Klohn Crippen Berger

Teck Resources Limited

Quintette Coal Operations

2020 Annual Summary of Tailings Facility Performance

Plantsite Tailings Dam and Plantsite Seepage Collection Pond Dam

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March 2021

Klohn Crippen Berger

March 26, 2021

Teck Resources Limited
Legacy Properties
601 Knighton Road
Kimberley, British Columbia
V1A 1C7

Mr. Mark Slater, P.Eng.
Senior Geotechnical Engineer

Dear Mr. Slater:

Quintette Coal Operations
2020 Annual Summary of Tailings Facility Performance
Plantsite Tailings Dam and Plantsite Seepage Collection Pond Dam

We are pleased to submit the 2020 Annual Summary of Tailings Facility Performance for the Plantsite Tailings Dam and Plantsite Seepage Collection Pond Dam.

Please contact us if you have any questions regarding this report.

Yours truly,

KLOHN CRIPPEN BERGER LTD.

Max Cronk, P.Eng.
Project Manager

MC/LN:jc

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Teck Resources Limited

Quintette Coal Operations

2020 Annual Summary of Tailings Facility Performance

Plantsite Tailings Dam and Plantsite Seepage Collection Pond Dam

CLARIFICATIONS

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Teck Resources Limited (Client) for the specific application to the 2020 Annual Summary of Tailings Facility Performance of the Plantsite Tailings Dam and Plantsite Seepage Collection Pond, and it may not be relied upon by any other party without KCB's written consent.

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EXECUTIVE SUMMARY

Klohn Crippen Berger Ltd. (KCB) were engaged by Teck Resources Limited (Teck) to complete an annual summary of tailings facility performance for the Plantsite Tailings Dam (PTD) and Plantsite Seepage Collection Pond (PSCP) at the Quintette Coal Operations (QCO) mine site to comply with Section 10.5.3 of the Health, Safety and Reclamation Code (HSRC) for Mines in British Columbia (also referred to as the Code) (MEM[1] 2017). This report covers the period from September 2019 to August 2020, herein referred to as the "review period," and was prepared following:

- Section 4.2 "Annual Tailings Facility and Dam Safety Inspection Report" of the 2016 HSRC Guidance Document (MEM 2016); and
- Guideline for Tailings and Water Retaining Structures (TWRS) (Teck 2019b).

This summary section is provided in accordance with the HSRC, and Teck's "Guideline for Tailings and Water Retaining Structures" (Teck 2019a). The summary is provided solely for purposes of overview. Any party who relies on this report must read the full report. The summary omits a number of details, any one of which could be crucial to the proper application of this report.

Summary of Facility Description

The QCO site is under care and maintenance status where Teck staff are onsite for environmental sampling, inspections and maintenance. Key descriptions of the PTD and PSCP are as follows:

- The PTD and PSCP are approximately 2 km north of the QCO processing plant and approximately 16 km south of the Municipality of Tumbler Ridge in northeastern BC.
- The PTD is a downstream-constructed embankment which forms a side-hill impoundment tailings facility that was used to store fine coal refuse produced during operations. It has a downstream slope with a maximum height (crest to toe) of 52 m and an average slope of 2H:1V. The crest elevation ranges from El. 882 masl to El. 883 masl, is approximately 5 m wide, and is approximately 2.6 km long. The embankment consists of a compacted coarse coal rejects (CCR) downstream shell with an upstream low permeability zone of compacted glacial till; a chimney drain separates the two zones.
- The PTD impoundment is formed by the PTD and adjacent natural slopes. Fine coal tailings were stored in the impoundment from the start of operations in 1984 to 1997 (Golder 2003). The impoundment has been inactive since 1997 except for the construction of the closure spillway in 2001 and 2002.
- The PTD closure spillway channel is approximately 630 m long with a base width ranging from 16 m to 27 m and includes a meandering low flow channel 2 m to 5 m wide. The spillway invert starts at the tailings surface and slopes down to original ground before discharging into M17 Creek which reports to the Murray River downstream. The majority of the spillway channel is at a shallow grade and is unarmoured; local areas are protected with riprap such as where the channel bends and near the outlet (also referred to as the "Level Spreader").

[1] Now referred to as the Ministry of Energy, Mines, and Low Carbon Innovation (EMLI).

- Seepage through the embankment is collected in a perimeter ditch, where it flows to the PSCP.
- The PSCP is approximately 200 m west of the PTD. The embankment is approximately 15 m high from crest to toe, with 3H:1V downstream slopes. The embankment shell was constructed of weathered bedrock (siltstone and shale) which was compacted to 98% standard Proctor maximum dry density (Golder 1984b). Water is discharged to the north via an open-channel spillway which eventually reports to the Murray River via a forested area.

Summary of Key Potential Hazards and Failure Modes

KCB understands that Teck's long-term goal for all of their tailings facilities is to reach landform status with all potential failure modes that could result in catastrophic release of tailings and/or water being either not present or having been reduced to non-credible. Teck's long-term goal for the PTD is for all potential failure modes to be non-credible based on extreme loading conditions, or loading conditions appropriate using the principles of ALARP (i.e., As Low as Reasonably Practicable) when it is not practical to consider extreme conditions. KCB also support Teck's long-term goal to decommission sedimentation and seepage collection ponds, and remove potential safety risks, once the facilities are no longer required.

Evaluation of failure modes with respect to these goals is ongoing. The key hazard for the PTD is slope instability under extreme seismic loading, which Teck are addressing as part of their long-term closure planning. The key hazard for the PSCP is the potential for blockage of the spillway by beaver activity, which is being managed with the existing design and operational controls. There have been no significant changes to the key hazards and existing controls during the review period, and no performance concerns were identified.

Consequence Classification

The PTD was assigned a "High" consequence classification (KCB 2014), based on CDA (2013) category system. The "High" classification is governed by potential environmental impacts of a tailings breach into the Murray River (KCB 2014). The PSCP was assigned a "Low" consequence classification (Teck 2018) based on CDA (2013).

There were no changes to the downstream environment or operation of either structure during 2020 that would warrant a change of this classification.

Changes in Instrumentation and/or Visual Monitoring Records

There were no significant changes noted in the instrumentation readings or visual inspections. Instrumentation was monitored as per the frequency specified in the OMS manual.

The piezometers indicate low pore pressures in the downstream shell.

Teck commissioned an Interferometric Synthetic Aperture Radar (InSAR) trial in 2020 in lieu of reading the survey monuments. The InSAR trial reviewed data from 2015 to 2020, and the results indicate that there have been no displacements of concern (e.g., slumping or bulging) of the embankment over that period of time (settlement less than 20 mm from 2015 to 2020).

The 2020 site visit observations did not indicate any significant changes to the PTD or PSCP.

Inspections of the PSCP spillway did not identify any beaver activity in 2020. There are no instruments installed at the PSCP.

Changes to Surface Water Management

There were no changes to surface water management at either facility in 2020. Estimated seepage rates based on a simplified water balance accounting calculation are consistent with estimates since 2013 (KCB 2013).

Operations, Maintenance, and Surveillance Manual

The Operations, Maintenance, and Surveillance (OMS) manual, was in the process of being updated in 2020 to align with Teck's revised OMS Manual template. Quantifiable Performance Objectives (QPOs) (i.e., thresholds) and trigger responses for piezometers, survey monuments and freeboard are included in the OMS manual, and the existing manual (Teck 2019b) remains appropriate for the facility while the update is being prepared.

Emergency Preparedness and Response Plan

Teck updated the Emergency Preparedness and Response Plan (EPRP) for the PTD in March, 2019 (Teck 2019c), and the plan is considered appropriate for the facility.

Dam Safety Review

Teck engaged Thurber Engineering Ltd. to initiate a DSR for the PTD in 2020. The site visit was completed in October, 2020 and the report was in progress at the time of writing and are expected to be finalized in Q3 2021. The Code requires that DSRs be performed at least once every 5 years; the next DSR should be scheduled for initiation in 2025.

2020 Summary of Recommendations

The observed performance of the PTD and PSCP is consistent with past behavior and design requirements. There have been no significant changes to the condition of the structures during 2020.

Recommendations are summarized in Table E-1. Closed recommendations are shown in grey italics and will be removed from the table in the next annual performance report. Preliminary recommendations issued following the 2020 site visit that were closed before this report was issued have not been included in Table E-1.

KCB have assigned priority to the various recommendations using the 2016 HSRC Guidance Document priority definitions, which are as follows:

- Priority 1: A high probability or actual dam safety issue considered immediately dangerous to life, health or the environment, or a significant risk of regulatory enforcement.
- Priority 2: If not corrected could likely result in dam safety issues leading to injury, environmental impact or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.
- Priority 3: Single occurrences of deficiencies or non-conformances that alone would not be expected to result in dam safety issues.
- Priority 4: Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

Table E-1 Summary of Recommendations

ID Number	Deficiency or Non-Conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Recommended Deadline
Previous Recommendations Closed / Superseded					
PTD-2017-01	*Emergency Preparedness and Response Plan (EPRP)*	*HSRC Code*	*The EPRP should be updated and verified that all Teck contacts, community outreach contacts, contingency plan and information on testing of response plan are current and accurate.*	*3*	*CLOSED*
PTD-2017-03	*Seismic Hazard Assessment for "Closure-Passive Care"*	*n/a*	*Complete a site-specific seismic hazard assessment for the PTD, using the Code recommended design event for a "High" consequence classification dam under "Closure-Passive Care" condition.*	*4*	*CLOSED (Site-specific seismic hazard assessment has been completed. The review of the facility against Closure – Passive Care criteria should be incorporated into the overall closure planning for the facility)*
PTD-2018-03	*n/a*	*n/a*	*Review whether the Seepage Collection Pond is still required, or if the structure can be decommissioned.*	*4*	*CLOSED (Teck have indicated that the PSCP facility may be required for closure construction)*
PTD-2019-01	*Piezometer label updates*	*n/a*	*Update the piezometer labels to be consistent with the database*	*4*	*CLOSED (field IDs incorporated into electronic database in lieu of replacing labels in the field)*
PTD-2019-05	*PSCP Pond Level Indicator*	*n/a*	*Establish a water level indicator to facilitate pond level measurements during routine and event-driven inspections*	*4*	*CLOSED*
PTD-2018-04	*Upper and Lower Met rain gauges unreliable in winter*	*n/a*	*Repair or improve the Upper and Lower Met Climate Station rain gauges to improve reliability of precipitation measurements during the winter months*	*4*	*CLOSED (Teck plan to establish a heated rain gauge on site to allow precipitation readings to be taken in the winter, Upper Met station may be excluded due to difficult winter access. Not a safety risk, to be done prior to a re-start of operations.)*
PTD-2019-03	*Survey Datum*	*n/a*	*Confirm that the annual drone LiDAR surveys and crest monument surveys have been done using the same survey datum, and confirm key facility metrics (e.g., crest, downstream slope, etc.).*	*4*	*CLOSED (drone LiDAR replaced with InSAR trial for 2020, to be confirmed in the next OMS update)*
PTD-2019-04	*PSCP Inspection*	*HSRC Code Section 10.5.2 (1)*	*Incorporate the routine and event-driven inspection procedures for the PSCP into the OMS manual, and establish QPOs if/where applicable*	*3*	*CLOSED (to be confirmed in the next OMS update)*
Previous Recommendations Ongoing					
PTD-2019-02	Vegetation on dam slopes	OMS manual (Section Titled "Items Requiring Maintenance")	Clear trees from the upstream and downstream slopes of the dam.	4	Q4 2021 (OPEN - Vegetation partially removed from crest and toe areas, additional clearing planned in 2021, priority reduced to 4 given that the remaining vegetation is not impacting dam safety but should be removed to reduce the potential for further growth)
2020 Recommendations – no new recommendations					

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LIST OF ACRONYMS

Acronym	Definition
BC	British Columbia
CCR	Coarse Coal Rejects
CDA	Canadian Dam Association
DSR	Dam Safety Review
EDGM	Earthquake Design Ground Motion
EMLI	Ministry of Energy, Mines and Low Carbon Innovation
ENV	Ministry of Environment (BC)
EoR	Engineer of Record
EPRP	Emergency Preparedness and Response Plan
FoS	Factor of Safety
HSRC	Health, Safety and Reclamation Code for Mines in BC
IDF	Inflow Design Flood
InSAR	Interferometric Synthetic Aperture Radar
KL	Klohn Leonoff
KCB	Klohn Crippen Berger Ltd.
LiDAR	Light Detection and Radar
MAC	Mining Association of Canada
MEM	Ministry of Energy and Mines
OMS	Operational, Maintenance and Surveillance
PMF	Probable Maximum Flood
PSCP	Plantsite Seepage Collection Pond
PTD	Plantsite Tailings Dam
QCO	Quintette Coal Operations
QOC	Quintette Operating Corporation
QPO	Quantifiable Performance Objectives
TSF	Tailings Storage Facility
UHRS	Uniform Hazard Response Spectra

1 INTRODUCTION

Klohn Crippen Berger Ltd. (KCB) were engaged by Teck Resources Limited (Teck) to complete an annual summary of tailings facility performance for the Plantsite Tailings Dam (PTD) and Plantsite Seepage Collection Pond (PSCP) at the Quintette Coal Operations (QCO) mine site to comply with Section 10.5.3 of the Health, Safety and Reclamation Code (HSRC) for Mines in British Columbia (also referred to as the Code) (MEM[1] 2017). This report covers the period from September 2019 to August 2020, herein referred to as the "review period," and was prepared following:

- Section 4.2 "Annual Tailings Facility and Dam Safety Inspection Report" of the 2016 HSRC Guidance Document (MEM 2016); and
- Guideline for Tailings and Water Retaining Structures (TWRS) (Teck 2019b).

The site visit was completed on July 21, 2020 by the EoR, KCB representative Mr. Bob Chambers, P.Eng., along with Mr. Stephen Clark, P.Eng., of KCB. During the site visit, KCB engineers were accompanied by Mr. Andrew Bidwell, P.Eng., and Mr. Rob Muise, of Teck. The weather was sunny and the temperature was 17°C. No precipitation was recorded 24 hours prior to the site visit. Figure 1 and Figure 2 provide a general site location and an overview of the site from satellite imagery. Figure 3 is an overview of the facility and shows site visit photograph locations. Site visit observations are summarized in the following sections and photographs are provided in Appendix I.

Teck have designated Mr. Mark Slater, P.Eng., as the Tailings Storage Facility (TSF) Qualified Person (QP), as defined by the Code. Mr. Slater transitioned into the TSF QP role during 2020 from Mr. Bidwell, P.Eng.. Mr. Rob Muise and Mr. Ray Proulx are Teck's Dam Inspectors designated in the PTD OMS manual (Teck 2019a). KCB have been involved as EoR since March, 2016, with KCB representative Mr. Rick Friedel, P.Eng., serving as EoR from March, 2016 to September, 2016. Golder Associates and Kilborn Engineering Ltd. designed the facility and Golder were involved with it until approximately 2005.

The PTD was assigned a "High" consequence category based on CDA (2013) category system (KCB 2014). The consequence classification is driven by the Environmental and Cultural Losses category based on the potential for tailings to reach the Murray River (KCB 2011).

The PSCP was assigned a "Low" consequence category based on CDA (2013) category system (Teck 2017).

The factors considered in the classification are listed in Table 1.1. There have been no changes to the downstream environment or operation of either structure that would warrant a change to this classification.

[1] Now referred to as the Ministry of Energy, Mines, and Low Carbon Innovation (EMLI).

Table 1.1 PTD Consequence Classification (KCB 2011, 2014)

Facility	Population at Risk	Loss of Life	Economic and Social Loss	Environmental and Cultural Losses
PTD	No Permanent Population	Significant	Low	**High**
PSCP	No Permanent Population	None	**Low**	**Low**

Teck engaged Thurber Engineering Ltd. to initiate a DSR for the PTD in 2020. The site visit was completed in October, 2020 and the report was in progress at the time of writing and to be finalized in 2021. The Code requires that DSRs be performed at least once every 5 years; the next DSR should be scheduled for initiation in 2025.

2 BACKGROUND AND RECENT ACTIVITY

2.1 Background Information

General

QCO is an inactive coal mine located in northeastern British Columbia, approximately 15 km south of the Municipality of Tumbler Ridge (Figure 1). The PTD is approximately 2 km north of the QCO processing plant and gatehouse (Figure 2). The Murray River flows from south to north approximately 1 km west (downstream) of the PTD. M17 Creek flows along the southwest boundary of the PTD toe at the closest location. There is an unnamed smaller creek that runs adjacent to the north boundary of the facility.

QCO ceased operation in 2000. Portions of the site have been reclaimed, but otherwise the site has been under care and maintenance status since operations stopped. During care and maintenance, Teck staff are on site for environmental sampling, inspections and maintenance.

In 2013 and 2014, Teck received permits for a restart of mining operations at the QCO site:

- Ministry of Energy and Mines[2] (MEM), Permit No. C-156 (amended June 20, 2013); and
- Ministry of Environment (ENV), Permit No. PE-06739 (amended July 9, 2014).

Teck have deferred the restart of operations. The PTD would not be used for tailings storage if operations are restarted at QCO. However, the 2014 ENV permit amendment includes provisions for water quality monitoring of the PTD.

Plantsite Tailings Dam

The PTD was designed by Kilborn Engineering Ltd. and Golder Associates Ltd. (Golder) in 1982, with Golder continuing as the design engineer of the facility during operations.

Fine coal tailings slurry was first deposited in the impoundment when mine operations began in 1984 (Golder 2003). During operations, tailings were discharged from the northeastern edge of the impoundment which formed a tailings beach slope towards the horseshoe-shaped PTD. Ponded water was pumped back to the plant by a reclaim barge. The impoundment has been inactive since 1997 when it reached capacity and tailings deposition shifted to the Shikano North Tailings Facility. The PTD closure spillway was constructed between 2001 and 2002. Since 2002, there has been no construction (raises, upgrades, or repairs) at the facility. A list of available reference documents is included in Appendix III.

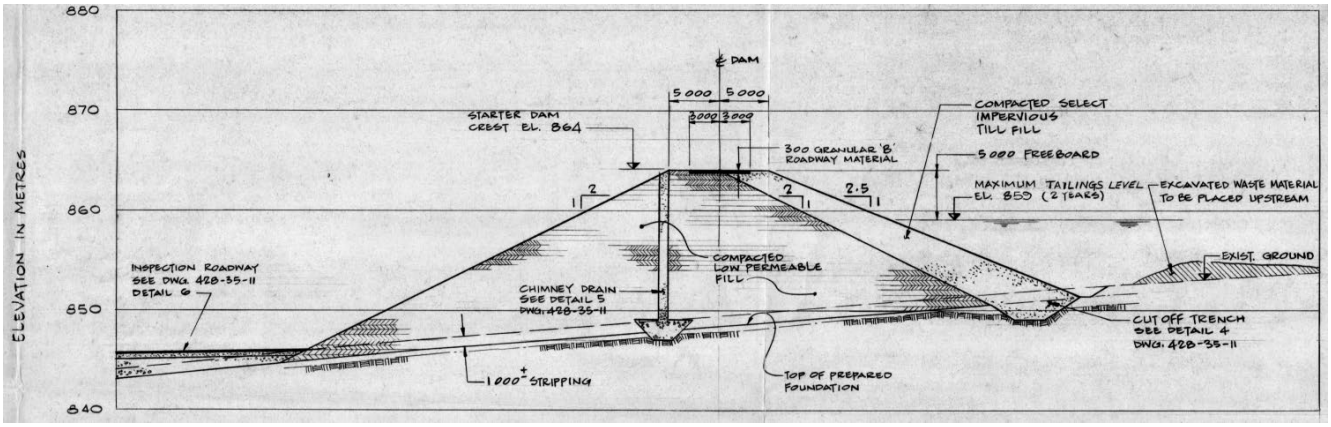
The PTD is a downstream-constructed embankment which forms a side-hill tailings facility. The crest elevation currently ranges from El. 882 masl to El. 883 masl. The crest is approximately 5 m wide and 2.6 km long. The maximum downstream slope height (crest to toe) is 52 m.

The PTD starter embankment was constructed to El. 864 masl, starting in 1983. A typical cross section of the starter embankment is shown on Figure 2.1 (Kilborn 1982). The starter embankment is

[2] Now referred to as the Ministry of Energy, Mines, and Low Carbon Innovation (EMLI).

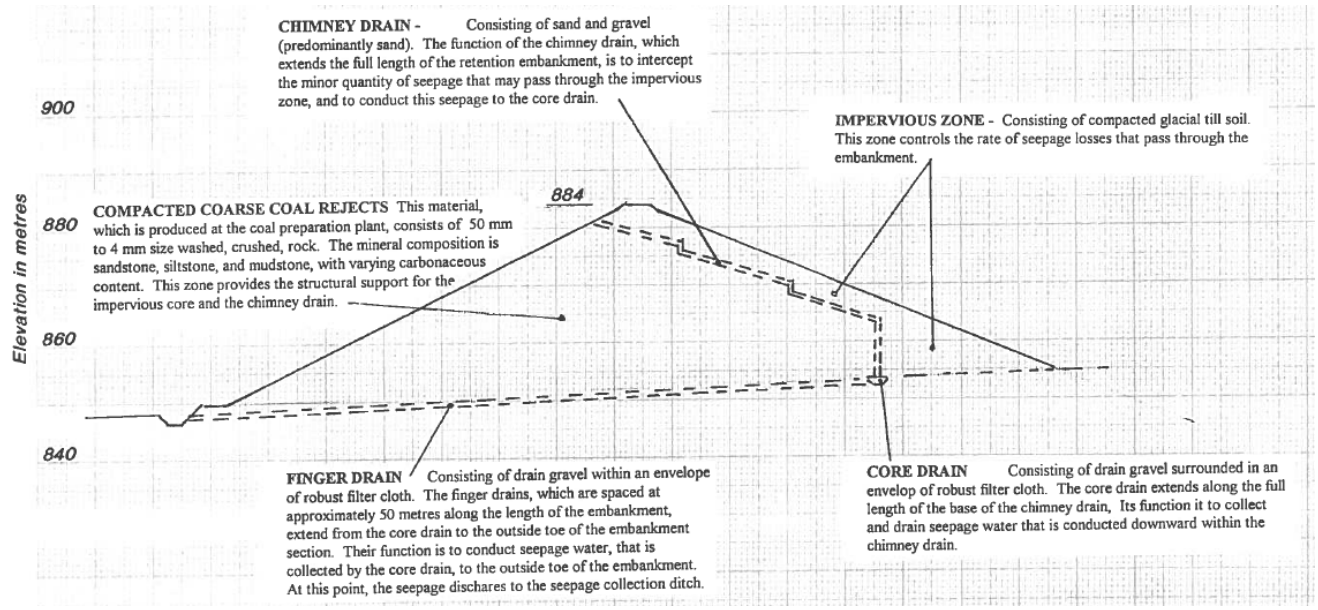
primarily constructed of locally borrowed compacted glacial till (labelled as compacted select impervious till fill on Figure 2.1) and weathered bedrock (siltstone/shale). A 1 m wide vertical chimney drain between the glacial till and weathered bedrock performed as a filter and drainage feature. The chimney drain was connected to a core drain which had a series of finger drains that extended to the downstream toe at 45 m intervals along the crest. The upstream glacial till zone was keyed into the in-situ glacial till or bedrock with a cut-off trench.

