE-A	2019 12 11	0.2

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-GHC-A	2019 03 28	3.39
	Duplicate	3.7
	2019 04 25	3.89
	Duplicate	3.45
	2019 08 26	4.51
	2019 11 20	4.81
GH_MW-GHC-B	2019 03 28	0.141
	2019 04 25	0.351
	2019 08 26	0.387
	2019 11 20	0.073
	Duplicate	0.071

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-TD	2019 03 12	< 0.050
	2019 05 27	< 0.050
	2019 08 28	0.053
	2019 12 12	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_POTW17	2019 01 15	5.73
	2019 04 24	5.39
	2019 08 22	10.3
	2019 11 13	9.42

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_POTW15	2019 01 15	< 0.050
	2019 04 24	0.068
	2019 08 22	< 0.050
	2019 11 13	< 0.050

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_POTW10	2019 01 15	4.14
	2019 04 24	4.72
	Duplicate	4.52
	2019 08 22	3.03
	Duplicate	2.93
	2019 11 13	4

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_POTW09	2019 01 15	0.861
	2019 04 24	1.06
	2019 08 22	1.19
	2019 11 13	0.926

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
GH_MW-RLP-1D	2019 03 25	< 0.050
	2019 04 30	< 0.050
	2019 09 24	< 0.050
	Duplicate	< 0.050
	2019 12 12	1.68

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
RG_01-07 (Located approx 9km downstream)	2019 02 25	1.89
	2019 05 27	2.07
	2019 08 22	1.84
	2019 11 25	1.61

Primary Screening Criteria	Dissolved Selenium µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10
Secondary Screening Criteria	**Dissolved Selenium µg/L**
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective (Elk River)	19 SPO
Compliance Point (Elk River)	15 CP
Site Perfomance Objective (Fording River)	63 SPO

Legend

Surface Water Stations
- Compliance Point
- Order Station
- Order Station and Compliance Point
- Receiving Environment
- Authorized Discharge
- Regional Seep Program

Site Features
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- Tailings/Settling Pond
- GHO
- Study Areas
- Pit
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Rock Drain

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

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:

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

PROJECT LOCATION:
Greenhills Operations, BC

CLIENT NAME:
Teck Coal Limited

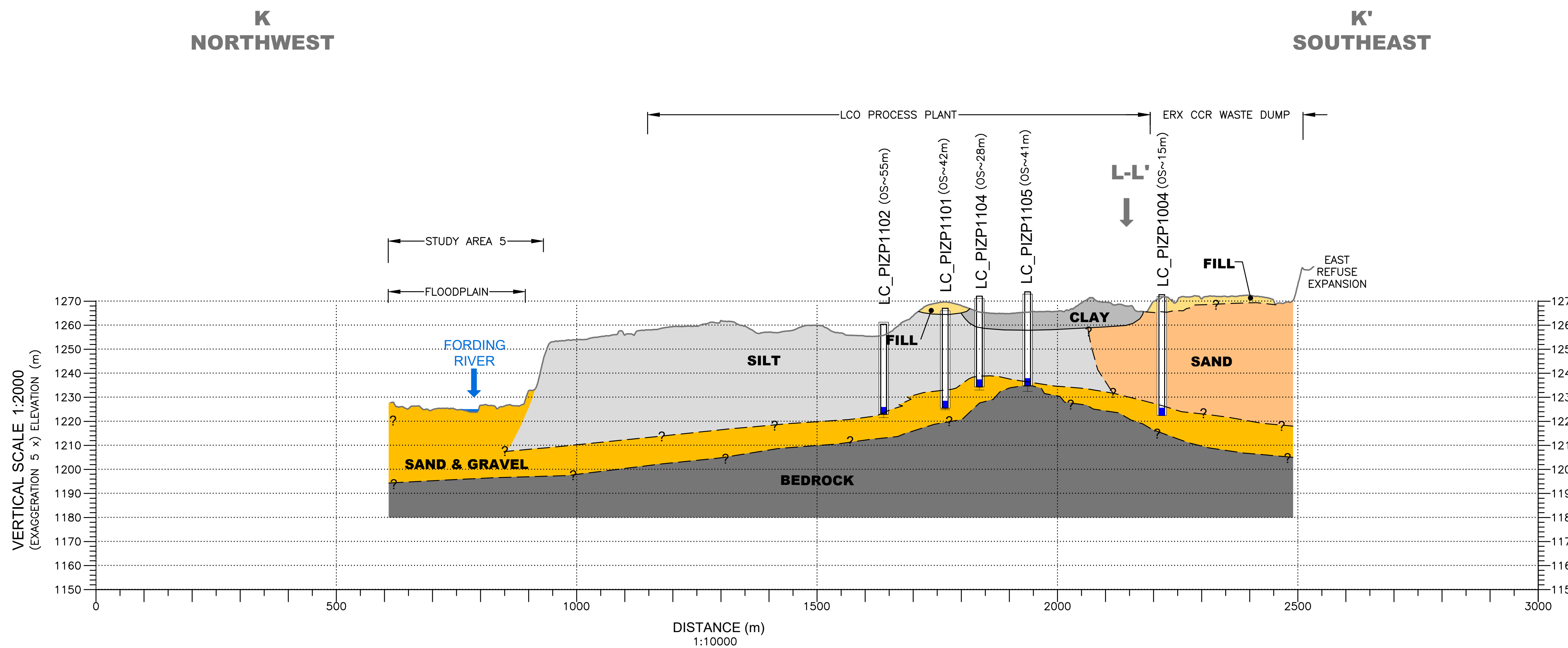
SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater - Greenhills Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | **DRAWING 30**

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\30-SelGHO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

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

— — — INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. 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	2020–03–25	ISSUED TO CLIENT	AJK	KC

CLIENT NAME:
TECK COAL LIMITED
–

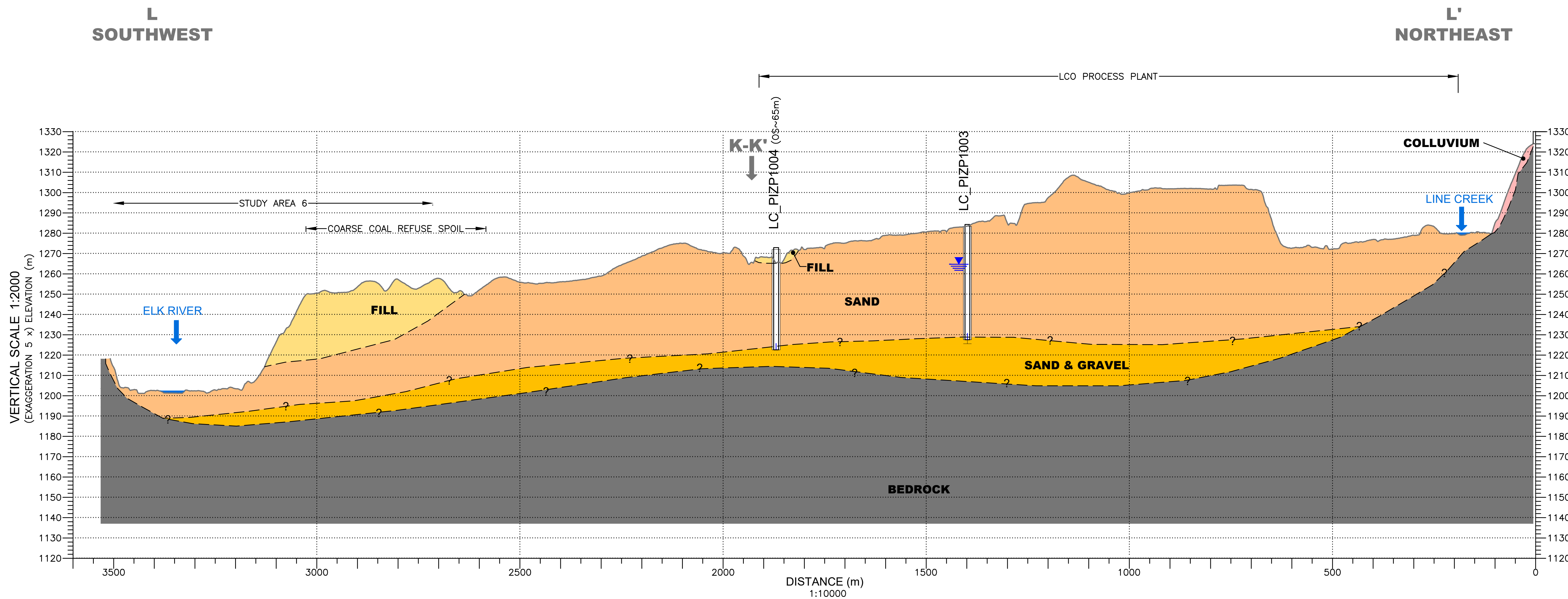
PROJECT LOCATION:
LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

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

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No:	REV.: 0
CHK'D: KC	PLOT: 20200324.1432	CADFILE: 671557–XR1	DRAWING 31	

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

FILL	- - - INFERRED STRATIGRAPHIC BOUNDARY
COLLUVIUM	GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)
SAND & GRAVEL	
SAND	
SILT	
CLAY	
BEDROCK	

BOREHOLE LEGEND

EV_BCgw (OS~70m)

- WELL OFFSET FROM SECTION LINE
- 50 mmø SOLID PVC PIPE
- 50 mmø SLOTTED PVC 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. 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	2020–03–25	ISSUED TO CLIENT	AJK	KC

CLIENT NAME: TECK COAL LIMITED
–

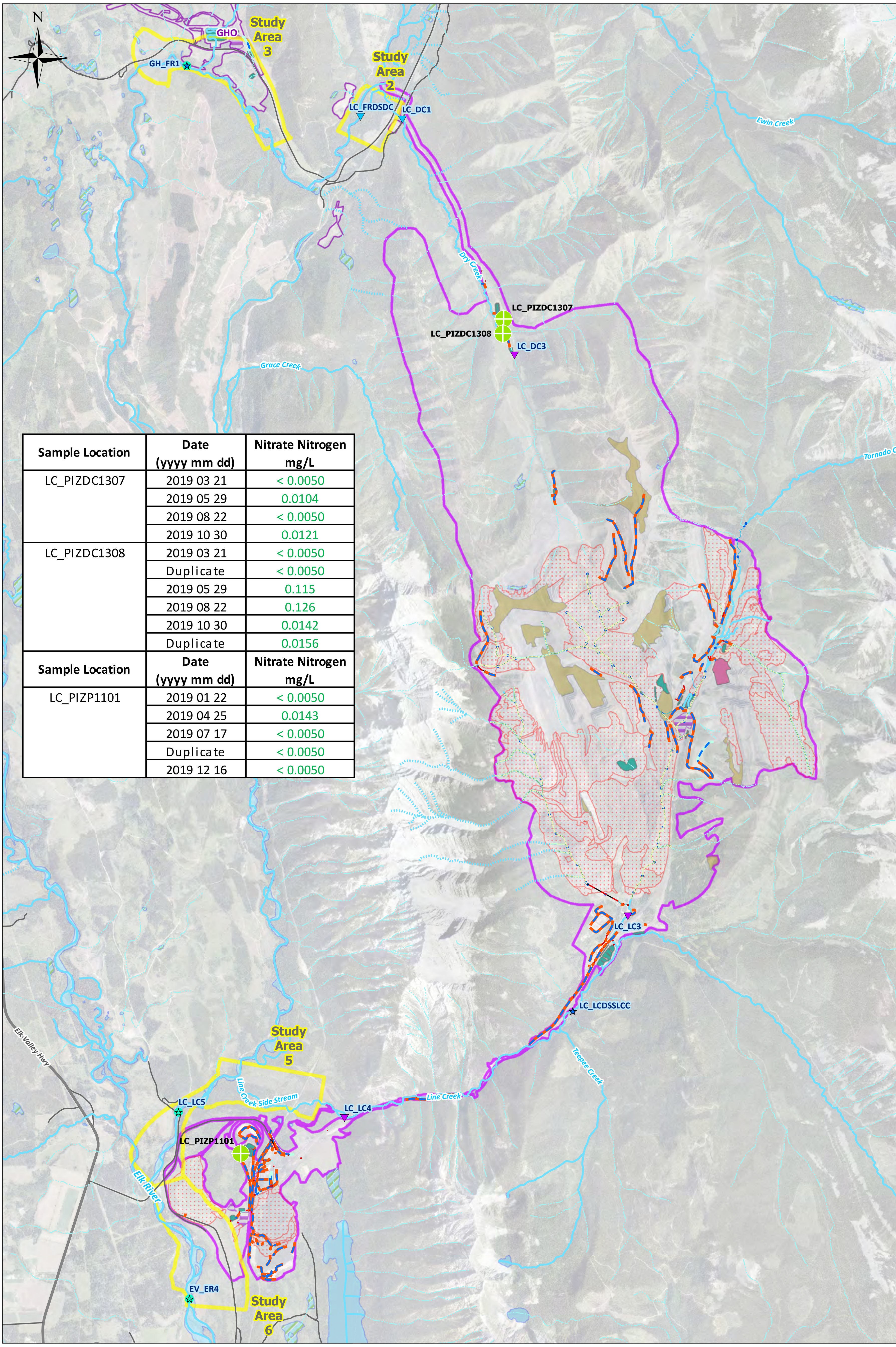
PROJECT LOCATION: LINE CREEK OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE: **LINE CREEK OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION L-L'**

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: KC	PLOT: 20200324.1432	CADFILE: 671557–XR1	DRAWING 32

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
LC_PIZDC1307	2019 03 21	< 0.0050
	2019 05 29	0.0104
	2019 08 22	< 0.0050
	2019 10 30	0.0121
LC_PIZDC1308	2019 03 21	< 0.0050
	Duplicate	< 0.0050
	2019 05 29	0.115
	2019 08 22	0.126
	2019 10 30	0.0142
	Duplicate	0.0156

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
LC_PIZP1101	2019 01 22	< 0.0050
	2019 04 25	0.0143
	2019 07 17	< 0.0050
	Duplicate	< 0.0050
	2019 12 16	< 0.0050

Legend

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

Site Features
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- Tailings/Settling Pond
- Reservoir
- GHO
- LCO
- Study Areas

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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 Nitrogen mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 300 600 1,200 1,800 2,400 3,000 Meters

PROJECT LOCATION: Teck Coal Limited

CLIENT NAME: Greenhills Operations, BC

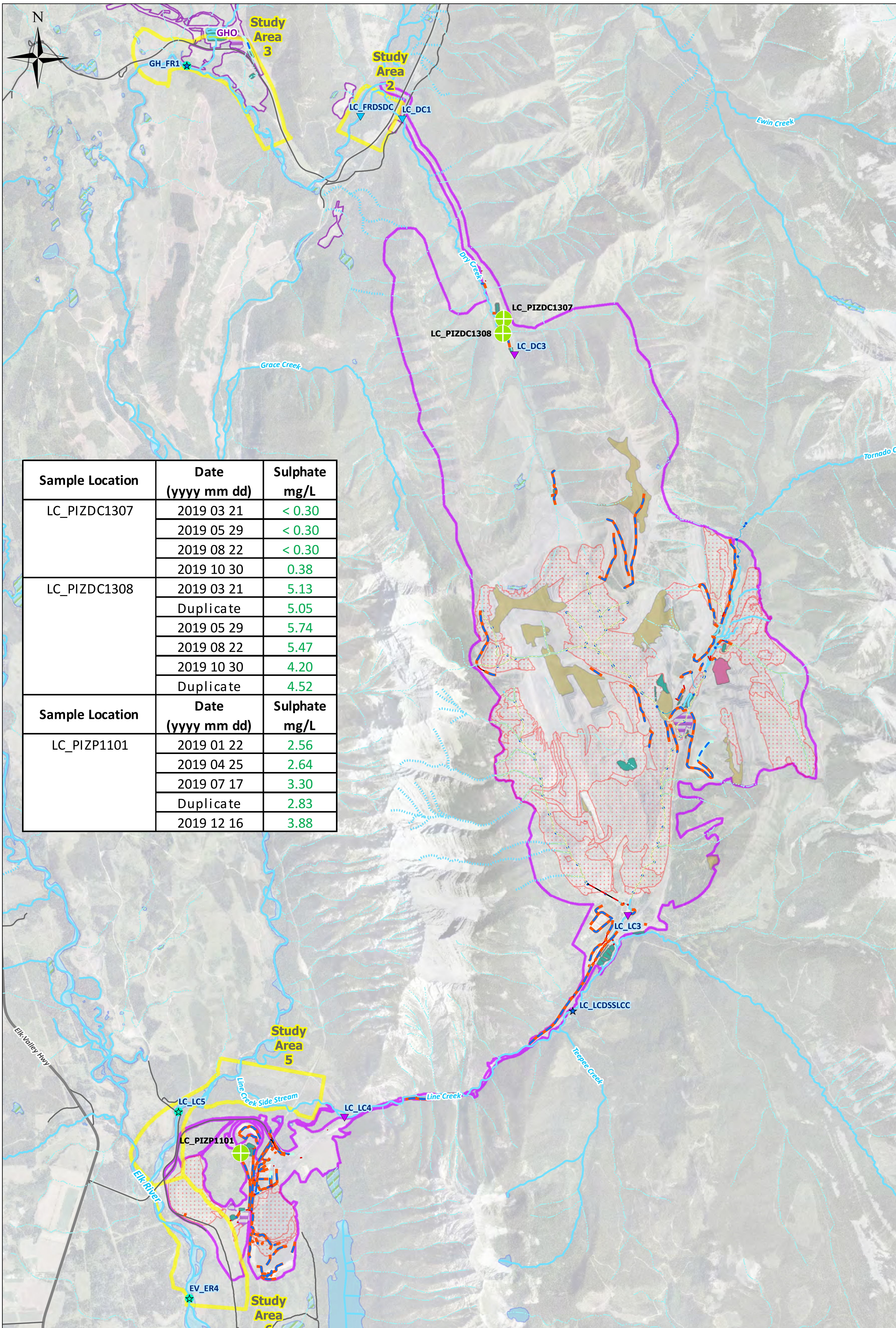
SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater - Line Creek Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:60,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | **DRAWING 33**

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\33-NitLCO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZDC1307	2019 03 21	< 0.30
	2019 05 29	< 0.30
	2019 08 22	< 0.30
	2019 10 30	0.38
LC_PIZDC1308	2019 03 21	5.13
	Duplicate	5.05
	2019 05 29	5.74
	2019 08 22	5.47
	2019 10 30	4.20
	Duplicate	4.52

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
LC_PIZP1101	2019 01 22	2.56
	2019 04 25	2.64
	2019 07 17	3.30
	Duplicate	2.83
	2019 12 16	3.88

Legend

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

Site Features
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- Tailings/Settling Pond
- Reservoir
- GHO
- LCO
- Study Areas

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 300 600 1,200 1,800 2,400 3,000 Meters

PROJECT LOCATION: Teck Coal Limited

CLIENT NAME: Greenhills Operations, BC

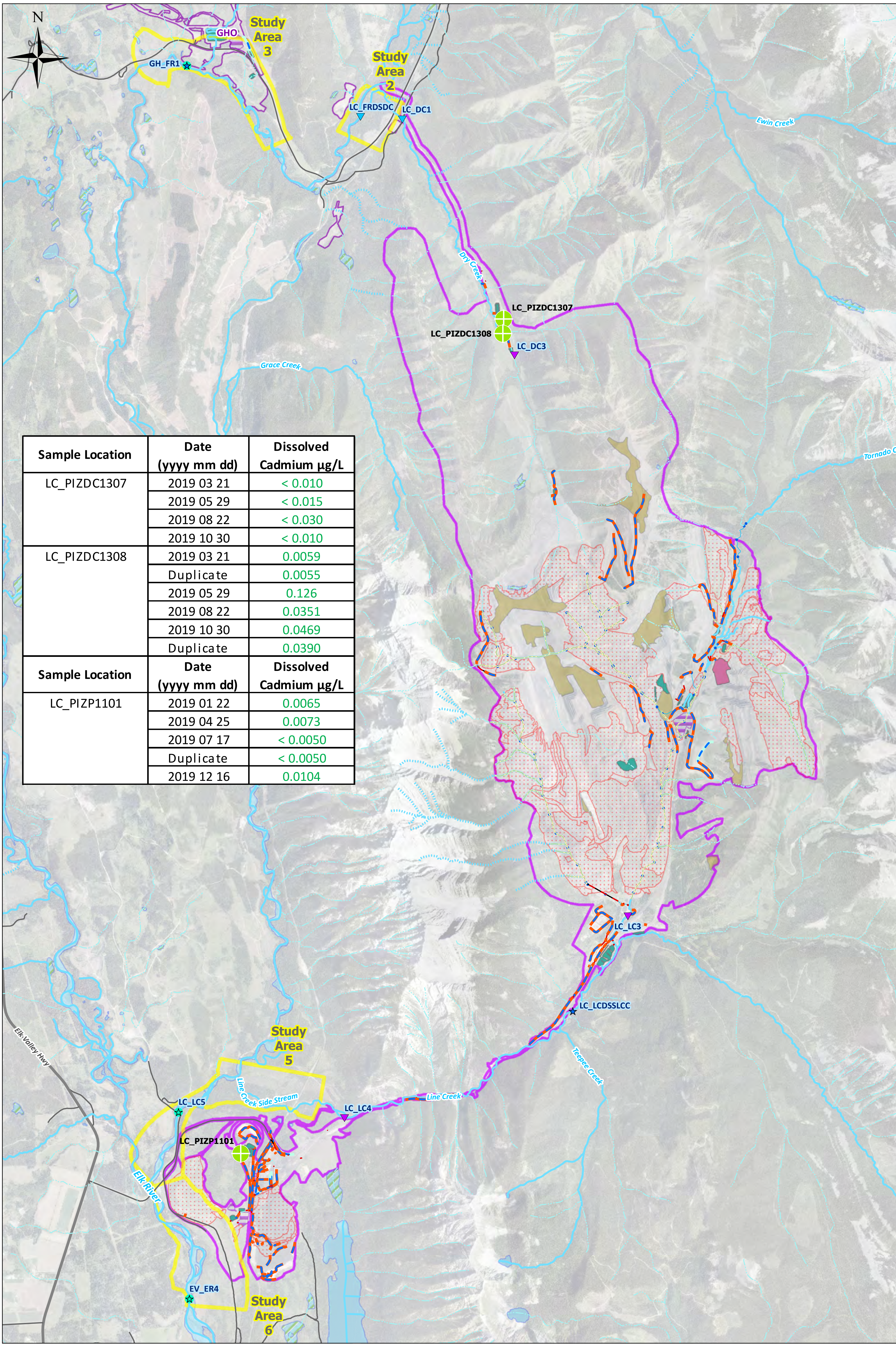
SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater - Line Creek Operations

CHK'D: SB | DATE: 2020/03/31 | SCALE: 1:60,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 34

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\34-SulLCO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
LC_PIZDC1307	2019 03 21	< 0.010
	2019 05 29	< 0.015
	2019 08 22	< 0.030
	2019 10 30	< 0.010
LC_PIZDC1308	2019 03 21	0.0059
	Duplicate	0.0055
	2019 05 29	0.126
	2019 08 22	0.0351
	2019 10 30	0.0469
	Duplicate	0.0390

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
LC_PIZP1101	2019 01 22	0.0065
	2019 04 25	0.0073
	2019 07 17	< 0.0050
	Duplicate	< 0.0050
	2019 12 16	0.0104

Legend

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

Site Features
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- Tailings/Settling Pond
- Reservoir
- GHO
- LCO
- Study Areas

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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	Dissolved Cadmium µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 300 600 1,200 1,800 2,400 3,000 Meters

