Klohn Crippen Berger

Teck Metals Ltd.

Pinchi Lake Mine Tailings Storage Facility

2023 Annual Facility Performance Review

M07728A39.730

September 2023

Klohn Crippen Berger

September 7, 2023

Teck Metals Ltd.
Kimberley Operations
Bag 2000
Kimberley, British Columbia
V1A 3E1

Jason McBain, P.Eng.
Mine Manager

Dear Mr. McBain:

Pinchi Lake Mine Tailings Storage Facility
2023 Annual Facility Performance Review

We are pleased to submit the 2023 Annual Facility Performance Review of the Pinchi Lake Mine Tailings Storage Facility.

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

Yours truly,

KLOHN CRIPPEN BERGER LTD.

Daniel Klassen

Daniel Klassen, P.Eng.
Project Manager

SM:jc/sw

230907R-Pinchi AFPR.docx
M07728A39.730

Klohn Crippen Berger Ltd.
500 - 2955 Virtual Way ▪ Vancouver BC V5M 4X6 ▪ Canada
t 604.669.3800 ▪ f 604.669.3835 ▪ www.klohn.com

Teck Metals Ltd.

Pinchi Lake Mine Tailings Storage Facility

2023 Annual Facility Performance Review

EXECUTIVE SUMMARY

This report presents the 2023 Annual Facility Performance Review for Teck Metals Ltd.'s (Teck) Pinchi Lake Mine Tailings Storage Facility (TSF). This report was prepared by Klohn Crippen Berger Ltd. (KCB) to fulfill the requirements of a Dam Safety Inspection (DSI) in the Health, Safety and Reclamation Code for Mines in British Columbia (HSRC) (MEM 2016, EMLI 2022). It is also an essential document per the Global Industry Standard on Tailings Management (GISTM) which was released in August 2020.

The annual inspection of the TSF facilities was conducted in June 2023 by the Engineer of Record, Daniel Klassen, P.Eng., and Sareena Mohammad, EIT of KCB, accompanied by Chris Jeffrey, P.Eng., of Teck. The Site Surveillance Officer, Mark Pokorski of Ecofor, also accompanied the annual inspection team, in addition to completing the routine inspections in October 2022 and May 2023.

This summary section is provided in accordance with the HSRC, and Teck's "Guideline for Tailings and Water Retaining Structures" (Teck 2019).

Summary of Facility Description

Pinchi Lake Mine has been closed since 1975. Teck completed the reclamation/closure works for the TSF in 2011. The TSF and associated water management infrastructure include the following:

- An earthfill tailings embankment: 3 m to 15 m high, approximately 1300 m long.
- A tailings impoundment containing approximately one million cubic metres of tailings. The impoundment is a dry facility with a glacial till cover and vegetation on the tailings surface. There is no storage of water in the impoundment.
- A free-flowing, riprap lined open channel Closure Spillway.
- The Ed Creek Diversion Channel, which diverts Ed Creek away from the TSF.

Summary of Key Hazards

Teck, with support from KCB, conducted a credible catastrophic failure mode assessment in April 2022. The assessment considered the three key failure modes for tailings facilities identified in the ICMM Good Practice Guide (ICMM 2021): overtopping, internal erosion and piping, and slope instability. Teck's definition of a "catastrophic" failure is one with a risk to life safety or irreversible impact to a rare or valued ecosystem, social, or cultural heritage element. The conclusion from the assessment was that there are no credible "catastrophic" failure scenarios for the TSF based on the available information and current understanding of the site.

A summary of the current conditions is provided below to describe the safeguards that are in place and the justification that failure modes are well-managed for the TSF.

Overtopping:

- There is no permanent pond in the TSF, and the Closure Spillway is designed to convey flood flows passively without developing a large pond in the TSF. A hydrotechnical review of the

Closure Spillway found that the freeboard in the TSF during the 1/3 between 1000-year and PMF event is over 4 m (KCB 2023a). The spillway and freeboard are effective controls to manage overtopping risks.

Internal Erosion and Piping:

- The embankment includes three fill zones: local silt-clay and glacial till borrow material, a rockfill zone on the downstream slope, and a transition material between the silt-clay/glacial till and the rockfill. The filter adequacy was reviewed previously, and it was found that the as-built information is insufficient to assess the filter compatibility of these materials (KCB 2015b). However, the majority of the embankment is composed of clayey material with plasticity index greater than 7, which is not susceptible to internal erosion (Fell et al. 2008), and the clayey zone is wide enough that it would not sustain a crack where piping could develop. In addition, there is no water stored in the TSF to generate a gradient or flow to propagate internal erosion to the point of failure if initiated. Based on these considerations, a piping failure of the TSF is considered not credible.