Figure 2.1 Typical Section of PTD Starter Embankment (Kilborn 1982)



The PTD was raised in a downstream configuration with compacted coarse coal rejects (CCR) between 1983 and 1995. The chimney drain and upstream glacial till zone were raised with each crest raise between the glacial till and CCR. The glacial till zone has a minimum thickness of 3.5 m, measured perpendicular to the upstream face (Golder 1988). The overall downstream slope is 2H:1V. The upstream slope was built at 2.5H:1V to El. 878 masl and 2H:1V to the ultimate crest (KCB 2015a). A typical cross-section of the ultimate embankment is shown on Figure 2.2.

Figure 2.2 Typical Section of PTD Ultimate Embankment (QOC 1997)



The closure spillway is approximately 650 m long and has a grade of 0.5% to 0.8%. The base of the channel is a minimum of 20 m wide and contained by 4 m to 6 m high banks with 2.2H:1V side slopes. There is a low-flow channel that meanders along the bottom of the closure spillway that is approximately 2 m to 5 m wide and 0.5 m deep. The spillway is protected against erosion with vegetation (grasses and shrubs) along the majority of its length. There is riprap where the spillway channel makes a 90-degree bend (approximately 150 m upstream of the outlet to M17 Creek) and at the "Level Spreader" (the area within approximately 20 m of the outlet).

The foundation profile beneath the PTD consists of glacial overburden of variable thickness overlying bedrock (Golder 1982a). KCB (2018a) identified glaciolacustrine deposits, which comprise over-consolidated clayey silt and silty clays, below the glacial till in the southwest and northwest areas of the facility. Section 6 provides further discussion on the glaciolacustrine material as it relates to slope stability.

Muskeg and surficial silt and clay deposits (above the glacial till) were present over the PTD footprint with a maximum observed thickness of 3 m (Golder 1982a). However, construction specifications and record documents indicate that these deposits were removed during foundation preparation (KCB 2015a).

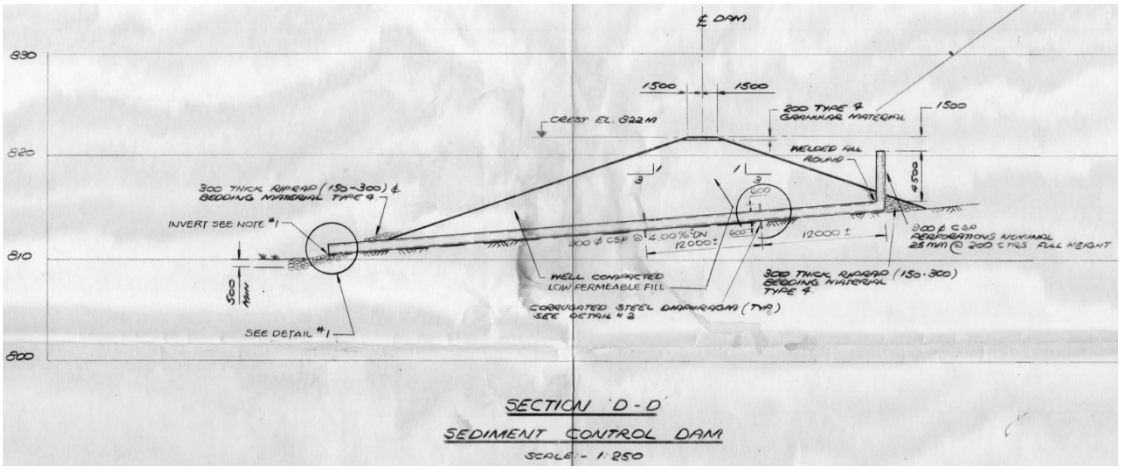
Seepage is collected in a ditch at the toe of the facility and conveyed to the PSCP, located approximately 200 m west of the PTD (Figure 3).

Plantsite Seepage Collection Pond Dam

The PSCP is retained by an earthfill embankment constructed in February, 1983 (Golder 1984a) to collect seepage and runoff from the PTD. Similar to the PTD, the PSCP was designed by Kilborn Engineering Ltd. The shell was constructed of weathered bedrock (siltstone and shale) which was compacted to 98% standard Proctor maximum dry density (Golder 1984b). There is no internal zoning in the structure. The weather rock was noted to be a well-graded, 75 mm minus material with a fines content typically between 10% and 30% (Golder 1982b). The embankment is approximately 15 m high (crest to toe) and has downstream and upstream slopes of 3H:1V.

The pond discharges to the north via an open-channel spillway; the spillway channel is vegetated with grass and flows through a forested area before it ultimately reaches the Murray River. The spillway invert is approximately El. 818.7 masl (based on the 2019 LiDAR). A typical section of the PSCP taken from Kilborn (1982) drawing 428-35-11 is shown in Figure 2.3. The drawing shows a 900 mm diameter decant pipe through the embankment, which does not appear to have been constructed.

Figure 2.3 Typical Section of Plantsite Seepage Collection Pond (Kilborn 1982)



Periodic inspection reports by Golder (1984a, 1984b, 1986) describe observations from the early operation of the facility. KCB (2020a) summarized these observations of the construction and early operation for the facility.

2.2 2020 Activity

The PTD is a closed facility and does not require operational intervention, except for routine surveillance and maintenance activities. Vegetation was cleared from the slopes and toe of the facility in 2020 as part of routine maintenance outlined in the OMS manual (Teck 2018).

3 WATER MANAGEMENT, CLIMATE AND WATER ACCOUNTING

3.1 Overview

Under normal and flood flow conditions, the primary inflows into the PTD impoundment are runoff from the catchment, precipitation on the tailings beach, and precipitation on the pond. There is no active discharge of water or tailings into the facility. Water accumulates in depressions on the tailings surface and exits as either seepage, evaporation, or as flow through the spillway. Approximately 25,000 m^3 of water can collect in local depressions on the tailings surface within the impoundment before flowing out the spillway (KCB 2019b). The largest ponded areas are shown on Figure 3. The catchment for the PTD impoundment is 160 ha (KCB 2019b) and is shown on Figure 4. The catchment is broken down as follows:

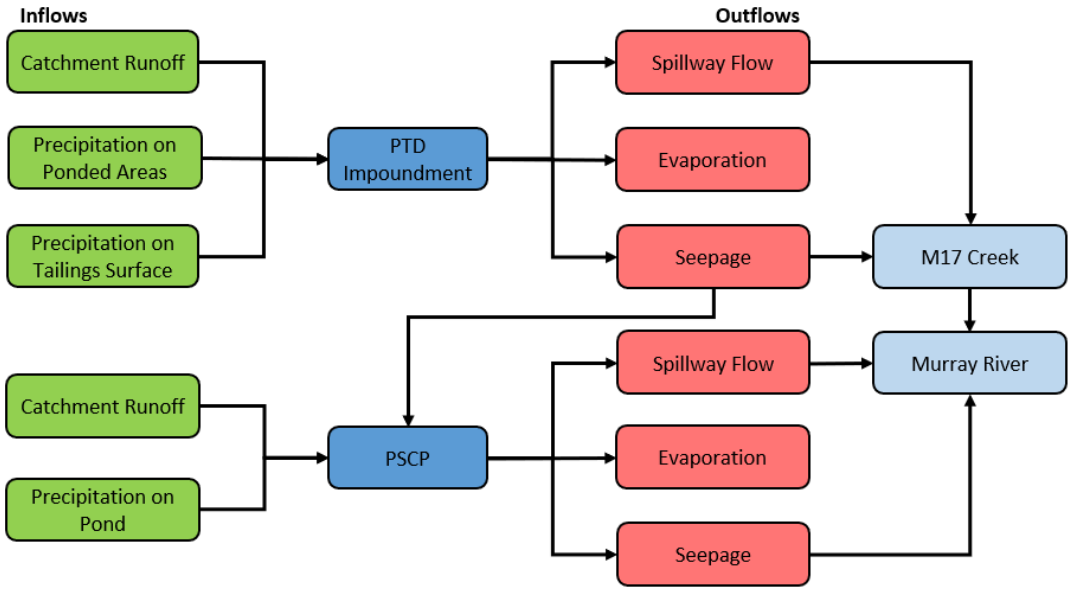
- tailings beach = 97 ha;
- ponded areas = 5 ha; and
- undiverted upstream catchment = 58 ha.

There are two roads upslope of the facility that divert runoff away from the facility under normal conditions. The catchment upstream of the two road is approximately 22 ha. During a significant storm event such as the IDF, the roads are assumed to overtop which increases the total catchment to 182 ha.

The PSCP has a catchment area of approximately 25 ha. Under normal conditions, seepage from the PTD and runoff from the slopes are conveyed to the PSCP via a ditch. Outflows from the facility consist of evaporation, seepage, and flow through the open-channel spillway at the right abutment. Both seepage and flow through the spillway eventually report to the Murray River.

A simplified flow schematic of both facilities is shown on Figure 3.1.

Figure 3.1 Flow Schematic for the PTD and PSCP



3.2 Climate

To support this review, precipitation and temperature data from the two climate stations on site (Figure 2) were reviewed between September 1, 2019 and August 31, 2020:

- Upper Met Climate Station (also referred to as Quintette 2), located near Kilometer 10 on the main haul road at El. 1543 masl; and
- Lower Met Climate Station (also referred to as Plantsite), located near the QCO Plantsite at El. 914 masl.

Data were available from the Lower Met Climate Station; only 5 days of data were missing between September 2019 and August 2020. Data was not available from the Upper Met Climate Station for ~50% of the review period. Teck noted this was caused by a hardware issue that prevented connectivity to the data logger.

Seasonal snowpack data is measured digitally at the Lower Met Climate Station; however, data conversion details are not available. Therefore, snowpack information is not available for review.

The rain gauges at both Upper Met and Lower Met climate stations are not heated, so precipitation data during freezing conditions can be unreliable. As a result, climate data from Environment Canada Chetwynd Airport Climate Station (station No. 1181508, at elevation 610 masl and 86 km north of QCO) were used to supplement the precipitation readings from September to April.

Climate data from the site climate stations is not relied upon as a critical control for the facility during freezing conditions, when precipitation falls as snow, and therefore gaps in the climate data do not represent a significant deficiency in PTD and PSCP surveillance.

Precipitation data were corrected for orographic effects and elevation based on the Baseline Hydrology and Design Basis (Teck 2013) and summarized in Table 3.1.

The following observations are made based on the data from September 1, 2019 to August 31, 2020:

- Temperatures in the summer months (May to October) were similar (within 1 °C) to the Lower Met average temperatures (1991 – 2000). However, November, December, and February were warmer than the average, while March and April were colder. A comparison of the temperatures is summarized in Table 3.1.
- Total precipitation at the PTD (435 mm) was lower than the estimated Mean Annual Precipitation (561 mm) and previous years (KCB 2016a, 2016b, 2018, 2019, 2020).
- February 2020 was the driest month in the period; the Lower Met and Chetwynd Airport climate stations recorded 3 mm and 0 mm of precipitation, respectively.
- July 2020 was the wettest month recorded at Lower Met Climate Station, which recorded a total precipitation of 73 mm.
- The largest rainfall occurred between July 1 and July 2, 2020, where 70 mm of rain was recorded at Chetwynd Airport Climate Station. Refer to Section 4.3.2 for further details regarding the event-driven inspection.

Table 3.1 Precipitation and Temperature at Plantsite Tailings Dam

Month	PTD Mean Annual Precipitation Distribution[1] (mm)	Corrected PTD 2019-2020 Precipitation[2],[3] (mm)	Lower Met Climate Station 1991 – 2000 Average Temperature[4] (°C)	Lower Met Climate Station 2019 – 2020 Temperatures[5] (°C)		
				Minimum	Mean	Maximum
September	45	20	10.1	5.0	9.3	13.2
October	51	63	3.6	-0.5	2.8	6.0
November	56	32	-3.7	-4.8	-1.0	2.3
December	39	8	-6.8	-6.2	-2.7	0.0
January	45	53	-10.7	-15.5	-11.3	-7.3
February	34	0	-5.4	-7.9	-3.3	0.7
March	34	21	-2.1	-12.6	-6.9	-1.9
April	28	18	3.5	-3.8	1.7	6.2
May	34	49	8.3	2.3	8.6	14.4
June	73	61	12.3	7.3	12.5	17.0
July	73	71	14.5	10.5	14.8	18.9
August	51	39	13.9	8.1	13.4	18.5
Total	561	435				

Notes:
1. Monthly precipitation values are based on the mean annual precipitation-elevation relationship and the monthly distribution outlined in the Baseline Hydrology and Design Basis Report (Teck 2013).
2. October 2019 to April 2020 precipitation values were based on Chetwynd Airport Climate Station (station No. 1181508; elevation 610 masl; and 86 km north of QCO) data, with the mean annual precipitation and elevation correction outlined in the Baseline Hydrology and Design Basis Report (Teck 2013).
3. September 2019, and May 2020 to August 2020 precipitation values were based on Lower Met Climate Station data with the mean annual precipitation and elevation correction outlined in the Baseline Hydrology and Design Basis Report (Teck 2013).
4. Average monthly temperatures at Quintette Plantsite (1991 – 2000) as outlined in the Baseline Hydrology and Design Basis Report (Teck 2013)
5. Daily maximum, minimum, average temperatures are based on temperature readings that were taken at the Lower Met Climate Station.

3.3 Water Accounting

Based on Figure 3.1, a simplified water accounting calculation was prepared for the review period (values rounded to the nearest thousand). The results are summarized in Table 3.2.

The average annual flow rate through the PTD spillway was 5 L/s, which is within the range of previously calculated flows 3.5 L/s (KCB 2013) to 17 L/s (KCB 2019c).

The average annual flow rate through the PSCP spillway was 0.6 L/s, which is slightly less than estimated in 2019 (1 L/s), and is close to the lower end of the range observed during operations, 0.8 L/s (Golder 1999) to 13.9 L/s (Golder 1989).

Table 3.2 Simplified Water Accounting

Annual Inflows/Outflows		PTD	PSCP
Inflow (m^3/year)	Runoff from Upstream Catchment[1]	101,000	43,000
	Precipitation on Tailings Beach (excluding pond)[2]	241,000	0
	Precipitation on Pond[3]	22,000	2,000
	Seepage Inflow[4]	0	20,000
Outflows (m^3/year)	Evaporation from Pond Surface[5]	27,000	3,000
	Estimated Seepage Losses[6]	182,000	44,000
	Average Annual Flow Through Spillway[7]	155,000 (approx. 5 L/s)	18,000 (approx. 0.6 L/s)

Notes:
1. Assumed average runoff coefficient of 0.4. For the PTD, assumed that both roads upstream of the facility act as catchment divides under average conditions.
2. Assumed average runoff coefficient of 0.6.
3. Assumed ponds occupy approximately 5% of tailings beach based on observed localized ponds in the PTD impoundment and at the spillway inlet.
4. Golder (2003) estimated a seepage rate of 0.6 L/s (from PTD), measured at the PSCP spillway weir.
5. Evaporation rate for this site is 536 mm/yr based on the evaporation-elevation relationship from Teck (2013).
6. Based on KCB experience with similar materials at other projects, seepage losses into the coal tailings was assumed at an approximate rate of 10 mm/day for PTD. The seepage loss rate for PSCP was assumed at an approximate rate of 30 mm/day for losses into till foundations.
7. The remainder of inflows minus evaporation and seepage losses.

3.4 Flood Routing

Plantsite Tailings Dam

During flood events, runoff is routed through the facility via the open channel spillway. The inflow design flood (IDF) for a "High" consequence dam is 1/3rd between the 1,000-year return period and probable maximum flood (PMF) based on the Code.

KCB reviewed the PTD closure spillway (KCB 2019b) performance during the IDF and concluded that the spillway has sufficient capacity to route the IDF while maintaining a freeboard of 5 m within the facility. The assessment conservatively assumed that both roads upslope of the PTD would not divert any inflow away from the impoundment (KCB 2019b). The estimated freeboard within the facility greatly exceeds the minimum freeboard (0.4 m) based on the method of calculation proposed by CDA (2013) for wind setup and wave runup (KCB 2019b).

Plantsite Seepage Collection Pond Dam

The IDF for the PSCP, a "Low" consequence dam regulated under the Code, is a 200-year flood (MEM 2016). KCB (2020c) reviewed the hydrotechnical performance of the PSCP and its spillway and concluded that the PSCP could safely route the IDF and maintain a freeboard of 0.9 m during the flood. This exceeds the minimum freeboard (0.1 m) based on the CDA (2013) for wind setup and wave runup (KCB 2020c), and the minimum freeboard (0.5 m) based on ENV (2015) guidelines.

4 REVIEW OF MONITORING RECORDS AND DOCUMENTS

4.1 Operations, Maintenance and Surveillance Manual

The OMS manual was last updated in March, 2019. The OMS manual was reviewed in 2020 and remains appropriate for the facility. Teck were in the process of updating the OMS manual to be in their new template format based on the MAC (2019) guidelines, which is scheduled to be completed in 2021.

4.2 Emergency Preparedness and Response Plan

Teck developed an Emergency Preparedness and Response Plan (EPRP) for the PTD in November, 2014. The EPRP was updated in March, 2019 and incorporated into the Mine Emergency Response Plan (MERP), which was reviewed in 2020 and remains appropriate for the facility.

4.3 Monitoring Program

4.3.1 Overview

The monitoring program for the PTD and PSCP is summarized in Table 4.1 with comments on activities during the review period. The monitoring program is appropriate for the existing conditions of the PTD and PSCP given the long performance history, adequacy of instrumentation coverage, and provision of an open channel spillway.

4.3.2 Visual Inspection

Routine visual inspections were completed by the Teck Dam Inspector. Teck reported that there were no concerns observed during the review period. Inspection observations are documented on a standard form and uploaded to Teck's SharePoint site, and are provided to the TSF QP and EoR for review.

4.3.3 Downstream Slope Erosion

On-going rill erosion has been observed on the slope of the PTD since operations ceased. Monitoring of rill erosion has been done as part of routine monitoring, by comparing photographs from select locations since 2016. Rill monitoring locations and photographs are included in Appendix II. Based on comparison of photographs and previous annual performance reports, changes in the rill erosion of the downstream slope have been negligible since 2011. The rills do not represent a dam safety concern; rather, they represent a maintenance issue that will need to be resolved as part of developing long-term closure plans for the facility.

Table 4.1 Summary of Monitoring Program

Surveillance Type/Task	Frequency	Responsible	OMS Compliance Met?	Notes for Review Period
Water Quality	Varies (refer to ENV Permit PE-06739, 2014 Amendment)	Teck Dam Inspector	Yes	Reported separately by Teck to the Ministry of Environment.
Flow measurement at Seepage Collection Pond	When water quality is measured	Teck Dam Inspector	Yes	Completed alongside water quality sampling. Documented in a spreadsheet stored on Teck's network.
Routine Inspections	Three times per year	Teck Dam Inspector	No	Routine inspections were completed in May 2020 and July 2020 (alongside the annual site visit). Fall inspection was not completed by Teck because the DSR site visit was conducted at that time. Teck personnel should still plan to complete routine inspections even when there is a DSR site visit.
Piezometers	Annual	Teck Dam Inspector	Yes	Read by KCB on behalf of Teck during the annual site visit.
Survey Monuments	Annual	Teck	Yes	The survey monuments were not read in 2020. Teck conducted an aerial drone LiDAR survey and InSAR in lieu of the survey monuments to track embankment displacements which are considered acceptable alternatives to the survey monuments. The frequency of survey monument reviews should be updated in the OMS Manual to reflect the revised reading frequency.
Event-Driven Inspections	As required	Teck Dam Inspector	Yes	Event-driven inspection conducted on July 2, 2020 in response to a significant rainfall event where 70 mm of rain fell between July 1 and July 2, 2020. No earthquake events occurred that triggered an inspection.
Annual Summary of Tailings Facility Performance	Annual	EoR	Yes	This report
Dam Safety Review	Every 5 years	Third Party Consultant/ Qualified Registered Professional Engineer	Yes	Site visit was completed by Thurber Engineering Ltd. in October 2020. The report was in progress at the time of writing.

4.3.4 Piezometers

There are 19 functional pneumatic piezometers installed (Table 4.2) in the fill (upstream and downstream of the chimney drain) and foundation of the PTD. The majority of the piezometers are located along the southern and southwestern portion of the facility, as shown on Figure 3. Pneumatic piezometer cables are accessible in corrugated steel culvert risers along the downstream toe. The piezometers are measured annually by the Teck Dam Inspector. There are no piezometers at the PSCP.

Based on the PTD performance to date and lack of reported dam safety issues, the current functional piezometers and reading frequency are considered sufficient for on-going monitoring of the facility under current conditions.

Table 4.2 Piezometer Readout Locations and 2020 Monitoring Summary

Readout Location ID	Read Out Location Coordinates[1]		Functional Piezometers	2020 Reading Collected	
	Northing (m)	Easting (m)		July 21	Comments
0+188	6097529	628210	1A	Yes	
0+300	6097676	628052	P1, P2, P3 and P4	Yes	P2 - July 2020 reading did not stabilize.
0+475	6097914	627979	P5, P6 and P7	Yes	
0+575	6098050	628002	P8, P9, P10 and P11	Yes	P11 – End was cracked. Replaced and read during inspection.
0+696	6098172	628045	P12, P13 and P14	Yes	
0+800	6098278	628094	P15, P16 and P17	Yes	P16 – End was rusted, could not fit into reader
2+040	6099035	628875	P31	Yes	

Notes:
1. UTM Zone 10N, NAD83.

Pore pressure readings were collected on July 21, 2020 during the annual site visit and are plotted on Figures 5 through 11. The following observations are made based on the 2020 piezometer readings:

- All piezometer readings are below the established threshold value levels defined in the OMS manual (Teck 2019a). No changes to thresholds are recommended.
- In general, piezometers showed similar or slightly lower water levels compared to 2019 readings, except P15 at Sta. 0+800 which shows a slight increasing trend over the last two years.
- The chimney drain appears to be performing as designed based on lower pore pressures measured in the downstream shell of the embankment compared to readings upstream of the chimney drain.

4.3.5 Survey Monument Pins

Eight survey pins are present along the PTD crest (refer to Figure 3) to monitor displacement which are surveyed annually as per the OMS manual (Teck 2019a). There are no survey monuments at the PSCP. The survey monuments were not read in 2020.

Teck commissioned an Interferometric Synthetic Aperture Radar (InSAR) of the PTD in lieu of reading the survey monuments in 2020. The InSAR data are discussed further in Section 4.3.7. No changes to the thresholds and responses included in the 2019 OMS manual are recommended for 2021.