PROJECT LOCATION: Teck Coal Limited

CLIENT NAME: Greenhills Operations, BC

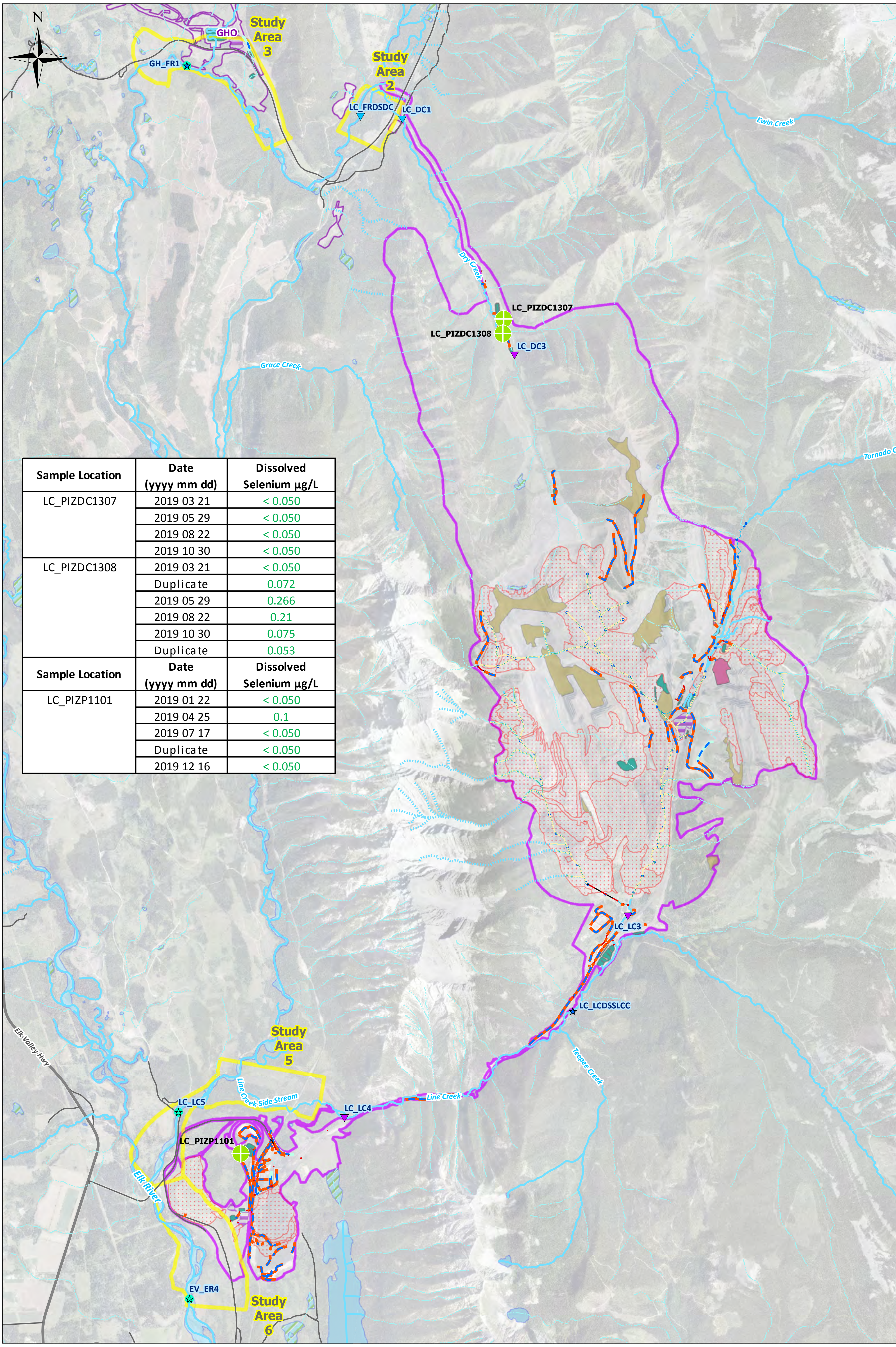
SNC·LAVALIN

Spatial Distribution of Dissolved Cadmium in Groundwater - Line Creek Operations

CHK'D: SB
BY: AO
DATE: 2020/03/31 SCALE: 1:60,000
COORD SYS: NAD 1983 UTM Zone 11N
Ref Num: **DRAWING 35**

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\67155735-CADLCO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
LC_PIZDC1307	2019 03 21	< 0.050
	2019 05 29	< 0.050
	2019 08 22	< 0.050
	2019 10 30	< 0.050
LC_PIZDC1308	2019 03 21	< 0.050
	Duplicate	0.072
	2019 05 29	0.266
	2019 08 22	0.21
	2019 10 30	0.075
	Duplicate	0.053

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
LC_PIZP1101	2019 01 22	< 0.050
	2019 04 25	0.1
	2019 07 17	< 0.050
	Duplicate	< 0.050
	2019 12 16	< 0.050

Legend

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

Site Features
- Highway
- Secondary Road
- Pit
- Stockpiles
- Waste Spoil
- Tailings/Settling Pond
- Reservoir
- GHO
- LCO
- Study Areas

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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	Dissolved Selenium µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 300 600 1,200 1,800 2,400 3,000 Meters

PROJECT LOCATION: Teck Coal Limited

CLIENT NAME: Greenhills Operations, BC

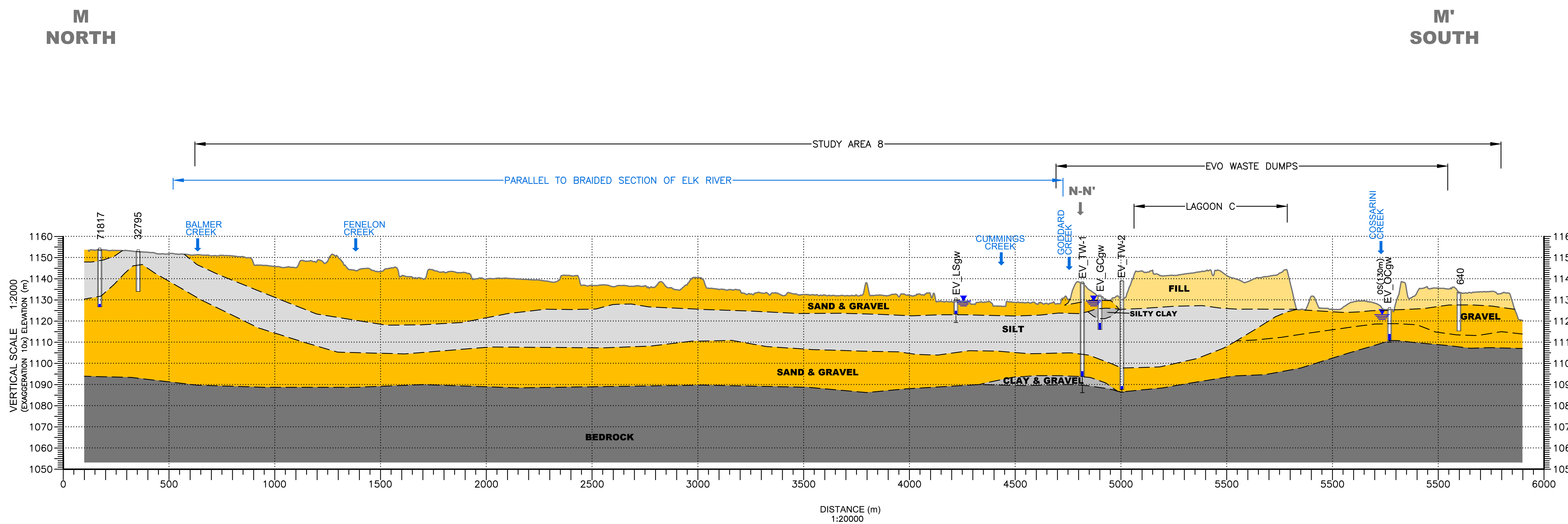
SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater - Line Creek Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:60,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | **DRAWING 36**

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\67155736-SelLCO.mxd



LEGEND

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

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. 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	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME: TECK COAL LIMITED
–

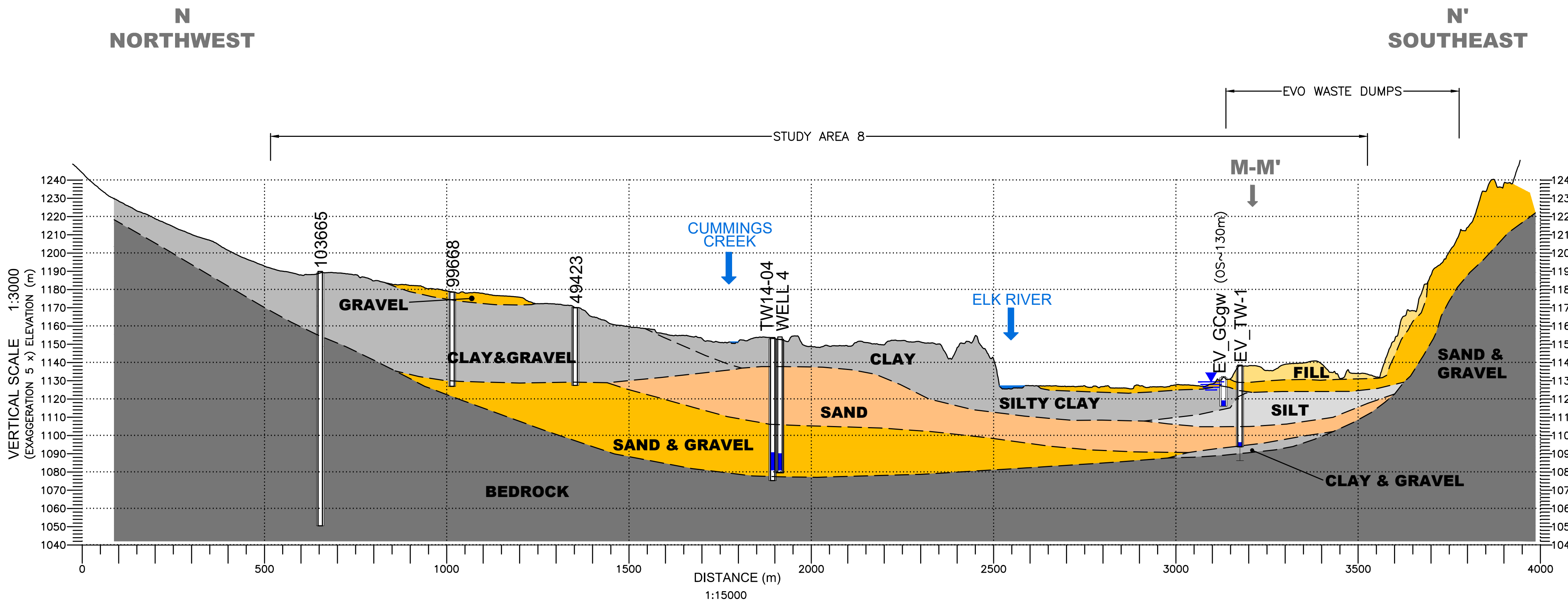
PROJECT LOCATION: ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE: **ELKVIEW OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION M-M'**

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: DRAWING 37	REV.: 0
CHK'D: LH	PLOT: 20200324.1432	CADFILE: 671557–XR1		

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

FILL	
COLLUVIUM	
SAND & GRAVEL	
SAND	
SILT	
CLAY	
BEDROCK	

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. 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	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME:
TECK COAL LIMITED
–

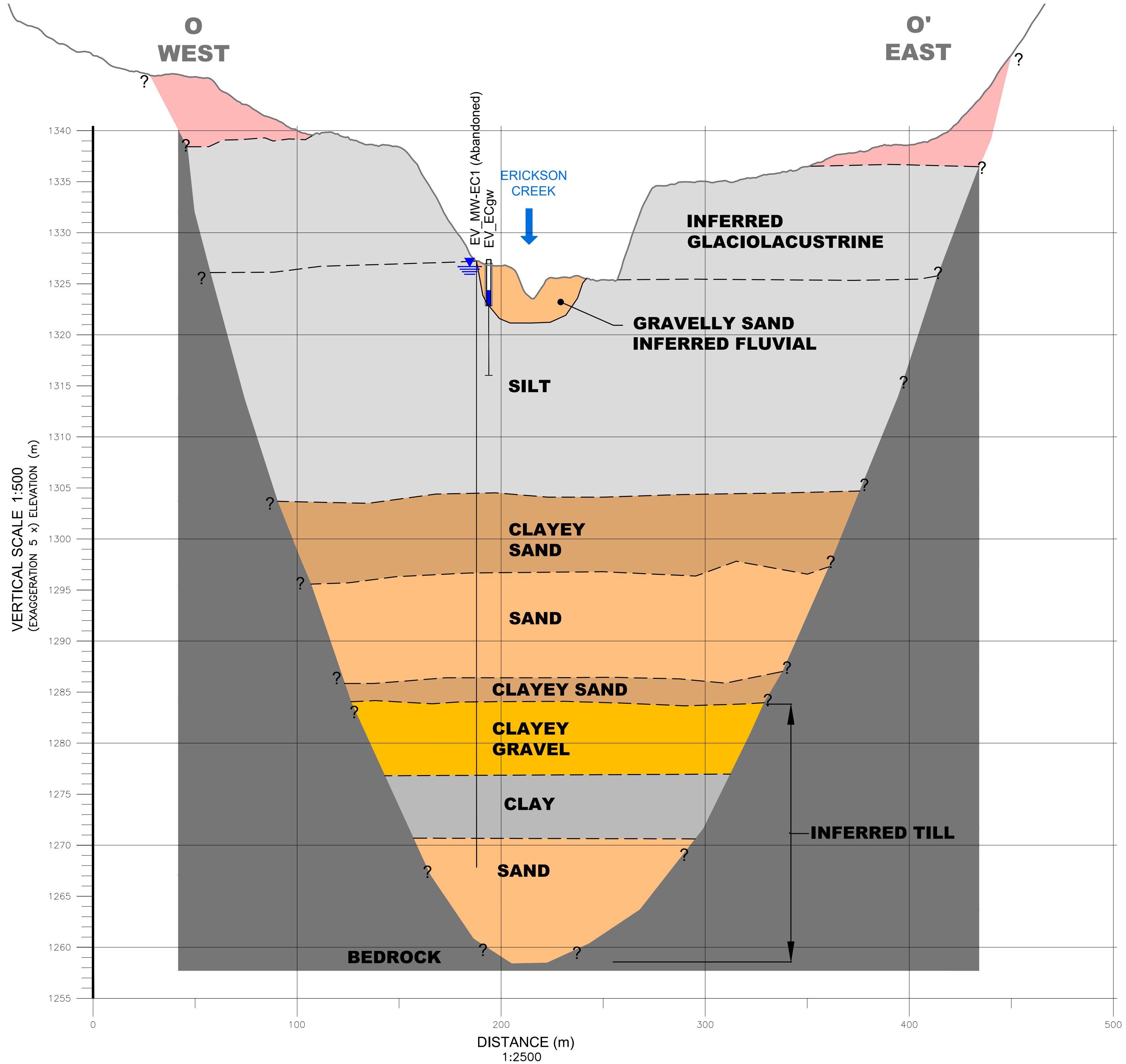
PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION N-N'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: DRAWING 38 REV.: 0
CHK'D: LH	PLOT: 20200324.1432	CADFILE: 671557–XR1	

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK
- INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_ECgw

- 50 mmø SOLID PVC PIPE
- 50 mmø SLOTTED PVC 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. EV_MW-EC1 ABANDONED DUE TO FLOWING ARTESIAN CONDITIONS.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME: TECK COAL LIMITED
–

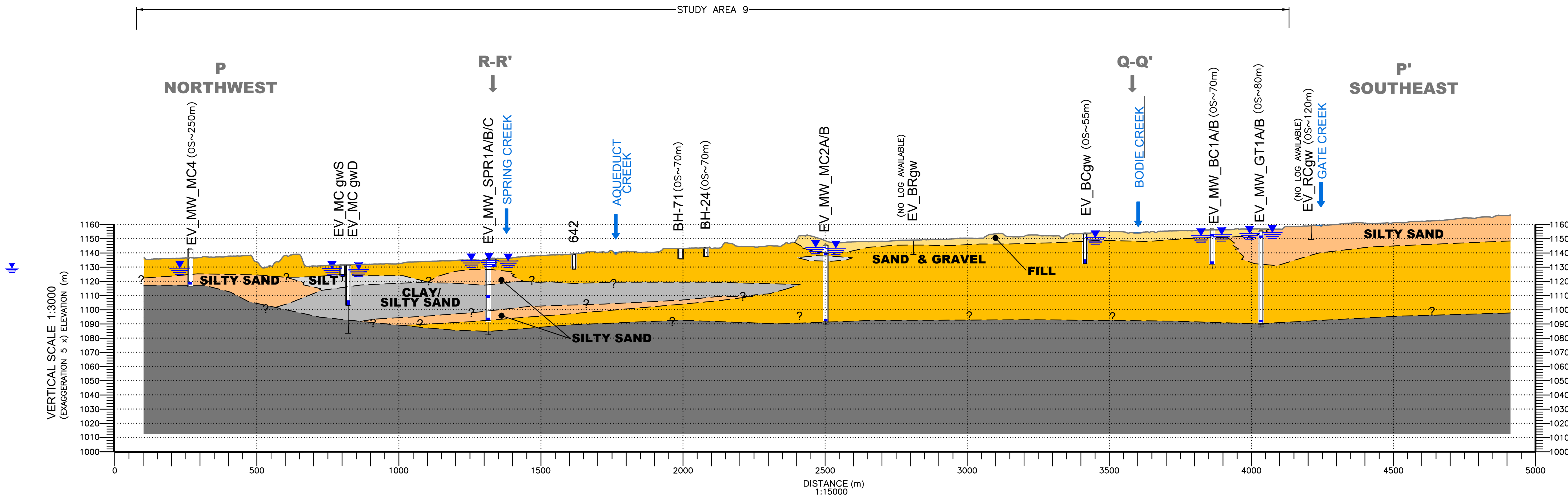
PROJECT LOCATION: ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE: **ELKVIEW OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION O-O'**

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: DRAWING 39	REV.: 0
CHK'D: LH	PLOT: 20200324.1432	CADFILE: 671557–XR1		

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

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

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m) — WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. 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	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME:
TECK COAL LIMITED
–

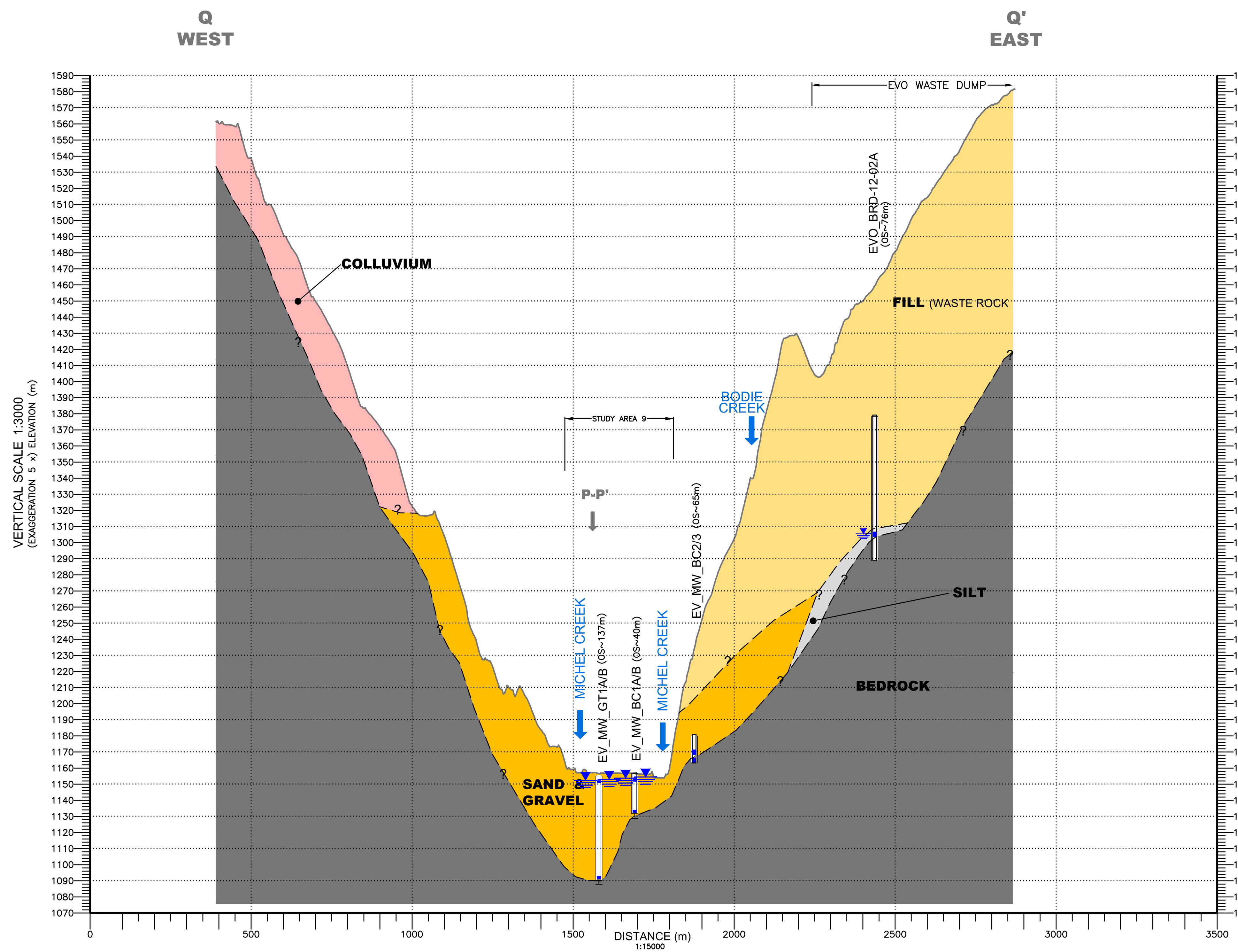
PROJECT LOCATION:
ELKVIEW OPERATIONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION P-P'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: DRAWING 40	REV.: 0
CHK'D: LH	PLOT: 20200324.1433	CADFILE: 671557–XR1		

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



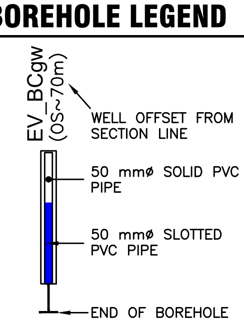
LEGEND

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

— — — — INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 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 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	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME:
TECK COAL LIMITED
–

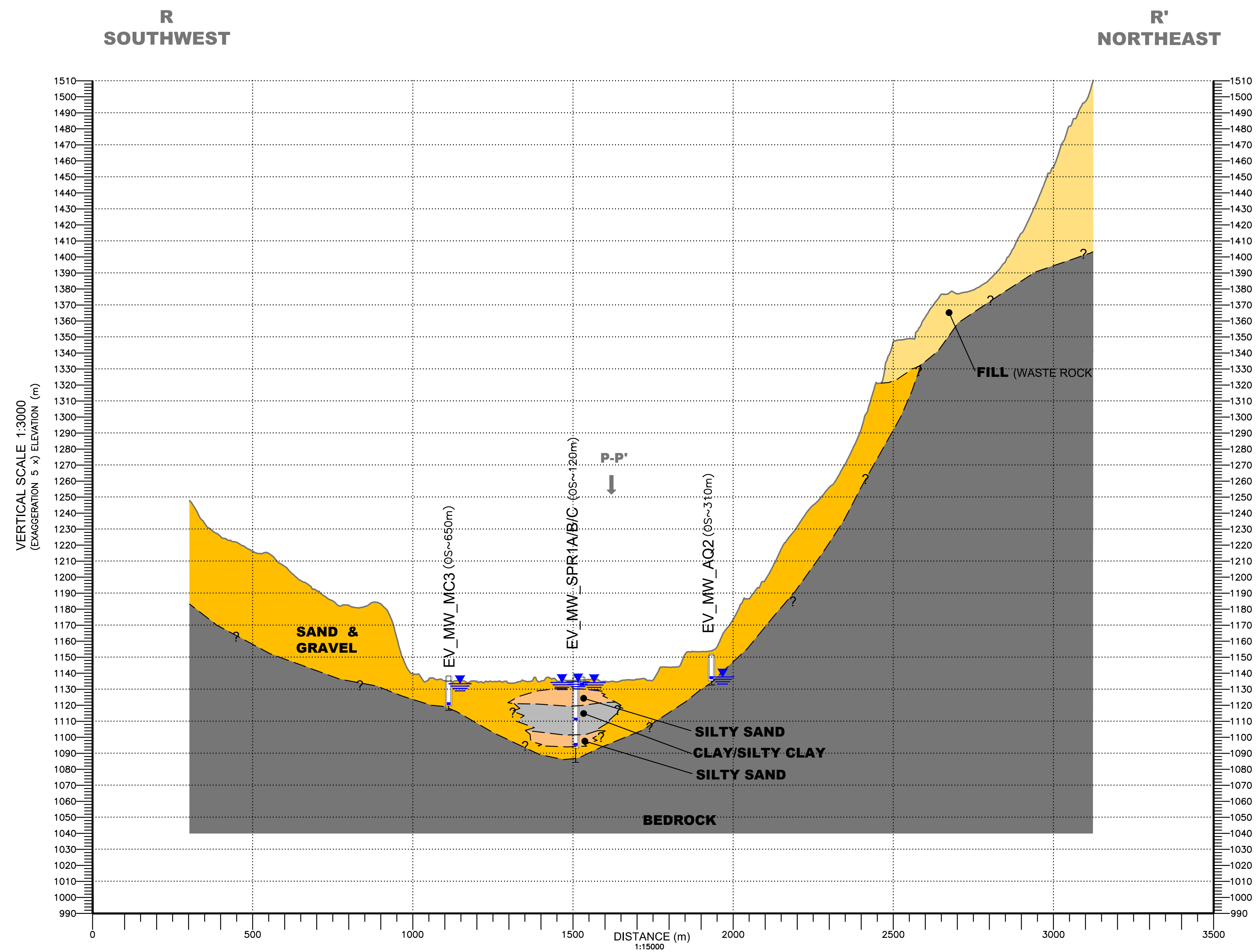
PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION Q-Q'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: LH	PLOT: 20200324.1433	CADFILE: 671557–XR1	DRAWING 41