Slope Instability:

- A stability assessment concluded that the TSF meets HSRC factor of safety criteria (KCB 2022b), consistent with the good performance of the facility since closure in 1975. The condition of the embankment is generally more favourable for stability now than it was during operations due to the draining of the pond and trimming of the embankment crest in some areas. Survey monuments on the embankment crest have not shown ongoing movements since the first readings in 1998.
- The TSF is located in a region of low seismic activity. Simplified deformation analyses were performed as part of the stability assessment (KCB 2022b) and the predicted deformations for the 10,000-year ground motions are less than 0.3 m, which indicates that the embankment and the TSF are expected to perform well under seismic loading.
- The potential for toe erosion to affect embankment stability has been considered, and there are controls in place to address this. Ed Creek Diversion Channel was designed to convey the 1000-year flood event without erosion damage, but gradual weathering and breakage of the riprap has reduced its capacity. A 100 m section of the channel is approximately 10 m from the TSF Embankment, and damage to the riprap during an extreme flood event could initiate gradual erosion of the channel towards the embankment. This is addressed through surveillance and maintenance, and erosion would not be allowed to progress to the point where it could undermine the toe of the embankment. Options for remediating the channel are also being investigated, including replacing the riprap and possibly realigning the channel away from the TSF.

Consequence Classification

The CDA Dam Safety Guidelines provide a dam classification scheme based on the potential consequences of a hypothetical failure that can be used to provide guidance on the standard of care

expected of dam owners and designers. Consequence of a hypothetical failure is not related to the likelihood of a failure, but rather the potential impact resulting from a failure if it did occur.

Teck provided the following statement regarding the consequence classification of the facility:

> *Teck is committed to the safe and environmentally responsible management of tailings facilities throughout the mining life cycle to minimize harm to the environment and protect the health and safety of our people and surrounding Communities of Interest. This commitment includes the implementation of the Global Industry Standard on Tailings Management (GISTM) and industry-leading guidelines established by the International Council on Mining and Metals (ICMM), the Mining Association of Canada (MAC) and Canadian Dam Association (CDA).*
>
> *For the purpose of assigning a dam classification, the consequences of potential failure modes are assessed as per the Canadian Dam Association (CDA) guidelines and the requirements of the jurisdictions in which we operate. The Global Industry Standard on Tailings Management (GISTM) bases consequence classification on credible failure modes only, which may result in a lower stated classification.*
>
> *As part of Teck's commitment to the safety of tailings facilities, Teck has adopted using extreme loading criteria for any new facilities with a credible catastrophic flow failure mode, regardless of consequence classification. Risk assessments are performed for all tailings facilities, with the objective of reducing risks to As Low As Reasonably Practicable (ALARP). In some cases, this results in further risk reduction beyond applicable regulatory requirements and is consistent with the GISTM and industry-leading best practice.*

The consequence classification of the Pinchi TSF was reviewed in 2012 after the completion of the reclamation/closure works and based on the CDA (2007) scheme the TSF was noted to have a **Significant** consequence classification (KCB 2012). The Significant consequence classification was deemed appropriate in the 2018 Dam Safety Review (DSR) (SRK 2020). There have been no material changes to the TSF or the upstream and downstream conditions since the previous review; therefore, there is no change in the TSF's consequence classification.

Evaluations of the TSF under extreme loading have been completed and they concluded that the facility can withstand extreme earthquake and flood events (10,000-yr return period) without release of tailings, though the spillway may require repairs after passing an extreme flood (KCB 2023a).

Summary of Key Observations and Significant Changes

There has been no construction or any other significant changes to the TSF or associated water management infrastructure since the reclamation and closure works for the TSF were completed in 2011.

There are six vibrating wire piezometers at three locations around the embankment and fourteen survey monuments. Piezometers are read twice per year, and survey monuments were previously measured every ten years, but have since been replaced by InSAR. Teck is in the process of

developing thresholds for InSAR. Survey monument thresholds will be used until the transition to InSAR is complete. There were no significant changes in the piezometer readings in 2023, and the quantifiable performance objectives (QPOs) were met. Piezometer readings show seasonal fluctuations between spring and summer/fall. Survey monuments were last read in December 2016, and the readings were below the alert criteria and did not show ongoing movements. There is normally no storage of water in the TSF and no instrumentation for water level or flow monitoring. Based on the TSF performance to date, the current instrumentation and reading frequency are considered sufficient for ongoing monitoring of the facility under current conditions (KCB 2022a).

Overall, the TSF Embankment is in good condition with no significant changes observed since 2022, which indicates no changes to stability. A stability assessment of the TSF was performed in 2022, which concluded that the facility meets industry standard static and seismic stability design criteria (KCB 2022b).

OMS Manual and EPRP

The OMS Manual for the TSF was revised in 2021 (Teck 2021). Teck has indicated that an updated version is in progress, with plan to publish by end of 2023. The EPRP for the TSF is incorporated into the site-wide Mine Emergency Response Plan (MERP), which was revised in 2023 (Teck 2023). These documents are reviewed annually and updated as needed.

Dam Safety Review

A Dam Safety Review (DSR) of the TSF and associated water infrastructure was performed by SRK in 2018 (SRK 2020). There was appropriate engagement and input from the Engineer of Record. The HSRC (MEM 2016, EMLI 2022) requires that all tailings storage facilities undergo a DSR every 5 years at minimum. The 2023 DSR is in progress.