4.3.6 Pond Level

Freeboard QPOs and threshold responses are defined in the OMS manual (Teck 2019a) based on visual observations of the ponded areas (refer to Figure 3):

- Ponded Area 1 at northwest corner of the impoundment;
- Ponded Area 2 along the west side of the impoundment; and
- Ponded Area 3 at the northeast corner of the impoundment.

During the 2020 site visit, the pond levels appeared higher than past years, but were well below their threshold levels. To date, there have been no reported exceedances since the monitoring program was implemented.

Freeboard QPOs have not been developed for the PSCP, and should be incorporated into the 2020 update of the OMS manual..

4.3.7 Aerial Survey

Teck are trialing aerial surveys to track embankment displacements at the PTD and potentially replace the survey monument pins. Pending completion of the trial, Teck will update their OMS manuals in 2021 to include the selected technology. In 2020, Teck retained TRE Altamira to complete a historical InSAR survey of the QCO site to estimate displacements at each facility. The InSAR trial reviewed data from 2015 to 2020 which showed no displacement trends or magnitudes of concern (e.g., slumping or bulging) over that period. The survey comparison does show localized settlement on the tailings beach (up to 170 mm) which is to be expected and does not indicate a concern with the facility. Settlement of the PTD surface was less than 20 mm which is consistent with survey monument data. This survey did not include any data points at the PSCP.

4.4 Water Quality

Teck monitor water quality downstream of the PTD at monitoring points M17A and M17B as per the ENV Permit No. PE-06739. Seepage flows from the PTD are one of multiple inflows into M17A and M17B; therefore, the water quality at monitoring points M17A and M17B is not directly representative of PTD seepage water quality. Teck have indicated that there are no permit limits for these sites, but that there are periodic exceedances above BC Water Quality Guidelines for certain

parameters. Teck submit reports on their water quality monitoring program to the ENV. Monitoring program at these locations includes:

- M17A:
  - April to October, weekly: flow rate; dissolved Oxygen; TSS and field turbidity;
  - November to March, monthly: flow rate; and
  - Quarterly: field turbidity; lab turbidity and total suspended solids; total extractable hydrocarbons (I); metal and non-metal parameters as defined by the permit.
- M17B:
  - Quarterly: flow, metal and non-metal parameters as defined by the permit.

5 VISUAL OBSERVATIONS

No significant changes related to dam safety were observed between the 2019 and 2020 site visits. The following observations were made during the 2020 site visit.

Plantsite Tailings Dam

- **Crest**: Good condition with minor rutting due to vehicle traffic. No signs of movement, no significant differential settlement and no cracking.
- **Downstream Slope**: Good condition. No signs of displacement or slumping. The minor depression on the east embankment slope observed in 2018, which was attributed to animal activity, did not show signs of change. This feature is not considered a dam safety concern. Rilling was observed on the downstream slope (Photos I-37), similar to previous site visits, however there was no visually discernable change in rill size. Refer to Section 4.3.3 for discussion of rill erosion and Appendix II for rill photographs.
- **Downstream Toe**: Good condition. No signs of displacement or bulging..
- **Upstream Slope**: Good condition. No signs of significant erosion or displacement. Vegetation, primarily grasses and bushes, covers most of the slope.
- **North Abutment**: Good condition. No signs of significant erosion or displacement along the fill/natural material interface.
- **South Abutment**: The PTD does not have a south abutment as the closure spillway excavation leaves a gap between the native abutment and fill.
- **Tailings Impoundment**: Similar to previous site visits, there was some locally ponded water (upstream of instrument lines at Sta. 0+300, Sta. 0+475, and Sta. 0+575) in low points on the tailings surface likely formed by differential settlement. The tailings surface is partially vegetated and well-drained, except in pond areas. No sinkholes or depressions on tailings surface adjacent to the crest were observed. At the time of the 2020 site visit, water was ponded at the northeast and northwest corners of the impoundment, and in local tailings depressions near the spillway inlet. Low flow in the spillway was observed during the 2020 site visit but could not be reliably estimated due to vegetation in the spillway channel.
- **Closure Spillway Channel**: Good condition. The vegetation cover, primarily grasses and bushes, is well-established. No signs of erosion or scouring were noted. The riprap on the natural slope bank continues to show signs of particle breakdown but is not considered a dam safety concern at this time. Further discussion is included in Section 6.
- **Closure Spillway Outlet to M17 Channel**: Good condition. Vegetation is well established. No signs of obstruction or debris blocking the outlet.
- **Seepage**: Minor seepage was observed from the finger drains at several locations along the toe. Where seepage was flowing from the finger drain, the water was clear.

Plantsite Seepage Collection Pond

- **Crest**: Good condition. No signs of cracking, movement, or differential settlement.
- **Downstream Slope:** Good condition. No signs of displacement, no slumping, and no erosion. Slope is vegetated with grasses and small trees.
- **Abutments:** Good condition. No signs of seepage and no erosion observed. Granular material observed along both abutments which is consistent with the abutment treatments noted in the historical reports from Golder.
- **Downstream Toe:** Good condition. No signs of seepage or bulging observed.
- **Spillway:** Good condition. The spillway was unobstructed at the time of the site visit. Teck removed a beaver dam from the spillway in October, 2018. While a beaver lodge was noted in the pond in 2020, there was no beaver activity or dam blocking the spillway.

6 TAILINGS FACILITY SAFETY ASSESSMENT

KCB understands that Teck's long-term goal for all of their tailings facilities is to reach landform status with all potential failure modes that could result in catastrophic release of tailings and/or water being either not present or having been reduced to non-credible. Teck's long-term goal for the PTD is for all potential failure modes to be non-credible based on extreme loading conditions, or loading conditions appropriate using the principles of ALARP (i.e., As Low as Reasonably Practicable) when it is not practical to consider extreme conditions. KCB also support Teck's long-term goal to decommission sedimentation and seepage collection ponds, and remove potential safety risks, once the facilities are no longer required. Evaluation of failure modes with respect to these goals is ongoing.

There have been no significant changes to the key hazards and existing controls and no performance concerns were identified. The potential failure modes included in the CDA Dam Safety Guidelines (2013) were reviewed based on the site visit and review of available documents:

Plantsite Tailings Dam

- **Overtopping:** There have been no reported incidents of overtopping, nor any signs that it has occurred during the operation of the facility. The following controls are in place to manage overtopping:
  - The closure spillway is located in the lowest area of the tailings surface and carries flow out of the facility and limits the size of the pond within the facility.
  - The minimum vertical distance between the invert channel and crest is 5.8 m and the channel base is a minimum of 20 m. Therefore, a complete blockage of the spillway, resulting in no discharge from the facility, is not feasible.
  - Routine and event-driven inspections of the spillway to check for signs of blockage or debris build-up, and to check for signs of significant erosion.
  - A hydrotechnical assessment indicates that the spillway is capable of routing the PMF while maintaining greater than 4.5 m of freeboard (KCB 2019b).
  - With the above controls in place, the potential for an overtopping event is negligible.
- **Internal Erosion and Piping:** The facility has a long performance record with no indicators of internal erosion during operations, when hydraulic gradients were higher, and under current conditions. The following controls are in place to manage internal erosion and piping:
  - The embankment has a chimney drain between the low permeability glacial till upstream blanket and downstream CCR shell to prevent internal erosion. Filter compatibility was reviewed and no deficiencies requiring follow up activities were identified (KCB 2015a).
  - Annual inspections of the toe to check for turbidity in the seepage.
  - Piezometers in the facility to monitor water levels in the embankment and confirm that the internal drains are performing as intended.

- **Slope Instability - Static:** The facility has a long performance record with no indicators of slope instability during operations and under current conditions. The following controls are in place to manage slope instability:
  - Routine and event-driven inspections to check for signs of instability (e.g., cracking, slumping).
  - Piezometers in the facility to monitor water levels in the embankment and confirm that the internal drains are performing as intended.
  - Survey monuments and aerial surveys to monitor embankment displacements.
  - KCB (2019a) completed a review of stability performance and analyses for the PTD which concluded that the existing structure met factors of safety (FoS) criteria as defined in the Code (≥ 1.5 for static stability) except for one analysis section (Sta. 0+800) in the southwest corner. At Sta. 0+800 the calculated FoS assuming peak drained strengths is greater than 1.5; based on undrained shear strengths, the calculated FoS is 1.3. The stability is influenced by the undrained strength of the glaciolacustrine unit; additional site investigations and laboratory testing could support a higher undrained strength in the glaciolacustrine unit. The calculated FoS support the observations that the facility is stable under normal conditions.
- **Surface Erosion:** As is common with earthfill structures in this climate, there is rill erosion (i.e., erosion gullies) on the downstream slope. Observations over the past several years have not indicated any visually obvious changes to the rills year-over-year, suggesting that the erosion has either stabilized or is occurring at a gradual rate. Currently the rills do not extend through the crest and do not affect the integrity of the embankment. On-going surface erosion represents a maintenance issue that should be addressed as part of long-term closure. To date, the following controls are in place to manage surface erosion:
  - Routine and event-driven inspections to monitor the rilling on the downstream slope and to check for signs of erosion in the spillway. Annual monitoring of the rill erosion as part of this review.
  - The presence of grasses on the downstream slope, which reduces the potential rill erosion.
  - Erosion protection in the spillway channel, including riprap at the channel bend and level spreader.
  - The downstream toe is more than 90 m vertically above the Murray River elevation, and offset more than 900 m horizontally and so is not at risk from the river eroding the toe.
- **Slope Stability - Earthquakes:** There have been no reported incidents of slope instability caused by an earthquake though there have not been any major events impacting the region during the period of time the facility has existed. The following controls are in place to manage slope instability caused by earthquakes:

- Similar to static loading, the calculated post-earthquake FoS at the Sta. 0+800 cross section (FoS = 1.1) (KCB 2019a) is less than criteria recommended by the CDA Dam Safety Guidelines (i.e., FoS > 1.2) (CAD 2013), but does not indicate that failure would occur (i.e., FoS < 1.0). A large earthquake is the only identified trigger to such a loading condition developing. Aligned with Teck's goal of achieving non-credible failure modes, Teck are in the process of developing long-term closure plans for the facility, which includes updating measures to meet the most stringent seismic design criteria. The FoS criteria is met at other sections of the PTD during seismic loading.
- The estimated range of potential deformations (<1 m) during the design earthquake are less than the available freeboard under normal conditions and can therefore be accommodated by the structure (KCB 2019a).

Based upon the review of potential failure modes that could exist for the PTD facility, key hazards related to the PTD are being managed effectively under current conditions and external hydrological and seismic loading events.

Plantsite Seepage Collection Pond Dam

- **Overtopping:** There have been no reported incidents of overtopping, nor any signs that it has occurred during the operation of the facility. The following controls are in place to manage overtopping:
  - The open channel spillway, which is capable of routing the IDF (200-year flood) while maintaining 0.9 m of freeboard (KCB 2020c), which complies with the Code requirements for freeboard in the facility.
  - Routine and event-driven inspections of the spillway to check for signs of blockage due to beaver activity or debris build-up, and to check for signs of significant erosion.
- **Internal Erosion and Piping:** Internal erosion and piping were reported during operations and were treated with the construction of a toe buttress and granular drain along the abutment (Golder 1984b). Since that time, there have been no reports of internal erosion or piping related issues, and recent inspections have not observed seepage daylighting from the embankment. The following controls are in place to manage internal erosion and piping:
  - The toe buttress and granular drain which were installed during operations and have performed well since they were installed (Golder 1984b).
  - Annual inspections of the facility to check for seepage on the downstream slope and at the toe.
- **Slope Instability - Static:** There have been no reported incidents of slope instability (e.g., cracking, slumping) at the structure which indicates the embankment is stable under normal loading conditions. The following controls are in place to manage slope instability:
  - Construction quality control was conducted and the embankment fill was compacted to 98% standard proctor maximum dry density (Golder 1984a).

- Routine and event-driven inspections to check for signs of instability (e.g., cracking, slumping).
- A geotechnical assessment of the existing structure (2020c), which indicated that the PSCP has a static stability FoS of 1.4 with the appropriately conservative assumption that the foundation consists of glaciolacustrine deposits. Although this result is marginally below the Code requirement of 1.5, the results supports the conclusion that the facility is stable under normal loading conditions.

- **Surface Erosion:** A shallow erosion gulley, 0.3 m to 0.5 m deep, was noted along the left abutment during operations. The erosion was treated by filling it with gravel in 1985. Since that time, there have been no observations of surface erosion of the facility. The following controls are currently in place to manage surface erosion:
  - The presence of grasses on the embankment slopes which reduces the potential for rill erosion. The PSCP embankment has a flatter slope and shorter slope length than the PTD, which also contributes to reduced potential for rilling relative to the PTD.
  - Routine and event-driven inspections to monitor for signs of on-going erosion.
  - The gravel that was placed in the erosion gulley at the left abutment.
  - The downstream toe is more than 60 m vertically above the Murray River elevation, and offset more than 500 m horizontally and so is not at risk from the river eroding the toe.
- **Slope Stability - Earthquakes:** There have been no reported incidents of slope instability caused by an earthquake. The following controls are in place to manage slope instability caused by earthquakes:
  - The peak ground acceleration (PGA) for an EDGM (i.e. 100-year event) is 0.015 g based on the site-specific seismic hazard assessment (KCB 2020b). This is a very low seismic load for a compacted earthfill embankment founded on competent foundation materials.
  - A geotechnical evaluation of the facility under the EDGM (KCB 2020c) indicates that the PSCP has a post-earthquake FOS of 1.2, meets the CDA Dam Safety Guidelines (CDA 2013) recommended FOS for post-earthquake stability (i.e., min. FOS of 1.2).
  - A simplified deformation analysis based on the Hynes-Griffin and Franklin (1984) method indicates that deformation due to the EDGM would be less than 0.1 m, which is significantly less than the available freeboard in the facility under normal conditions (1.1 m), and indicates that the estimated deformations under the EDGM can be tolerated by the structure without releasing the pond (KCB 2020c).

Based upon the review of potential failure modes for the Plantsite Seepage Collection Pond, the facility meets the applicable Code requirements and there are no concerns with the existing facility and Teck's long-term plans for it.

7 SUMMARY AND RECOMMENDATIONS

The observed performance of the PTD and PSCP is consistent with past behavior and design requirements. There were no significant changes to the condition of either facility during 2020.

Recommendations are summarized in Table 7.1. Closed recommendations are shown in grey italics and will be removed from the table in the next annual performance report. Preliminary recommendations issued following the 2020 site visit that were closed before this report was issued have not been included in Table 7.1.

Priority guidelines, specified in the 2016 HSRC Guidance Document, are assigned to each recommendation by KCB. Priority guidelines are as follow:

- Priority 1: A high probability or actual dam safety issue considered immediately dangerous to life, health or the environment, or a significant risk of regulatory enforcement.
- Priority 2: If not corrected could likely result in dam safety issues leading to injury, environmental impact or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.
- Priority 3: Single occurrences of deficiencies or non-conformances that alone would not be expected to result in dam safety issues.
- Priority 4: Best Management Practice – further improvements are necessary to meet industry best practices or reduce potential risks.

Table 7.1 Summary of Recommendations

ID Number	Deficiency or Non-Conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Recommended Deadline
Previous Recommendations Closed / Superseded					
PTD-2017-01	*Emergency Preparedness and Response Plan (EPRP)*	*HSRC Code*	*The EPRP should be updated and verified that all Teck contacts, community outreach contacts, contingency plan and information on testing of response plan are current and accurate.*	*3*	*CLOSED*
PTD-2017-03	*Seismic Hazard Assessment for "Closure-Passive Care"*	*n/a*	*Complete a site-specific seismic hazard assessment for the PTD, using the Code recommended design event for a "High" consequence classification dam under "Closure-Passive Care" condition.*	*4*	*CLOSED (Site-specific seismic hazard assessment has been completed. The review of the facility against Closure – Passive Care criteria should be incorporated into the overall closure planning for the facility)*
PTD-2018-03	*n/a*	*n/a*	*Review whether the Seepage Collection Pond is still required, or if the structure can be decommissioned.*	*4*	*CLOSED (Teck have indicated that the PSCP facility may be required for closure construction)*
PTD-2019-01	*Piezometer label updates*	*n/a*	*Update the piezometer labels to be consistent with the database*	*4*	*CLOSED (field IDs incorporated into electronic database in lieu of replacing labels in the field)*
PTD-2019-05	*PSCP Pond Level Indicator*	*n/a*	*Establish a water level indicator to facilitate pond level measurements during routine and event-driven inspections*	*4*	*CLOSED*
PTD-2018-04	*Upper and Lower Met rain gauges unreliable in winter*	*n/a*	*Repair or improve the Upper and Lower Met Climate Station rain gauges to improve reliability of precipitation measurements during the winter months*	*4*	*CLOSED (Teck plan to establish a heated rain gauge on site to allow precipitation readings to be taken in the winter, Upper Met station may be excluded due to difficult winter access. Not a safety risk, to be done prior to a re-start of operations.)*
PTD-2019-03	*Survey Datum*	*n/a*	*Confirm that the annual drone LiDAR surveys and crest monument surveys have been done using the same survey datum, and confirm key facility metrics (e.g., crest, downstream slope, etc.).*	*4*	*CLOSED (drone LiDAR replaced with InSAR trial for 2020, to be confirmed in the next OMS update)*
PTD-2019-04	*PSCP Inspection*	*HSRC Code Section 10.5.2 (1)*	*Incorporate the routine and event-driven inspection procedures for the PSCP into the OMS manual, and establish QPOs if/where applicable*	*3*	*CLOSED (to be confirmed in the next OMS update)*
Previous Recommendations Ongoing					
PTD-2019-02	Vegetation on dam slopes	OMS manual (Section Titled "Items Requiring Maintenance")	Clear trees from the upstream and downstream slopes of the dam.	4	Q4 2021 (OPEN - Vegetation partially removed from crest and toe areas, additional clearing planned in 2021, priority reduced to 4 given that the remaining vegetation is not impacting dam safety but should be removed to reduce the potential for further growth)
2020 Recommendations – no new recommendations					

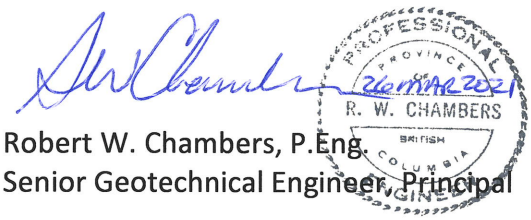
8 CLOSING

Thank you for the opportunity to work on this project. Should you have any questions, please contact the undersigned.

Yours truly,

KLOHN CRIPPEN BERGER LTD.

Max Cronk, P.Eng.
Project Manager
Civil Engineer



Robert W. Chambers, P.Eng.
Senior Geotechnical Engineer, Principal

MC/LN:jc

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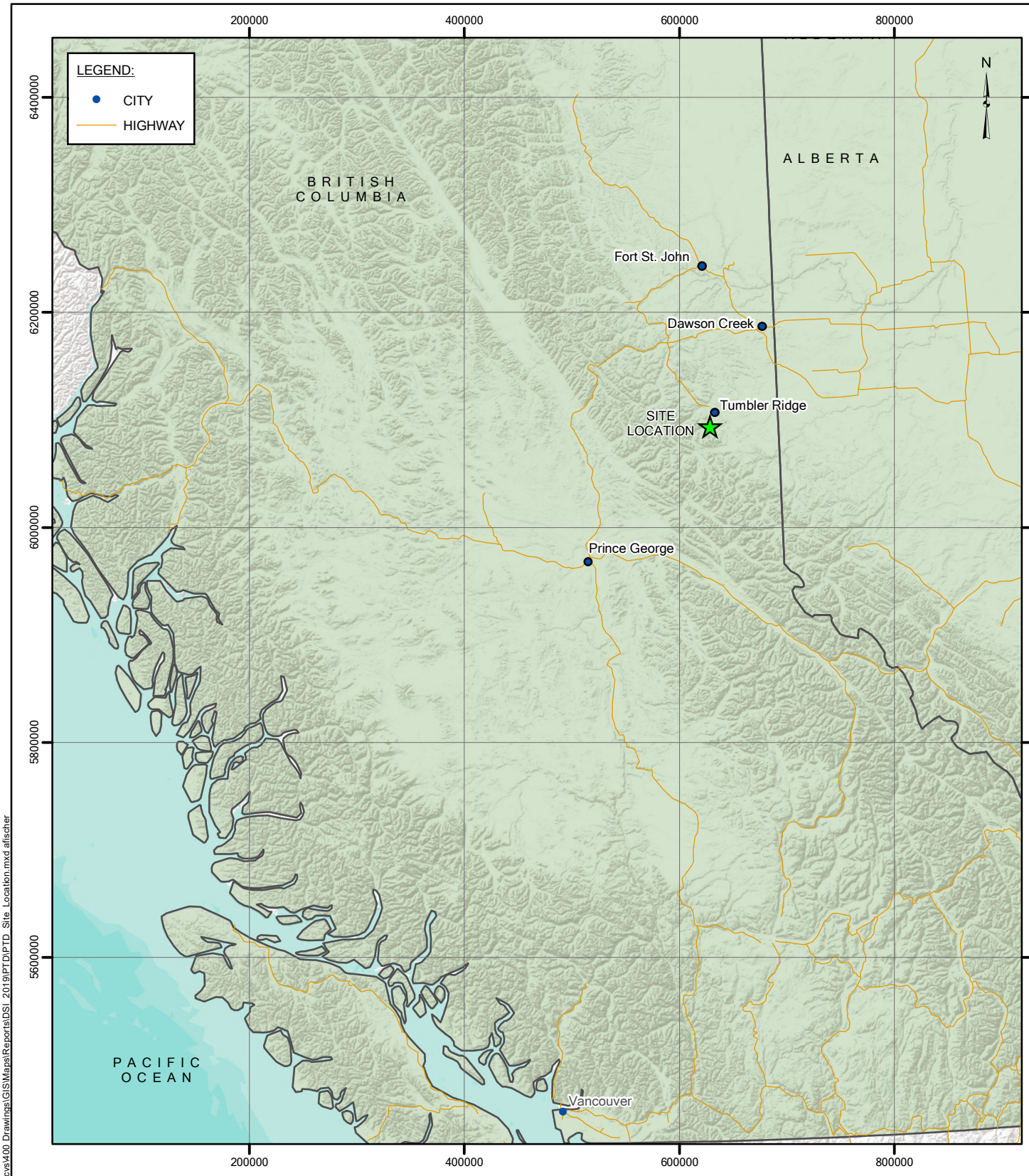
FIGURES



NOTES:
1. PROJECTION: NAD83 UTM ZONE 10N.
2. BASE DATA: ESRI.