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

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

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. 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	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME:
TECK COAL LIMITED
–

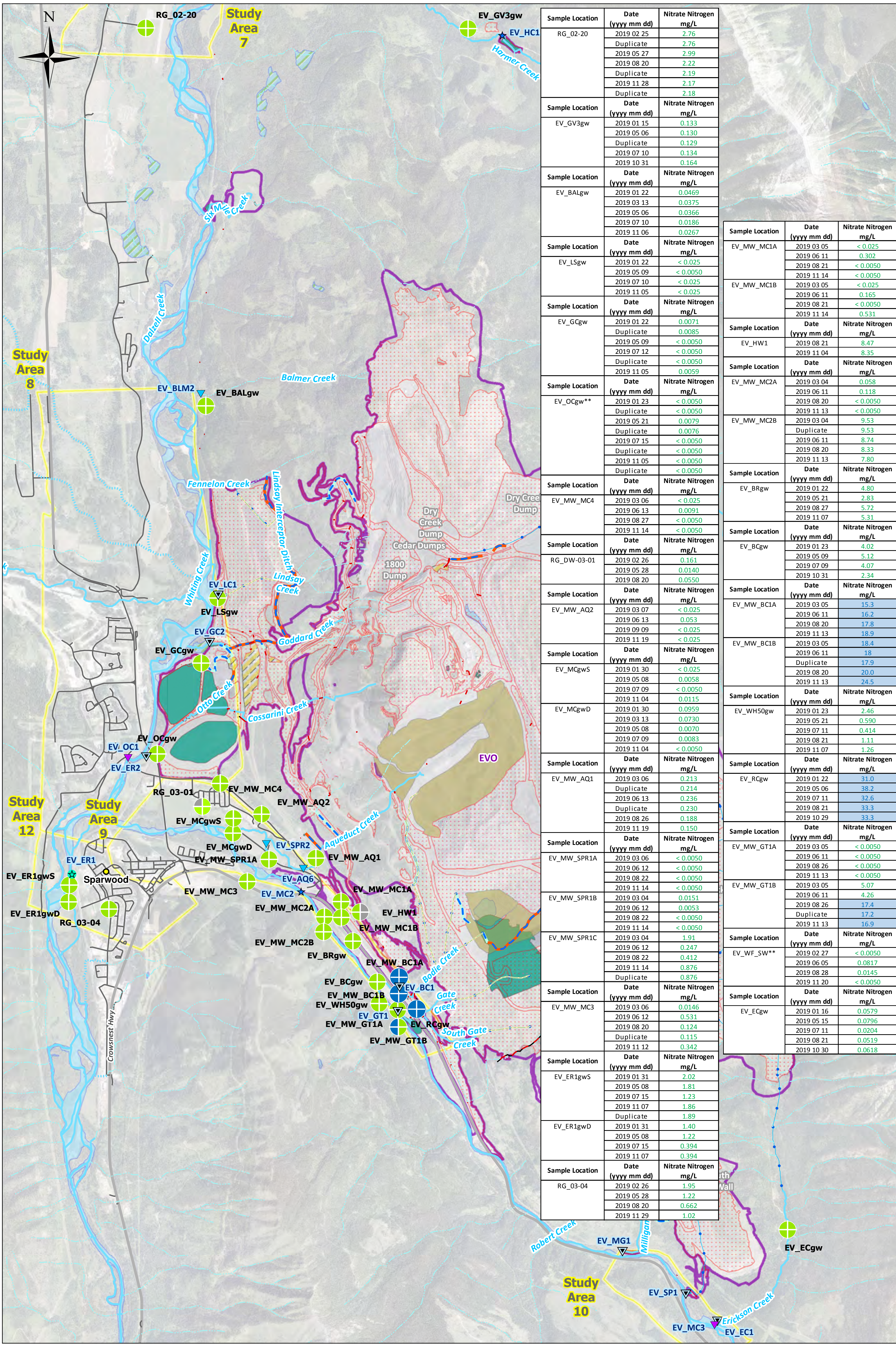
PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION R-R'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: LH	PLOT: 20200324.1433	CADFILE: 671557–XR1	DRAWING 42

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
RG_02-20	2019 02 25	2.76
	Duplicate	2.76
	2019 05 27	2.99
	2019 08 20	2.22
	Duplicate	2.19
	2019 11 28	2.17
	Duplicate	2.18

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_GV3gw	2019 01 15	0.133
	2019 05 06	0.130
	Duplicate	0.129
	2019 07 10	0.134
	2019 10 31	0.164

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_BALgw	2019 01 22	0.0469
	2019 03 13	0.0375
	2019 05 06	0.0366
	2019 07 10	0.0186
	2019 11 06	0.0267

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_LSgw	2019 01 22	< 0.025
	2019 05 09	< 0.0050
	2019 07 10	< 0.025
	2019 11 05	< 0.025

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_GCgw	2019 01 22	0.0071
	Duplicate	0.0085
	2019 05 09	< 0.0050
	2019 07 12	< 0.0050
	Duplicate	< 0.0050
	2019 11 05	0.0059

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_OCgw**	2019 01 23	< 0.0050
	Duplicate	< 0.0050
	2019 05 21	0.0079
	Duplicate	0.0076
	2019 07 15	< 0.0050
	Duplicate	< 0.0050
	2019 11 05	< 0.0050
	Duplicate	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_MC4	2019 03 06	< 0.025
	2019 06 13	0.0091
	2019 08 27	< 0.0050
	2019 11 14	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
RG_DW-03-01	2019 02 26	0.161
	2019 05 28	0.0140
	2019 08 20	0.0550

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_AQ2	2019 03 07	< 0.025
	2019 06 13	0.053
	2019 09 09	< 0.025
	2019 11 19	< 0.025

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MCgwS	2019 01 30	< 0.025
	2019 05 08	0.0058
	2019 07 09	< 0.0050
	2019 11 04	0.0115
EV_MCgwD	2019 01 30	0.0959
	2019 03 13	0.0730
	2019 05 08	0.0070
	2019 07 09	0.0083
	2019 11 04	< 0.0050

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_AQ1	2019 03 06	0.213
	Duplicate	0.214
	2019 06 13	0.236
	Duplicate	0.230
	2019 08 26	0.188
	2019 11 19	0.150

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_SPR1A	2019 03 06	< 0.0050
	2019 06 12	< 0.0050
	2019 08 22	< 0.0050
	2019 11 14	< 0.0050
EV_MW_SPR1B	2019 03 04	0.0151
	2019 06 12	0.0053
	2019 08 22	< 0.0050
	2019 11 14	< 0.0050
EV_MW_SPR1C	2019 03 04	1.91
	2019 06 12	0.247
	2019 08 22	0.412
	2019 11 14	0.876
	Duplicate	0.876

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_MC3	2019 03 06	0.0146
	2019 06 12	0.531
	2019 08 20	0.124
	Duplicate	0.115
	2019 11 12	0.342

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_ER1gwS	2019 01 31	2.02
	2019 05 08	1.81
	2019 07 15	1.23
	2019 11 07	1.86
	Duplicate	1.89
EV_ER1gwD	2019 01 31	1.40
	2019 05 08	1.22
	2019 07 15	0.394
	2019 11 07	0.394

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
RG_03-04	2019 02 26	1.95
	2019 05 28	1.22
	2019 08 20	0.662
	2019 11 29	1.02

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_MC1A	2019 03 05	< 0.025
	2019 06 11	0.302
	2019 08 21	< 0.0050
	2019 11 14	< 0.0050
EV_MW_MC1B	2019 03 05	< 0.025
	2019 06 11	0.165
	2019 08 21	< 0.0050
	2019 11 14	0.531

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_HW1	2019 08 21	8.47
	2019 11 04	8.35

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_MC2A	2019 03 04	0.058
	2019 06 11	0.118
	2019 08 20	< 0.0050
	2019 11 13	< 0.0050
EV_MW_MC2B	2019 03 04	9.53
	Duplicate	9.53
	2019 06 11	8.74
	2019 08 20	8.33
	2019 11 13	7.80

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_BRgw	2019 01 22	4.80
	2019 05 21	2.83
	2019 08 27	5.72
	2019 11 07	5.31

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_BCgw	2019 01 23	4.02
	2019 05 09	5.12
	2019 07 09	4.07
	2019 10 31	2.34

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_BC1A	2019 03 05	15.3
	2019 06 11	16.2
	2019 08 20	17.8
	2019 11 13	18.9
EV_MW_BC1B	2019 03 05	18.4
	2019 06 11	18
	Duplicate	17.9
	2019 08 20	20.0
	2019 11 13	24.5

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_WH50gw	2019 01 23	2.46
	2019 05 21	0.590
	2019 07 11	0.414
	2019 08 21	1.11
	2019 11 07	1.26

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_RCgw	2019 01 22	31.0
	2019 05 06	38.2
	2019 07 11	32.6
	2019 08 21	33.3
	2019 10 29	33.3

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_MW_GT1A	2019 03 05	< 0.0050
	2019 06 11	< 0.0050
	2019 08 26	< 0.0050
	2019 11 13	< 0.0050
EV_MW_GT1B	2019 03 05	5.07
	2019 06 11	4.26
	2019 08 26	17.4
	Duplicate	17.2
	2019 11 13	16.9

Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_WF_SW**	2019 02 27	< 0.0050
	2019 06 05	0.0817
	2019 08 28	0.0145
	2019 11 20	< 0.0050

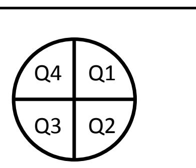
Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
EV_ECgw	2019 01 16	0.0579
	2019 05 15	0.0796
	2019 07 11	0.0204
	2019 08 21	0.0519
	2019 10 30	0.0618

Legend

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Highway
- Secondary Road
- Tailings/Settling Pond
- Reservoir
- EVO
- Study Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain



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
**wells are within 10m of a surface water body and results were compared to BCWQG for AW

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

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.
2. Mapped Aquifers are from Water Resources Atlas (BC ENV)

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION: Elkview Operations, BC

CLIENT NAME: Teck Coal Limited

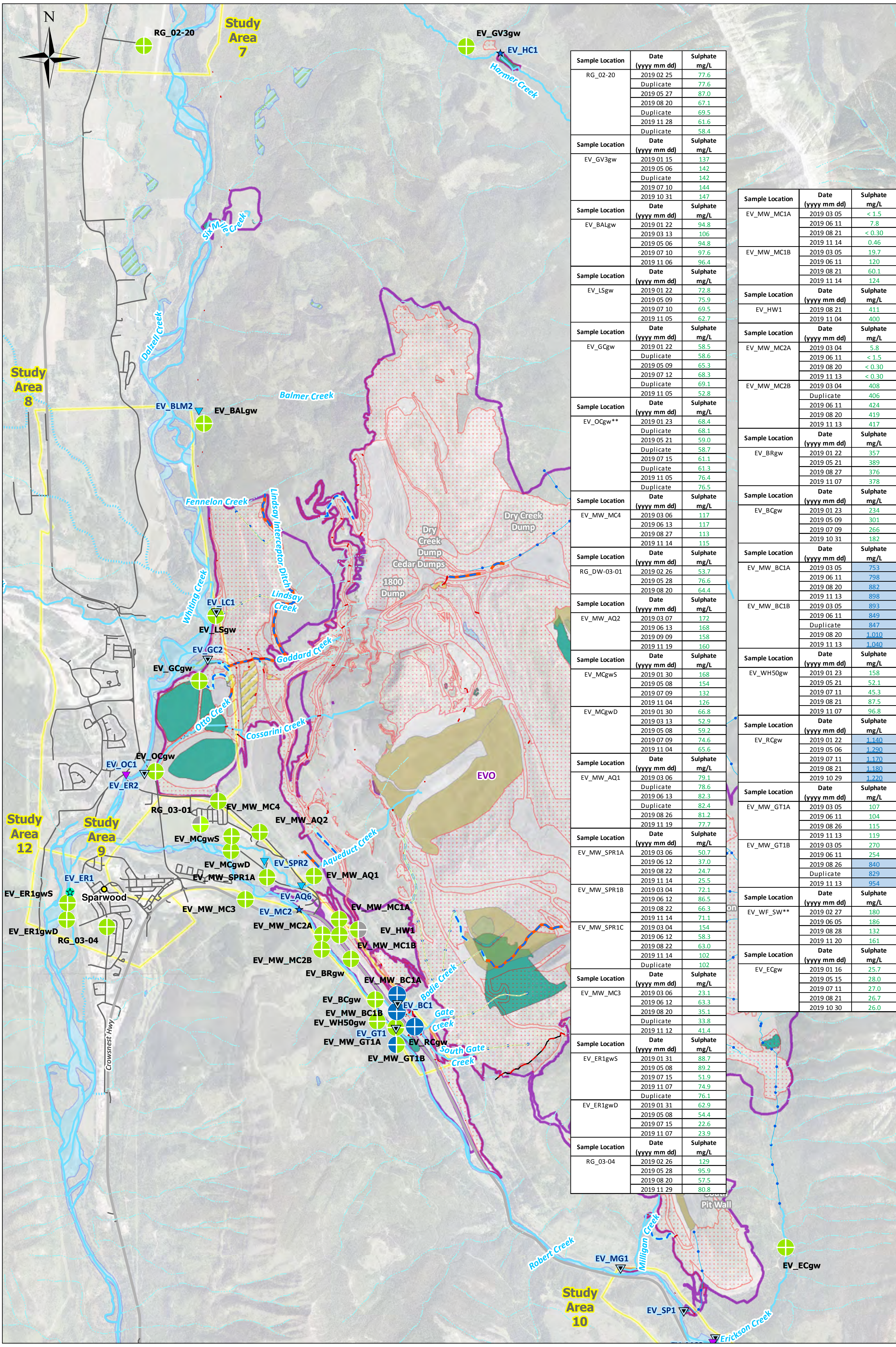
SNC·LAVALIN

Spatial Distribution of Nitrate Nitrogen in Groundwater - Elkview Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num: **DRAWING 43**
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\43-NitEVO.mxd



Sample Location	Date (yyyy mm dd)	Sulphate mg/L
RG_02-20	2019 02 25	77.6
	Duplicate	77.6
	2019 05 27	87.0
	2019 08 20	67.1
	Duplicate	69.5
	2019 11 28	61.6
	Duplicate	58.4

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_GV3gw	2019 01 15	137
	2019 05 06	142
	Duplicate	142
	2019 07 10	144
	2019 10 31	147

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_BALgw	2019 01 22	94.8
	2019 03 13	106
	2019 05 06	94.8
	2019 07 10	97.6
	2019 11 06	96.4

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_LSgw	2019 01 22	72.8
	2019 05 09	75.9
	2019 07 10	69.5
	2019 11 05	62.7

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_GCgw	2019 01 22	58.5
	Duplicate	58.6
	2019 05 09	65.3
	2019 07 12	68.3
	Duplicate	69.1
	2019 11 05	52.8

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_OCgw**	2019 01 23	68.4
	Duplicate	68.1
	2019 05 21	59.0
	Duplicate	58.7
	2019 07 15	61.1
	Duplicate	61.3
	2019 11 05	76.4
	Duplicate	76.5

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_MC4	2019 03 06	117
	2019 06 13	117
	2019 08 27	113
	2019 11 14	115

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
RG_DW-03-01	2019 02 26	53.7
	2019 05 28	76.6
	2019 08 20	64.4

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_AQ2	2019 03 07	172
	2019 06 13	168
	2019 09 09	158
	2019 11 19	160

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MCgwS	2019 01 30	168
	2019 05 08	154
	2019 07 09	132
	2019 11 04	126
EV_MCgwD	2019 01 30	66.8
	2019 03 13	52.9
	2019 05 08	59.2
	2019 07 09	74.6
	2019 11 04	65.6

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_AQ1	2019 03 06	79.1
	Duplicate	78.6
	2019 06 13	82.3
	Duplicate	82.4
	2019 08 26	81.2
	2019 11 19	77.7

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_SPR1A	2019 03 06	50.7
	2019 06 12	37.0
	2019 08 22	24.7
	2019 11 14	25.5
EV_MW_SPR1B	2019 03 04	72.1
	2019 06 12	86.5
	2019 08 22	66.3
	2019 11 14	71.1
EV_MW_SPR1C	2019 03 04	154
	2019 06 12	58.3
	2019 08 22	63.0
	2019 11 14	102
	Duplicate	102

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_MC3	2019 03 06	23.1
	2019 06 12	63.3
	2019 08 20	35.1
	Duplicate	33.8
	2019 11 12	41.4

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_ER1gwS	2019 01 31	88.7
	2019 05 08	89.2
	2019 07 15	51.9
	2019 11 07	74.9
	Duplicate	76.1
EV_ER1gwD	2019 01 31	62.9
	2019 05 08	54.4
	2019 07 15	22.6
	2019 11 07	23.9

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
RG_03-04	2019 02 26	129
	2019 05 28	95.9
	2019 08 20	57.5
	2019 11 29	80.8

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_MC1A	2019 03 05	< 1.5
	2019 06 11	7.8
	2019 08 21	< 0.30
	2019 11 14	0.46
EV_MW_MC1B	2019 03 05	19.7
	2019 06 11	120
	2019 08 21	60.1
	2019 11 14	124

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_HW1	2019 08 21	411
	2019 11 04	400

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_MC2A	2019 03 04	5.8
	2019 06 11	< 1.5
	2019 08 20	< 0.30
	2019 11 13	< 0.30
EV_MW_MC2B	2019 03 04	408
	Duplicate	406
	2019 06 11	424
	2019 08 20	419
	2019 11 13	417

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_BRgw	2019 01 22	357
	2019 05 21	389
	2019 08 27	376
	2019 11 07	378

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_BCgw	2019 01 23	234
	2019 05 09	301
	2019 07 09	266
	2019 10 31	182

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_BC1A	2019 03 05	753
	2019 06 11	798
	2019 08 20	882
	2019 11 13	898
EV_MW_BC1B	2019 03 05	893
	2019 06 11	849
	Duplicate	847
	2019 08 20	1,010
	2019 11 13	1,040

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_WH50gw	2019 01 23	158
	2019 05 21	52.1
	2019 07 11	45.3
	2019 08 21	87.5
	2019 11 07	96.8

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_RCgw	2019 01 22	1,140
	2019 05 06	1,290
	2019 07 11	1,170
	2019 08 21	1,180
	2019 10 29	1,220

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_MW_GT1A	2019 03 05	107
	2019 06 11	104
	2019 08 26	115
	2019 11 13	119
EV_MW_GT1B	2019 03 05	270
	2019 06 11	254
	2019 08 26	840
	Duplicate	829
	2019 11 13	954

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_WF_SW**	2019 02 27	180
	2019 06 05	186
	2019 08 28	132
	2019 11 20	161

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
EV_ECgw	2019 01 16	25.7
	2019 05 15	28.0
	2019 07 11	27.0
	2019 08 21	26.7
	2019 10 30	26.0

Legend

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Highway
- Secondary Road
- Tailings/Settling Pond
- Reservoir
- EVO
- Study Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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
**wells are within 10m of a surface water body and results were compared to BCWQG for AW

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. Intended for illustration purposes only.
2. Original in colour.
References:
1. Information provided by Teck Coal Limited.
Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION: Elkview Operations, BC

CLIENT NAME: Teck Coal Limited

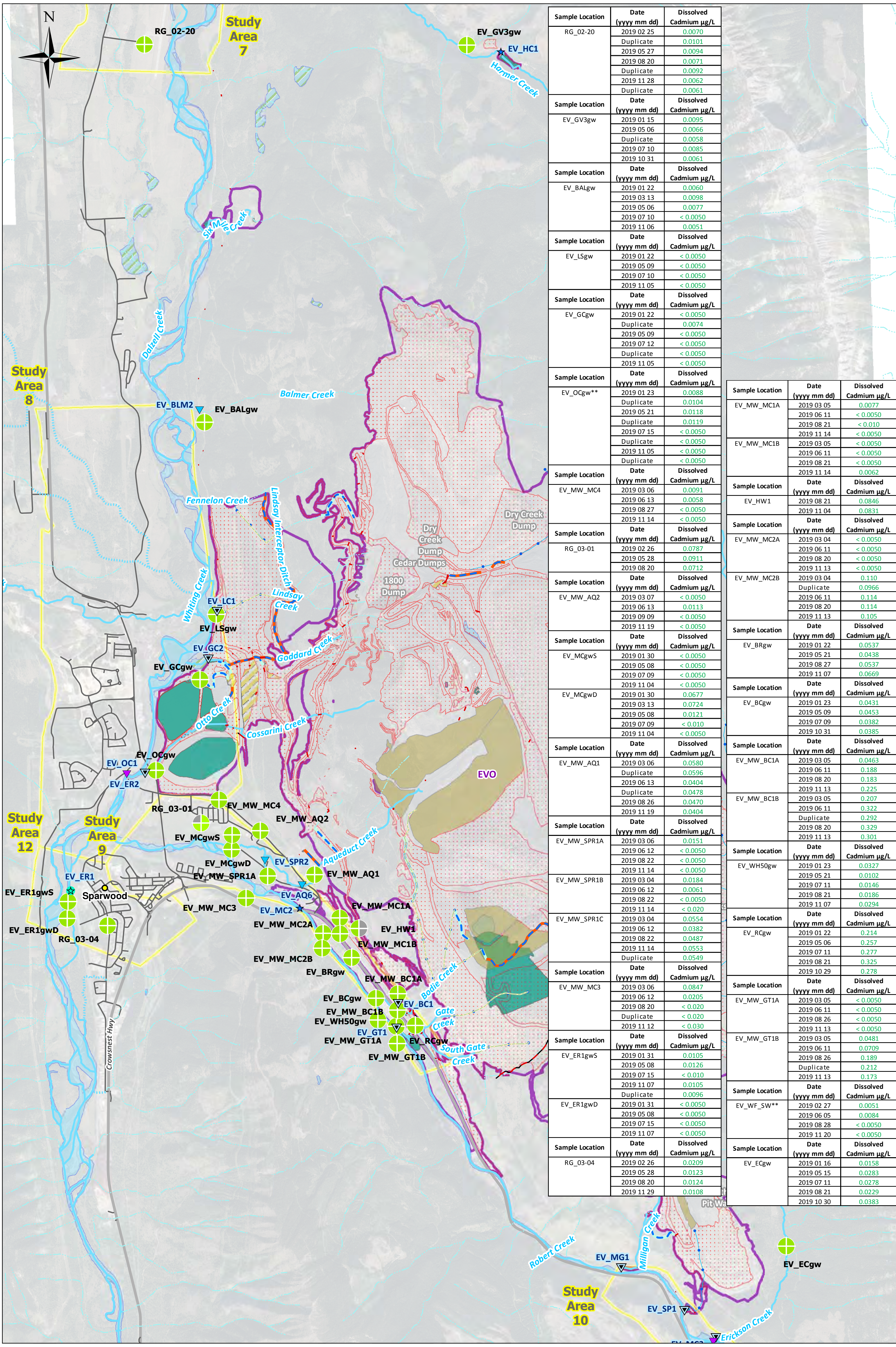
SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater - Elkview Operations