Summary of Recommendations

No new issues related to TSF safety were identified during the 2023 AFPR, so there are no new recommendations. Ongoing deficiencies and recommendations from previous years are summarized in Table ES-1. Aligned with the noted good condition of the facility and no observed or computed stability concerns, none of the issues are high priorities. The levels of priority assigned to each item in the table are based on priority ratings developed by Teck (and consistent with HSRC) as follows:

Priority 1 A high probability or actual TSF 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 TSF 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 TSF safety issues.

Priority 4 Best Management Practice as a suggestion for continuous improvement towards industry best practices that could further reduce potential risks.

As shown in Table ES-1, none of the issues are expected to result in a TSF safety issue and are therefore considered “best practice” issues rather than urgent, TSF safety items.

Table ES-1 Summary of Deficiencies and Recommendations

Structure	ID No.	Deficiency or Non-Conformance	Applicable Regulation or OMS Reference	Recommended Action	Priority	Recommended Deadline/Status
Previous Recommendations Ongoing						
Ed Creek Diversion Channel	2020-02	The riprap along the Ed Creek Diversion Channel is undersized and is deteriorating due to weathering	OMS Manual	Select one or two preferred options for upgrading/replacing the existing Ed Creek Diversion Channel that will be advanced to a feasibility level design.	3	In progress – Site investigation planned for Q3 2023 to explore realignment options.
TSF	*2021-01*	*A small beaver dam (0.8 m high) was observed in the ditch that runs parallel to the toe of the east leg of the TSF Embankment.*	*OMS Manual*	*Remove beaver dam from the toe of the east leg of the TSF Embankment to discourage beaver activity in the area.*	*4*	*CLOSED – The beaver dam was removed in October 2022.*
2023 Recommendations						
No new recommendations						

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

List of Tables

List of Figures

List of Appendices

CLARIFICATIONS REGARDING THIS REPORT

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Teck Metals Ltd. (Client) for the specific application to the Pinchi Lake Mine project, and it may not be relied upon by any other party without KCB's written consent.

KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

1. The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.
2. The Executive Summary is a selection of key elements of the report. It does not include details needed for the proper application of the findings and recommendations in the report.
3. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
4. The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
5. KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.

1 INTRODUCTION

1.1 Purpose, Scope of Work and Methodology

This report presents the 2023 Annual Facility Performance Review (AFPR) for Teck Metals Ltd.'s (Teck) Pinchi Lake Mine Tailings Storage Facility (TSF). This report was prepared by Klohn Crippen Berger Ltd. (KCB) to fulfill the requirements of a Dam Safety Inspection (DSI) in the Health, Safety and Reclamation Code for Mines in British Columbia (HSRC) (MEM 2016, EMLI 2022). It is also an essential document per the Global Industry Standard on Tailings Management (GISTM) which was released in August 2020. The following activities were undertaken by KCB:

- Site inspection by Daniel Klassen, P.Eng. (the Engineer of Record) and Sareena Mohammad, EIT on June 21, 2023, accompanied by Chris Jeffrey, P.Eng., of Teck. The Site Surveillance Officer, Mark Pokorski of EcoFor, also accompanied the inspection team.
- Review and update of the list of outstanding recommendations from the previous annual performance reports.
- Review instrumentation and confirm that readings are within acceptable limits.

The inspection was conducted, and this report prepared, in accordance with the Teck Guideline for Tailings and Water Retaining Structures (Teck 2019).

The AFPR is issued before the end of the calendar year, so the period considered for climate data and instrumentation is from September 2022 to August 2023.

1.2 Regulatory Requirements

This inspection report addresses the performance of the TSF and associated water management infrastructure in accordance with the HSRC and the Permit Amendment Approving Closure Plan (Permit No. M-5) dated July 12, 2010.

1.3 Roles and Responsibilities

The HSRC describes and defines responsibilities for several key roles for a TSF (MEM 2016). For the TSF the following personnel fill these roles:

- Mine Manager: Mr. Jason McBain, P.Eng., of Teck;
- Responsible Tailings Facility Engineer (RTFE) (equivalent to the TSF Qualified Person role defined in the HSRC): Mr. Chris Jeffrey, P.Eng., of Teck; and
- Engineer of Record (EOR): Mr. Daniel Klassen, P.Eng., as a representative of KCB.

1.4 Facility Description

The Pinchi Lake Mine is in central British Columbia on the northern shore of Pinchi Lake approximately 25 km northwest of Fort St. James and 75 km northwest of Vanderhoof. Pinchi Lake is

long (23 km) and narrow (ranging from approximately 1000 m to 3250 m wide) and lies at an elevation of approximately 720 metres above sea level (masl). At the mine site, Pinchi Lake is only 1250 m wide. The terrain near the mine site is heavily wooded with rolling hills and generally less than 300 m of relief, although some hills rise to over 1000 masl.

The mercury mine was originally commissioned in the 1940s and operated from 1940 to 1944 during the Second World War. The mine was closed until 1968, when it re-opened and operated from 1968 to 1975. The property was placed on care and maintenance in 1975. Teck substantially completed the mine reclamation and closure works from 2010 to 2012. Closure activities at the TSF were completed from 2010 to 2011.