SCALE 0 100,000 m

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF TAILINGS FACILITY PERFORMANCE

TITLE: SITE LOCATION

PROJECT No. M09684A18

FIG No. 1

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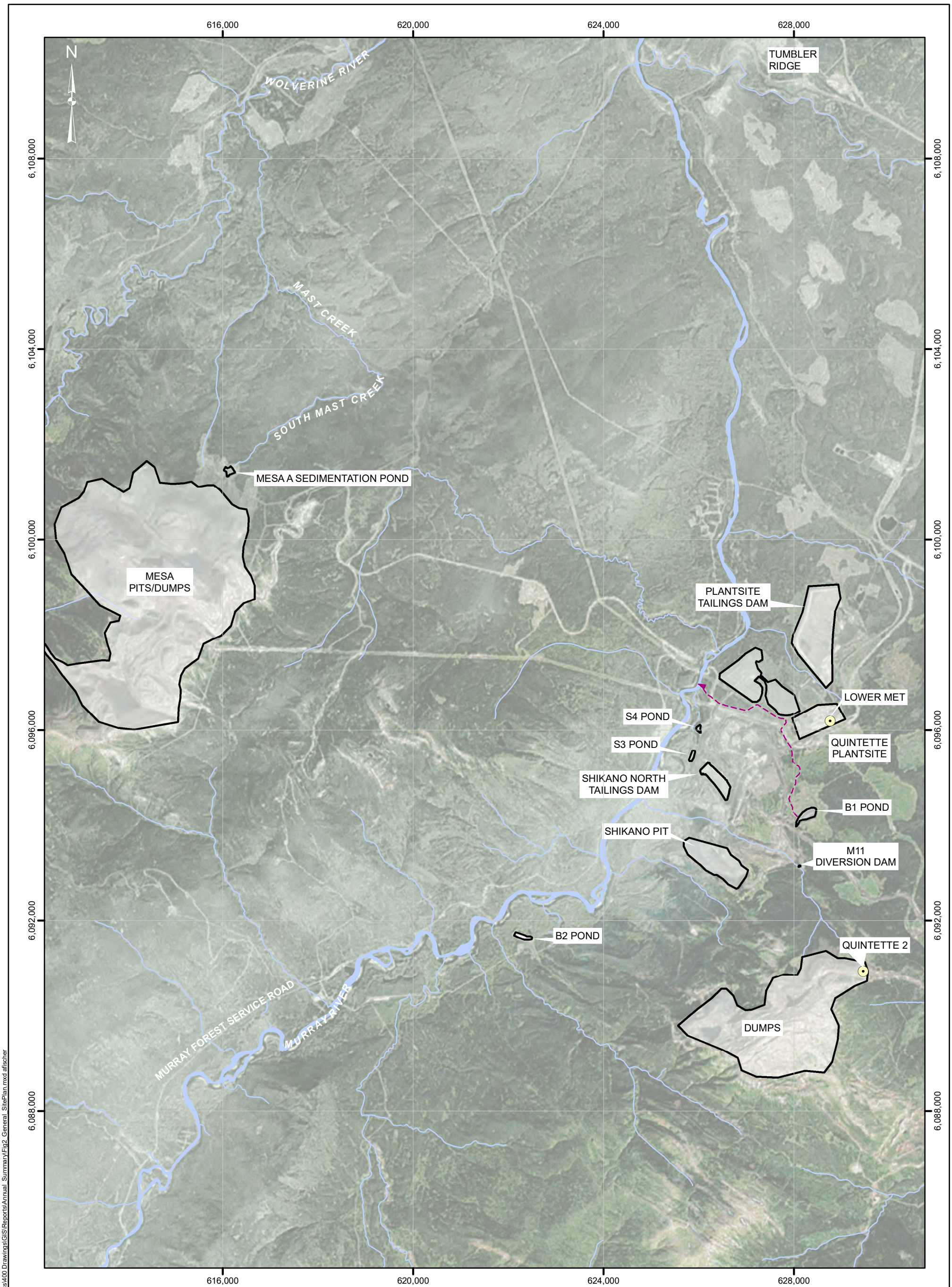

NOTES:
1. DATUM, PROJECTION: NAD83, UTM ZONE 10N.
2. IMAGERY: ESRI.

LEGEND:

- CLIMATE STATION
- M11/M15 CHANNEL
- CREEK/RIVER
- STRUCTURE BOUNDARY

SCALE 0 2,500 m

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF TAILINGS FACILITY PERFORMANCE

TITLE: GENERAL SITE PLAN

PROJECT No. M09684A18

FIG No. 2

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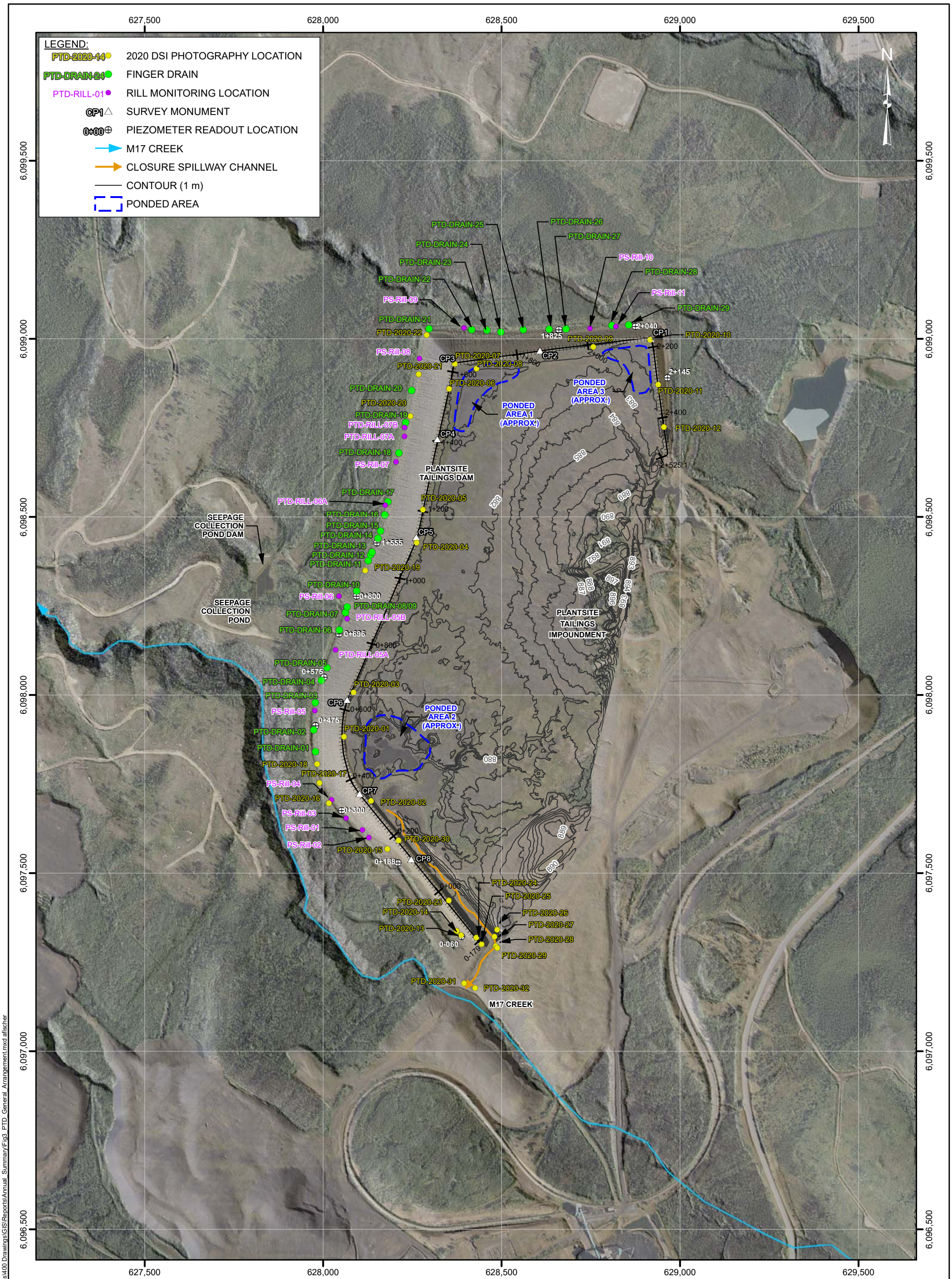


NOTES:
1. PROJECTION: NAD83 UTM ZONE 10N.
2. 2010 ORTHOPHOTO PROVIDED BY TECK.
3. CONTOUR DATA BASED ON 2010 LIDAR PROVIDED BY TECK

SCALE 0 500 m

CLIENT: Teck

Klohn Crippen Berger

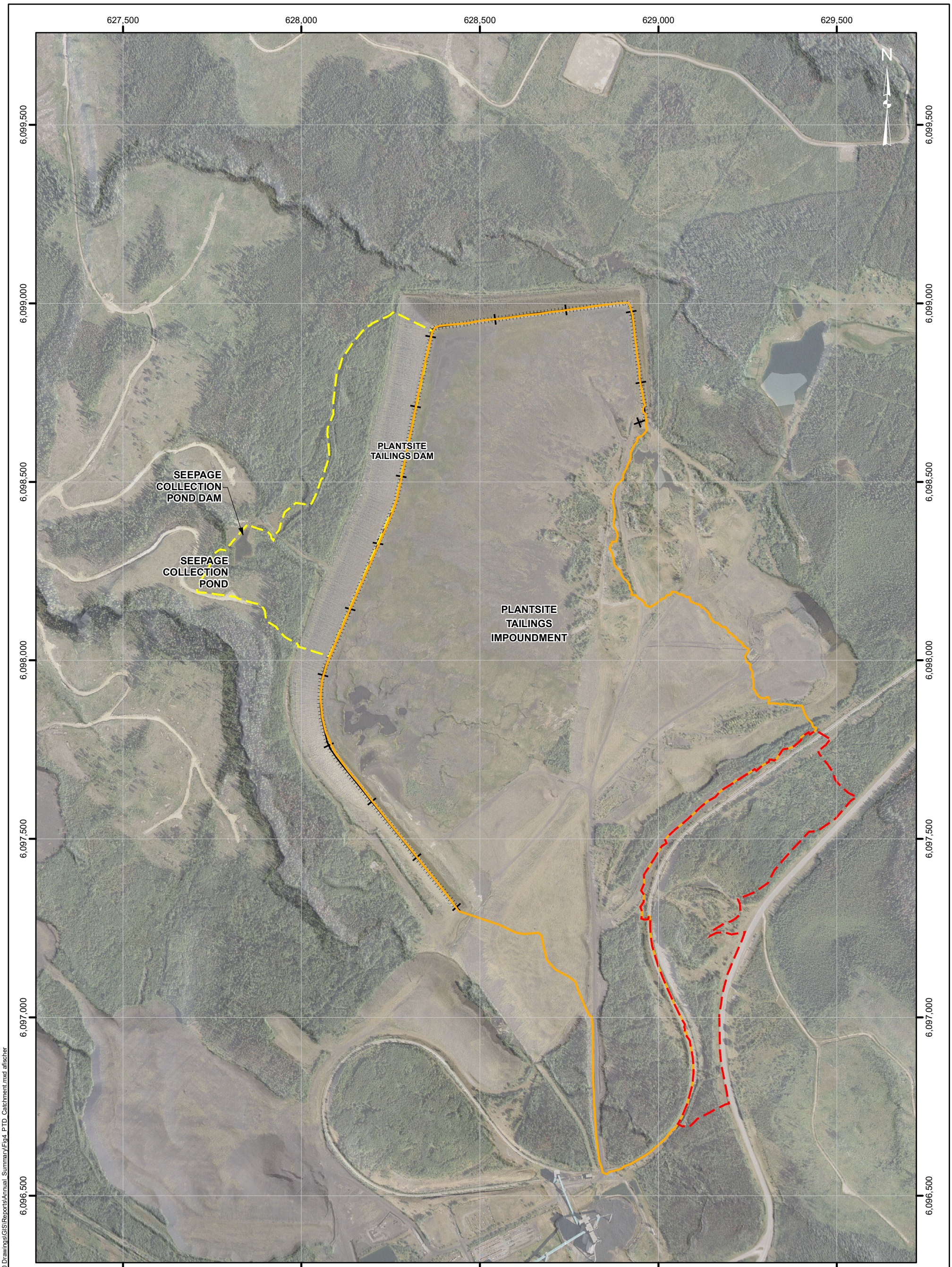
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM GENERAL ARRANGEMENT

PROJECT No. M09684A18

FIG No. 3

Path: Z:\MV\CR\M09684A18 - TML-Quintette Legacy 2020 Svcs\400 Drawings\GIS\Reports\Annual_Summary\Fig3_PTD_General_Arrangement.mxd afischer



NOTES:
1. PROJECTION: NAD83 UTM ZONE 10N.
2. 2010 ORTHOPHOTO PROVIDED BY TECK.

LEGEND:

- PLANTSITE TAILINGS DAM CATCHMENT – NORMAL CONDITIONS
- ADDITIONAL PLANTSIDE TAILINGS DAM CATCHMENT – FLOOD CONDITIONS
- PLANTSITE SEEPAGE COLLECTION POND CATCHMENT

SCALE 0 500 m

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF TAILINGS FACILITY PERFORMANCE

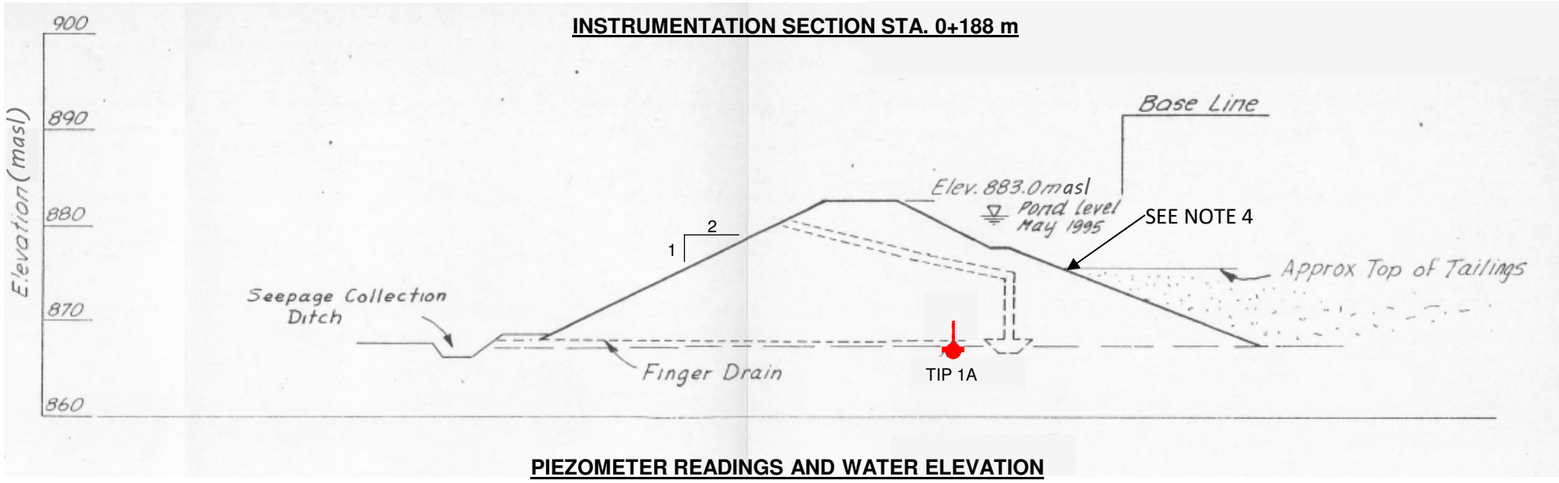
TITLE: PLANTSITE TAILINGS DAM CATCHMENT

PROJECT No. M09684A18

FIG No. 4

Path: Z:\MV\CRM\M09684A18 - TML-Quintette Legacy 2020 Svcs\400 Drawings\GIS\Reports\Annual_Summary\Fig4_PTD_Catchment.mxd afischer

INSTRUMENTATION SECTION STA. 0+188 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2020-07-21	0+188	1A	PNEUMATIC	867.0	0.2	0.1	867.1

LEGEND:

- PIEZOMETER TIP ELEVATION
- 21-JULY-2020 WATER LEVEL
- TIP 1A WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (1995).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1995).
4. UPSTREAM SLOPE AT 2.5H:1V TO EL. 878 masl AT WHICH UPSTREAM SLOPE BECOMES 2H:1V TO THE FINAL CREST EL. 883 masl.

CLIENT: Teck

Klohn Crippen Berger

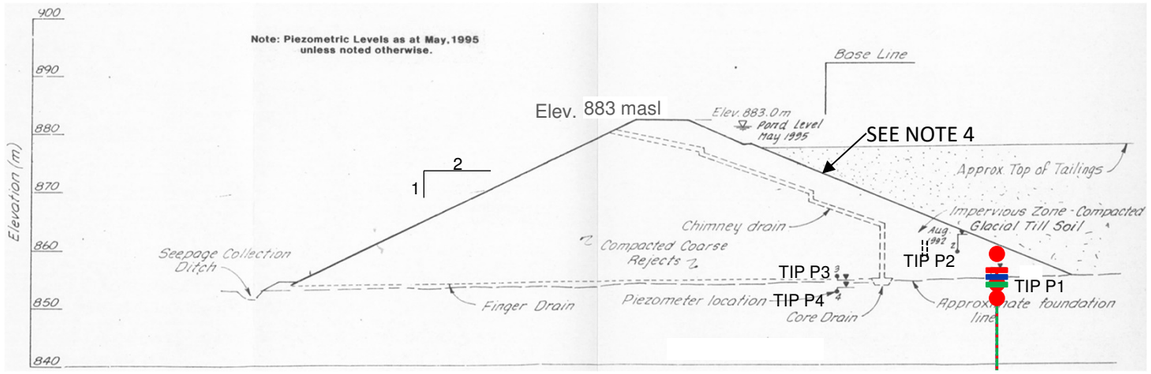
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2020 PIEZOMETER READINGS
STA. 0+188 m

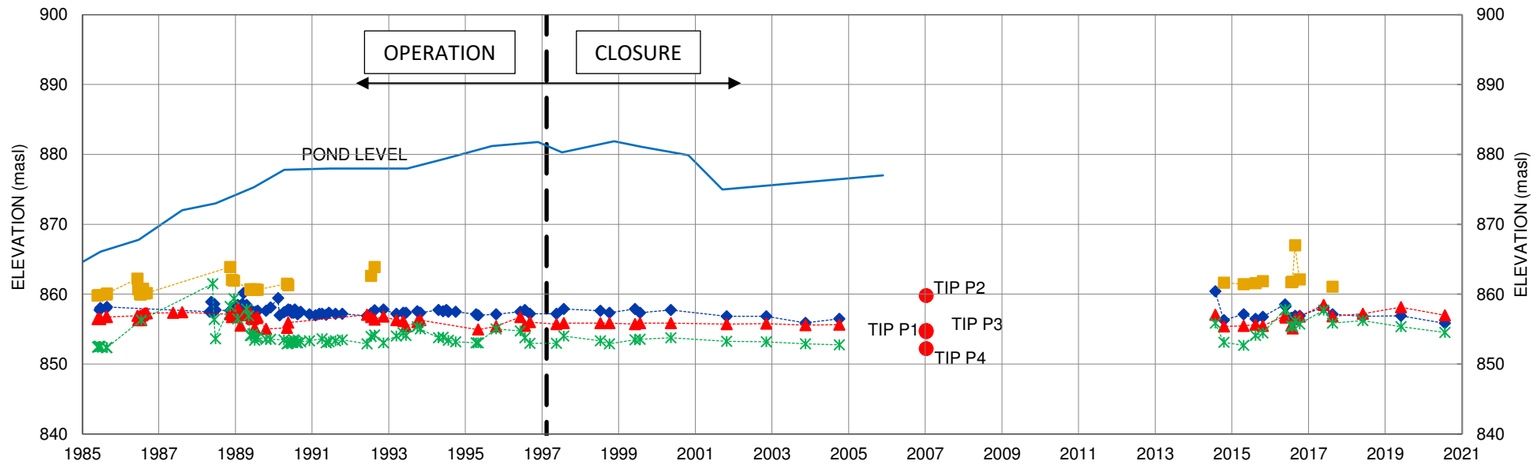
PROJECT No. M09684A18

FIG. No. 5

Date & Time: 2020-12-02 16:47
Figure File: Z:\MVCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Piezometer\[201002 Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+300 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2020-07-21	0+300	P1	PNEUMATIC	854.8	1.5	1.1	855.9
		P2	PNEUMATIC	859.8	SEE NOTE 5	-	-
		P3	PNEUMATIC	854.6	3.4	2.4	857.0
		P4	PNEUMATIC	852.2	3.3	2.3	854.5

LEGEND:

- PIEZOMETER TIP ELEVATION
- 21-JULY-2020 WATER LEVEL
- TIP P1 WATER ELEVATION
- TIP P2 WATER ELEVATION
- TIP P3 WATER ELEVATION
- TIP P4 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).
4. UPSTREAM SLOPE AT 2.5H:1V TO EL. 878 masl AT WHICH UPSTREAM SLOPE BECOMES 2H:1V TO THE FINAL CREST EL. 883 masl.
5. INSTRUMENT DID NOT STABILIZE. THIS IS CONSISTENT WITH OBSERVATIONS IN PREVIOUS ANNUAL PERFORMANCE REPORTS (KCB 2020a). THE INSTRUMENT WAS NOTED AS PLUGGED IN 2003 (GOLDER 2003).