CHK'D: SB	DATE: 2020/03/30	SCALE: 1:50,000	Ref Num: DRAWING 44
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\44-SulEVO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
RG_02-20	2019 02 25	0.0070
	Duplicate	0.0101
	2019 05 27	0.0094
	2019 08 20	0.0071
	Duplicate	0.0092
	2019 11 28	0.0062
	Duplicate	0.0061

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_GV3gw	2019 01 15	0.0095
	2019 05 06	0.0066
	Duplicate	0.0058
	2019 07 10	0.0085
	2019 10 31	0.0061

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_BALgw	2019 01 22	0.0060
	2019 03 13	0.0098
	2019 05 06	0.0077
	2019 07 10	< 0.0050
	2019 11 06	0.0051

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_LSgw	2019 01 22	< 0.0050
	2019 05 09	< 0.0050
	2019 07 10	< 0.0050
	2019 11 05	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_GCgw	2019 01 22	< 0.0050
	Duplicate	0.0074
	2019 05 09	< 0.0050
	2019 07 12	< 0.0050
	Duplicate	< 0.0050
	2019 11 05	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_OCgw**	2019 01 23	0.0088
	Duplicate	0.0104
	2019 05 21	0.0118
	Duplicate	0.0119
	2019 07 15	< 0.0050
	Duplicate	< 0.0050
	2019 11 05	< 0.0050
	Duplicate	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_MC4	2019 03 06	0.0091
	2019 06 13	0.0058
	2019 08 27	< 0.0050
	2019 11 14	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
RG_03-01	2019 02 26	0.0787
	2019 05 28	0.0911
	2019 08 20	0.0712

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_AQ2	2019 03 07	< 0.0050
	2019 06 13	0.0113
	2019 09 09	< 0.0050
	2019 11 19	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MCgwS	2019 01 30	< 0.0050
	2019 05 08	< 0.0050
	2019 07 09	< 0.0050
	2019 11 04	< 0.0050
EV_MCgwD	2019 01 30	0.0677
	2019 03 13	0.0724
	2019 05 08	0.0121
	2019 07 09	< 0.010
	2019 11 04	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_AQ1	2019 03 06	0.0580
	Duplicate	0.0596
	2019 06 13	0.0404
	Duplicate	0.0478
	2019 08 26	0.0470
	2019 11 19	0.0404

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_SPR1A	2019 03 06	0.0151
	2019 06 12	< 0.0050
	2019 08 22	< 0.0050
	2019 11 14	< 0.0050
EV_MW_SPR1B	2019 03 04	0.0184
	2019 06 12	0.0061
	2019 08 22	< 0.0050
	2019 11 14	< 0.020
EV_MW_SPR1C	2019 03 04	0.0554
	2019 06 12	0.0382
	2019 08 22	0.0487
	2019 11 14	0.0553
	Duplicate	0.0549

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_MC3	2019 03 06	0.0847
	2019 06 12	0.0205
	2019 08 20	< 0.020
	Duplicate	< 0.020
	2019 11 12	< 0.030

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_ER1gwS	2019 01 31	0.0105
	2019 05 08	0.0126
	2019 07 15	< 0.010
	2019 11 07	0.0105
	Duplicate	0.0096
EV_ER1gwD	2019 01 31	< 0.0050
	2019 05 08	< 0.0050
	2019 07 15	< 0.0050
	2019 11 07	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
RG_03-04	2019 02 26	0.0209
	2019 05 28	0.0123
	2019 08 20	0.0124
	2019 11 29	0.0108

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_MC1A	2019 03 05	0.0077
	2019 06 11	< 0.0050
	2019 08 21	< 0.010
	2019 11 14	< 0.0050
EV_MW_MC1B	2019 03 05	< 0.0050
	2019 06 11	< 0.0050
	2019 08 21	< 0.0050
	2019 11 14	0.0062

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_HW1	2019 08 21	0.0846
	2019 11 04	0.0831

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_MC2A	2019 03 04	< 0.0050
	2019 06 11	< 0.0050
	2019 08 20	< 0.0050
	2019 11 13	< 0.0050
EV_MW_MC2B	2019 03 04	0.110
	Duplicate	0.0966
	2019 06 11	0.114
	2019 08 20	0.114
	2019 11 13	0.105

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_BRgw	2019 01 22	0.0537
	2019 05 21	0.0438
	2019 08 27	0.0537
	2019 11 07	0.0669

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_BCgw	2019 01 23	0.0431
	2019 05 09	0.0453
	2019 07 09	0.0382
	2019 10 31	0.0385

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_BC1A	2019 03 05	0.0463
	2019 06 11	0.188
	2019 08 20	0.183
	2019 11 13	0.225
EV_MW_BC1B	2019 03 05	0.207
	2019 06 11	0.322
	Duplicate	0.292
	2019 08 20	0.329
	2019 11 13	0.301

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_WH50gw	2019 01 23	0.0327
	2019 05 21	0.0102
	2019 07 11	0.0146
	2019 08 21	0.0186
	2019 11 07	0.0294

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_RCgw	2019 01 22	0.214
	2019 05 06	0.257
	2019 07 11	0.277
	2019 08 21	0.325
	2019 10 29	0.278

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_MW_GT1A	2019 03 05	< 0.0050
	2019 06 11	< 0.0050
	2019 08 26	< 0.0050
	2019 11 13	< 0.0050
EV_MW_GT1B	2019 03 05	0.0481
	2019 06 11	0.0709
	2019 08 26	0.189
	Duplicate	0.212
	2019 11 13	0.173

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_WF_SW**	2019 02 27	0.0051
	2019 06 05	0.0084
	2019 08 28	< 0.0050
	2019 11 20	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
EV_ECgw	2019 01 16	0.0158
	2019 05 15	0.0283
	2019 07 11	0.0278
	2019 08 21	0.0229
	2019 10 30	0.0383

Legend

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Highway
- Secondary Road
- Tailings/Settling Pond
- Reservoir
- EVO
- Study Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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
**wells are within 10m of a surface water body and results were compared to BCWQG for AW

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

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION: Elkview Operations, BC

CLIENT NAME: Teck Coal Limited

SNC·LAVALIN

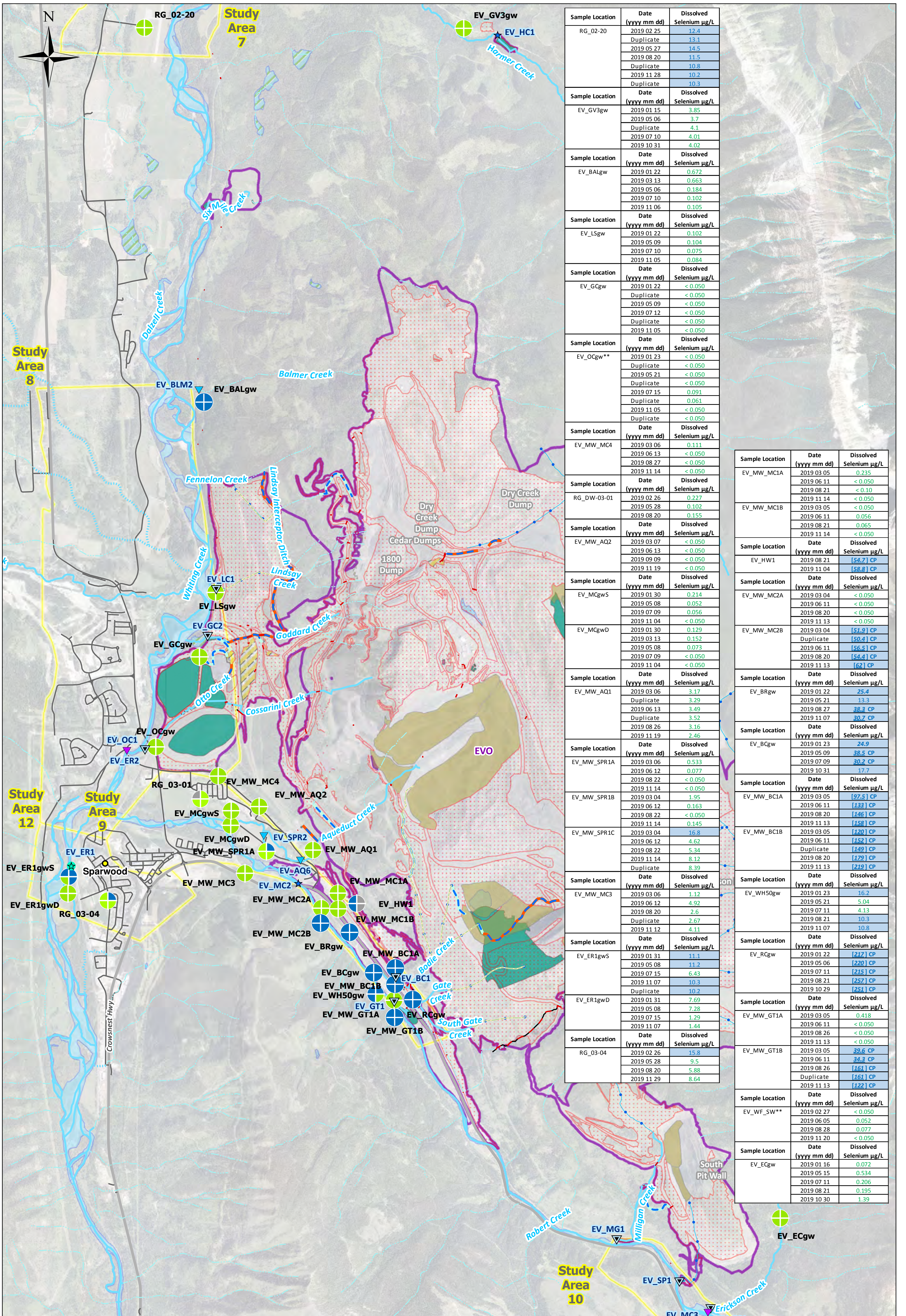
Spatial Distribution of Dissolved Cadmium in Groundwater - Elkview Operations

CHK'D: SB | DATE: 2020/03/30 | SCALE: 1:50,000 | Ref Num:

BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | **DRAWING 45**

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\45-CadEVO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
RG_02-20	2019 02 25	12.4
	Duplicate	13.1
	2019 05 27	14.5
	2019 08 20	11.5
	Duplicate	10.8
	2019 11 28	10.2
	Duplicate	10.3
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_GV3gw	2019 01 15	3.85
	2019 05 06	3.7
	Duplicate	4.1
	2019 07 10	4.01
	2019 10 31	4.02
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_BALgw	2019 01 22	0.672
	2019 03 13	0.663
	2019 05 06	0.184
	2019 07 10	0.102
	2019 11 06	0.105
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_LSgw	2019 01 22	0.102
	2019 05 09	0.104
	2019 07 10	0.075
	2019 11 05	0.084
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_GCgw	2019 01 22	< 0.050
	Duplicate	< 0.050
	2019 05 09	< 0.050
	2019 07 12	< 0.050
	Duplicate	< 0.050
	2019 11 05	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_OCgw**	2019 01 23	< 0.050
	Duplicate	< 0.050
	2019 05 21	< 0.050
	Duplicate	< 0.050
	2019 07 15	0.091
	Duplicate	0.061
	2019 11 05	< 0.050
	Duplicate	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MW_MC4	2019 03 06	0.111
	2019 06 13	< 0.050
	2019 08 27	< 0.050
	2019 11 14	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
RG_DW-03-01	2019 02 26	0.227
	2019 05 28	0.102
	2019 08 20	0.155
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MW_AQ2	2019 03 07	< 0.050
	2019 06 13	< 0.050
	2019 09 09	< 0.050
	2019 11 19	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MCgwS	2019 01 30	0.214
	2019 05 08	0.052
	2019 07 09	0.056
	2019 11 04	< 0.050
EV_MCgwD	2019 01 30	0.129
	2019 03 13	0.152
	2019 05 08	0.073
	2019 07 09	< 0.050
	2019 11 04	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MW_AQ1	2019 03 06	3.17
	Duplicate	3.29
	2019 06 13	3.49
	Duplicate	3.52
	2019 08 26	3.16
	2019 11 19	2.46
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MW_SPR1A	2019 03 06	0.533
	2019 06 12	0.077
	2019 08 22	< 0.050
	2019 11 14	< 0.050
EV_MW_SPR1B	2019 03 04	1.95
	2019 06 12	0.163
	2019 08 22	< 0.050
	2019 11 14	0.145
EV_MW_SPR1C	2019 03 04	16.8
	2019 06 12	4.62
	2019 08 22	5.34
	2019 11 14	8.12
	Duplicate	8.39
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MW_MC3	2019 03 06	1.12
	2019 06 12	4.92
	2019 08 20	2.6
	Duplicate	2.67
	2019 11 12	4.11
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_ER1gwS	2019 01 31	11.1
	2019 05 08	11.2
	2019 07 15	6.43
	2019 11 07	10.3
	Duplicate	10.2
EV_ER1gwD	2019 01 31	7.69
	2019 05 08	7.28
	2019 07 15	1.29
	2019 11 07	1.44
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
RG_03-04	2019 02 26	15.8
	2019 05 28	9.5
	2019 08 20	5.88
	2019 11 29	8.64

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
EV_MW_MC1A	2019 03 05	0.235
	2019 06 11	< 0.050
	2019 08 21	< 0.10
	2019 11 14	< 0.050
EV_MW_MC1B	2019 03 05	< 0.050
	2019 06 11	0.056
	2019 08 21	0.065
	2019 11 14	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_HW1	2019 08 21	[54.7] CP
	2019 11 04	[58.8] CP
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MW_MC2A	2019 03 04	< 0.050
	2019 06 11	< 0.050
	2019 08 20	< 0.050
	2019 11 13	< 0.050
EV_MW_MC2B	2019 03 04	[51.9] CP
	Duplicate	[50.4] CP
	2019 06 11	[56.5] CP
	2019 08 20	[54.4] CP
	2019 11 13	[62] CP
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_BRgw	2019 01 22	*25.4*
	2019 05 21	13.3
	2019 08 27	38.3 CP
	2019 11 07	30.7 CP
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_BCgw	2019 01 23	*24.9*
	2019 05 09	38.5 CP
	2019 07 09	30.2 CP
	2019 10 31	17.7
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MW_BC1A	2019 03 05	[97.5] CP
	2019 06 11	[133] CP
	2019 08 20	[146] CP
	2019 11 13	[158] CP
EV_MW_BC1B	2019 03 05	[120] CP
	2019 06 11	[152] CP
	Duplicate	[149] CP
	2019 08 20	[179] CP
	2019 11 13	[219] CP
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_WH50gw	2019 01 23	16.2
	2019 05 21	5.04
	2019 07 11	4.13
	2019 08 21	10.3
	2019 11 07	10.8
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_RCgw	2019 01 22	[217] CP
	2019 05 06	[220] CP
	2019 07 11	[215] CP
	2019 08 21	[257] CP
	2019 10 29	[251] CP
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_MW_GT1A	2019 03 05	0.418
	2019 06 11	< 0.050
	2019 08 26	< 0.050
	2019 11 13	< 0.050
EV_MW_GT1B	2019 03 05	39.6 CP
	2019 06 11	34.3 CP
	2019 08 26	[161] CP
	Duplicate	[161] CP
	2019 11 13	[122] CP
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_WF_SW**	2019 02 27	< 0.050
	2019 06 05	0.052
	2019 08 28	0.077
	2019 11 20	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
EV_ECgw	2019 01 16	0.072
	2019 05 15	0.534
	2019 07 11	0.206
	2019 08 21	0.195
	2019 10 30	1.39

Legend

Surface Water Stations
- Compliance Point
- Order Station
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Highway
- Secondary Road
- Tailings/Settling Pond
- Reservoir
- EVO
- Study Areas

Water Features
- Intermittent Stream
- Stream Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland
- Culvert
- Ditch
- Rock Drain

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
**wells are within 10m of a surface water body and results were compared to BCWQG for AW

Primary Screening Criteria	Dissolved Selenium µg/L
CSR Aquatic Life	**20**
CSR Irrigation Watering	*20*
CSR Livestock Watering	30
CSR Drinking Water	10
BCWQG Aquatic Life Short-term Maximum**	**n/a**
BCWQG Aquatic Life Long-term Average**	**2**
Secondary Screening Criteria	**Dissolved Selenium µg/L**
Guideline for Canadian Drinking Water Quality	[50]
Site Performance Objective (Elk River)	19 SPO
Compliance Point (Michel Creek)	28 CP

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

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

PROJECT LOCATION:
Elkview Operations, BC

CLIENT NAME:
Teck Coal Limited

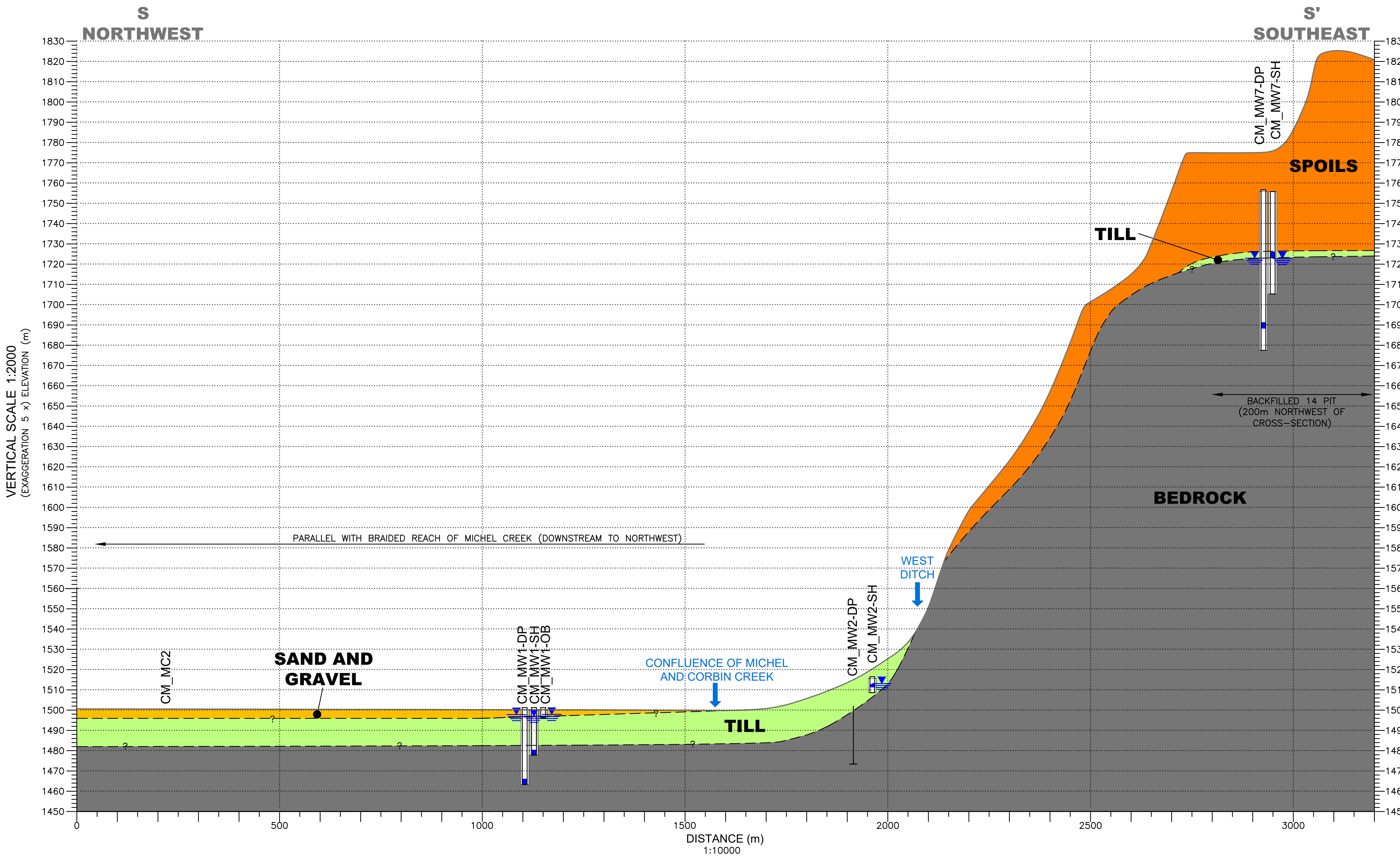
SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater - Elkview Operations

CHK'D: SB	DATE: 2020/03/30	SCALE: 1:50,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 46

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\46-SelEVO.mxd

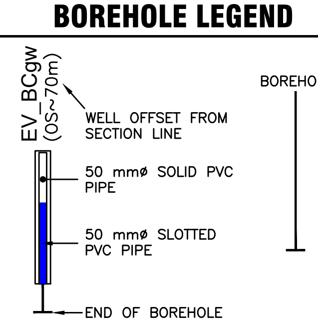
Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

- FILL
- COLLUVIUM
- SAND & GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK
- GRAVEL (FLUVIAL)
- GRAVEL (SPOILS)
- SILT, SAND, GRAVEL (TILL)
- INFERRED STRATIGRAPHIC BOUNDARY
- GROUNDWATER ELEVATION (2019 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.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME:
TECK COAL LIMITED
–