A mine site plan and the general arrangement of the TSF are presented in Figures 1.1 and 1.2, respectively. Cross-sections of the TSF Embankment, based on 2012 topography, are shown in Figure 1.3.

The TSF was constructed in 1967 and utilized between 1967 and 1975. The TSF is a side-hill impoundment covering approximately 24 ha and contained on three sides by an embankment. Approximately one million cubic metres of tailings are stored in the TSF. The TSF Embankment is approximately 1300 m long, and 3 m to 15 m high. The original embankment was designed and constructed in the late 1960s and was raised in 1975 as shown in the historical drawing presented in Appendix IV. The embankment was originally a homogeneous embankment constructed with local glacial till and upstream slopes of 2.0H:1V near the crest and 2.5H:1V elsewhere, and downstream slopes of 2.0H:1V near the crest and 3.0H:1V elsewhere. When the embankment was raised in 1975, a zone of rockfill was placed on the downstream slope with a transition zone between the glacial till and the rockfill.

Ed Creek originally flowed through the impoundment area as shown in the drawing in Appendix IV (labelled as “Main Creek” and “Ed Main Creek” in the drawing). The creek was diverted to Pinchi Lake via the Ed Creek Diversion Channel, which was constructed on the east side of the TSF (see Figure 1.2).

Water management for the TSF, prior to the implementation of the reclamation/closure works in 2010, comprised a low level decant system supplemented by an open channel Emergency Spillway. The decant box and spillway were located near the west abutment of the TSF Embankment as shown in the drawing in Appendix IV. The decant box and the Emergency Spillway are labelled in the drawing as “new water collection box” and “overflow ditch”, respectively. The decant system and the Emergency Spillway were decommissioned and a Closure Spillway was constructed as part of the closure works completed by Teck in 2010 and 2011.

A facility data sheet that summarizes key information for the TSF is presented in Appendix I.

1.5 Background Information and History

1.5.1 General

The design and construction history, from start-up to closure, is summarized below.

1.5.2 Pre-2010 Construction

The design/construction chronology was as follows:

- 1967 engineering of the facility (Stage 1) by Ripley, Klohn and Leonoff;
- 1967 construction with inspection by Kootenay Engineering and Tara Engineering Laboratories conducting fill placement quality control;
- 1971 inspection letter from Cominco Civil Designer noting settlement (approximately 2 ft) and resulting loss of freeboard - remedial measures were suggested;
- 1974 engineering report by Golder Associates for a 10 ft embankment raise (Stage 2);
- 1975 letter by Golder Associates approving design drawings for a reduced embankment raise of 5 ft;
- 1975 construction of the 5 ft raise;
- 2000 stabilization and rehabilitation of the Ed Creek Diversion Channel;
- 2001 rehabilitation of the Ed Creek Diversion Channel as the riprap and fish habitat were eroded by a large flood wave that resulted from a series of beaver dam failures; and
- 2001 Emergency Spillway excavation to increase flow capacity.

1.5.3 2010 and 2011 Reclamation/Closure Works for the TSF

The following reclamation/closure works for the TSF were completed by Teck in 2010 and 2011:

- drained the water from the Tailings Impoundment;
- abandoned the Emergency Spillway;
- abandoned the decant system and backfilled the concrete decant inlet box with soil;
- placed and seeded glacial till soil cover over the tailings in the TSF;
- trimmed the crest of the west leg of the TSF Embankment for use as cover material for the tailings; and
- constructed the TSF Closure Spillway.

In addition to trimming the TSF embankment crest for the 2010/2011 closure works, Teck developed three borrow areas adjacent to the TSF as a source of cover material for the tailings (see Figure 1.2): Borrow Area A is located downstream of the south leg of the TSF Embankment; and Borrow Areas B and C are located upstream of the TSF.

The Closure Spillway is located in the area of the former supernatant pond. The spillway invert is set such that water would not be stored in the Tailings Impoundment under normal conditions. Draining the water from the impoundment and constructing the spillway has converted the TSF into a “dry” facility.

2 SITE ACTIVITIES – FALL 2022 TO SUMMER 2023

The TSF is a closed facility and does not require operational intervention. Scheduled and event driven inspections and maintenance work are carried out on an as-required basis. Requirements for routine inspection and monitoring, and trigger levels for inspection following an extreme event are presented in the Operation, Maintenance and Surveillance (OMS) Manual (Teck 2021).

The Site Surveillance Officer, Mr. Mark Pokorski of Ecofor, carries out inspections of the facility twice per year: one in the spring after freshet, and one in the fall. The 2022 fall inspection was carried out on October 31, 2022, and the 2023 spring inspection was carried out on May 26, 2023. These inspections did not identify any TSF safety issues.

An annual inspection of the TSF is conducted by the Engineer of Record; this inspection occurred on June 21, 2023.

In October 2022, vegetation was cleared from the following areas: the downstream face of the TSF embankment, the Middle Reach and Lower Reach of the Outlet Channel, and the Ed Creek culverts crossing Pinchi Lake Road.