CLIENT: Teck

Klohn Crippen Berger

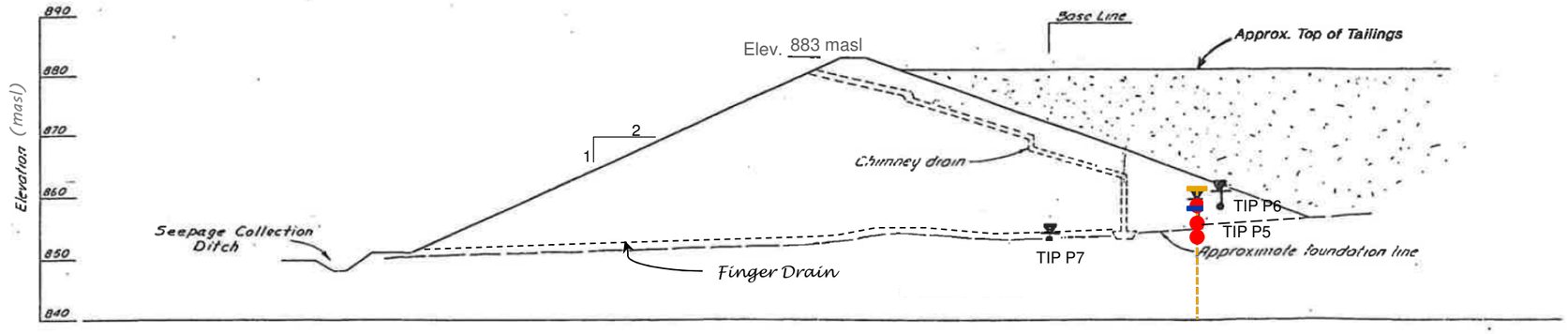
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2020 PIEZOMETER READINGS
STA. 0+300 m

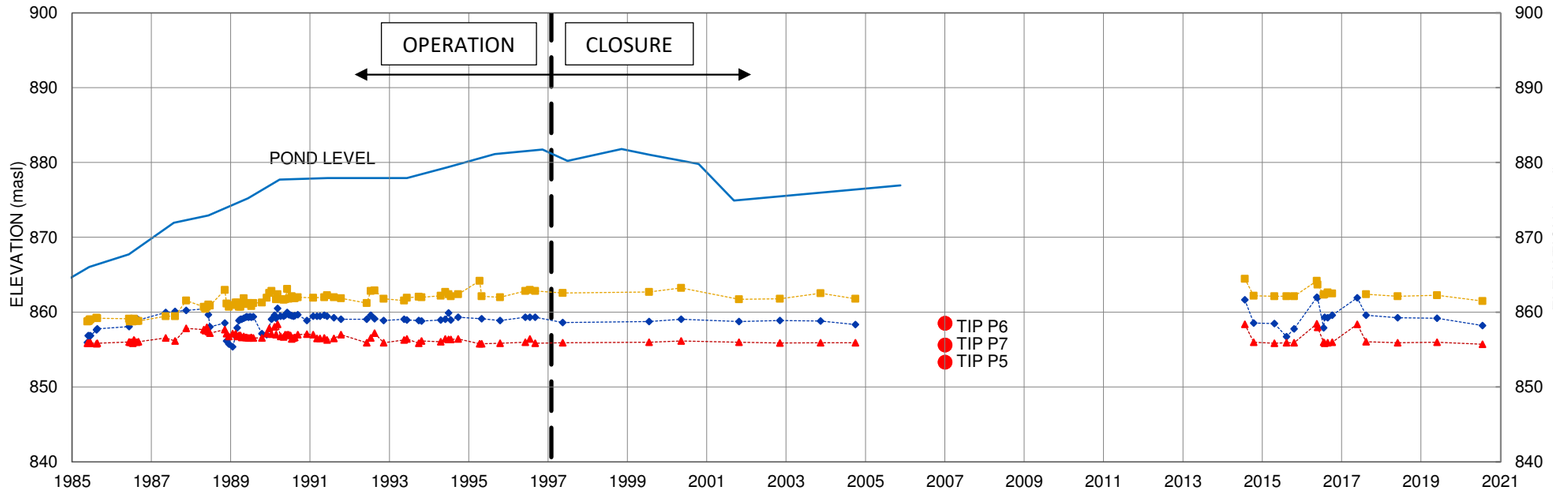
PROJECT No. M09684A18

FIG. No. 6

Date & Time: 2020-12-02 16:47
Figure File: Z:\M\VCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Piezometer\[201002 Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+475 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2020-07-21	0+475	P5	PNEUMATIC	853.4	6.8	4.8	858.2
		P6	PNEUMATIC	858.6	4.1	2.9	861.5
		P7	PNEUMATIC	855.7	0.0	DRY	

LEGEND:

- PIEZOMETER TIP ELEVATION
- 21-JULY-2020 WATER LEVEL
- TIP P5 WATER ELEVATION
- TIP P6 WATER ELEVATION
- TIP P7 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).

CLIENT: Teck

Klohn Crippen Berger

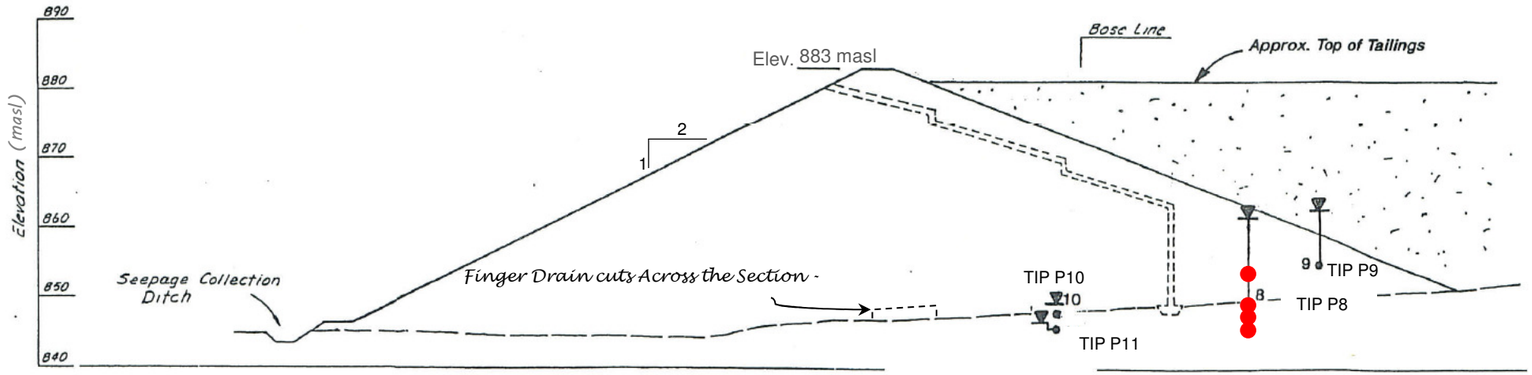
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2020 PIEZOMETER READINGS
STA. 0+475 m

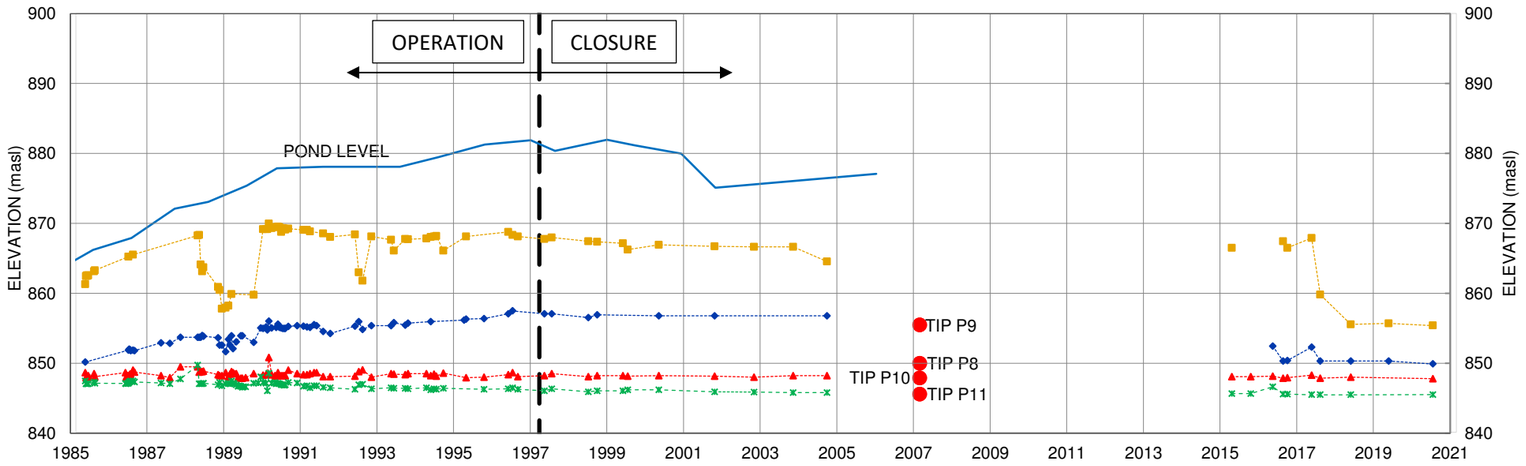
PROJECT No. M09684A18

FIG. No. 7

Date & Time: 2020-12-02 16:47
Figure File: Z:\M\VCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Piezometer\[201002 Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+575 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2020-07-21	0+575	P8	PNEUMATIC	849.9	0.0	DRY	
		P9	PNEUMATIC	855.4	0.0	DRY	
		P10	PNEUMATIC	847.8	0.0	DRY	
		P11	PNEUMATIC	845.5	0.0	DRY	

LEGEND:

- PIEZOMETER TIP ELEVATION
- 21-JULY-2020 WATER LEVEL
- TIP P8 WATER ELEVATION
- TIP P9 WATER ELEVATION
- TIP P10 WATER ELEVATION
- TIP P11 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).

CLIENT: Teck

Klohn Crippen Berger

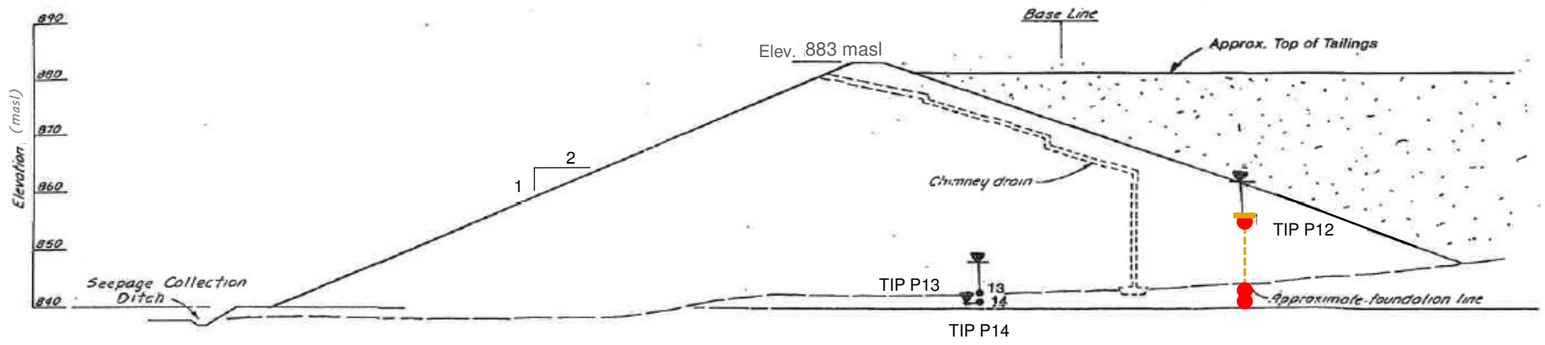
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2020 PIEZOMETER READINGS
STA. 0+575 m

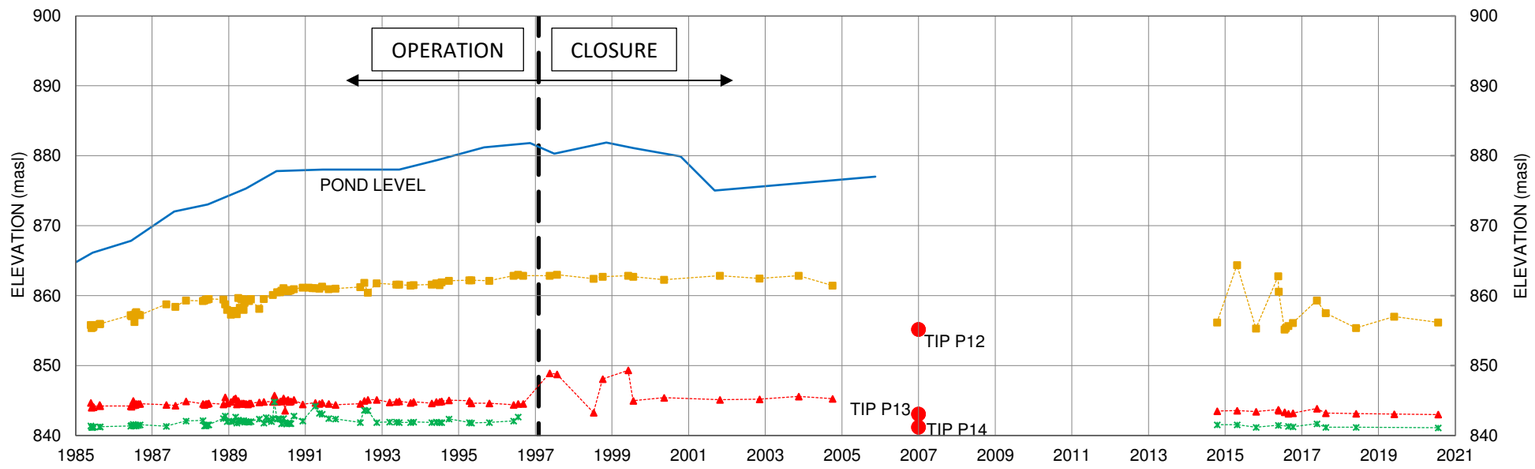
PROJECT No. M09684A18

FIG. No. 8

Date & Time: 2020-12-02 16:47
Figure File: Z:\M\VCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Piezometer\[201002 Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+696 m



PIEZOMETER READINGS AND WATER ELEVATIONS

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2020-07-21	0+696	P12	PNEUMATIC	855.1	1.5	1.1	856.2
		P13	PNEUMATIC	843.0	0.0	DRY	
		P14	PNEUMATIC	841.1	0.0	DRY	

LEGEND:

- PIEZOMETER TIP ELEVATION
- 21-JULY-2020 WATER LEVEL
- TIP P12 WATER ELEVATION
- TIP P13 WATER ELEVATION
- TIP P14 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).

CLIENT: Teck

Klohn Crippen Berger

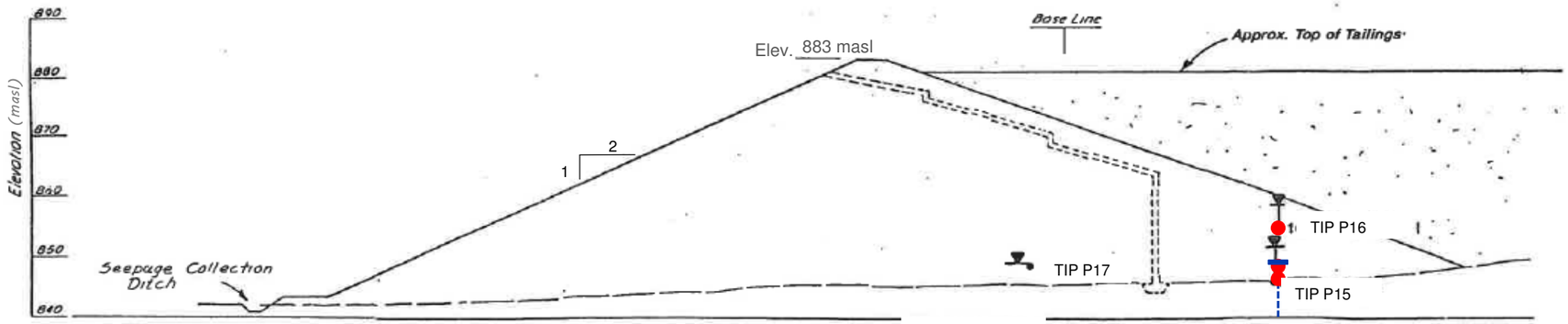
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2020 PIEZOMETER READINGS
STA. 0+696 m

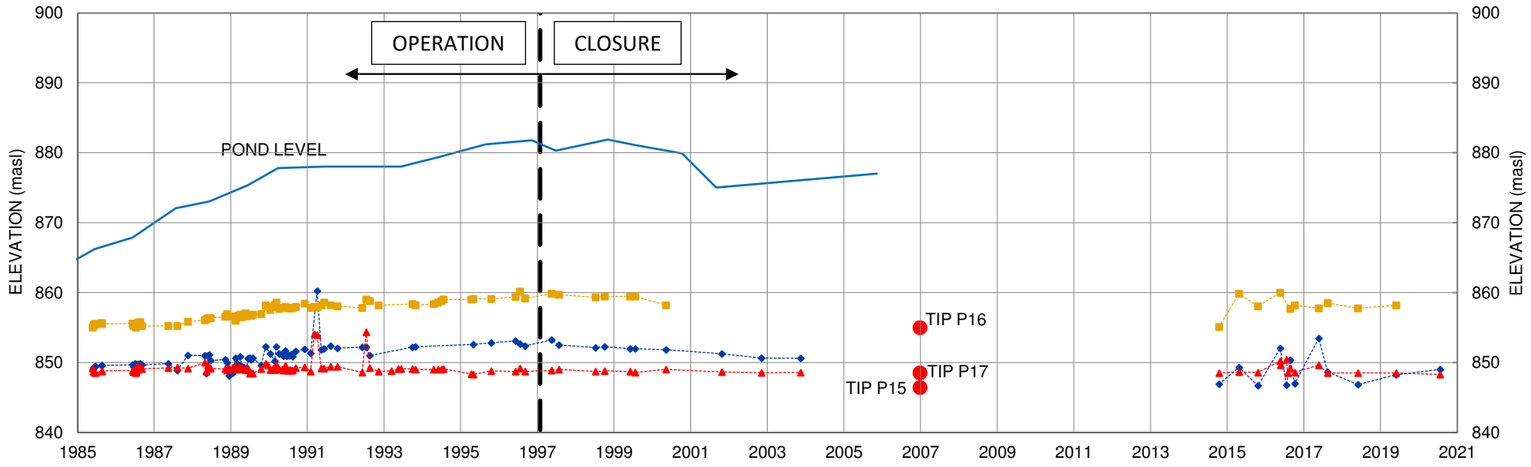
PROJECT No. M09684A18

FIG. No. 9

Date & Time: 2020-12-02 16:47
Figure File: Z:\M\VCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Piezometer\[201002 Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 0+800 m



PIEZOMETER READINGS AND WATER ELEVATIONS

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2020-07-21	0+800	P15	PNEUMATIC	846.2	4.0	2.8	849.0
		P16	PNEUMATIC	854.8	SEE NOTE 4		
		P17	PNEUMATIC	848.3	0.0	DRY	

LEGEND:

- PIEZOMETER TIP ELEVATION
- 21-JULY-2020 WATER LEVEL
- TIP P15 WATER ELEVATION
- TIP P16 WATER ELEVATION
- TIP P17 WATER ELEVATION

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (2003).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. PIEZOMETER TIP ELEVATION INTERPRETED FROM GOLDER (1984).
4. PIEZOMETER WAS RUSTED AND COULD NOT BE READ.

CLIENT: Teck

Klohn Crippen Berger

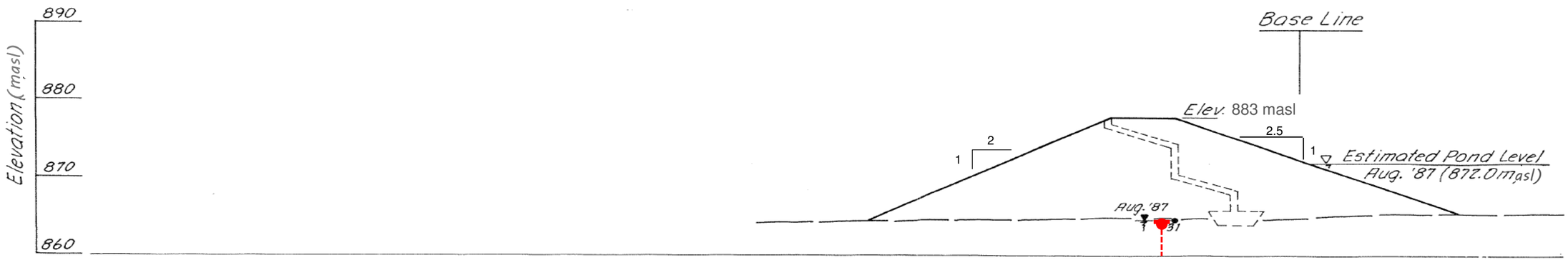
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2020 PIEZOMETER READINGS
STA. 0+800 m

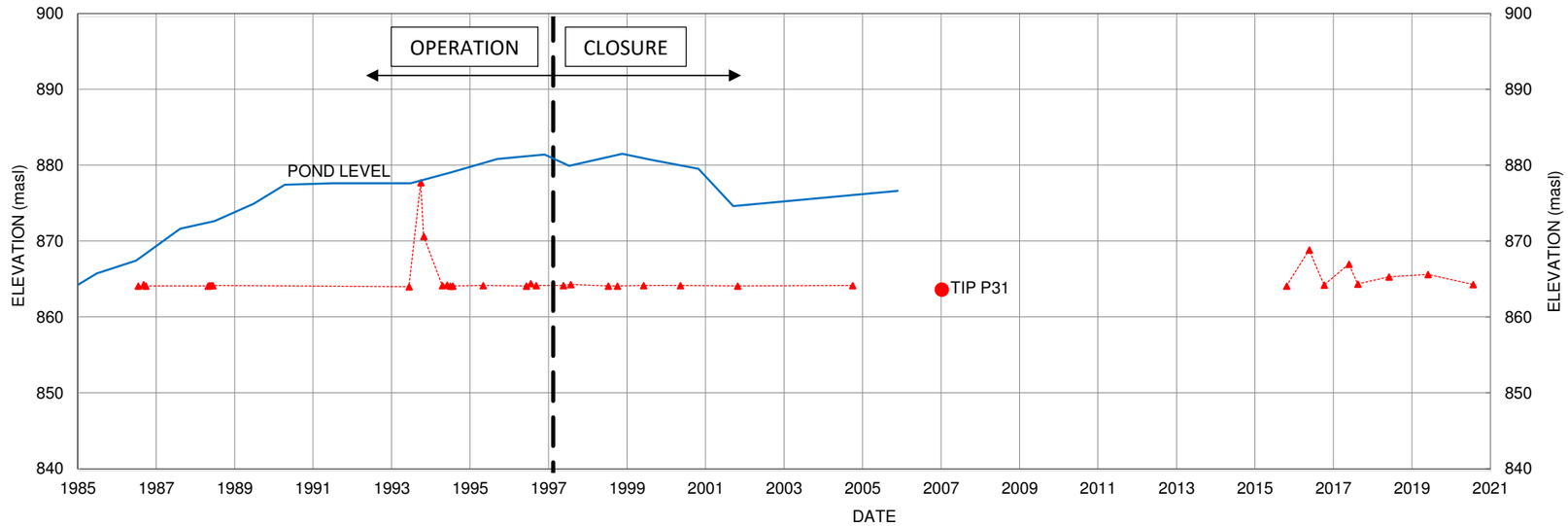
PROJECT No. M09684A18

FIG. No. 10

Date & Time: 2020-12-02 16:47
Figure File: Z:\MIVCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Piezometer\[201002 Plantsite Piezometer.xlsx]Figure F



INSTRUMENTATION SECTION STA. 2+040 m



PIEZOMETER READINGS AND WATER ELEVATION

DATE	STATION	PIEZOMETER ID.	PIEZOMETER TYPE	TIP ELEVATION (masl)	PRESSURE READING (psi)	PIEZOMETRIC LEVELS	
						HEAD (m)	ELEVATION (masl)
2020-07-21	2+040	P31 (NOTE 3)	PNEUMATIC	864.0	0.4	0.3	864.3

LEGEND:

- PIEZOMETER TIP ELEVATION
- TIP P31 WATER ELEVATION
- 21-JULY-2020 WATER LEVEL

NOTES:

1. INSTRUMENT SECTIONS TAKEN FROM GOLDER (1988).
2. INSTRUMENT CHART AND HISTORICAL RAW MONITORING DATA PROVIDED BY TECK IN 2015.
3. NO LABEL ON PIEZOMETER LEAD. LABELS SHOULD BE ADDED FOR ON-GOING COMPARISON PURPOSES.