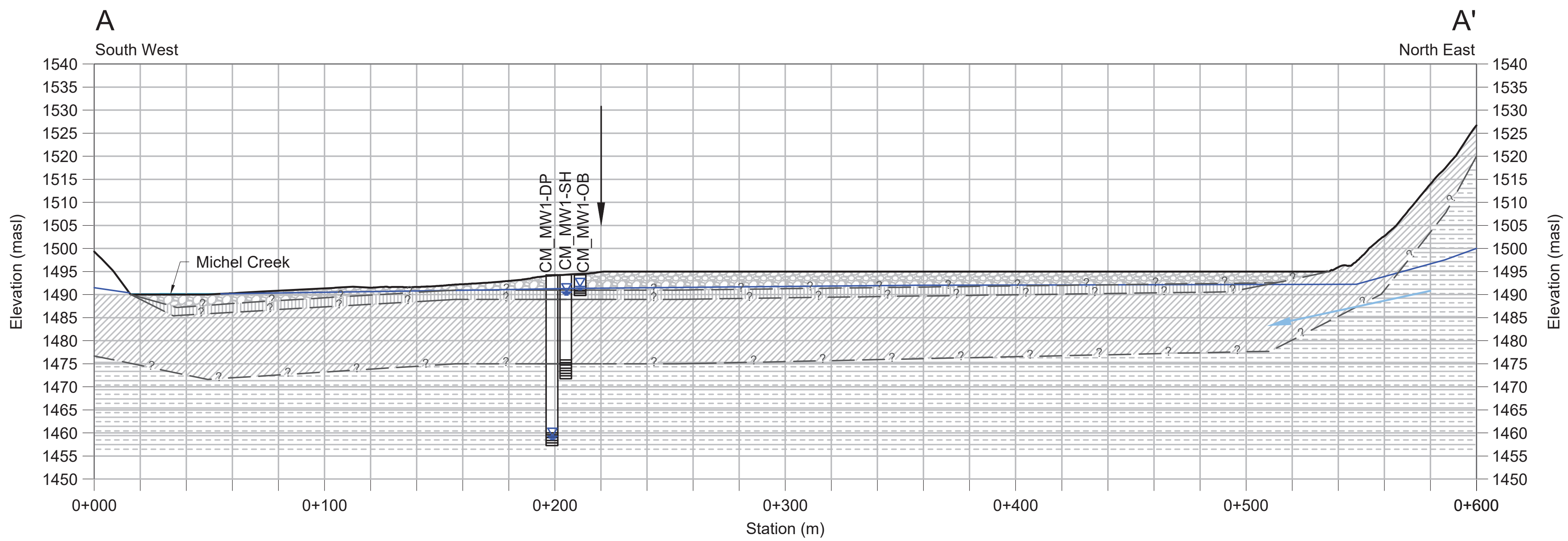
PROJECT LOCATION:
COAL MOUNTAIN OPERATONS
ELK VALLEY, BC

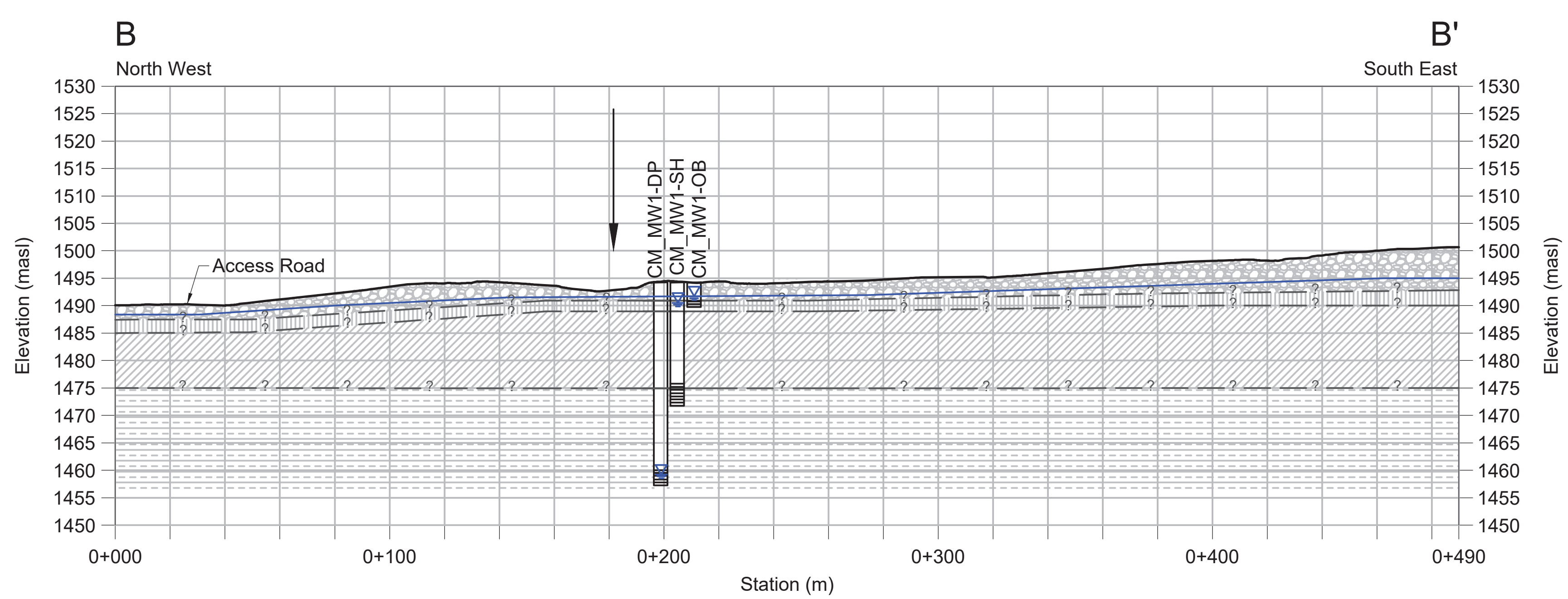
SNC·LAVALIN

TITLE:
COAL MOUNTAIN OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION S-S'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: LH	PLOT: 20200324.1433	CADFILE: 671557–XR1	DRAWING 47

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG





LEGEND

- Direction of Flow
- Groundwater Gradient
- Existing Ground
- Creek
- Inferred Lithological Boundary
- Gravel
- Silt
- Clay
- Siltstone Bedrock
- Water Level
- Well Location
- Well Screen Location

NOTES

1. Topography provided by Coal Mountain Operations, 2016 site conditions.
2. Lithology inferred from drilling program conducted in August, 2015 by SRK

2x Vertical Exaggeration

Horizontal 0m 10 20 30 40 50

Reproduced without change from Teck 2017

srk consulting

SRK JOB NO.: 1CT017.199

FILE NAME: 1CT017.168 - CrossSections.dwg

Teck

Coal Mountain

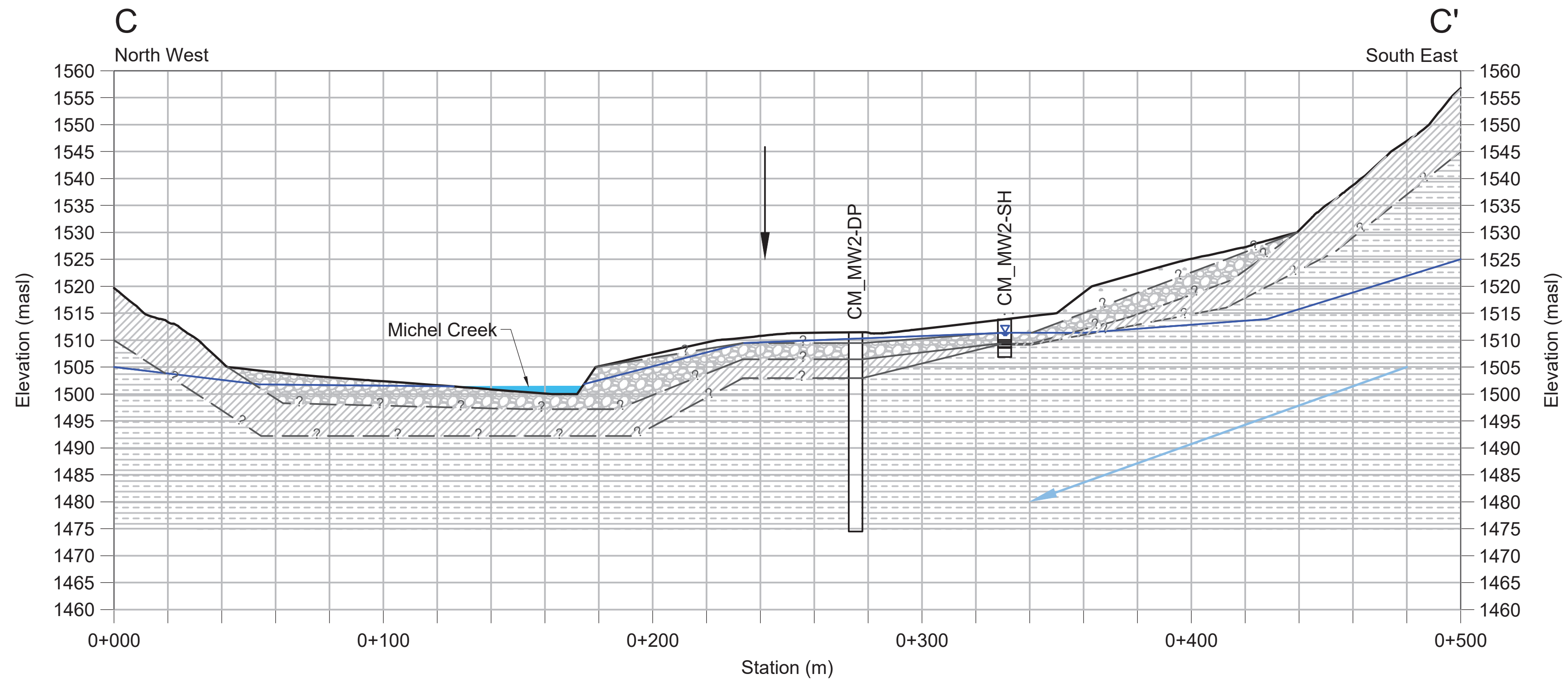
CMO SSGMP 2018 Update

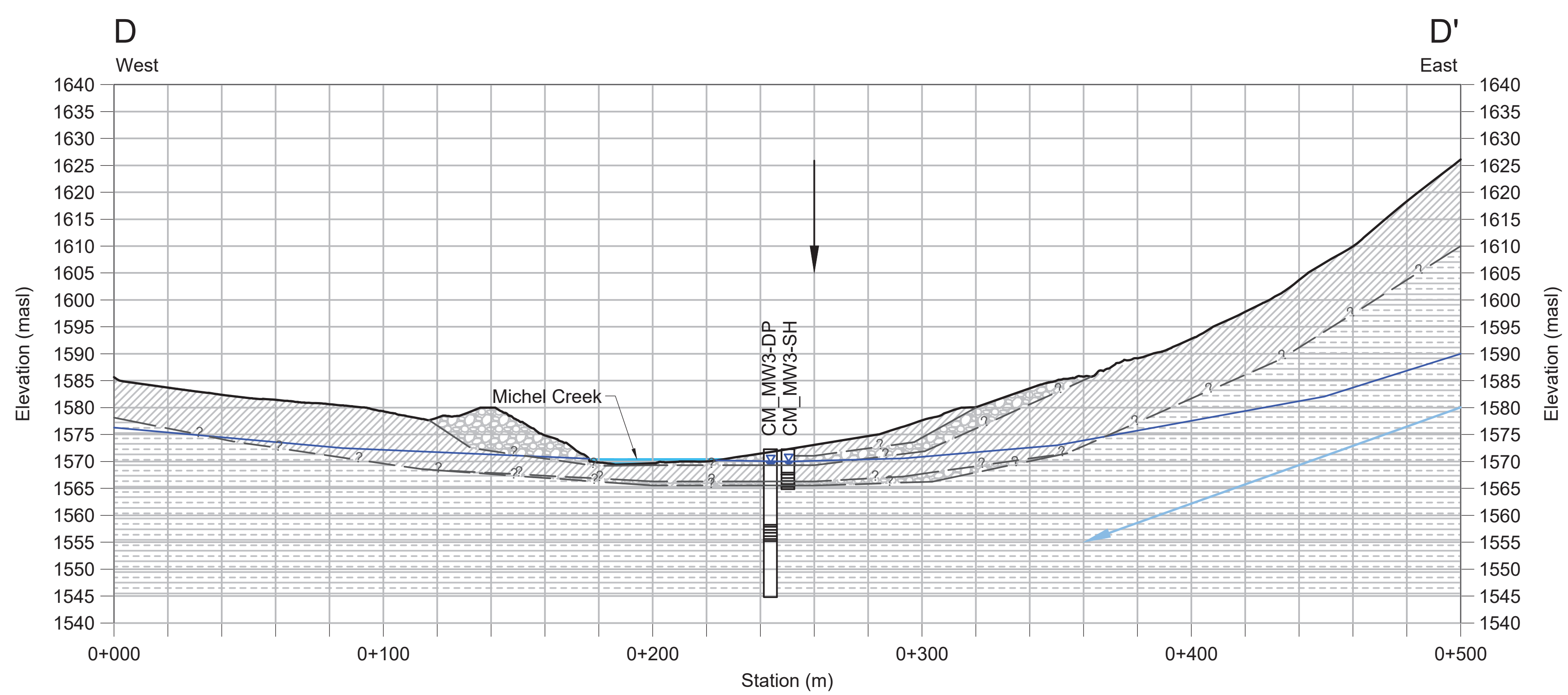
Interpreted Cross Sections of Valley at CM_MW-1/DP/OB/SH

DATE:	APPROVED:	Ref. No.
10/04/2018	RB	DRAWING 48*

*Section from SRK (2018c); only the Drawing number was changed.

P:\01_SITES\Coal Mountain\040_AutoCAD\2016 Annual Hydrogeology Report\1CT017.139 - CrossSections.dwg





LEGEND

- Direction of Flow
- Groundwater Gradient
- Existing Ground
- Creek
- Inferred Lithological Boundary
- Gravel
- Clay
- Bedrock
- Water Level
- Well Location
- Well Screen Location

NOTES

1. Topography provided by Coal Mountain Operations, 2016 site conditions.
2. Lithology inferred from drilling program conducted in August, 2015 by SRK

2x Vertical Exaggeration

Horizontal 0m 10 20 30 40 50

Reproduced without change from Teck 2017

srk consulting

SRK JOB NO.: 1CT017.199

FILE NAME: 1CT017.168 - CrossSections.dwg

Teck

Coal Mountain

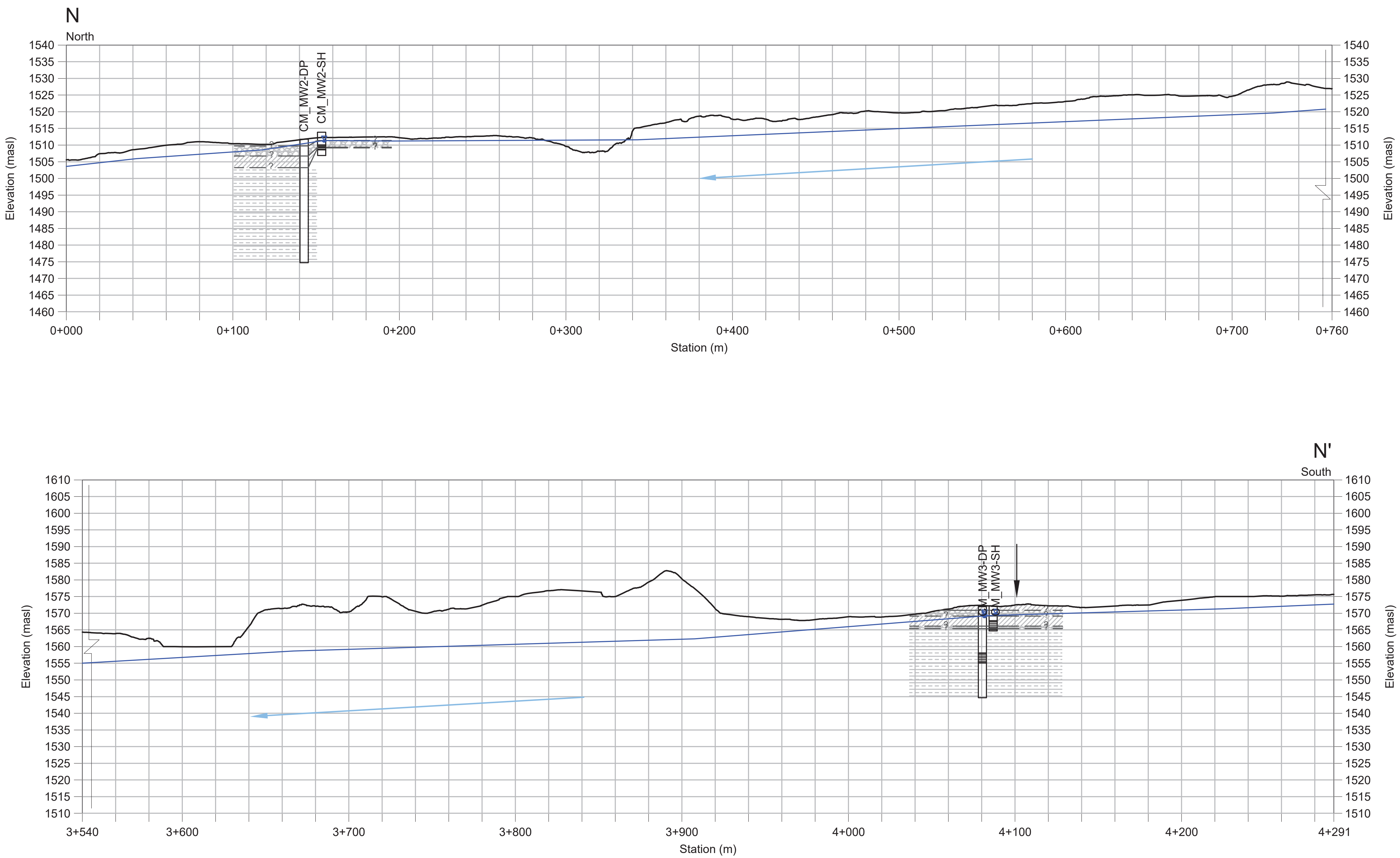
CMO SSGMP 2018 Update

Interpreted Cross Sections of Valley at CM_MW2-DP/SH and CM_MW3-DP/SH

DATE: 10/04/2018 | APPROVED: RB | Ref. No. DRAWING 49*

*Section from SRK (2018c); only the Drawing number was changed.

P:\01_SITES\Coal Mountain\1040_AutoCAD\2016 Annual Hydrogeology Report\1CT017.139 - CrossSections.dwg



LEGEND

- Direction of Flow
- Groundwater Gradient
- Existing Ground
- Creek
- Inferred Lithological Boundary
- Gravel
- Loam
- Clay
- Siltstone Bedrock
- Water Level
- Well Location
- Well Screen Location

NOTES

1. Topography provided by Coal Mountain Operations, 2016 site conditions.
2. Lithology inferred from drilling program conducted in August, 2015 by SRK

2x Vertical Exaggeration

Horizontal 0m 10 20 30 40 50

Reproduced without change from Teck 2017

srk consulting

SRK JOB NO.: 1CT017.199

FILE NAME: 1CT017.168 - CrossSections.dwg

Teck

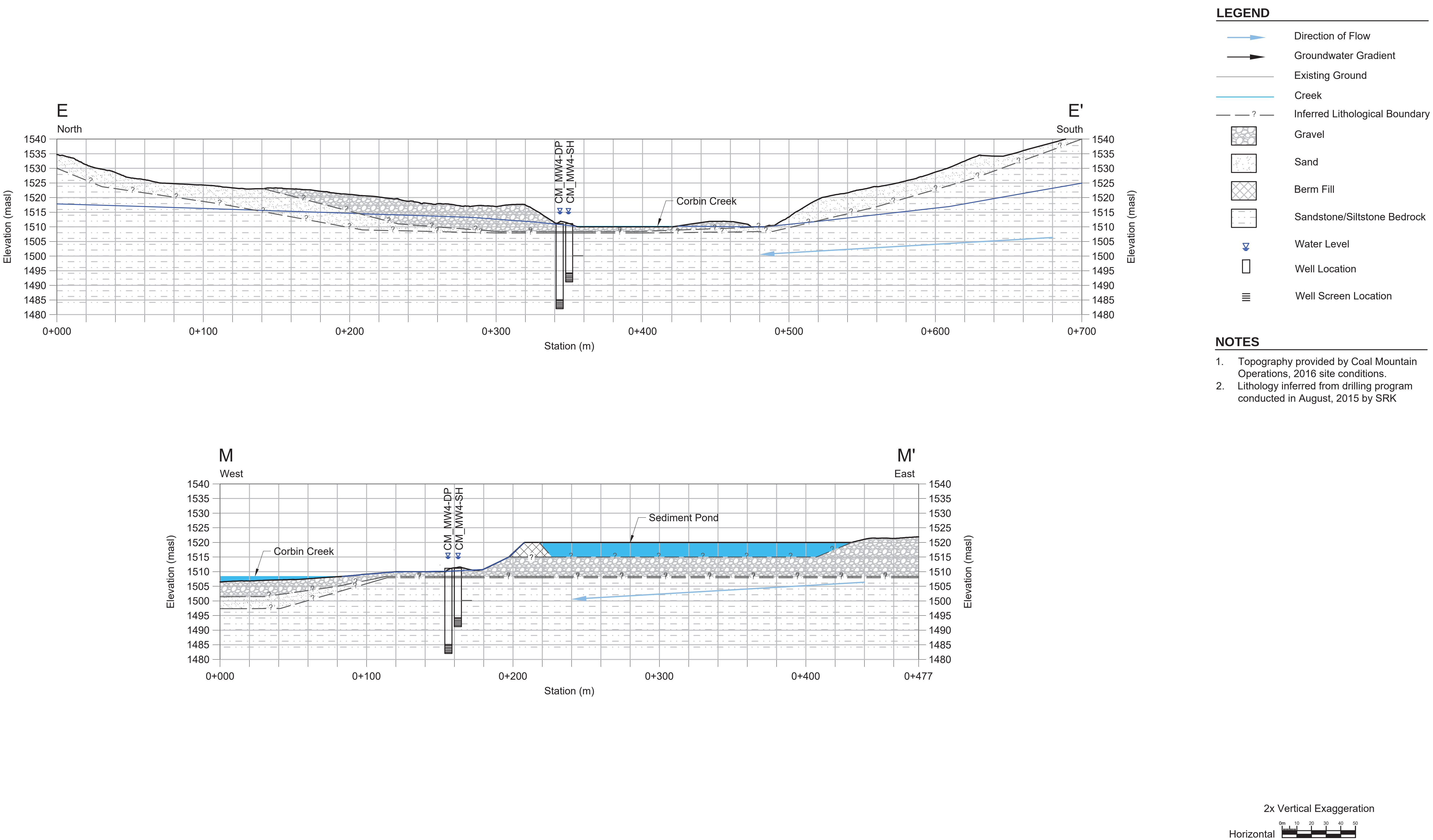
Coal Mountain

CMO SSGMP 2018 Update

Interpreted Cross Section along Valley at CM_MW2-DP/SH and CM_MW3-DP/SH

DATE: 10/04/2018 | APPROVED: RB | Ref. No. DRAWING 50*

*Section from SRK (2018c); only the Drawing number was changed.