Routine water quality sampling was performed on the discharge from the TSF.

Apart from these routine monitoring and maintenance activities, there were no other site activities over the last year.

3 CLIMATE DATA AND WATER BALANCE DURING 2023

3.1 Climate Data

There is no climate station at the mine site; however, temperature and precipitation data for Fort St. James (Environment Canada climate station no. 1092975, located approximately 25 km southeast of the mine) were reviewed. Table 3.1 compares the recorded monthly temperatures and precipitation from September 1, 2022 to August 31, 2023 with the station's temperature and precipitation normals for 1991 to 2020 (KCB 2022d). The records of temperature and total precipitation (i.e., rainfall + snowfall) from this station are nearly complete (with one day of missing data from August 4, 2023), but separate measurements of rain and snow are not available at this or any other nearby stations with recent data. The records show that while temperatures during the reporting period were generally similar to average conditions, precipitation was consistently lower than the 1991-2020 normals (except in the month of February).

Table 3.1 Fort St. James (No. 1092975) Temperatures and Precipitation – September 2022 to August 2023 vs. Normal Values

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Year
1991-2020 Normals													
Temperature													
Daily Average (°C)	10.4	4.3	-2.3	-7.4	-9.1	-7.0	-2.0	3.9	9.6	13.5	15.6	15.0	3.7
Daily Maximum (°C)	16.5	8.9	1.2	-3.6	-4.9	-1.9	3.8	9.8	16.1	19.4	21.8	21.6	9.1
Daily Minimum (°C)	4.3	-0.4	-5.7	-11.1	-13.3	-12.1	-7.8	-2.1	3.1	7.5	9.3	8.3	-1.6
Precipitation													
Rainfall (mm)	41.0	45.1	21.5	7.7	3.0	4.5	10.0	19.7	36.0	50.0	51.6	47.4	337.5
Snowfall (cm)	0.0	7.6	26.7	36.5	43.1	26.0	15.3	3.1	0.2	0.0	0.0	0.0	158.5
Precipitation (mm)	41.0	52.8	48.2	44.2	46.1	30.4	25.3	22.9	36.2	50.0	51.6	47.4	496.1
September 2022 – August 2023													
Temperature													
Daily Average (°C)	12.8	8.3	-6.3	-13.7	-3.6	-5.5	-4.6	4.0	13.4	15.5	17.2	17.4	4.6
Daily Maximum (°C)	19.6	13.9	-3.1	-9.5	0.5	-0.8	2.3	9.6	20.5	22.7	23.9	24.2	10.3
Daily Minimum (°C)	6.1	2.8	-9.6	-18.0	-7.6	-10.2	-11.6	-1.7	6.2	8.4	10.5	10.6	-1.2
Precipitation													
Rainfall (mm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Snowfall (cm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Precipitation (mm)	3.2	5.1	17.2	25.5	29.3	36.4	9.2	18.9	11.1	8.0	30.3	14.3	208.5
No. of days of missing data	0	0	0	0	0	0	0	0	0	0	0	1	0

3.2 Water Balance

The HSRC (MEM 2016, EMLI 2022) calls for a water balance review in the annual inspection report. Since the TSF is a dry facility, there is no storage of water in the Tailings Impoundment and stormwater inflows are passively released from the impoundment via the Closure Spillway. Based on observations, there has been no indication of water ponding behind the spillway, except in small local low areas of the tailings cover. Because inflow to the impoundment is limited to direct precipitation and stormwater runoff from small catchments upslope of the TSF, an annual water balance review is deemed to be unnecessary. However, a water balance was prepared in 2022 (KCB 2023b) based on average precipitation and temperature from 1993 to 2022 at Fort St. James (Environment Canada climate stations no. 1092970 and no. 1092975). Any gaps in data were filled in with data from other nearby Environment Canada climate stations. The average discharge through the spillway was estimated to be 0.7 L/s.

3.3 Water Quality

The surface water quality discharging from the TSF is monitored annually under effluent permit PE-224. The groundwater quality at Pinchi Lake Mine is monitored under the Contaminated Sites Regulation (B.C. Reg. 375/96). Both surface and groundwater quality are reported by Teck to B.C. Ministry of Environment and B.C. Ministry of Energy, Mines & Petroleum Resources.

4 SITE OBSERVATIONS – JUNE 2023

4.1 Visual Inspection

The following areas were inspected during the June 21, 2023 site visit:

- Tailings Storage Facility:
  - Tailings Impoundment (drained and covered with soil);
  - TSF Embankment; and
  - Closure Spillway.
- Borrow Area A Slope;
- Ed Creek:
  - Ed Creek Diversion Channel; and
  - Ed Creek culverts under Pinchi Lake Road.

Weather during the site visit was sunny and about 22°C. Very little rain was recorded in Fort St. James on the day of the site visit (0.4 mm; mostly in the late afternoon) and a total of 6.6 mm in the previous six days.

Site observations and recommendations are presented in the following sub-sections and observation locations are identified in Figure 4.1. Selected photographs taken during the inspection are presented in Appendix II, and inspection forms are presented in Appendix III.