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2020 PIEZOMETER READINGS
STA. 2+040 m

PROJECT No. M09684A18

FIG. No. 11

Date & Time: 2020-12-02 16:47
Figure File: Z:\M\VCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Piezometer\[201002 Plantsite Piezometer.xlsx]Figure F

MONUMENT	NORTHING (m)		CHANGES BETWEEN READINGS AND PREVIOUS YEAR (mm)
	June 21, 2018	July 11, 2019	July 11, 2019
CP1	6099000.203	6099000.192	-11
CP2	6098967.243	6098967.219	-24
CP3	6098932.259	6098932.253	-6
CP4	6098718.758	6098718.769	11
CP5	6098443.866	6098443.859	-7
CP6	6097987.168	6097987.165	-3
CP7	6097722.678	6097722.664	-14
CP8	6097539.406	6097539.402	-4

MONUMENT	EASTING (m)		CHANGES BETWEEN READINGS AND PREVIOUS YEAR (mm)
	June 21, 2018	July 11, 2019	July 11, 2019
CP1	628918.378	628918.360	-18
CP2	628607.726	628607.721	-5
CP3	628369.024	628369.012	-12
CP4	628319.737	628319.733	-4
CP5	628260.891	628260.924	33
CP6	628067.107	628067.101	-6
CP7	628102.222	628102.206	-16
CP8	628246.914	628246.915	1

MONUMENT	ELEVATION (masl)		CHANGES BETWEEN READINGS AND PREVIOUS YEAR (mm)
	June 21, 2018	July 11, 2019	July 11, 2019
CP1	883.082	883.085	3
CP2	882.818	882.832	14
CP3	882.753	882.776	23
CP4	882.748	882.778	30
CP5	882.207	882.204	-3
CP6	882.579	882.587	8
CP7	882.375	882.369	-6
CP8	882.538	882.576	38

NOTES:

1. LATEST SURVEY DATA PROVIDED BY QUINTETTE COAL OPERATIONS ON AUGUST 19, 2019. 2020 SURVEY WAS IN PROGRESS AT THE TIME OF WRITING.

SURVEY ACCURACY:
HORIZONTAL: +/- 5 mm to 10 mm
VERTICAL: +/- 8 mm to 15 mm

CLIENT: Teck

Klohn Crippen Berger

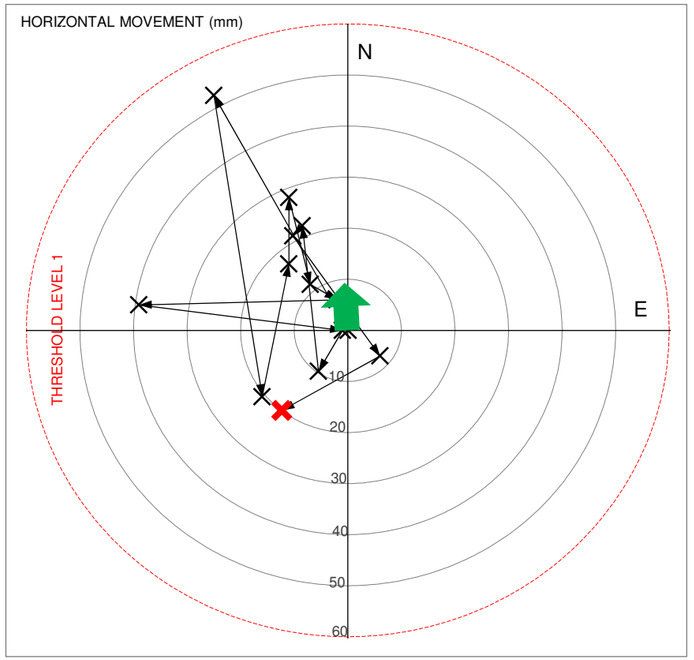
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

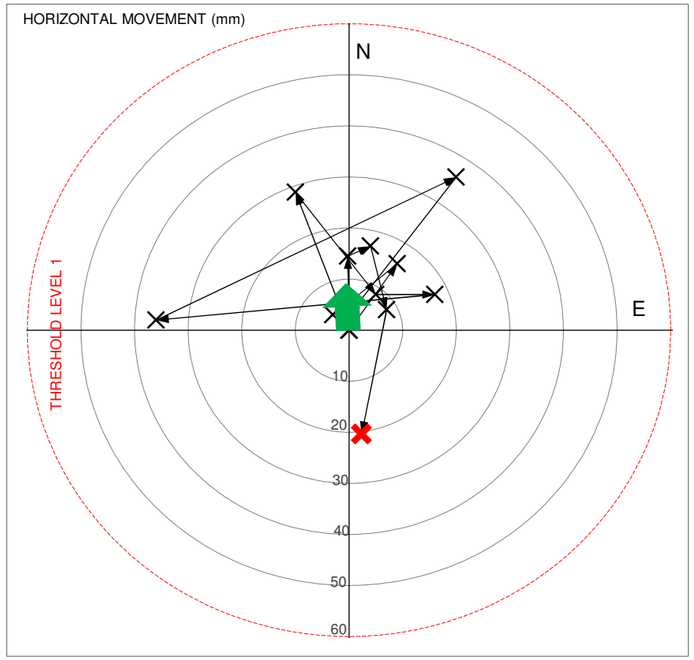
TITLE: PLANTSITE TAILINGS DAM
2019 SURVEY MONUMENT DATA

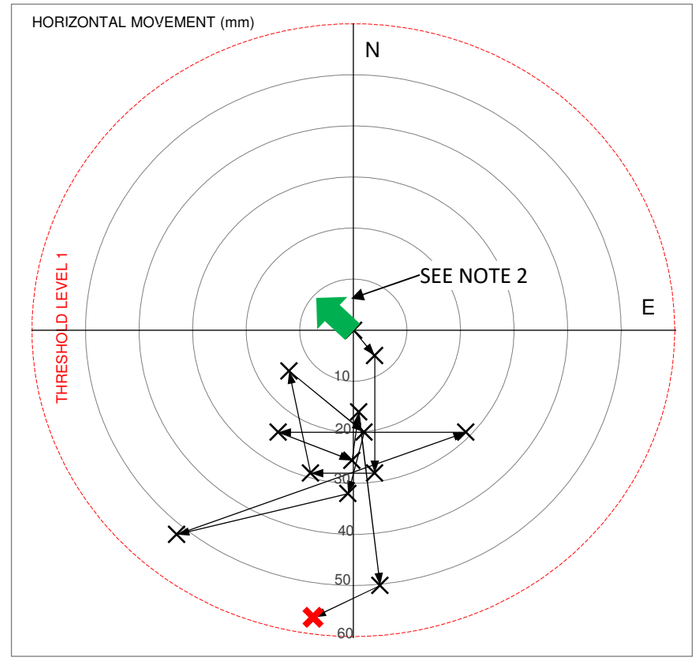
PROJECT No. M09684A18

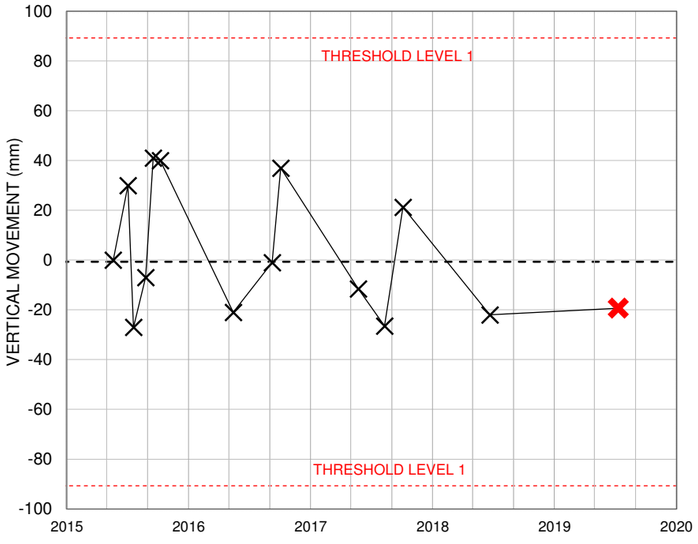
FIG. No. 12

Date & Time: 2020-12-01 14:17
Figure File: Z:\MVCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Survey Monument\[200120 Plantsite Survey.xlsx]Fig 13

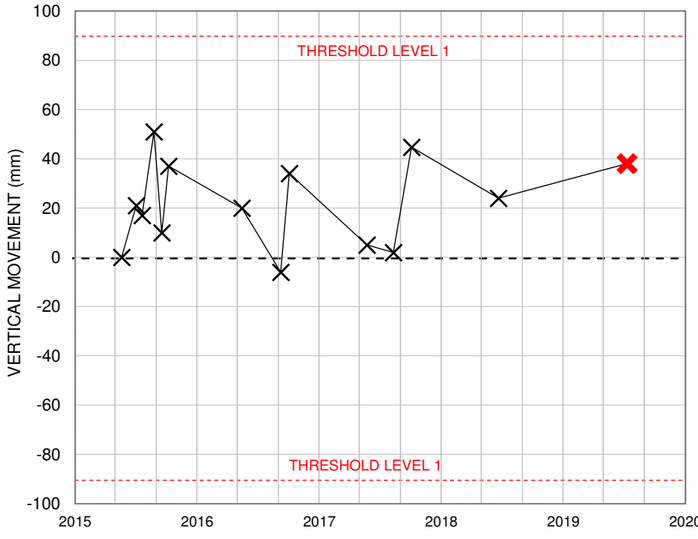




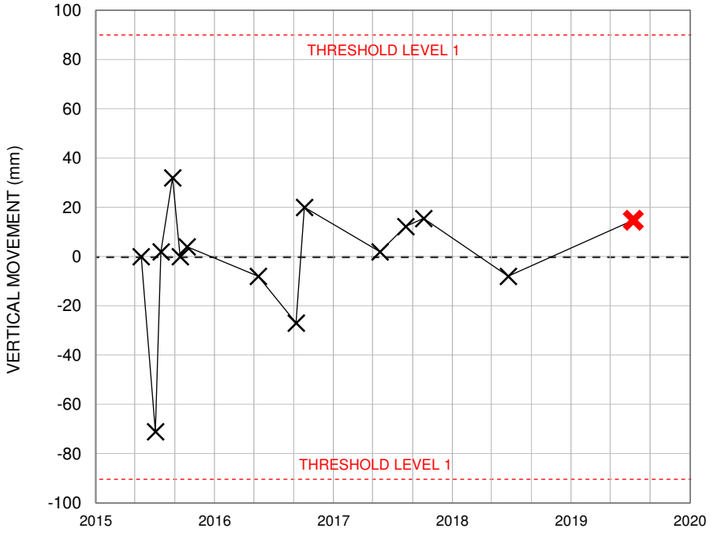




CP1 SURVEY RECORDS



CP2 SURVEY RECORDS



CP3 SURVEY RECORDS

NOTES:

1. LATEST SURVEY DATA PROVIDED BY QUINTETTE COAL OPERATIONS ON AUGUST 19, 2019. 2020 SURVEY WAS IN PROGRESS AT THE TIME OF WRITING.
2. CP3 IS ON THE NORTHWEST CORNER OF THE FACILITY.

LEGEND:

- DOWNSTREAM DIRECTION
- LATEST SURVEY READING

SURVEY ACCURACY:
HORIZONTAL: +/- 5 mm to 10 mm
VERTICAL: +/- 8 mm to 15 mm

THRESHOLD VALUES:
THRESHOLD LEVEL 1: ≥ 60 mm OF HORIZONTAL MOVEMENT FROM INITIAL READING;
≥ 90 mm OF VERTICAL MOVEMENT FROM INITIAL READING; OR
IF VERTICAL MOVEMENT ≥ 90 mm BETWEEN SUCCESSIVE READINGS.
THRESHOLD LEVEL 2: IF THERE IS A TREND OF THRESHOLD EXEEDANCE IN THE MONITORING MONUMENTS.

CLIENT: Teck

Klohn Crippen Berger

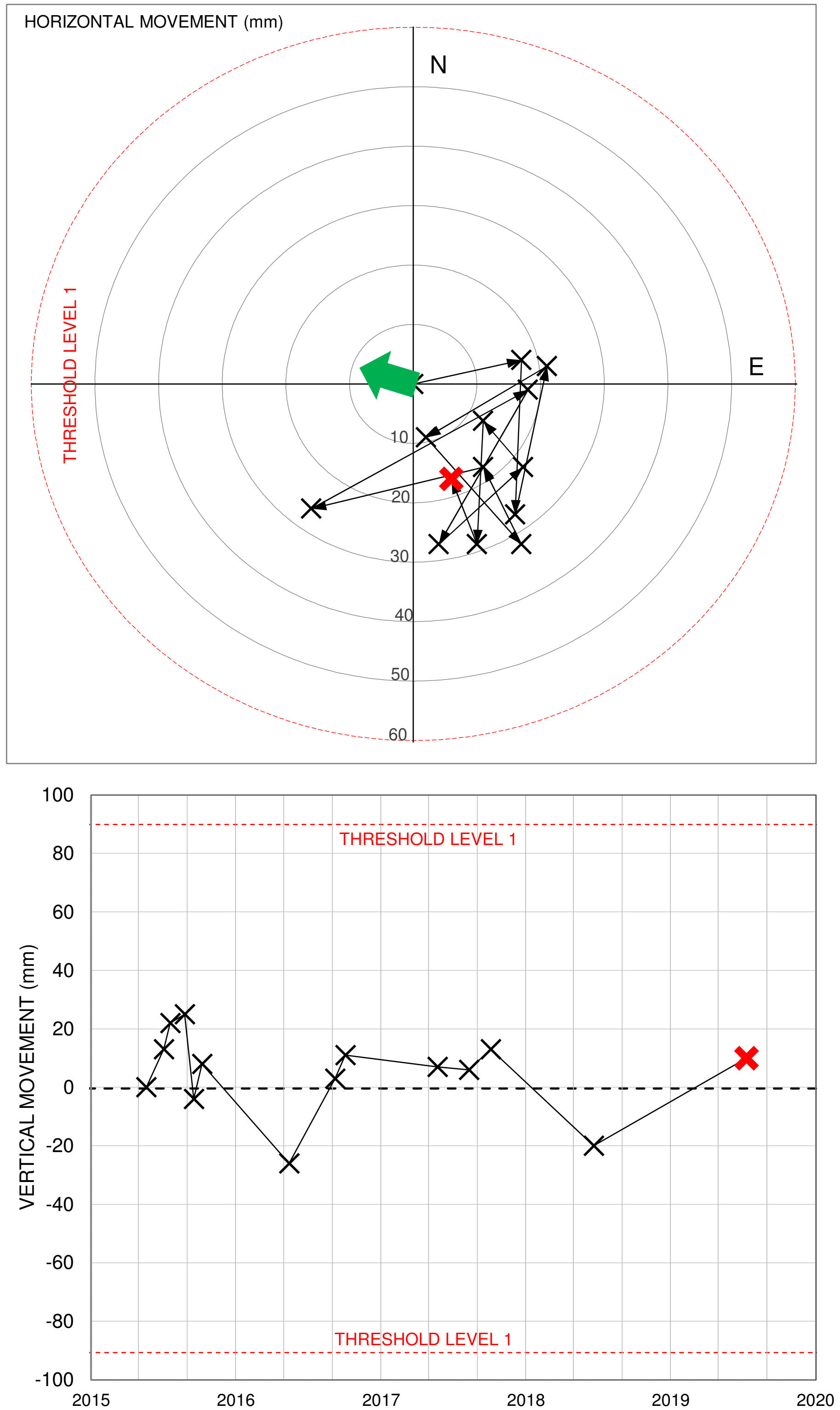
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2019 SURVEY MONUMENT PLOTS
(CP1 TO CP3)

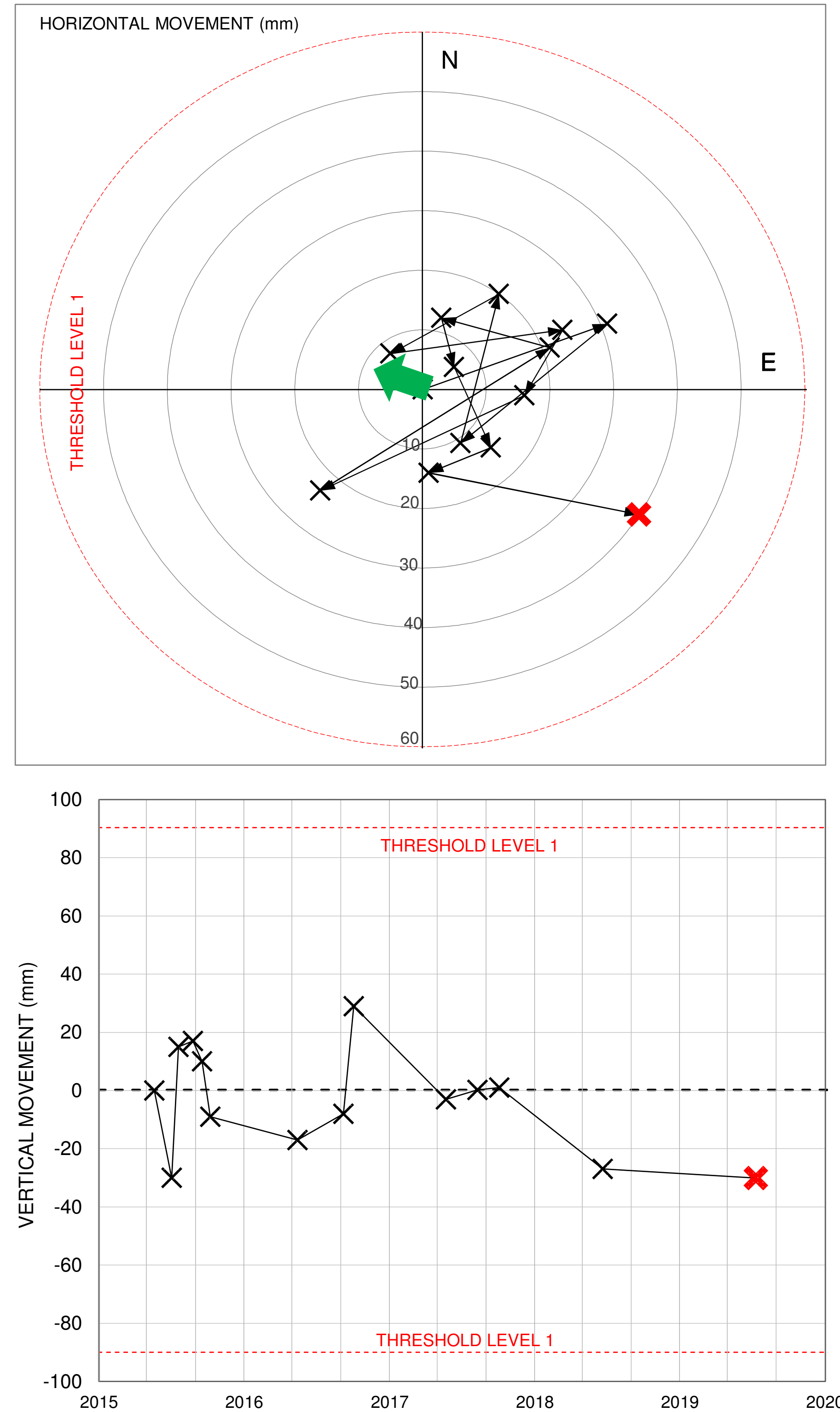
PROJECT No. M09684A18

FIG. No. 13

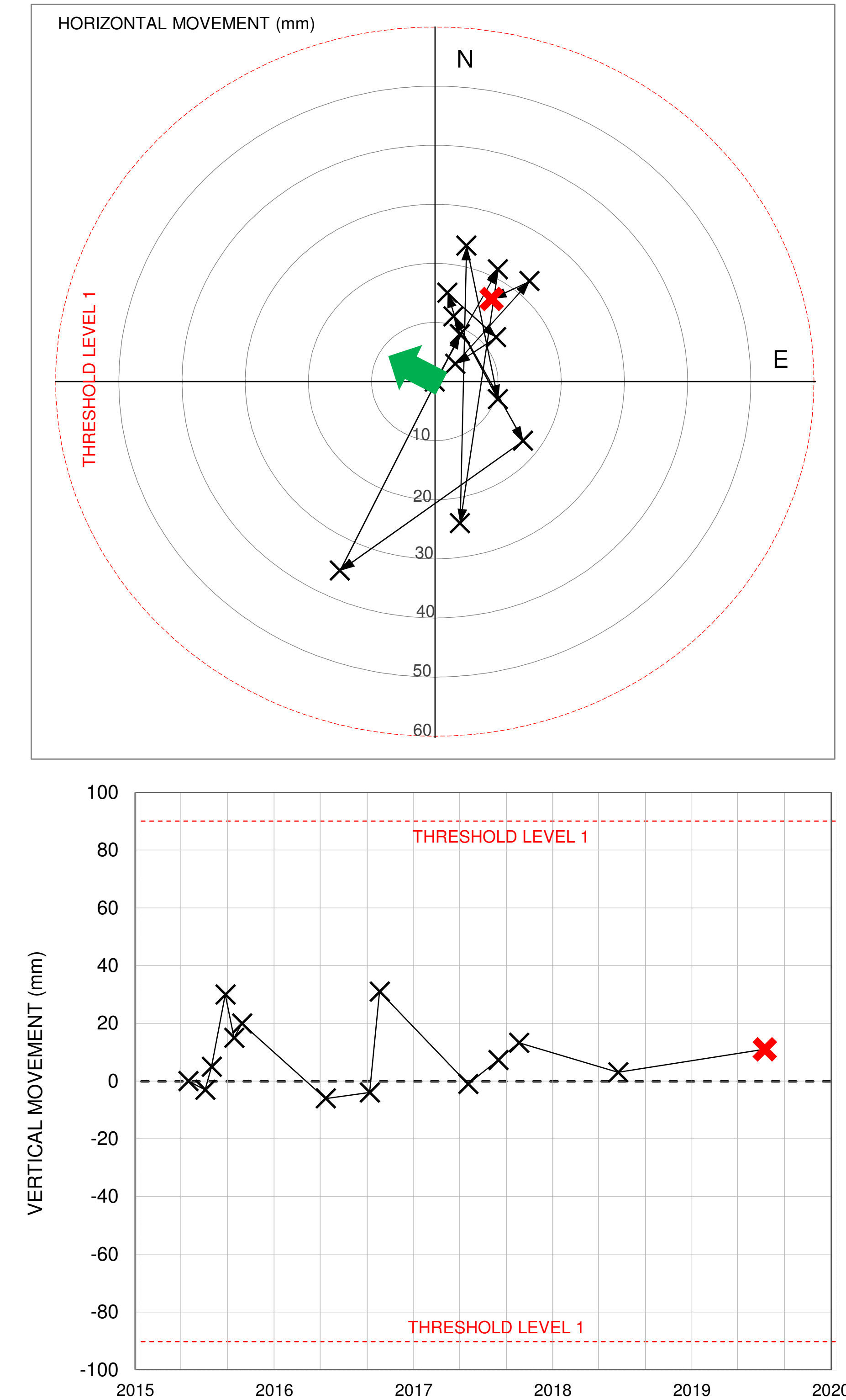
Date & Time: 2020-12-01 14:17
Figure File: Z:\MVCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Survey Monument\[200120 Plantsite Survey.xlsx]Fig 13



CP4 SURVEY RECORDS



CP5 SURVEY RECORDS



CP6 SURVEY RECORDS

NOTES:

1. LATEST SURVEY DATA PROVIDED BY QUINTETTE COAL OPERATIONS ON AUGUST 19, 2019. 2020 SURVEY WAS IN PROGRESS AT THE TIME OF WRITING.