NOTES

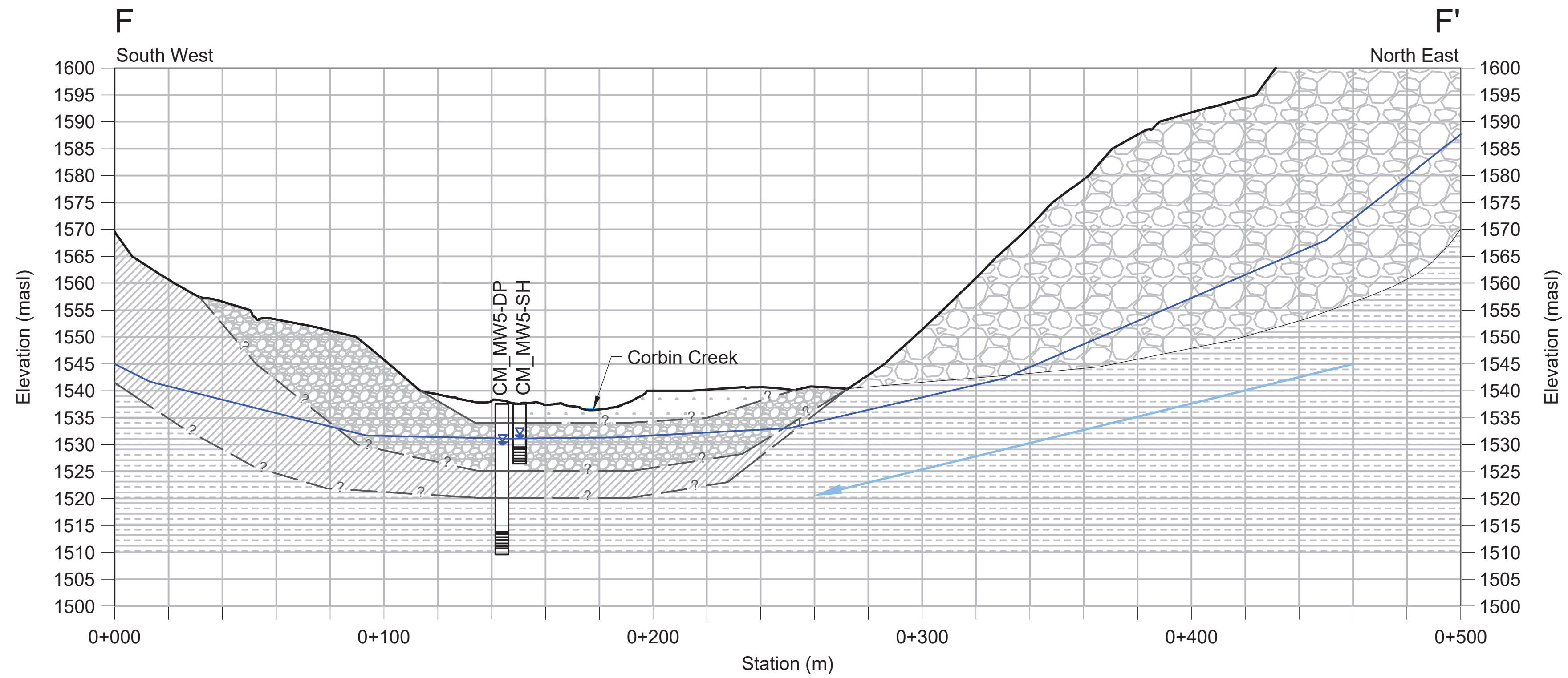
1. Topography provided by Coal Mountain Operations, 2016 site conditions.
2. Lithology inferred from drilling program conducted in August, 2015 by SRK

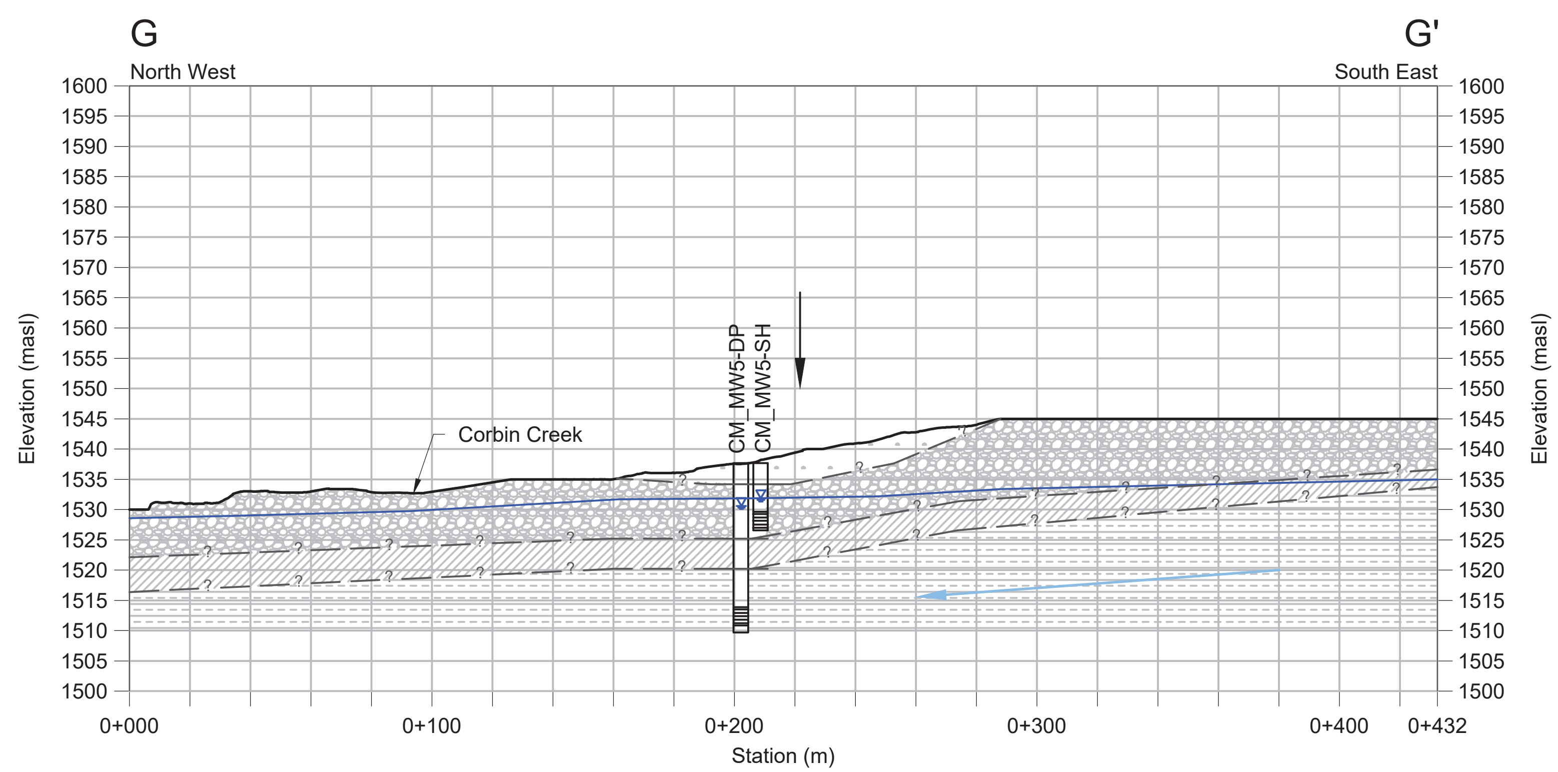
Reproduced without change from Teck 2017

srk consulting	Teck	CMO SSGMP 2018 Update
SRK JOB NO.: 1CT017.199	Coal Mountain	Interpreted Cross Sections of Valley at CM_MW4-DP/SH
FILE NAME: 1CT017.168 - CrossSections.dwg		DATE: 10/04/2018 APPROVED: RB Ref. No. DRAWING 51*

*Section from SRK (2018c); only the Drawing number was changed.

P:\01_SITES\Coal Mountain\1040_AutoCAD\2016 Annual Hydrogeology Report\1CT017.139 - CrossSections.dwg





LEGEND

- Direction of Flow
- Groundwater Gradient
- Existing Ground
- Creek
- Inferred Lithological Boundary
- Gravel
- Waste Rock
- Loam
- Clay
- Siltstone Bedrock
- Water Level
- Well Location
- Well Screen Location

NOTES

1. Topography provided by Coal Mountain Operations, 2016 site conditions.
2. Lithology inferred from drilling program conducted in August, 2015 by SRK

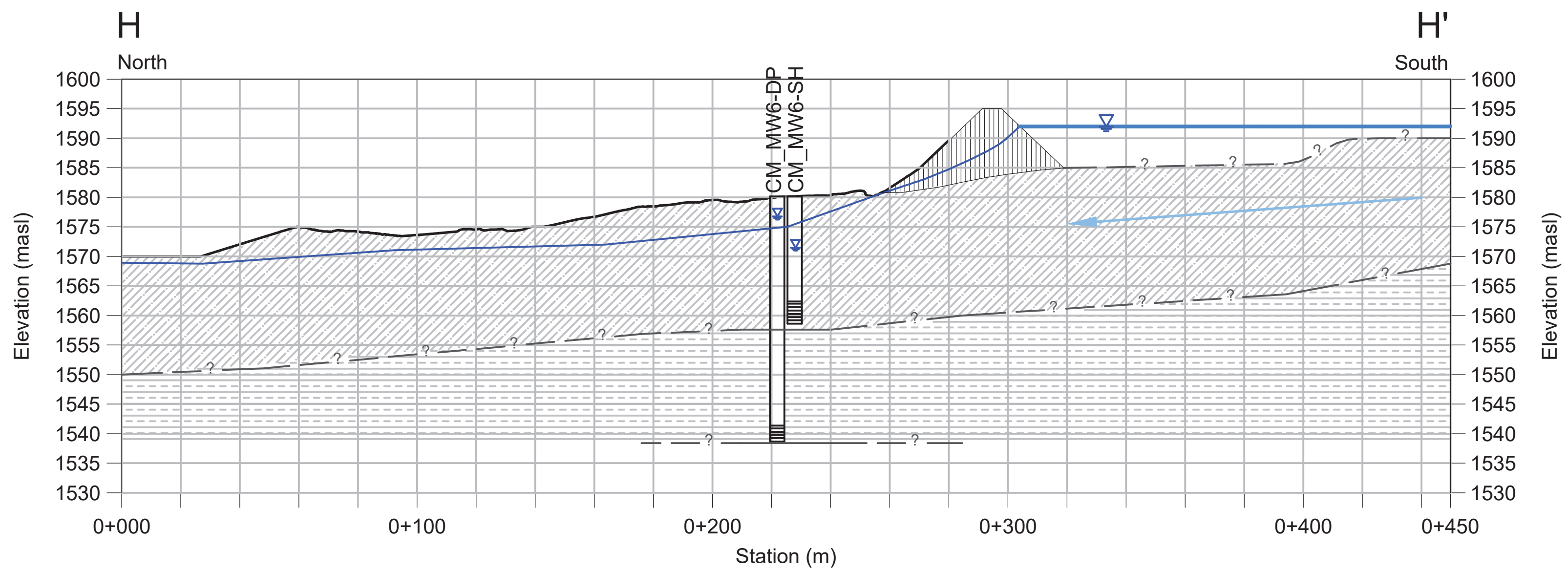
2x Vertical Exaggeration

Horizontal 0m 10 20 30 40 50

Reproduced without change from Teck 2017

srk consulting	Teck	CMO SSGMP 2018 Update
		Interpreted Cross Sections of Valley at CM_MW5-DP/SH
SRK JOB NO.: 1CT017.199	Coal Mountain	DATE: 10/04/2018
FILE NAME: 1CT017.168 - CrossSections.dwg		APPROVED: RB
		Ref. No. DRAWING 52*

*Section from SRK (2018c); only the Drawing number was changed.

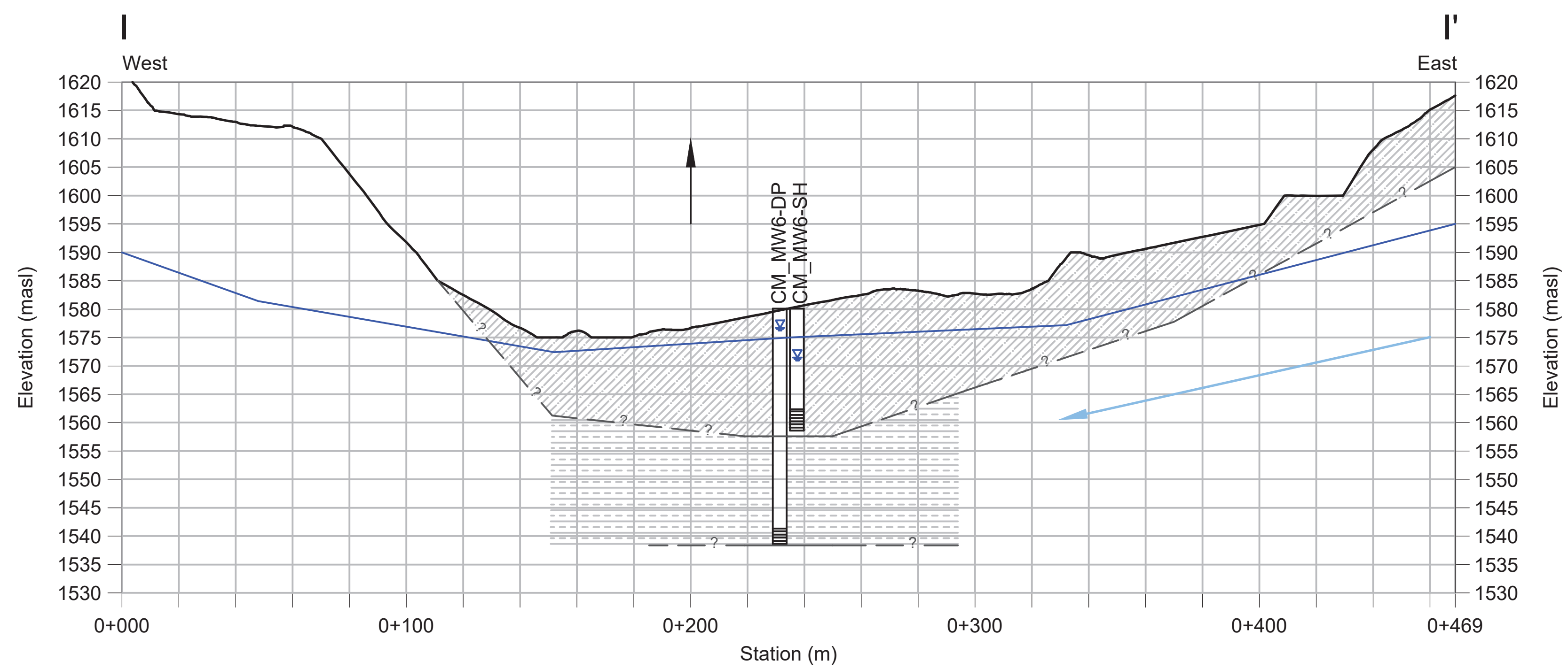


LEGEND

- Direction of Flow
- Groundwater Gradient
- Existing Ground
- Creek
- Inferred Lithological Boundary
- Well-Graded Sand
- Siltstone Bedrock
- Dam Fill
- Water Level
- Well Location
- Well Screen Location

NOTES

1. Topography provided by Coal Mountain Operations, 2016 site conditions.
2. Lithology inferred from drilling program conducted in August, 2015 by SRK



2x Vertical Exaggeration

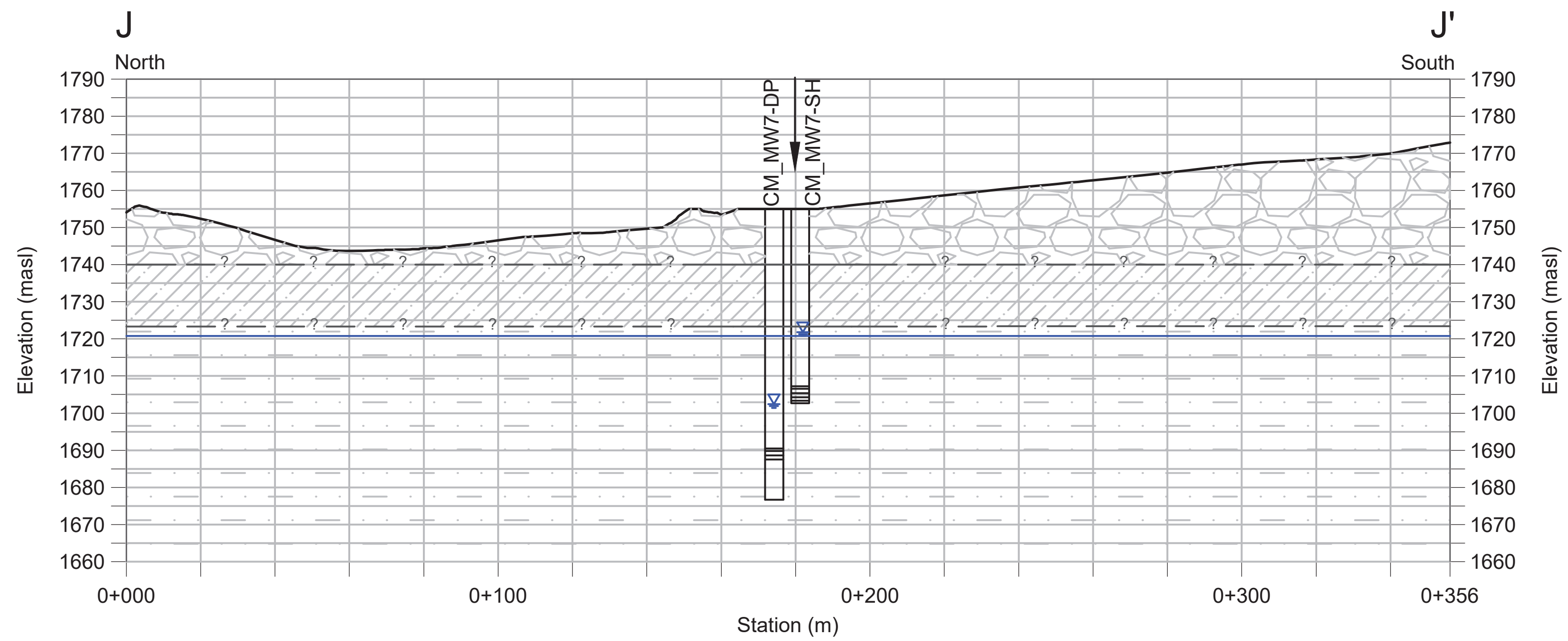
Horizontal 0m 10 20 30 40 50

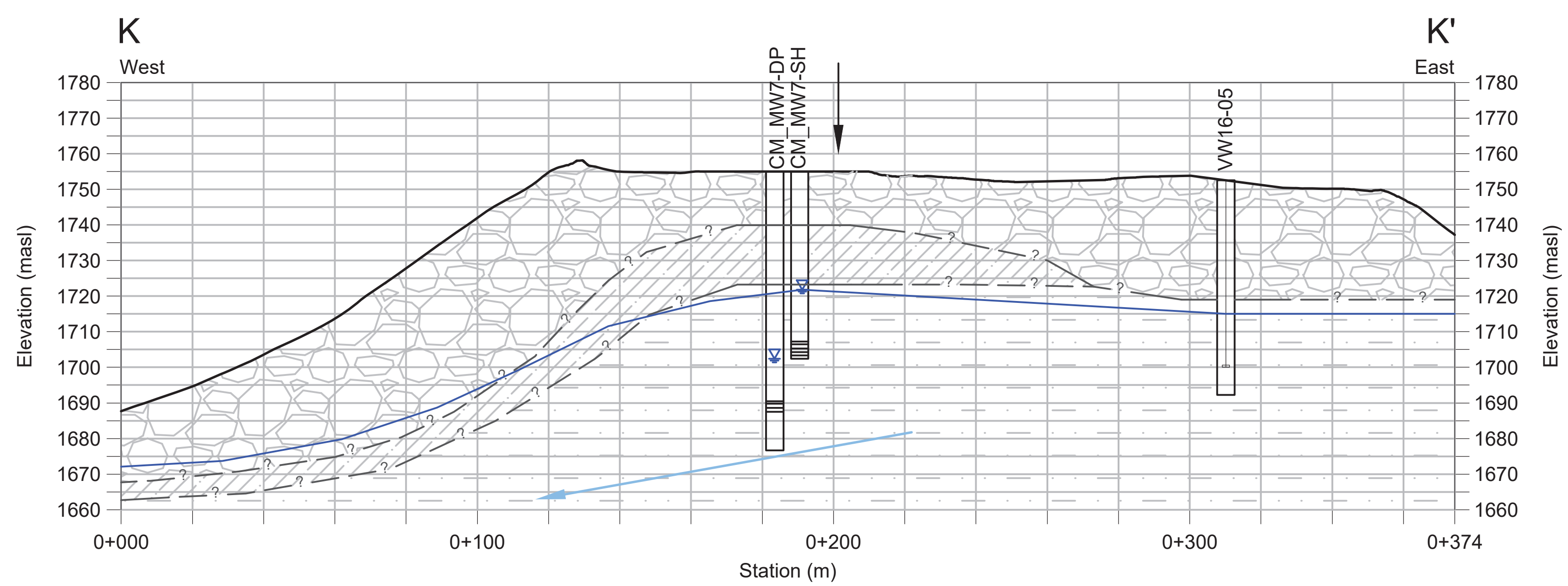
Reproduced without change from Teck 2017

P:\01_SITES\Coal Mountain\!040_AutoCAD\2016 Annual Hydrogeology Report\1CT017.139 - CrossSections.dwg

srk consulting	Teck	CMO SSGMP 2018 Update
SRK JOB NO.: 1CT017.199		Interpreted Cross Section of Valley at CM_MW6-DP/SH
FILE NAME: 1CT017.168 - CrossSections.dwg	Coal Mountain	DATE: 10/04/2018 APPROVED: RB Ref. No. DRAWING 53*

*Section from SRK (2018c); only the Drawing number was changed.





LEGEND

- Direction of Flow
- Groundwater Gradient
- Existing Ground
- Inferred Lithological Boundary
- Waste Rock
- Natural Ground - Well-Graded Sand
- Sandstone/Siltstone Bedrock
- Water Level
- Well Location
- Well Screen Location

NOTES

1. Topography provided by Coal Mountain Operations, 2016 site conditions.
2. Lithology inferred from drilling program conducted in August, 2016 by SRK

Modified from Teck 2017

srk consulting

Teck

CMO SSGMP 2018 Update

Interpreted Cross Sections at CM_MW7-DP/SH and VW16-05

SRK JOB NO.: 1CT017.199

FILE NAME: 1CT017.168 - CrossSections.dwg

Coal Mountain

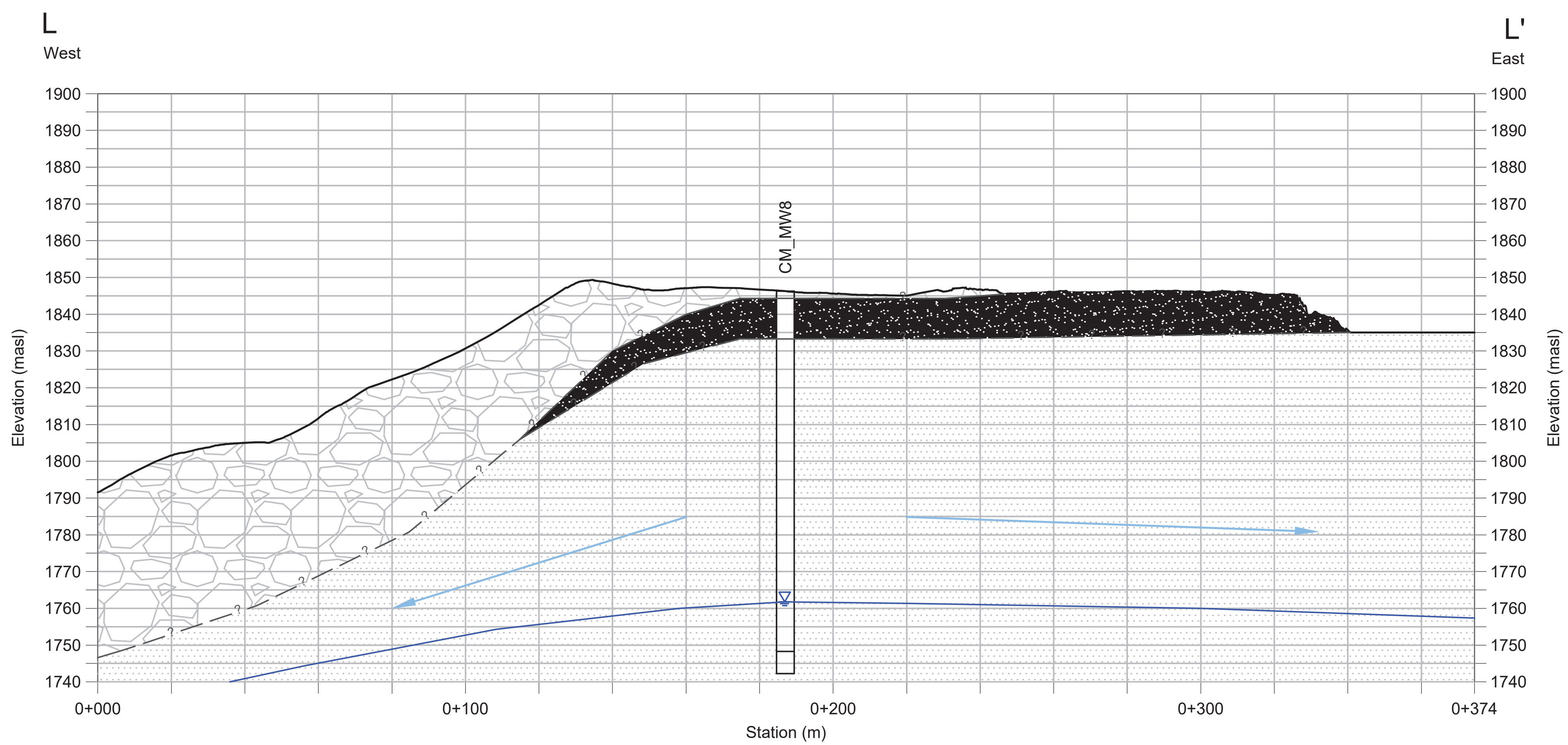
DATE: 10/04/2018

APPROVED: RB

Ref. No. DRAWING 54*

*Section from SRK (2018c); only the Drawing number was changed.