4.1.1 Tailings Storage Facility

Tailings Impoundment

- The Tailings Impoundment was observed from the embankment crest, and by walking 150 m north from the southwest leg across the soil cover.
- There was no standing water in the Tailings Impoundment at the time of inspection. No water was observed at the entrance to the Closure Spillway (see Photos II-19 and II-20 in Appendix II). There is a drainage channel on the cover that directs flow from east to west towards the Closure Spillway. No standing water was observed in the channel.
- The soil cover on the tailings is covered in grass (Photos II-1 to II-3, II-8, and II-10). No signs of erosion, large ponds, or deformation of the cover were observed. There are local low areas in the cover with no signs of erosion or exposed tailings (Photo II-2); these have likely been present since construction.

TSF Embankment

- The embankment crest, and upstream and downstream slopes of the TSF Embankment appeared to be in good condition (Photos II-4 to II-17).

- No cracks were observed on the embankment crest at the time of the inspection.
- The embankment slopes were covered with grasses and small shrubs. Vegetation along the downstream face of the embankment was cleared in October 2022.
- A pond was observed in the trees near the toe of the east leg of the TSF Embankment (see Figure 1.2 for location; Photo II-5) as in previous inspections. This pond is located near a drainage channel that was shown on historical drawings of the TSF (see Appendix IV) and labelled “runoff channel.” The channel ran parallel to the main Ed Creek channel, and was historically reported to join up with Ed Creek just inside the TSF. The pond appears to collect local runoff, and it now drains through a channel to the south and through a culvert into Ed Creek Diversion Channel. The pond level was slightly higher than was observed during inspections prior to 2021 due to the beaver dam noted below.
- A beaver dam was previously observed during the 2022 AFPR inspection in the channel south of the pond described above (see Location 5 in Figure 4.1). During the Fall 2022 routine inspection in October, Ecofor noted that the dam was removed (Ecofor 2022). During the Spring 2023 routine inspection, Ecofor observed that a new beaver dam (<1 m high) was re-established in approximately the same location (EcoFor 2023; see Location 5 in Figure 4.1; Photo II-44). The beaver dam is not a TSF safety issue and can remain in place.
- Apart from the pond noted above, the ground at the downstream toe of the embankment was dry and no ponded water or seepage were observed.

Closure Spillway

- There was no flow or standing water in the Closure Spillway channel. There was a 30 cm deep pond at the downstream end of the riprap (Photo II-24); this is typical for the Closure Spillway channel.
- The riprap along the entire Closure Spillway channel appeared to be in good condition (Photos II-18 to II-22). The spillway has likely not experienced any high flood discharges since it was constructed. Vegetation growth in the channel was minimal, with only a few small shrubs (Photo II-22).
- The Outlet Channel was observed at the culvert crossing on the road adjacent to the Emergency Spills Lagoon (Photos II-25 to II-27). Flow stations (each including a staff gauge and an ABS riser pipe with level logger inside) have been installed near the culvert inlet and outlet. The culvert inlet was wet but there was no flow into the culvert. There is local ponding (4 cm deep) but no flow at the culvert outlet. Vegetation was cleared from the Middle Reach and Lower Reach of the Outlet Channel in October 2022, and there was minor vegetation at the time of the inspection.

4.1.2 Borrow Area A Slope

- Borrow Area A is located near the south leg of the TSF Embankment. The slope, which is about 10 m downstream of the embankment toe, appeared to be in good condition (Photos II-28 to II-31).

- Cracks were observed on the slope from 2013 to 2017 (Location 1 in Figure 4.1) and in 2020 (Location 2 in Figure 4.1). Measurements of crack movements were taken from 2015 to 2018 using metal rods installed on either side of the cracks (Photo II-29), but these measurements showed no ongoing movements and were discontinued in 2019. The cracks are no longer visible due to vegetation growth and are not a TSF safety concern. Nevertheless, this area will continue to be monitored during routine inspections as per the OMS Manual.
- The toe of the borrow area slope was generally dry, with one area of wet ground observed in the northeast corner (Location 3 in Figure 4.1; Photo II-30); similar wet areas have been observed since 2011 and are believed to be associated with groundwater unrelated to the TSF.

4.1.3 Ed Creek

Ed Creek Diversion Channel

- Vegetation in Ed Creek Diversion Channel has grown to over 1.5 m height in some areas (Photo II-34). This is not currently a TSF safety concern. However, the vegetation management plan recommends vegetation clearing prior to the vegetation exceeding 1.5 m height (Spectrum 2017).
- Previous AFPR reports have noted that the riprap along some areas of the Ed Creek Diversion Channel is weathering and breaking up (Photo II-37). The condition of the riprap appeared similar to previous inspections. Degradation of the riprap is discussed further in Section 5.4.
- The riprap along a small section of the channel (Location 4 in Figure 4.1; Photo II-36), where a depression had formed in the riprap surface, was replaced in 2014. This riprap appeared to be in good condition.
- There was no flow through the 460 mm diameter HDPE culvert on the north bank of the Ed Creek Diversion Channel (see Figure 1.2 for culvert location, and Photos II-41 and II-42).