LEGEND:

- DOWNSTREAM DIRECTION
- LATEST SURVEY READING

SURVEY ACCURACY:
HORIZONTAL: +/- 5 mm to 10 mm
VERTICAL: +/- 8 mm to 15 mm

THRESHOLD VALUES:
THRESHOLD LEVEL 1: ≥ 60 mm OF HORIZONTAL MOVEMENT FROM INITIAL READING;
≥ 90 mm OF VERTICAL MOVEMENT FROM INITIAL READING; OR
IF VERTICAL MOVEMENT ≥ 90 mm BETWEEN SUCCESSIVE READINGS.
THRESHOLD LEVEL 2: IF THERE IS A TREND OF THRESHOLD EXEEDANCE IN THE MONITORING MONUMENTS.

CLIENT: Teck

Klohn Crippen Berger

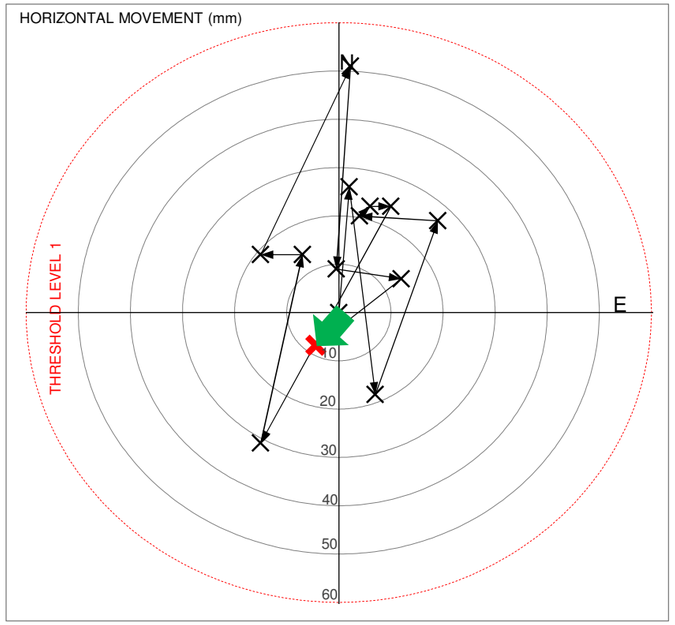
PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

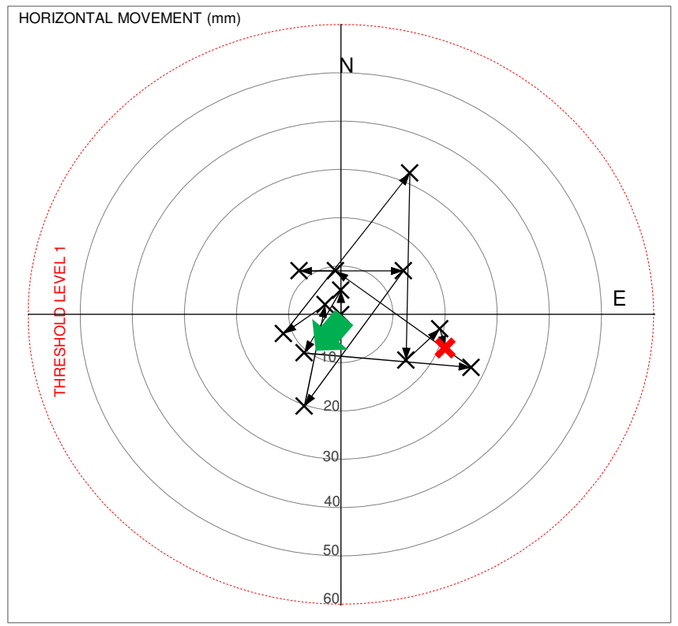
TITLE: PLANTSITE TAILINGS DAM
2019 SURVEY MONUMENT PLOTS
(CP4 TO CP6)

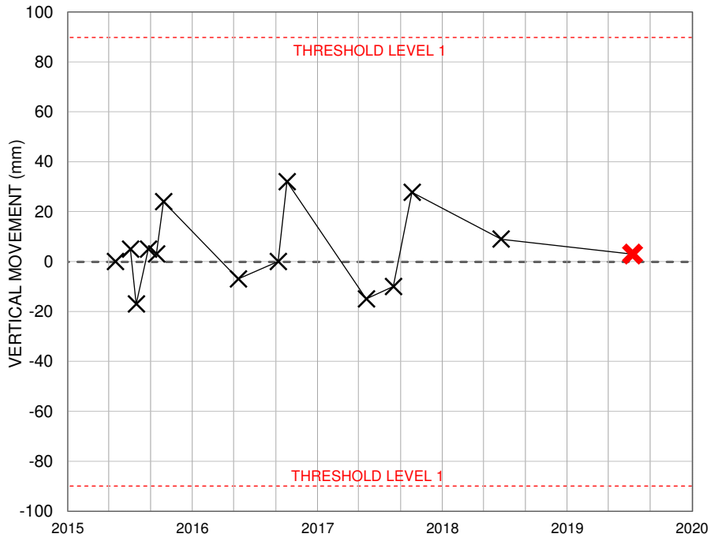
PROJECT No. M09684A18

FIG. No. 14

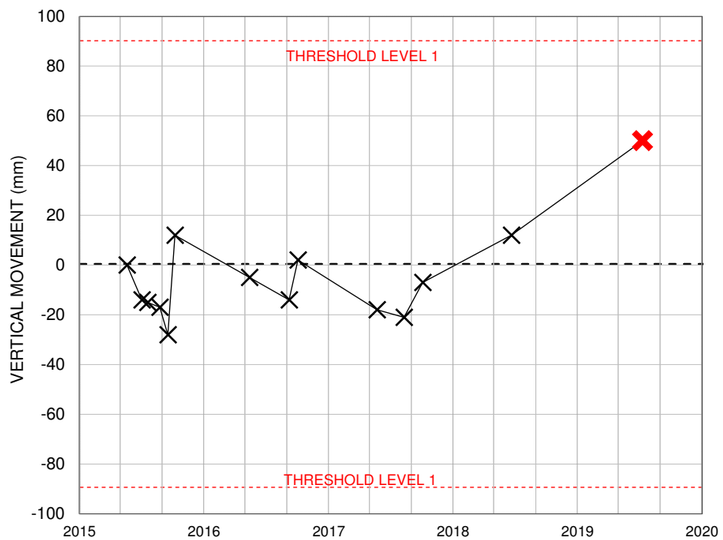
Date & Time: 2020-12-01 14:17
Figure File: Z:\MVCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Survey Monument\[200120 Plantsite Survey.xlsx]Fig 13







CP7 SURVEY RECORDS



CP8 SURVEY RECORDS

NOTES:

1. LATEST SURVEY DATA PROVIDED BY QUINTETTE COAL OPERATIONS ON AUGUST 19, 2019. 2020 SURVEY WAS IN PROGRESS AT THE TIME OF WRITING.

LEGEND:

- DOWNSTREAM DIRECTION
- LATEST SURVEY READING

SURVEY ACCURACY:
HORIZONTAL: +/- 5 mm to 10 mm
VERTICAL: +/- 8 mm to 15 mm

THRESHOLD VALUES:
THRESHOLD LEVEL 1: ≥ 60 mm OF HORIZONTAL MOVEMENT FROM INITIAL READING; ≥ 90 mm OF VERTICAL MOVEMENT FROM INITIAL READING; OR IF VERTICAL MOVEMENT ≥ 90 mm BETWEEN SUCCESSIVE READINGS.
THRESHOLD LEVEL 2: IF THERE IS A TREND OF THRESHOLD EXEEDANCE IN THE MONITORING MONUMENTS.

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF
TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE TAILINGS DAM
2019 SURVEY MONUMENT PLOTS
(CP7 AND CP8)

PROJECT No. M09684A18

FIG. No. 15

Date & Time: 2020-12-01 14:17
Figure File: Z:\MVCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\300 Design\303 Instrumentation\PTD\Survey Monument\[200120 Plantsite Survey.xlsx]Fig 13

627,600 627,800 628,000

6,098,600 6,098,400 6,098,200 6,098,000

LEGEND:
- M17 CREEK
- CLOSURE SPILLWAY CHANNEL
- PONDED AREA

N

SEEPAGE COLLECTION POND DAM

SEEPAGE COLLECTION POND

0+800

0+600

PONDED AREA 2 (APPROX.)

NOTES:
1. PROJECTION: NAD83 UTM ZONE 10N.
2. 2010 ORTHOPHOTO PROVIDED BY TECK.

SCALE 0 100 m

CLIENT: Teck

Klohn Crippen Berger

PROJECT: QUINTETTE COAL OPERATIONS
2020 ANNUAL SUMMARY OF TAILINGS FACILITY PERFORMANCE

TITLE: PLANTSITE SEEPAGE COLLECTION POND GENERAL ARRANGEMENT

PROJECT No. M09684A18

FIG No. 16

Path: Z:\M\VCR\M09684A18 - TML-Quintette Legacy 2020 Svcs\400 Drawings\GIS\Reports\Annual Summary\Fig16_PTD_SeepagePond.mxd afischer

APPENDIX I

Inspection Photographs

Appendix I
Inspection Photographs

LEGEND:

- PTD = Plantsite Tailings Dam
- PTD-2020-XX## refers to 2020 DSI photograph location, as shown on Figure 3.

Photographs were taken during site inspection on July 21, 2020.

Photo I-1 PTD Impoundment – looking south (PTD-2020-01)

Photo I-2 Ponded Area 2 – looking east (PTD-2020-01)

Photo I-3 PTD Spillway Inlet with Ponded Area 2 in background – looking northeast (PTD-2020-02)

Photo I-4 PTD upstream slope– looking south (PTD-2020-03)

Photo I-5 Impoundment area – looking southeast (PTD-2020-03)

Photo I-6 Impoundment area – looking east (PTD-2020-03)

Photo I-7 PTD crest – looking north (PTD-2020-03)

Photo I-8 PTD crest – looking north (PTD-2020-04)

Photo I-9 Impoundment – looking east (PTD-2020-04)

Photo I-10 PTD upstream slope, Ponded Area 1 in background – looking south (PTD-2020-04)

Photo I-11 PTD downstream slope – looking south (PTD-2020-05)

Photo I-12 PTD downstream slope – looking north (PTD-2020-05)

Photo I-13 Ponded Area 1 – looking north (PTD-2020-05)

Photo I-14 Dam downstream slope – looking south (PTD-2020-06)

Photo I-15 Ponded Area 1 – looking south (PTD-2020-06)

Photo I-16 Ponded Area 1 – looking east (PTD-2020-06)

Photo I-17 Downstream slope from northwest corner – looking north (PTD-2020-07)

Photo I-18 Downstream slope from northwest corner – looking west (PTD-2020-07)

Photo I-19 Ponded Area 1 from northwest corner – looking south (PTD-2020-08)

Photo I-20 Ponded Area 1 from northwest corner – looking east (PTD-2020-08)

Photo I-21 Dam crest and impoundment – looking west (PTD-2020-09)

Photo I-22 Dam crest, Ponded Area 3 in background – looking east (PTD-2020-09)

Photo I-23 Downstream slope at northeast corner – looking west (PTD-2020-10)

Photo I-24 Downstream slope at northeast corner – looking south (PTD-2020-10)

Photo I-25 Ponded Area 3 – looking west (PTD-2020-11)

Photo I-26 Small depression, potential animal activity (PTD-2020-11)

Photo I-27 Impoundment – looking north (PTD-2020-11)

Photo I-28 Dam crest – looking north (PTD-2020-12)

Photo I-29 Impoundment – looking west (PTD-2020-12)

Photo I-30 Downstream slope – looking north (PTD-2020-12)

Photo I-31 Downstream slope – looking northwest (PTD-2020-13)

Photo I-32 Downstream slope – looking southeast (PTD-2020-13)

Photo I-33 Ponded water in low spot at toe of dam (PTD-2020-14)

Photo I-34 Downstream slope – looking northwest (PTD-2020-15)

Photo I-35 Downstream slope – looking southeast (PTD-2020-15)

Photo I-36 Some flow along dam toe (PTD-2020-16)

Photo I-37 Minor rilling along downstream slope. Refer to Appendix II for specific rill monitoring photos (PTD-2020-17)

Photo I-38 Flow along dam toe (PTD-2020-18)

Photo I-39 Finger drain, no flow (PTD-DRAIN-02)

Photo I-40 Finger drain, low flow (<1 L/s) (PTD-DRAIN-03)

Photo I-41 Finger drain, no flow (PTD-DRAIN-05)

Photo I-42 Finger drain, ponded water, but no flow (PTD-DRAIN-06)

Photo I-43 Finger drain, no flow (PTD-DRAIN-10)

Photo I-44 Downstream slope – looking south (PTD-2020-19)

Photo I-45 Downstream slope – looking north (PTD-2020-19)

Photo I-46 Finger drain, some seepage observed (PTD-DRAIN-11)

Photo I-47 Finger drain, no seepage (PTD-DRAIN-12)

Photo I-48 Finger drain, wet, but no flow (PTD-DRAIN-13)

Photo I-49 Finger drain, dry (PTD-DRAIN-14)

Photo I-50 Finger drain, dry (PTD-DRAIN-15)

Photo I-51 Finger drain, dry (PTD-DRAIN-16)

Photo I-52 Finger drain, some seepage (PTD-DRAIN-17)

Photo I-53 Finger drain, dry (PTD-DRAIN-18)

Photo I-54 Finger drain, dry (PTD-DRAIN-19)

Photo I-55 Finger drain, flowing into two channels (PTD-DRAIN-19)

Photo I-56 Downstream slope – looking south (PTD-2020-20)

Photo I-57 Downstream slope – looking north (PTD-2020-20)

Photo I-58 Finger drain, some seepage (PTD-DRAIN-20)

Photo I-59 Downstream slope – looking south (PTD-2020-21)

Photo I-60 Downstream slope – looking north (PTD-2020-21)

Photo I-61 Downstream slope and toe from northeastern corner – looking east (PTD-2020-22)

Photo I-62 Downstream slope and toe from northeastern corner – looking south (PTD-2020-22)

Photo I-63 Finger drain, some seepage (PTD-DRAIN-21)

Photo I-64 Finger drain, downstream area is wet, no seepage visible (PTD-DRAIN-22)

Photo I-65 Finger drain, some seepage (PTD-DRAIN-23)

Photo I-66 Finger drain, dry (PTD-DRAIN-24)

Photo I-67 Finger drain, dry (PTD-DRAIN-25)

Photo I-68 Seepage channel along toe of dam (PTD-DRAIN-25)

Photo I-69 Finger drain, dry (PTD-DRAIN-26)

Photo I-70 Finger drain, dry (PTD-DRAIN-27)

Photo I-71 Finger drain, dry (PTD-DRAIN-29)

Photo I-72 Closure Spillway – looking towards outlet (southeast) (PTD-2020-23)

Photo I-73 Closure Spillway – looking towards inlet (north) (PTD-2020-24)

Photo I-74 Closure Spillway channel – looking north (PTD-2020-25)

Photo I-75 Closure Spillway channel – looking east (PTD-2020-25)

Photo I-76 Closure Spillway outlet – looking south (PTD-2020-25)

Photo I-77 Closure Spillway channel – looking south (PTD-2020-26)

Photo I-78 Closure Spillway channel – looking to outlet (southwest) (PTD-2020-27)

Photo I-79 Closure Spillway channel – looking downstream (southwest) (PTD-2020-28)

Photo I-80 Closure Spillway channel – looking upstream (northeast) (PTD-2020-28)

Photo I-81 Closure Spillway channel, some seepage (PTD-2020-28)

Photo I-82 Closure Spillway channel – looking upstream (northwest) (PTD-2020-29)

Photo I-83 Closure Spillway channel – looking downstream (southeast) (PTD-2020-29)

Photo I-84 Closure Spillway channel – looking upstream (northeast) (PTD-2020-30)

Photo I-85 Closure Spillway channel – looking upstream (northeast) (PTD-2020-31)

Photo I-86 Closure Spillway channel – looking upstream (northeast) (PTD-2020-32)

Photo I-87 Closure Spillway channel – looking downstream (southeast) (PTD-2020-32)

Photo I-88 Plantsite Seepage Collection Pond, from left abutment – looking east (PSCP-2020-01)

Photo I-89 Plantsite Seepage Collection Pond downstream slope, from left abutment – looking northeast (PSCP-2020-02)

Photo I-90 Plantsite Seepage Collection Pond left abutment from toe (PSCP-2020-03)

Photo I-91 Plantsite Seepage Collection Pond downstream slope from toe (PSCP-2020-03)

Photo I-92 Plantsite Seepage Collection Pond, downstream slope, small channel, dry (PSCP-2020-04)

Photo I-93 Plantsite Seepage Collection Pond right abutment (PSCP-2020-05)

Photo I-94 Plantsite Seepage Collection Pond downstream slope – looking west (PSCP-2020-06)

Photo I-95 Plantsite Seepage Collection Pond downstream slope – looking south (PSCP-2020-06)

Photo I-96 Plantsite Seepage Collection Pond outlet channel, no beaver dams, heavily vegetated – looking upstream (west) (PSCP-2020-07)

Photo I-97 Plantsite Seepage Collection Pond outlet channel, no beaver dams, heavily vegetated – looking downstream (east) (PSCP-2020-07)

Photo I-98 Plantsite Seepage Collection Pond outlet channel – looking northeast (PSCP-2020-08)

APPENDIX II

Rill Monitoring Photographs

Appendix II
Rill Monitoring Photos

LEGEND:

- PTD-RILL-## refers to proposed rill monitoring point, plan location is shown on Figure 3

Coordinates for monitoring points are summarized in Table II-1. All 2020 photographs were taken during inspection on July 21, 2020.

Table II-1 Rill Monitoring Point Locations

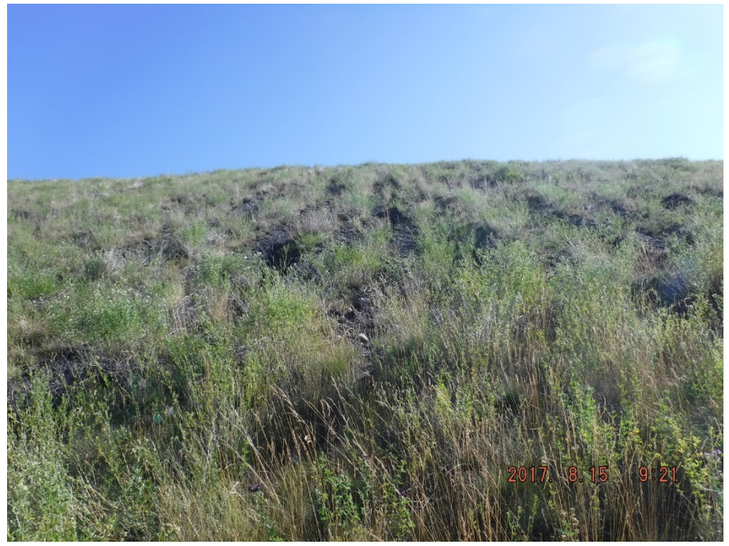
Rill Monitoring Point PTD-Rill-##	Northing (m)	Easting (m)
01	6097603.6	628135.4
02	6097599.6	628128.6
03	6097654.1	628064.7
04	6097706.1	628024.0
05	6097955.8	627976.7
05A	6098126.4	628034.7
05B	6098213.7	628067.3
06	6098278.2	628044.4
06A	6098533.6	628174.1
07	6098654.2	628204.4
07A	6098725.7	628219.6
07B	6098750.8	628228.3
08	6098945.2	628270.2
09	6099031.2	628394.9
10	6099029.1	628747.9
11	6099034.7	628820.0

II-1 PTD-RILL-01

2015

2016

2017



2018

2019

2020

No photograph taken.

II-2 PTD-RILL-02

2015

2016

2017

2018

2019 (looking at the opposite direction from previous inspections)

2020

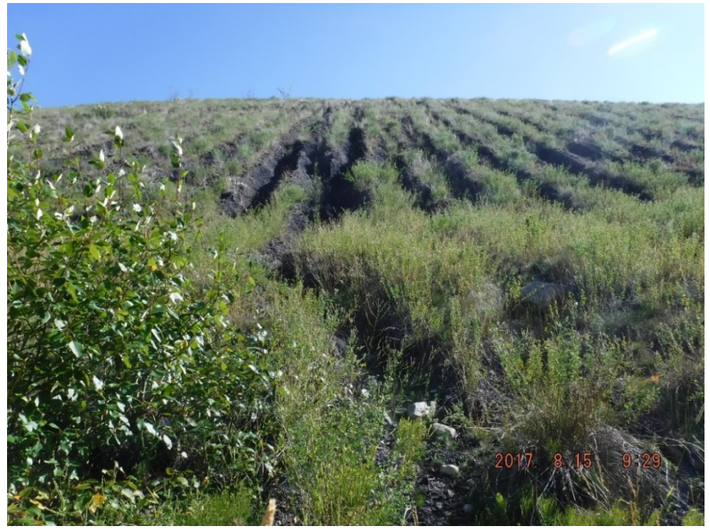
No photograph taken.