P:\01_SITES\Coal Mountain\!040_AutoCAD\2016 Annual Hydrogeology Report\1CT017.139 - CrossSections.dwg



LEGEND

- Direction of Flow
- Groundwater Gradient
- Existing Ground
- Creek
- Inferred Lithological Boundary
- Waste Rock
- Coal-rich Bedrock
- Sandstone Bedrock
- Water Level
- Well Location
- Well Screen Location

NOTES

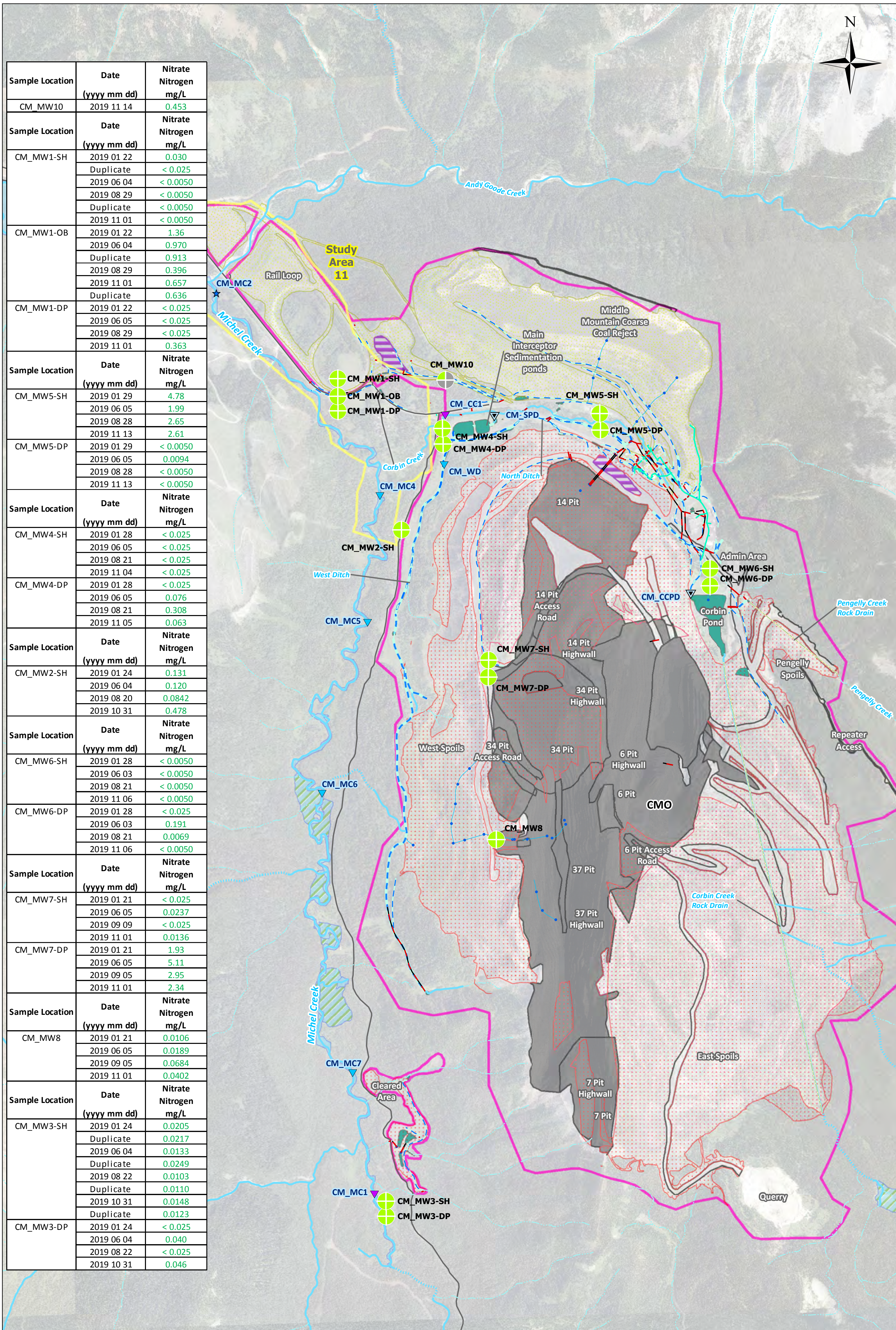
1. Topography provided by Coal Mountain
2. Lithology inferred from drilling program conducted in August, 2015 by SRK

Reproduced without change from Teck 2017

srk consulting	Teck	CMO SSGMP 2018 Update
SRK JOB NO.: 1CT017.199		Interpreted Cross Section of Valley at CM_MW8
FILE NAME: 1CT017.168 - CrossSections.dwg	Coal Mountain	DATE: 10/04/2018 · APPROVED: RB · Ref. No. DRAWING 55*

*Section from SRK (2018c); only the Drawing number was changed.

P:\01_SITES\Coal Mountain\1040_AutoCAD\2016 Annual Hydrogeology Report\1CT017.139 - CrossSections.dwg



Sample Location	Date (yyyy mm dd)	Nitrate Nitrogen mg/L
CM_MW10	2019 11 14	0.453
Sample Location	**Date (yyyy mm dd)**	**Nitrate Nitrogen mg/L**
CM_MW1-SH	2019 01 22	0.030
	Duplicate	< 0.025
	2019 06 04	< 0.0050
	2019 08 29	< 0.0050
	Duplicate	< 0.0050
	2019 11 01	< 0.0050
CM_MW1-OB	2019 01 22	1.36
	2019 06 04	0.970
	Duplicate	0.913
	2019 08 29	0.396
	2019 11 01	0.657
	Duplicate	0.636
CM_MW1-DP	2019 01 22	< 0.025
	2019 06 05	< 0.025
	2019 08 29	< 0.025
	2019 11 01	0.363
Sample Location	**Date (yyyy mm dd)**	**Nitrate Nitrogen mg/L**
CM_MW5-SH	2019 01 29	4.78
	2019 06 05	1.99
	2019 08 28	2.65
	2019 11 13	2.61
CM_MW5-DP	2019 01 29	< 0.0050
	2019 06 05	0.0094
	2019 08 28	< 0.0050
	2019 11 13	< 0.0050
Sample Location	**Date (yyyy mm dd)**	**Nitrate Nitrogen mg/L**
CM_MW4-SH	2019 01 28	< 0.025
	2019 06 05	< 0.025
	2019 08 21	< 0.025
	2019 11 04	< 0.025
CM_MW4-DP	2019 01 28	< 0.025
	2019 06 05	0.076
	2019 08 21	0.308
	2019 11 05	0.063
Sample Location	**Date (yyyy mm dd)**	**Nitrate Nitrogen mg/L**
CM_MW2-SH	2019 01 24	0.131
	2019 06 04	0.120
	2019 08 20	0.0842
	2019 10 31	0.478
Sample Location	**Date (yyyy mm dd)**	**Nitrate Nitrogen mg/L**
CM_MW6-SH	2019 01 28	< 0.0050
	2019 06 03	< 0.0050
	2019 08 21	< 0.0050
	2019 11 06	< 0.0050
CM_MW6-DP	2019 01 28	< 0.025
	2019 06 03	0.191
	2019 08 21	0.0069
	2019 11 06	< 0.0050
Sample Location	**Date (yyyy mm dd)**	**Nitrate Nitrogen mg/L**
CM_MW7-SH	2019 01 21	< 0.025
	2019 06 05	0.0237
	2019 09 09	< 0.025
	2019 11 01	0.0136
CM_MW7-DP	2019 01 21	1.93
	2019 06 05	5.11
	2019 09 05	2.95
	2019 11 01	2.34
Sample Location	**Date (yyyy mm dd)**	**Nitrate Nitrogen mg/L**
CM_MW8	2019 01 21	0.0106
	2019 06 05	0.0189
	2019 09 05	0.0684
	2019 11 01	0.0402
Sample Location	**Date (yyyy mm dd)**	**Nitrate Nitrogen mg/L**
CM_MW3-SH	2019 01 24	0.0205
	Duplicate	0.0217
	2019 06 04	0.0133
	Duplicate	0.0249
	2019 08 22	0.0103
	Duplicate	0.0110
	2019 10 31	0.0148
	Duplicate	0.0123
CM_MW3-DP	2019 01 24	< 0.025
	2019 06 04	0.040
	2019 08 22	< 0.025
	2019 10 31	0.046

Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Secondary Road
- Tailings/Settling Pond
- CMO Permit Boundary
- Study Areas
- Plant Site
- Road
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland

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 Nitrogen mg/L
CSR Aquatic Life	400
CSR Irrigation Watering	n/a
CSR Livestock Watering	100
CSR Drinking Water	10

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 100 200 400 600 800 1,000 Meters

PROJECT LOCATION:
Coal Mountain, BC

CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

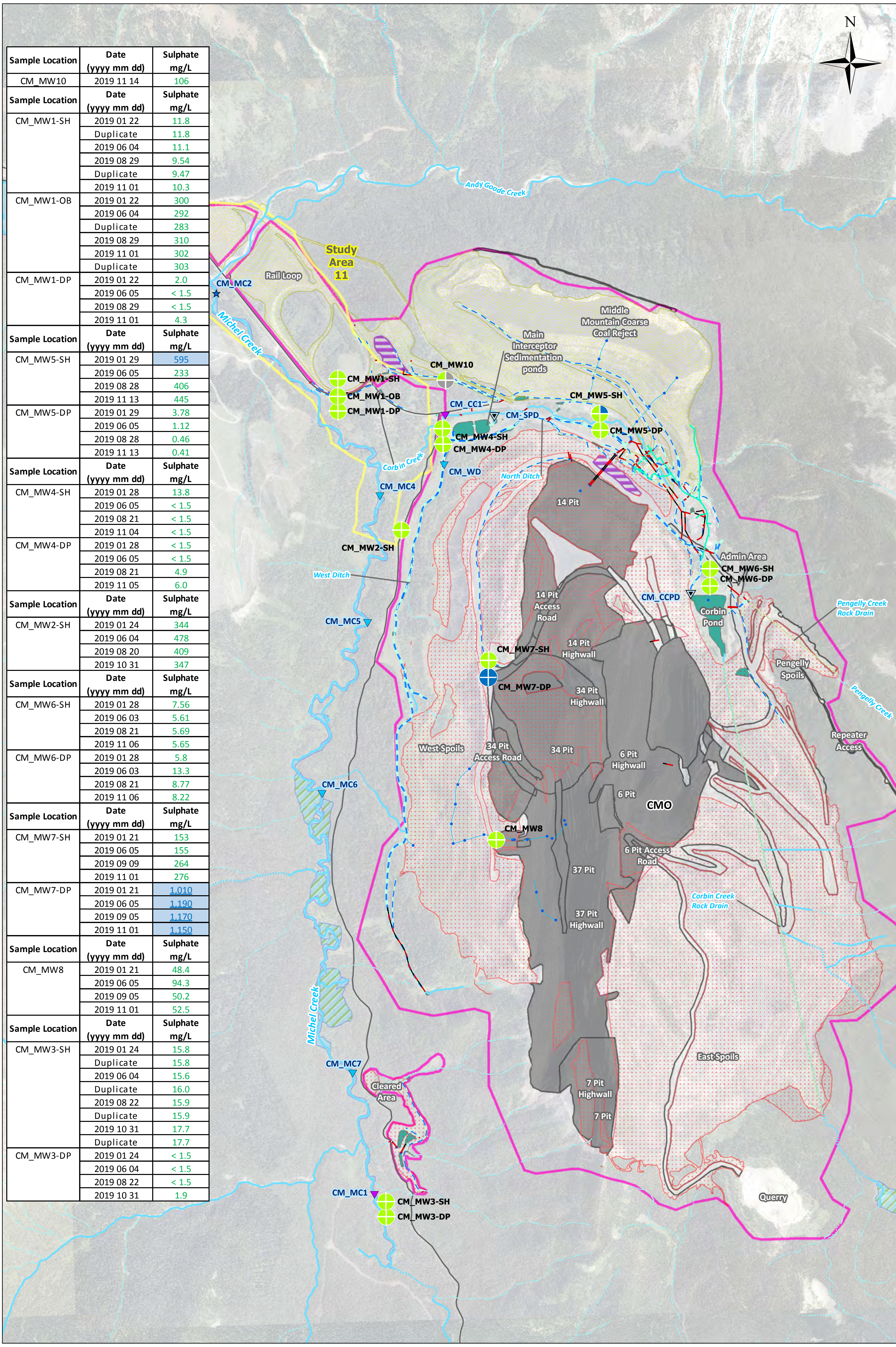
Spatial Distribution of Nitrate Nitrogen in Groundwater - Coal Mountain Operations

CHK'D: KC | DATE: 2020/03/30 | SCALE: 1:22,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 56

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\56-NitCMO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042

Sample Location	Date (yyyy mm dd)	Sulphate mg/L
CM_MW10	2019 11 14	106
Sample Location	**Date (yyyy mm dd)**	**Sulphate mg/L**
CM_MW1-SH	2019 01 22	11.8
	Duplicate	11.8
	2019 06 04	11.1
	2019 08 29	9.54
	Duplicate	9.47
	2019 11 01	10.3
CM_MW1-OB	2019 01 22	300
	2019 06 04	292
	Duplicate	283
	2019 08 29	310
	2019 11 01	302
	Duplicate	303
CM_MW1-DP	2019 01 22	2.0
	2019 06 05	< 1.5
	2019 08 29	< 1.5
	2019 11 01	4.3
Sample Location	**Date (yyyy mm dd)**	**Sulphate mg/L**
CM_MW5-SH	2019 01 29	595
	2019 06 05	233
	2019 08 28	406
	2019 11 13	445
CM_MW5-DP	2019 01 29	3.78
	2019 06 05	1.12
	2019 08 28	0.46
	2019 11 13	0.41
Sample Location	**Date (yyyy mm dd)**	**Sulphate mg/L**
CM_MW4-SH	2019 01 28	13.8
	2019 06 05	< 1.5
	2019 08 21	< 1.5
	2019 11 04	< 1.5
CM_MW4-DP	2019 01 28	< 1.5
	2019 06 05	< 1.5
	2019 08 21	4.9
	2019 11 05	6.0
Sample Location	**Date (yyyy mm dd)**	**Sulphate mg/L**
CM_MW2-SH	2019 01 24	344
	2019 06 04	478
	2019 08 20	409
	2019 10 31	347
Sample Location	**Date (yyyy mm dd)**	**Sulphate mg/L**
CM_MW6-SH	2019 01 28	7.56
	2019 06 03	5.61
	2019 08 21	5.69
	2019 11 06	5.65
CM_MW6-DP	2019 01 28	5.8
	2019 06 03	13.3
	2019 08 21	8.77
	2019 11 06	8.22
Sample Location	**Date (yyyy mm dd)**	**Sulphate mg/L**
CM_MW7-SH	2019 01 21	153
	2019 06 05	155
	2019 09 09	264
	2019 11 01	276
CM_MW7-DP	2019 01 21	1,010
	2019 06 05	1,190
	2019 09 05	1,170
	2019 11 01	1,150
Sample Location	**Date (yyyy mm dd)**	**Sulphate mg/L**
CM_MW8	2019 01 21	48.4
	2019 06 05	94.3
	2019 09 05	50.2
	2019 11 01	52.5
Sample Location	**Date (yyyy mm dd)**	**Sulphate mg/L**
CM_MW3-SH	2019 01 24	15.8
	Duplicate	15.8
	2019 06 04	15.6
	Duplicate	16.0
	2019 08 22	15.9
	Duplicate	15.9
	2019 10 31	17.7
	Duplicate	17.7
CM_MW3-DP	2019 01 24	< 1.5
	2019 06 04	< 1.5
	2019 08 22	< 1.5
	2019 10 31	1.9



Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Secondary Road
- Tailings/Settling Pond
- CMO Permit Boundary
- Study Areas
- Plant Site
- Road
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland

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. Intended for illustration purposes only.
2. Original in colour.
References:
1. Information provided by Teck Coal Limited.
Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 100 200 400 600 800 1,000 Meters

PROJECT LOCATION:
Coal Mountain, BC

CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

Spatial Distribution of Sulphate in Groundwater - Coal Mountain Operations

CHK'D: KC | DATE: 2020/03/30 | SCALE: 1:22,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 57

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\57-SULCMO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW10	2019 11 14	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW1-SH	2019 01 22	< 0.030
	Duplicate	< 0.030
	2019 06 04	< 0.020
	2019 08 29	< 0.020
	Duplicate	< 0.020
	2019 11 01	< 0.015
CM_MW1-OB	2019 01 22	0.0611
	2019 06 04	0.0714
	Duplicate	0.0824
	2019 08 29	0.0691
	2019 11 01	0.0808
	Duplicate	0.0833
CM_MW1-DP	2019 01 22	< 0.010
	2019 06 05	< 0.0050
	2019 08 29	< 0.0050
	2019 11 01	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW5-SH	2019 01 29	0.0468
	2019 06 05	0.0333
	2019 08 28	0.0429
	2019 11 13	0.0449
CM_MW5-DP	2019 01 29	< 0.0050
	2019 06 05	< 0.0050
	2019 08 28	< 0.0050
	2019 11 13	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW4-SH	2019 01 28	< 0.0050
	2019 06 05	< 0.0050
	2019 08 21	< 0.0050
	2019 11 04	< 0.0050
CM_MW4-DP	2019 01 28	< 0.010
	2019 06 05	< 0.0050
	2019 08 21	< 0.010
	2019 11 05	< 0.010

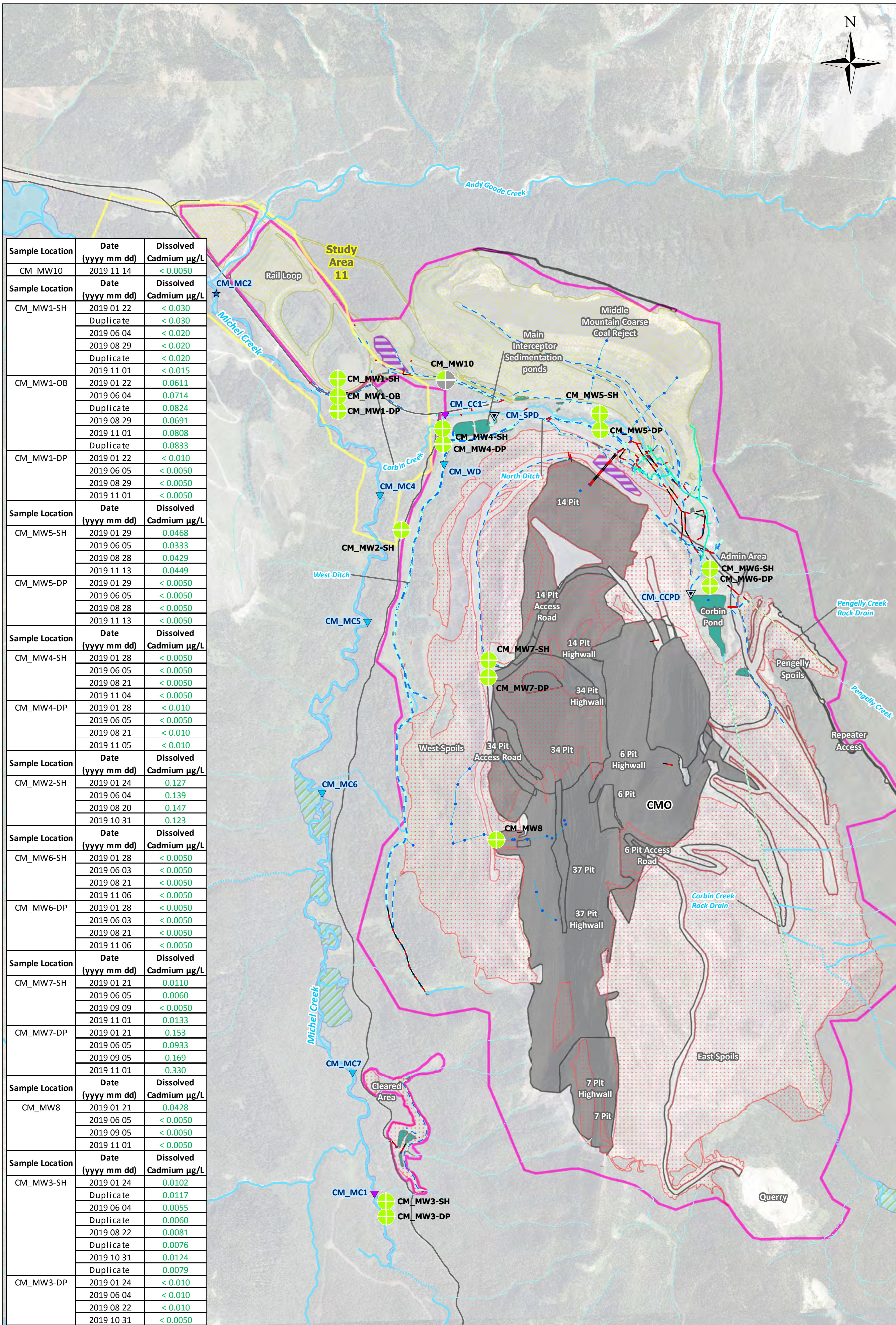
Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW2-SH	2019 01 24	0.127
	2019 06 04	0.139
	2019 08 20	0.147
	2019 10 31	0.123

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW6-SH	2019 01 28	< 0.0050
	2019 06 03	< 0.0050
	2019 08 21	< 0.0050
	2019 11 06	< 0.0050
CM_MW6-DP	2019 01 28	< 0.0050
	2019 06 03	< 0.0050
	2019 08 21	< 0.0050
	2019 11 06	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW7-SH	2019 01 21	0.0110
	2019 06 05	0.0060
	2019 09 09	< 0.0050
	2019 11 01	0.0133
CM_MW7-DP	2019 01 21	0.153
	2019 06 05	0.0933
	2019 09 05	0.169
	2019 11 01	0.330

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW8	2019 01 21	0.0428
	2019 06 05	< 0.0050
	2019 09 05	< 0.0050
	2019 11 01	< 0.0050

Sample Location	Date (yyyy mm dd)	Dissolved Cadmium µg/L
CM_MW3-SH	2019 01 24	0.0102
	Duplicate	0.0117
	2019 06 04	0.0055
	Duplicate	0.0060
	2019 08 22	0.0081
	Duplicate	0.0076
	2019 10 31	0.0124
	Duplicate	0.0079
CM_MW3-DP	2019 01 24	< 0.010
	2019 06 04	< 0.010
	2019 08 22	< 0.010
	2019 10 31	< 0.0050



Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Secondary Road
- Tailings/Settling Pond
- CMO Permit Boundary
- Study Areas
- Plant Site
- Road
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland

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	Dissolved Cadmium µg/L
CSR Aquatic Life	0.5-4
CSR Irrigation Watering	5
CSR Livestock Watering	80
CSR Drinking Water	5

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisions:
0 - AO - 2020-01-22 - DRAFT - KC