Ed Creek Culverts Under Pinchi Lake Road

- There are two culverts on Ed Creek under Pinchi Lake Road approximately 300 m east of the mine gate (see Figure 1.2 for location and refer to Photos II-45 and II-46). Flow was observed in the east (left) culvert, with a water depth of 3 cm at the inlet.
- Vegetation was cleared around the culverts in October 2022.
- During the May 2023 inspection, Ecofor observed the west (right) culvert to have corroded holes at the bottom of the culvert allowing water to drain through to the bottom before reaching the outlet (Ecofor 2023). This is not an immediate concern, but options to upgrade the culverts are being considered as part of plans to address the degradation of Ed Creek Diversion Channel riprap. In the meantime, the culverts should continue to be inspected.

4.2 Instrumentation Review

4.2.1 Piezometers

There are six vibrating wire piezometers at three locations around the embankment (four piezometers at the toe, two at the crest) as shown in Figure 1.2; these piezometers are read twice per year at minimum. Quantifiable Performance Objectives (QPOs) for the piezometers are defined as threshold piezometric elevations, and these are given in Appendix V. Based on the TSF performance to date, the piezometers and reading frequency are considered sufficient for ongoing monitoring of the facility under current conditions (KCB 2022a).

Piezometer readings taken between fall 2022 and summer 2023 are included in Table 4.1, and threshold values are shown for comparison. The readings are all below the threshold values. The readings show that the phreatic surface is 1 m to 3 m below ground at the toe of the embankment, and 9 m below the crest at the highest embankment section. Piezometer readings are shown as elevations versus time in Figure 4.2. The readings in the piezometers at the embankment toe (DH16-01-VWP1,2 and DH16-03-VWP1,2) show seasonal fluctuations up to 2 m, with higher readings in the spring and lower readings in the fall. The piezometers installed below the embankment crest (DH16-02-VWP1,2) have shown less variation in the readings after an initial period of stabilization following installation.

Prior to the 2010/2011 mine reclamation and closure works for the TSF, a piezometer located 10 m from DH16-02-VWP1,2 showed typical readings of around El. 733.5 m, which is 0.7 m higher than the June 21, 2023 reading. This suggests the piezometric levels in the embankment have gone down compared to the condition before the pond was drained.

Table 4.1 Fall 2022 and Spring 2023 Piezometer Readings

Piezometer ID	Piezometric Elevation (m)				Depth Below Ground (m)		
	Threshold Value	October 31, 2022	May 26, 2023	June 21, 2023	October 31, 2022	May 26, 2023	June 21, 2023
DH16-01-VWP1	736.1	733.2	735.0	734.6	2.9	1.1	1.5
DH16-01-VWP2	736.1	733.4	734.1	734.0	2.7	2.0	2.1
DH16-02-VWP1	738.5	732.5	732.5	732.5	9.5	9.5	9.5
DH16-02-VWP2	738.5	732.7	732.8	732.8	9.3	9.2	9.2
DH16-03-VWP1	737.0	734.3	735.2	735.0	3.6	2.7	2.9
DH16-03-VWP2	737.0	734.2	735.1	734.9	3.7	2.8	3.0

4.2.2 Flow and Water Level Measurements

Since there is no pond, there is no flow measurement or water level instrumentation at the TSF. Prior to decommissioning, flow from the decant system was measured. Since 2011, water is released through the Closure Spillway but, given that the spillway channel is lined with large riprap, most of the low flows pass through the riprap, making it difficult to measure flow.

4.2.3 Survey Monuments

Survey monuments were installed on the TSF Embankment crest in 1998; however, some monuments have been destroyed over the years. New survey monuments were installed in June 2014. The locations of the 2014 monuments and the surviving 1998 monuments are shown in Figure 1.2. QPOs for the survey monuments are provided in Appendix V.

Readings were last taken in December 2016, and the readings met the QPOs and did not show ongoing movements (KCB 2017). The next readings are planned for 2026.

KCB understands that Teck is currently in the process of replacing the survey monuments with InSAR and will be developing new thresholds. Survey monument thresholds will continue to be used until the transition to InSAR is complete.

5 TSF SAFETY ASSESSMENT

5.1 Dam Safety Review

A Dam Safety Review (DSR) of the TSF and associated water infrastructure was performed by SRK in 2018 (SRK 2020). There was appropriate engagement and input from the Engineer of Record.

The HSRC (MEM 2016, EMLI 2022) requires that all tailings storage facilities undergo a DSR every five years at minimum. The 2023 DSR is in progress.

5.2 Failure Modes Review

Teck, with support from KCB, conducted a credible catastrophic failure mode assessment in April 2022. The assessment considered the three key failure modes for tailings facilities identified in the ICMM Good Practice Guide (ICMM 2021): overtopping, internal erosion and piping, and slope instability. Teck's definition of a "catastrophic" failure is one with a risk to life safety or irreversible impact to a rare or valued ecosystem, social, or cultural heritage element. The conclusion from the assessment was that there are no credible "catastrophic" failure scenarios for the TSF based on the available information and current understanding of the site.