II-3 PTD-RILL-03

2015

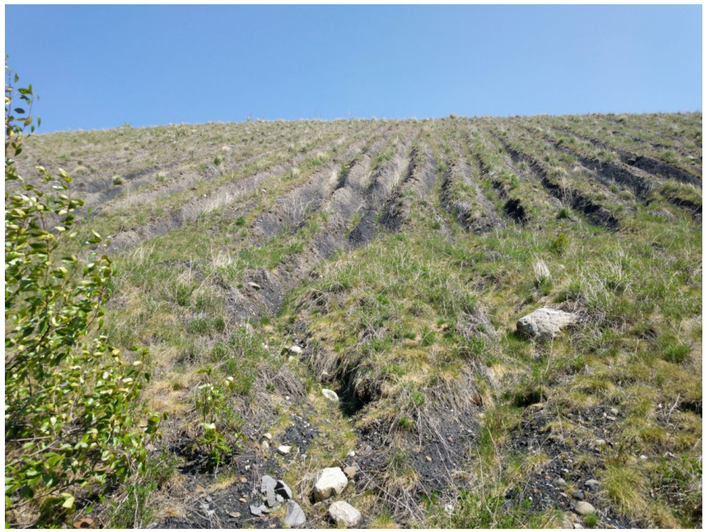
2016

2017



2018

2019



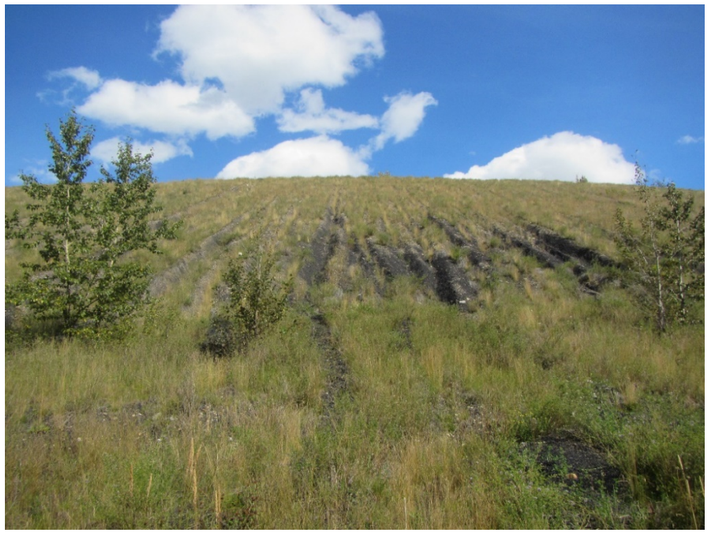
2020

No photograph taken.

II-4 PTD-RILL-04

2015

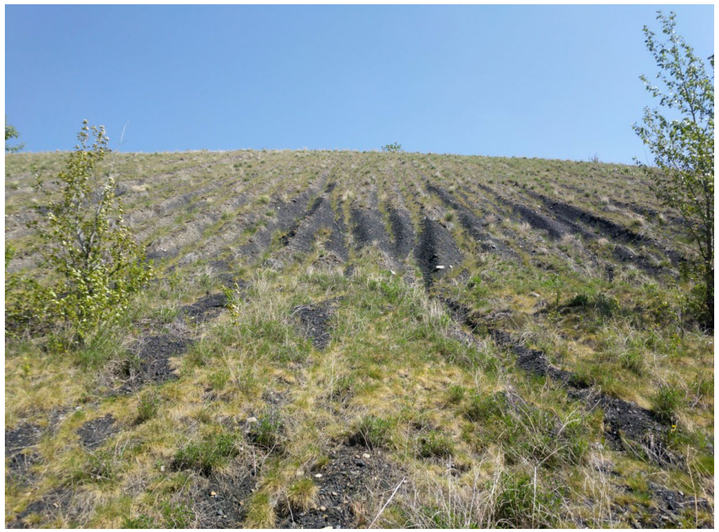
2016



2017

2018

2019



2020

No photograph taken.

II-5 PTD-RILL-05

2015

2016

2017

2018

2019

2020

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II-6 PTD-RILL-05A

2016

2017

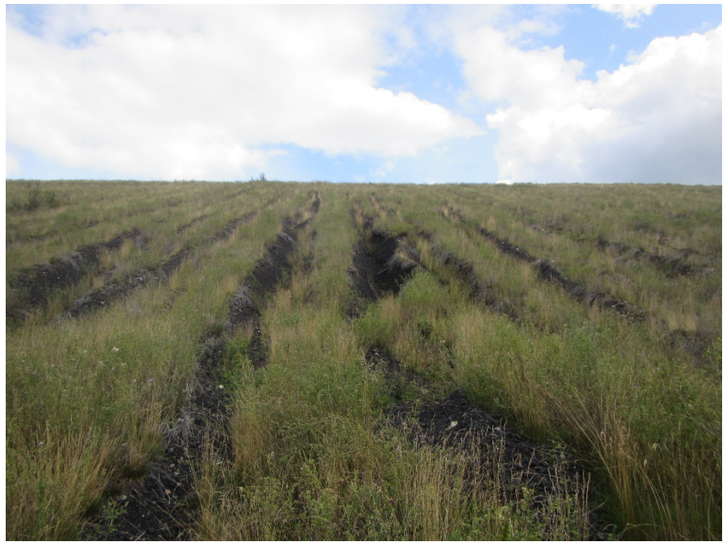
2018

2019

2020

II-7 PTD-RILL-05B

2016



2017

2018

2019

2020

II-8 PTD-RILL-06

2015

2016

2017

2018

2019

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II-9 PTD-RILL-06A

2016

2017

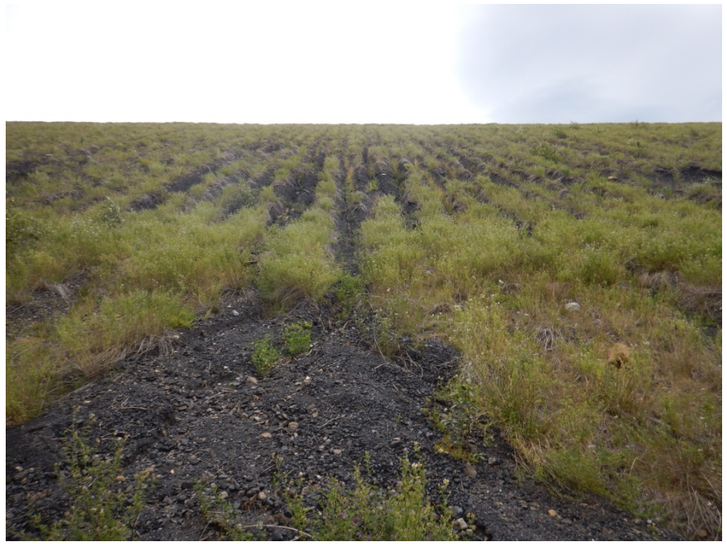
2018

2019

2020

II-10 PTD-RILL-07

2015



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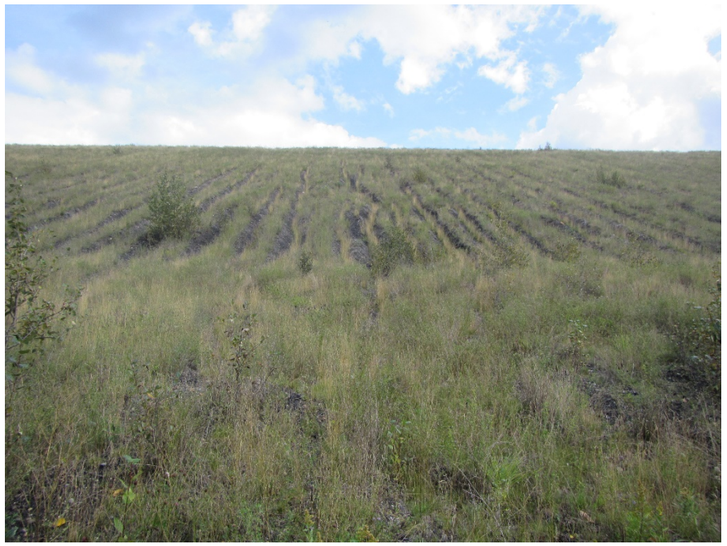
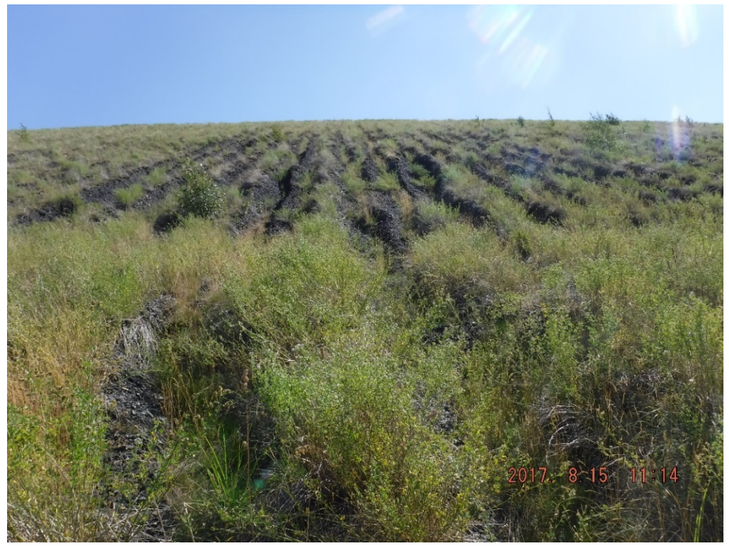


2017



2018

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II-11 PTD-RILL-07A

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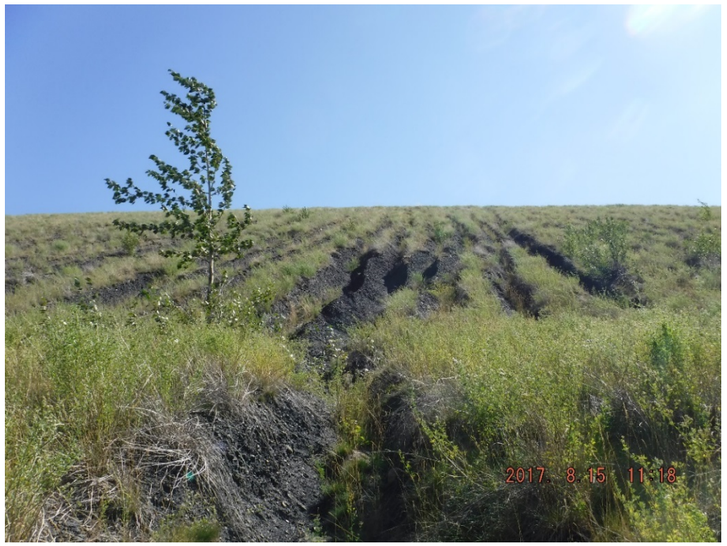

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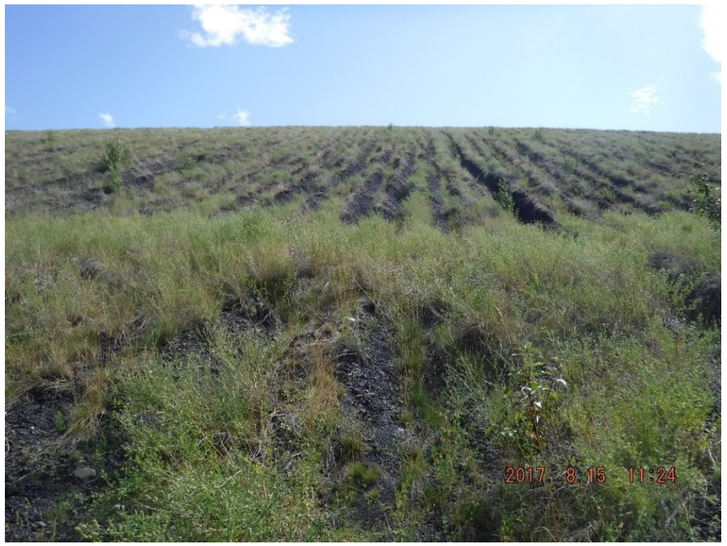
2017



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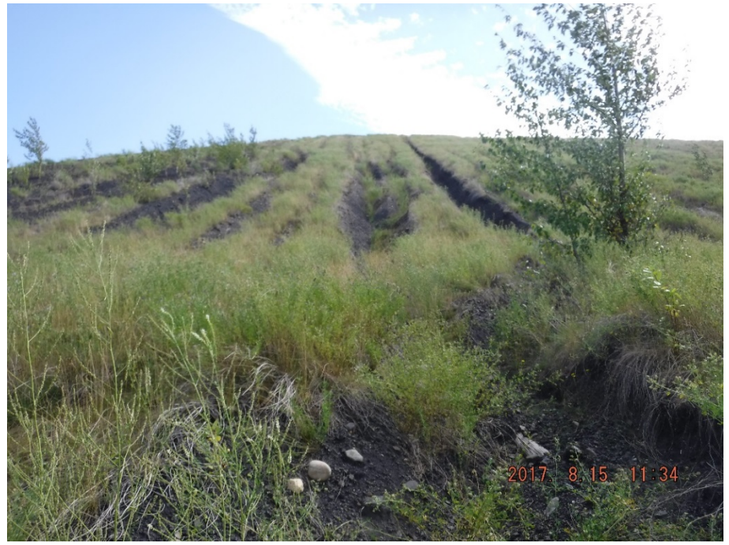

2018

2019

2020

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II-14 PTD-RILL-09

2015

2016

2017

2018

2019

2020

No photograph taken.

II-15 PTD-RILL-10

2015

2016

2017

2018

2019

2020

No photograph taken.

II-16 PTD-RILL-11

2015

2016

2017

No photograph taken.

2018

2019

2020

No photograph taken.

APPENDIX III

Register of Reference Documents

Appendix III
Register of Reference Documents

Document Title	Author	Date of Issue
Geotechnical Conditions at the Proposed Quintette Coal Development Site Near Chetwynd B.C.	Golder Associates Ltd.	Jan-78
Hydrology Design Memorandum for Quintette Coal Limited	Ker, Priestman & Associates Ltd.	May-81
Proposed Tailings Retention Area Quintette Coal Project	Golder Associates Ltd.	Jan-82
Quintette Coal Project Physical Properties of Coal Tails	Golder Associates Ltd.	11-May-82
Hydrogeology of the Quintette Project British Columbia Volume I - Main Text	Golder Associates Ltd.	May-82
Hydrogeology of the Quintette Project British Columbia Volume II - Appendices A to E	Golder Associates Ltd.	May-82
Design, Construction, Operation and Abandonment of the Tailings Impoundment	Kilborn Engineering (B.C.) Ltd. and Golder Associates	09-Jun-82
Drawing No. 428-35-2 - Surface Plant Tailings Disposal General Arrangement	Kilborn Engineering (B.C.) Ltd.	Sep-82
Drawing No. 428-35-8 - Surface Plant Tailings Disposal Clearing Plan	Kilborn Engineering (B.C.) Ltd.	Sep-82
Drawing No. 428-35-9 - Surface Plant Tailings Disposal Impoundment Area & Access Road Details	Kilborn Engineering (B.C.) Ltd.	Sep-82
Tailings Dam Design Review Quintette Coal Project	Golder Associates Ltd.	Oct-82
Drawing No. 428-35-11 - Surface Plant Tailings Disposal Starter Dam, Plan Sections and Details	Kilborn Engineering (B.C.) Ltd.	Jan-83
Drawing No. 428-35-12 - Surface Plant Tailings Disposal Starter Dam Sections and Profile	Kilborn Engineering (B.C.) Ltd.	Jan-83
Stability of Sediment Control Dam and Tailings Starter Dam at Quintette Coal Project	Golder Associates Ltd.	Feb-84
Assorted Daily Construction Inspection Reports	Golder Associates Ltd.	May to Sep-84
Letter Report to Quintette Coal Ltd. On Retention Dam	Golder Associates Ltd.	Jun-84
Tailings Retention Dam Placement of Coarse Rejects During Winter Weather	Golder Associates Ltd.	Oct-84
Stability Assessment of Settling Pond Dykes and Tailing Retention Structure	Golder Associates Ltd.	Oct-84
Performance of Tailings Dam and Other Impoundment Structures Quintette Coal Operations	Golder Associates Ltd.	May-85
Volumes Operations and Material Properties at the Tailings Retention Structure	Golder Associates Ltd.	Jul-85
Stability of Impoundment Structures at Quintette Coal Property	Golder Associates Ltd.	Sep-85
Drawing No. 85-901-76-002 - 1985 Tailings Dam Construction Program As-Built Details	Quintette Operating Corporation	Nov-85
Dawing No. 85-901-76-001 - 1985 Tailings Dam Construction Program As-Built Details	Quintette Operating Corporation	Nov-85
Application of Polymeric Liner in Tailings Dam Construction	Golder Associates Ltd.	Nov-85
Inspection of Tailings Dam	Golder Associates Ltd.	Dec-85
Drawing No. 86-901-76-1 - 1986 Tailings Dam Construction Program General Layout (Rev. 3)	Golder Associates Ltd.	18-Jun-86
Drawing No. 86-901-76-2 - 1986 Tailings Dam Construction Program Plan (Rev. 1)	Golder Associates Ltd.	12-Jun-86
Drawing No. 86-901-76-3 - 1986 Tailings Dam Construction Program Plan (Rev. 2)	Golder Associates Ltd.	12-Jun-86
Drawing No. 86-901-76-4 - 1986 Tailings Dam Construction Program Cross-Sections (Rev. 1)	Golder Associates Ltd.	12-Jun-86
Drawing No. 86-901-76-5 - 1986 Tailings Dam Construction Program Cross-Sections (Rev. 1)	Golder Associates Ltd.	12-Jun-86
Stability of Impoundment Structures at Quintette Coal Property	Golder Associates Ltd.	Oct-86
Drawing No. 86-901-76-001 - 1987 Tailings Dam Construction Program General Layout (Rev. A)	Golder Associates Ltd.	09-Jul-87
Drawing No. 86-901-76-002 - 1987 Tailings Dam Construction Program Plan Sheet 1 of 2 (Rev. A)	Golder Associates Ltd.	09-Jul-87
Drawing No. 86-901-76-003 - 1987 Tailings Dam Construction Program Plan Sheet 2 of 2 (Rev. A)	Golder Associates Ltd.	08-Jul-87
Drawing No. 86-901-76-004 - 1987 Tailings Dam Construction Program Cross-Sections (Rev. A)	Golder Associates Ltd.	08-Jul-87
Drawing No. 86-901-76-005 - 1987 Tailings Dam Construction Program Cross-Sections (Rev. O)	Golder Associates Ltd.	08-Jul-87
Construction and Performance of Tailings Dam	Golder Associates Ltd.	Feb-88
Geotechnical Investigation for a Porposed Borrow Source	Peace Country Materials Testing Ltd.	23-Mar-88
Stability of Outside Fill Slope Tailings Retention Embankment	Golder Associates Ltd.	Dec-88
1989 Tailings Dam Construction Production of Chimney Drain Material	Golder Associates Ltd.	10-Apr-89
Tailings Dam As At End of 1988 Construction Season	Golder Associates Ltd.	Jul-89
1989 Tailings Dam Construction Program Excerpt from QOC July 1990 Report to EMPR on Tailings Dam	Quintette Operating Corporation	Jul-90
Tailings Retention Embankment As At The End of 1989	Golder Associates Ltd.	Jan-91
Geotechnical Assessment of Shikano North Alternative Dump	Golder Associates Ltd.	Mar-91
Tailings Retention Embankment As At The End of 1990	Golder Associates Ltd.	Apr-91
Synopsis Excerpt from QCO May 1991 Report to EMPR on 1990 Construction.	Quintette Operating Corporation	May-91
Tailings Dam Repair	Golder Associates Ltd.	07-Aug-92
Tailings Dam Instrumentation	Golder Associates Ltd.	10-Sep-92
1991/1992 Tailings Dam Performance	Golder Associates Ltd.	Oct-92
1992/1993 Tailings Dam Performance	Golder Associates Ltd.	Nov-93
1994 Inspection of the Tailings Retention Dam	Golder Associates Ltd.	Sep-94
1995 Inspection of the Tailings Retention Dam	Golder Associates Ltd.	Aug-95
1995 Tailings Dam Raising	Peace Country Materials Testing Ltd.	Sep-95
Operation and Upkeep of the Tailings Impoundment - August 1994 to July 1995	Quintette Operating Corporation	May-96
Operation and Upkeep of the Tailings Impoundment - August 1995 to July 1996	Quintette Operating Corporation	Mar-97
Annual Inspection of the North Tailings Pond	Golder Associates Ltd.	Aug-97
Annual Inspection of the North Tailings Pond	Golder Associates Ltd.	Oct-98
Annual Inspection of the North Tailings Pond	Golder Associates Ltd.	Sep-99
Closure Drainage for North Tailings Pond	Golder Associates Ltd.	30-Sep-00
Permanent Spillway for Closure of the North Tailings Pond	Golder Associates Ltd.	07-Mar-01
Stability Assessment for The North Tailings Pond	Golder Associates Ltd.	Feb-02
Operation and Upkeep of the Plantsite Tailings Impoundment - August 1999 to October 2001	Golder Associates Ltd.	Mar-02
Stability Assessment for The North Tailings Pond	Golder Associates Ltd.	Mar-03
North Tailings Pond Spillway Review of As-Built Channel	Klohn Crippen	14-Jan-05
Annual Dam Safety Inspection Report Plantsite North Tailings Impoundment - 2005	Quintette Operating Corporation	Mar-06
Quintette 2010 Dam Safety Inspection and Consequence Classification	Klohn Crippen Berger Ltd.	01-Mar-11
Quintette Project - Baseline Climate & Hydrology Conditions	Clearwater Consultants Ltd.	17-Aug-11
2012 Dam Inspections: Plantsite Tailings Dam, M11 Diversion Dam, Shikano North Tailings Dam	Klohn Crippen Berger Ltd.	19-Dec-12
Plantsite Tailings Dam - 2013 Dam Safety Inspection Report	Klohn Crippen Berger Ltd.	12-Dec-13
Quintette Dam Safety Review - Plantsite Tailings Storage Facility	Klohn Crippen Berger Ltd.	27-May-14
Quintette Coal Operations - Plantsite Tailings Dam - 2014 Dam Safety Inspection - Revision 1	Klohn Crippen Berger Ltd.	26-Nov-14
Plantsite Tailings Dam - Response to February 3, 2015 MEM Memorandum	Klohn Crippen Berger Ltd.	29-Jun-15
Quintette Coal Operations - Plantsite Tailings Dam - Hydrotechnical Review	Klohn Crippen Berger Ltd.	22-Dec-15
Quintette Coal Operations - Plantsite Tailings Dam - 2015 Dam Safety Inspection	Klohn Crippen Berger Ltd.	03-Mar-16
Quintette Coal Operations - Plantsite Tailings Dam - 2016 Stability Assessment Report	Klohn Crippen Berger Ltd.	17-May-16
Quintette Coal Operations - Plantsite Tailings Dam - 2016 Dam Safety Inspection	Klohn Crippen Berger Ltd.	22-Dec-16
Quintette Coal Operations - Plantsite Tailings Dam - Water Management, Water Balance, and Quantified Performance Objectives	Klohn Crippen Berger Ltd.	22-Dec-16
Quintette Coal Operations - Plantsite Tailings Dam - Consolidated Facility Report	Klohn Crippen Berger Ltd.	18-Jan-18
Quintette Coal Operations - Plantsite Tailings Dam - 2017 Dam Safety Inspection	Klohn Crippen Berger Ltd.	16-Mar-18
Quintette Coal Operations - Plantsite Tailings Dam - Hydrotechnical Review - Rev. 1 - Draft	Klohn Crippen Berger Ltd.	19-Oct-18