0 100 200 400 600 800 1,000 Meters

PROJECT LOCATION:
Coal Mountain, BC

CLIENT NAME:
Teck Coal Limited

SNC·LAVALIN

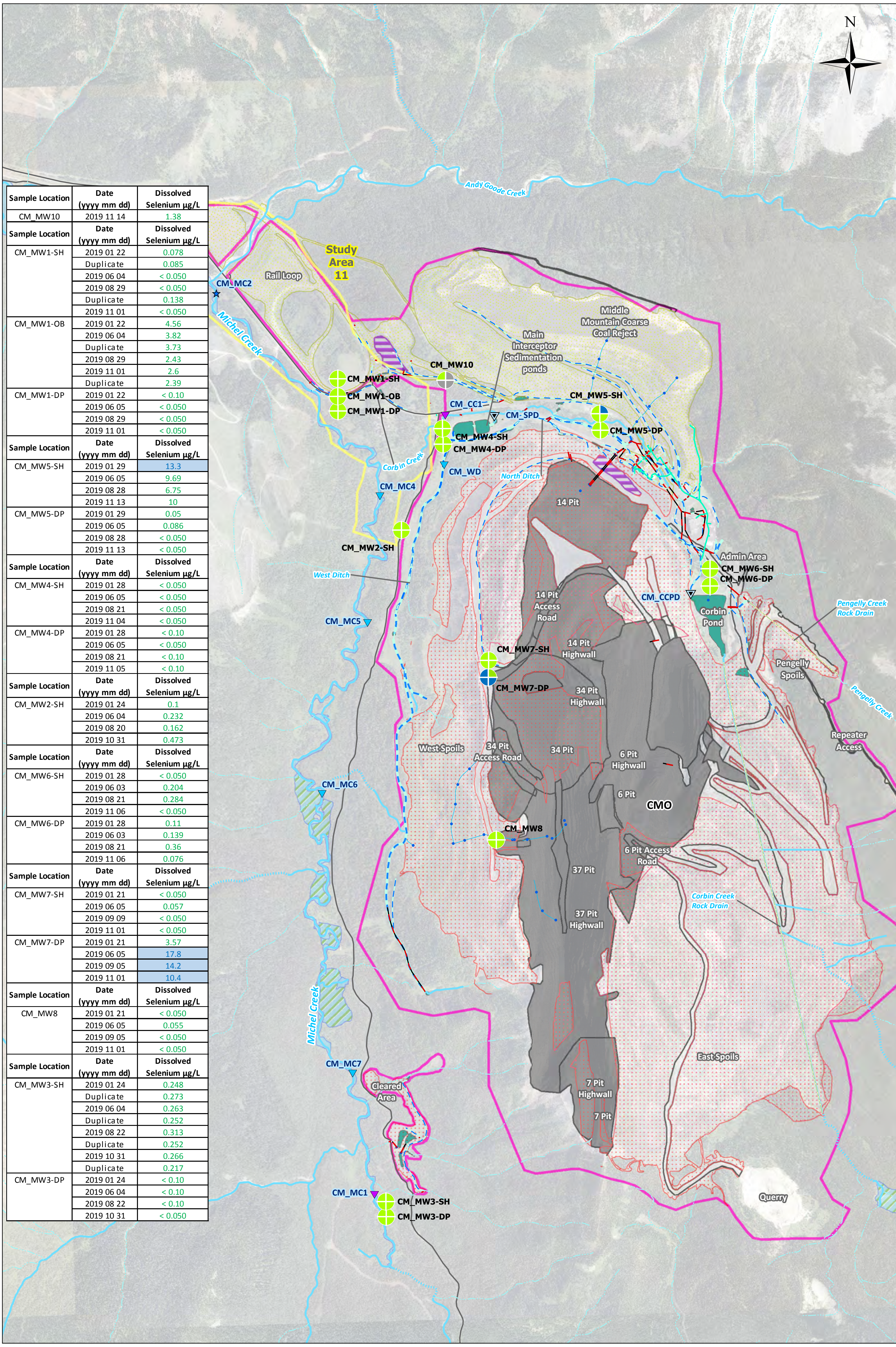
Spatial Distribution of Dissolved Cadmium in Groundwater - Coal Mountain Operations

CHK'D: KC	DATE: 2020/03/30	SCALE: 1:22,000	Ref Num:
BY: AO	COORD SYS: NAD 1983 UTM Zone 11N		DRAWING 58

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\58-CadCMO.mxd

Sample Location	Date (yyyy mm dd)	Dissolved Selenium µg/L
CM_MW10	2019 11 14	1.38
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
CM_MW1-SH	2019 01 22	0.078
	Duplicate	0.085
	2019 06 04	< 0.050
	2019 08 29	< 0.050
	Duplicate	0.138
	2019 11 01	< 0.050
CM_MW1-OB	2019 01 22	4.56
	2019 06 04	3.82
	Duplicate	3.73
	2019 08 29	2.43
	2019 11 01	2.6
	Duplicate	2.39
CM_MW1-DP	2019 01 22	< 0.10
	2019 06 05	< 0.050
	2019 08 29	< 0.050
	2019 11 01	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
CM_MW5-SH	2019 01 29	13.3
	2019 06 05	9.69
	2019 08 28	6.75
	2019 11 13	10
CM_MW5-DP	2019 01 29	0.05
	2019 06 05	0.086
	2019 08 28	< 0.050
	2019 11 13	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
CM_MW4-SH	2019 01 28	< 0.050
	2019 06 05	< 0.050
	2019 08 21	< 0.050
	2019 11 04	< 0.050
CM_MW4-DP	2019 01 28	< 0.10
	2019 06 05	< 0.050
	2019 08 21	< 0.10
	2019 11 05	< 0.10
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
CM_MW2-SH	2019 01 24	0.1
	2019 06 04	0.232
	2019 08 20	0.162
	2019 10 31	0.473
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
CM_MW6-SH	2019 01 28	< 0.050
	2019 06 03	0.204
	2019 08 21	0.284
	2019 11 06	< 0.050
CM_MW6-DP	2019 01 28	0.11
	2019 06 03	0.139
	2019 08 21	0.36
	2019 11 06	0.076
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
CM_MW7-SH	2019 01 21	< 0.050
	2019 06 05	0.057
	2019 09 09	< 0.050
	2019 11 01	< 0.050
CM_MW7-DP	2019 01 21	3.57
	2019 06 05	17.8
	2019 09 05	14.2
	2019 11 01	10.4
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
CM_MW8	2019 01 21	< 0.050
	2019 06 05	0.055
	2019 09 05	< 0.050
	2019 11 01	< 0.050
Sample Location	**Date (yyyy mm dd)**	**Dissolved Selenium µg/L**
CM_MW3-SH	2019 01 24	0.248
	Duplicate	0.273
	2019 06 04	0.263
	Duplicate	0.252
	2019 08 22	0.313
	Duplicate	0.252
	2019 10 31	0.266
	Duplicate	0.217
CM_MW3-DP	2019 01 24	< 0.10
	2019 06 04	< 0.10
	2019 08 22	< 0.10
	2019 10 31	< 0.050



Surface Water Stations
- Compliance Point
- Receiving Environment
- Authorized Discharge
- Monitoring

Site Features
- Secondary Road
- Tailings/Settling Pond
- CMO Permit Boundary
- Study Areas
- Plant Site
- Road
- Pit
- Stockpiles
- Waste Dump (Spoils)

Water Features
- Intermittent Stream
- Ditch
- Indefinite Stream
- Stream
- Subsurface
- Lake
- River Bed
- Wetland

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	Dissolved Selenium µg/L
CSR Aquatic Life	20
CSR Irrigation Watering	20
CSR Livestock Watering	30
CSR Drinking Water	10
Secondary Screening Criteria	**Dissolved Selenium µg/L**
Guideline for Canadian Drinking Water Quality	[50]
Compliance Point: Michel Creek [CM_MC2(E258937)]	19

Notes:
1. Intended for illustration purposes only.
2. Original in colour.

References:
1. Information provided by Teck Coal Limited.

Revisons:
0 - AO - 2020-01-22 - DRAFT - KC

0 100 200 400 600 800 1,000 Meters

PROJECT LOCATION: Coal Mountain, BC

CLIENT NAME: Teck Coal Limited

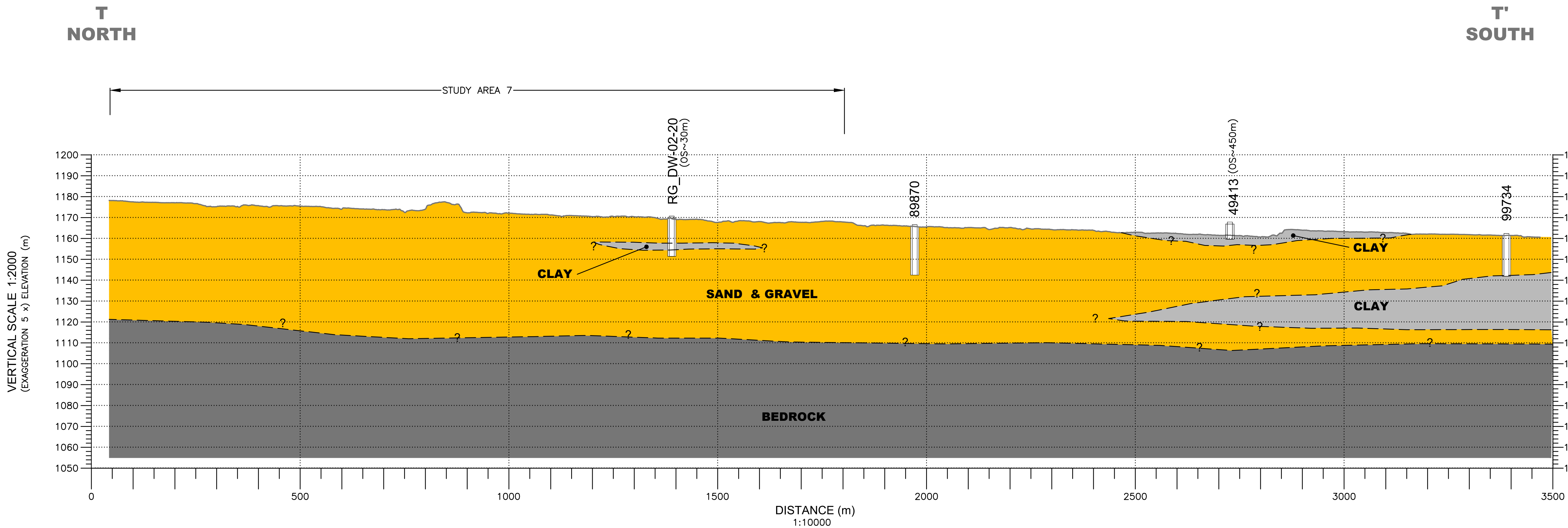
SNC·LAVALIN

Spatial Distribution of Dissolved Selenium in Groundwater - Coal Mountain Operations

CHK'D: KC | DATE: 2020/03/30 | SCALE: 1:22,000 | Ref Num:
BY: AO | COORD SYS: NAD 1983 UTM Zone 11N | DRAWING 59

MXD Path: E:_SYNC_FOLDERS\TECK_COAL_GIS\GISCAD\Map Series\671557\59-SelCMO.mxd

Project Path: P:\Current Projects\Teck Coal Ltd\GISCAD\Exports\659042_SSGMP_AnnualReport\659042



LEGEND

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

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME:
TECK COAL LIMITED
–

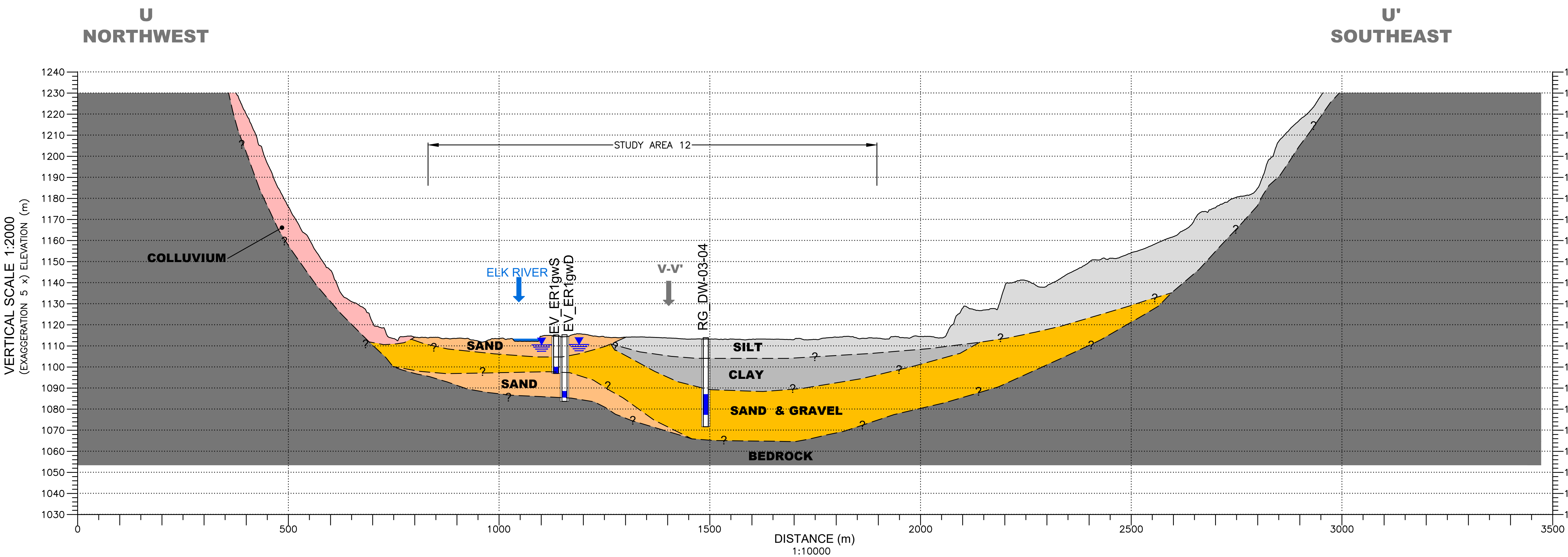
PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC•LAVALIN

TITLE:
ELKVIEW OPERATIONS -
INFERRED GEOLOGICAL CROSS SECTION T-T'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: LH	PLOT: 20200324.1433	CADFILE: 671557–XR1	DRAWING 60

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

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

– – – – INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME:
TECK COAL LIMITED
–

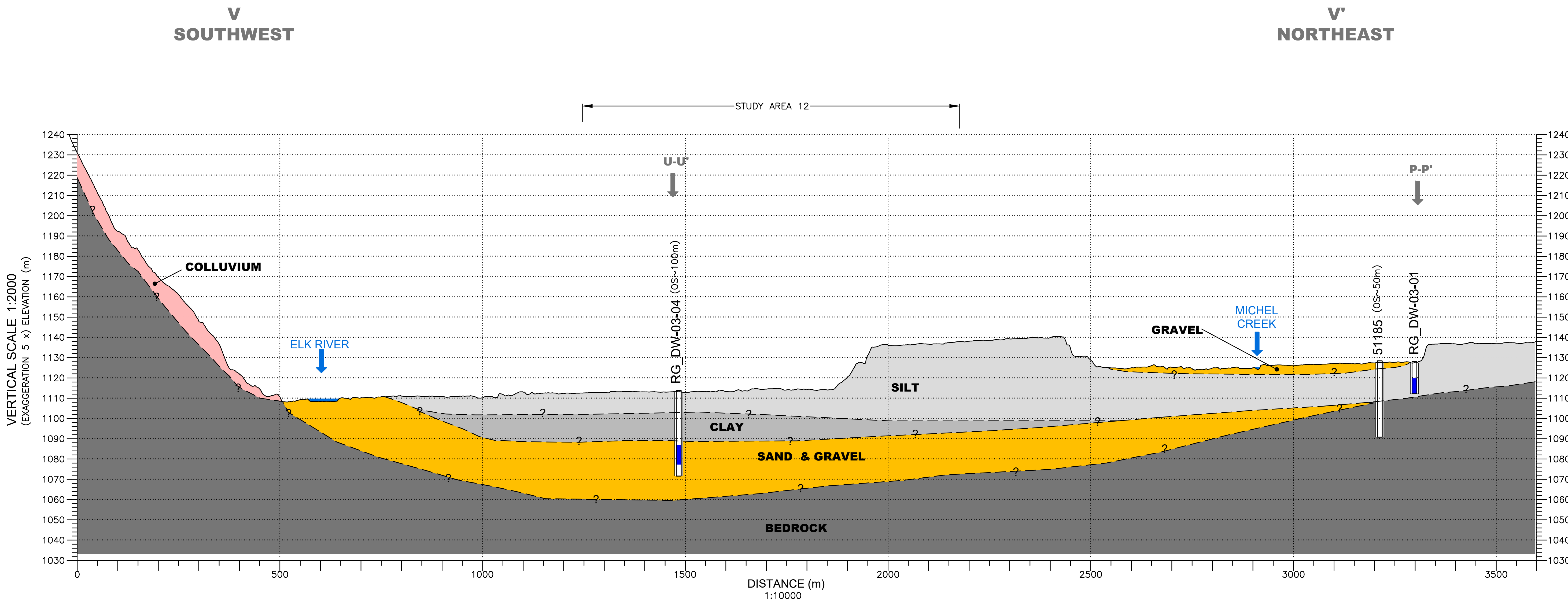
PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION U-U'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: DRAWING 61 REV.: 0
CHK'D: LH	PLOT: 20200324.1433	CADFILE: 671557–XR1	

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG



LEGEND

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

INFERRED STRATIGRAPHIC BOUNDARY

GROUNDWATER ELEVATION (2019 Q4 MANUAL WATER LEVEL MEASUREMENT)

BOREHOLE LEGEND

EV_BCgw (OS~70m)

WELL OFFSET FROM SECTION LINE

50 mmø SOLID PVC PIPE

50 mmø SLOTTED PVC 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. GROUND SURFACE ELEVATION OF WELLS WAS OBTAINED FROM LIDAR.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2020–03–25	ISSUED TO CLIENT	AJK	LH

CLIENT NAME:
TECK COAL LIMITED
–

PROJECT LOCATION:
ELKVIEW OPERATONS
ELK VALLEY, BC

SNC·LAVALIN

TITLE:
ELKVIEW OPERATIONS - INFERRED GEOLOGICAL CROSS SECTION V-V'

DWN BY: AJK	SCALE: AS SHOWN	DATE: 2020–02–10	DWG No: REV.: 0
CHK'D: LH	PLOT: 20200324.1433	CADFILE: 671557–XR1	DRAWING 62

PATH: \\SLI2606\PROJECTS\CURRENT PROJECTS\TECK COAL LTD\GISCAD\CAD\671557–XR1.DWG

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration

I, Michael Brewster (Print First and Last Name) as a member of Engineers and Geoscientists BC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this groundwater monitoring report (application/project/work/etc.). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Doug Hill, Regional Operations Director, - Mines (Insert Ministry Contact Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:
x [signature]

Print name: Michael Brewster

Date: March 31, 2020

Witnessed by:
x Kirsti Medig

Print name: KIRSTI MEDIG

Ministry of Environment and Climate Change Strategy

BRITISH COLUMBIA

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional Michael Brewster, MSc P.Geo

   Title Senior Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: Engineers and Geoscientists BC

3. Brief description of professional services:

   Annual site specific and regional groundwater monitoring report for Teck Coal mines in the Elk Valley, BC.

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature: x [signature]

Print Name: Michael Brewster

Date signed: March 31, 2020

Witnessed by:

x Kirsti Medig

Print Name: Kirsti Medig

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

BRITISH COLUMBIA

Ministry of Environment and Climate Change Strategy

Declaration

I, KATRINA CHEUNG as a member of EGBC declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Annual report + SGGMPs/RGMP. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Douglas Hill, erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

______

______

______

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

______

______

______

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:

x ______

Print name: KATRINA CHEUNG

Date: March 31, 2020

Witnessed by:

x Carmichael

Print name: Patricia Carmichael.

Ministry of Environment and Climate Change Strategy

BRITISH COLUMBIA

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional KATRINA CHEUNG

   Title Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC

3. Brief description of professional services:

   Environmental consulting for Annual GHO SSGMP and portion of RGMP reporting

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X [signature]

Print Name: KATRINA CHEUNG

Date signed: March 31, 2020

Witnessed by:

X [signature]

Print Name: Patricia Carmichael.

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Ministry of Environment and Climate Change Strategy

BRITISH COLUMBIA

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional KATRINA CHEUNG

   Title Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC

3. Brief description of professional services:

   Environmental consulting for Annual GHO SSGMP and portion of RGMP reporting

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X [signature]

Print Name: KATRINA CHEUNG

Date signed: March 31, 2020

Witnessed by:

X [signature] Carmichael

Print Name: Patricia Carmichael.

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Ministry of Environment and Climate Change Strategy

BRITISH COLUMBIA

Declaration

I, KATRINA CHEUNG as a member of EGBC declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Annual report + SGGMPs/RGMP I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Douglas Hill, erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:

x [signature]

Print name: KATRINA CHEUNG

Date: March 31, 2020

Witnessed by:

x [signature]

Print name: Patricia Carmichael.

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

BRITISH COLUMBIA

Ministry of Environment and Climate Change Strategy

Declaration

I, Tyler Gale as a member of Engineers and Geoscientists BC declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Groundwater Monitoring Report. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Doug Hill Regional Operations Director - Mines, erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:

X [signature]

Print name: Tyler Gale

Date: March 31 2020

Witnessed by:

X [signature]

Print name: Jeremy Zandbergen

Ministry of
Environment and
Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional Tyler Gale

   Title Project Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: Engineers and Geoscientists BC

3. Brief description of professional services:

   Annual report for site-specific and regional groundwater monitoring programs for Teck Coal Mines in the Elk Valley, BC

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X [signature]

Print Name: Tyler Gale

Date signed: March 31 2020

Witnessed by:

X [signature]

Print Name: Jeremy Zandbergen

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Ministry of Environment and Climate Change Strategy

BRITISH COLUMBIA

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act*, the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration

I, LESLIE HARKER (Print First and Last Name) as a member of EGBC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this report - RGMP/SSGMP (application/project/work/etc.). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Doug Hill (Insert Ministry Contact Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

____

____

____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

____

____

____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:	Witnessed by:
X [signature]	X [signature]
Print name: LESLIE HARKER	Print name: Scott Poirier
Date: March 31, 2020	

BRITISH COLUMBIA

Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional Leslie Harker

   Title Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC

3. Brief description of professional services:

   Environmental consulting for the EVO Annual SSGMP and portion of the Annual RGMP reporting

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X [signature]

Print Name: Leslie Harker

Date signed: March 31, 2020

Witnessed by:

X [signature]

Print Name: Scott Poirier

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional: Stefan Humphries

   Title: Senior Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC

3. Brief description of professional services:

   Senior review of combined annual report for site-specific and regional groundwater monitoring programs in the Elk Valley

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X [signature]

Print Name: Stefan Humphries

Date signed: March 31, 2020

Witnessed by:

X [signature]

Print Name: Leslie Harker

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Ministry of
Environment and
Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration

I, Stefan Humphries (Print First and Last Name) as a member of EGBC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Annual Report (application/project/work/etc.). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Douglas Hill (Ministry Contact Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

____

____

____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

____

____

____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:	Witnessed by:
X [signature]	X [signature]
Print name: Stefan Humphries	Print name: Leslie Harker
Date: March 31, 2020	

Ministry of
Environment and
Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

BRITISH COLUMBIA

Ministry of Environment and Climate Change Strategy

Declaration

I, KIRSTI MEDIG (Print First and Last Name) as a member of EGBC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this report - RGMP/SSGMPs (application/project/work/etc.). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Doug Hill (Insert Ministry Contact Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

____

____

____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

____

____

____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:	Witnessed by:
X Kirsti Medig	X [signature]
Print name: KIRSTI MEDIG	Print name: Jeremy Zandbergen
Date: March 31, 2020	

Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional Kirsti Medig

   Title Geologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC

3. Brief description of professional services:

   Environmental consulting for Annual FRO SSGMP and portion of RGMP reporting

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

x Kirsti Medig

Print Name: Kirsti Medig

Date signed: March 31, 2020

Witnessed by:

x [signature]

Print Name: Jeremy Zandbergen

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Ministry of Environment and Climate Change Strategy

BRITISH COLUMBIA

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who fulfill regulatory requirements on behalf of regulated persons seeking authorization under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Headquarters Office at 1-800-663-7867.

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

Ministry of Environment and Climate Change Strategy

BRITISH COLUMBIA

Declaration

I, Genevieve Pomerleau (Print First and Last Name) as a member of Engineers and Geoscientists BC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this groundwater monitoring report (application/project/work/etc.). I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Doug Hill, Regional Operations - Minirf (Insert Ministry Contact Name), erring on the side of caution.

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

____

____

____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

____

____

____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

Signature:	Witnessed by:
X [signature]	X [signature]
Print name: Genevieve Pomerleau	Print name: Stacey Charlton
Date: March 31, 2020	

Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

This declaration of competency is collected for the purposes of increasing government transparency and ensuring professional ethics and accountability. It will be disclosed to the public.

1. Name of Qualified Professional Genevieve Pomerleau

   Title Senior Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: Engineers and Geoscientists BC

3. Brief description of professional services:

   Annual site specific and Regional groundwater monitoring report for Teck Coal Mines in the Elk Valley, BC

Declaration

I declare that I am a qualified professional with the required knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X

Print Name: Genevieve Pomerleau

Date signed: March 31, 2020

Witnessed by:

X

Print Name: Stacey Charlton

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

- a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*
- b) *through suitable education, experience, accreditation and knowledge, may reasonably by relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

SNC·LAVALIN

SNC-Lavalin Inc.
#3 - 520 Lake Street
Nelson, British Columbia, Canada V1L 4C6
250.354.1664 604.515.5150
www.snclavalin.com