A summary of the current conditions is provided below to describe the safeguards that are in place and the justification that these failure modes are well-managed for the TSF.

Overtopping:

- There is no permanent pond in the TSF, and the Closure Spillway is designed to convey flood flows passively without developing a large pond in the TSF. A hydrotechnical review of the Closure Spillway found that the freeboard in the TSF during the 1/3 between 1000-year and PMF event is over 4 m (KCB 2023a). The spillway and freeboard are effective controls to manage overtopping risks.

Internal Erosion and Piping:

- The embankment includes three fill zones: local silt-clay and glacial till borrow material, a rockfill zone on the downstream slope, and a transition material between the silt-clay/glacial till and the rockfill. The filter adequacy was reviewed previously, and it was found that the as-built information is insufficient to assess the filter compatibility of these materials (KCB 2015b). However, the majority of the embankment is composed of clayey material with plasticity index greater than seven, which is not susceptible to internal erosion (Fell et al. 2008), and the clayey zone is wide enough that it would not sustain a crack where piping could develop. In addition, there is no water stored in the TSF to generate a gradient or flow to propagate internal erosion to the point of failure if initiated. Based on these considerations, a piping failure of the TSF is considered not credible.

Slope Instability:

- A stability assessment concluded that the TSF meets industry standard factor of safety criteria (KCB 2022b), consistent with the good performance of the facility since closure in 1975. The condition of the embankment is generally more favourable for stability now than it was during operations due to the draining of the pond and trimming of the embankment crest in some areas. Survey monuments on the embankment crest have not shown ongoing movements (Section 4.2.3).
- The geological and geotechnical characterization of the TSF is summarized in the stability assessment (KCB 2022b). The key foundation unit is a lacustrine clay which was characterized based on drilling and laboratory testing, and appropriately conservative assumptions about the extent, thickness, and strength parameters were made for modelling this unit to account for uncertainty. The site characterization is believed to be sufficiently detailed for this facility. The stability assessment described above examined slip surfaces through the lacustrine clay and found that stability criteria were met.
- The TSF is located in a region of low seismic activity, and the estimated seismic ground motions are small, with a peak ground acceleration (PGA) of 0.09 g for the 10,000-year return period for Site Class B/C[1] (KCB 2020) and 0.14 g for Site Class D (KCB 2022b). Simplified deformation analyses were performed as part of the stability assessment (KCB 2022b) and the predicted deformations for the 10,000-year ground motions range from less than 0.1 m to 0.3 m, which indicates that the embankment and the TSF are expected to perform well under seismic loading. The strengths adopted in this assessment were reduced to account for potential liquefaction of the tailings and for cyclic softening of the foundation clay.
- There are no significant erosion features on the crest or slopes of the embankment. Surface runoff from the impoundment drains towards the closure spillway and will not erode the embankment surface. The embankment surface is vegetated and well protected against surface erosion. The downstream slope of the embankment includes coarse rockfill, so any erosion channels that form would be self-armouring and unlikely to rapidly erode through the embankment.
- The potential for toe erosion to affect embankment stability has been considered, and there are controls in place to address this. Ed Creek Diversion Channel was designed to convey the 1000-year flood event without erosion damage, but gradual weathering and breakage of the riprap has reduced its capacity. A 100 m section of the channel is approximately 10 m from the TSF Embankment, and damage to the riprap during an extreme flood event could initiate gradual erosion of the channel towards the embankment. This is addressed through surveillance and maintenance, and erosion would not be allowed to progress to the point where it could undermine the toe of the embankment. Options for remediating the channel are also being investigated, including replacing the riprap and possibly realigning the channel away from the TSF.

[1] Site classes are as defined in Table 4.1.8.4-B of the National Building Code of Canada 2020.

5.3 Consequence Classification

The CDA Dam Safety Guidelines provide a dam classification scheme based on the potential consequences of a hypothetical failure that can be used to provide guidance on the standard of care expected of dam owners and designers. Consequence of a hypothetical failure is not related to the likelihood of a failure, but rather the potential impact resulting from a failure if it did occur.

Teck provided the following statement regarding the consequence classification of the facility:

> *Teck is committed to the safe and environmentally responsible management of tailings facilities throughout the mining life cycle to minimize harm to the environment and protect the health and safety of our people and surrounding Communities of Interest. This commitment includes the implementation of the Global Industry Standard on Tailings Management (GISTM) and industry-leading guidelines established by the International Council on Mining and Metals (ICMM), the Mining Association of Canada (MAC) and Canadian Dam Association (CDA).*
>
> *For the purpose of assigning a dam classification, the consequences of potential failure modes are assessed as per the Canadian Dam Association (CDA) guidelines and the requirements of the jurisdictions in which we operate. The Global Industry Standard on Tailings Management (GISTM) bases consequence classification on credible failure modes only, which may result in a lower stated classification.*
>
> *As part of Teck's commitment to the safety of tailings facilities, Teck has adopted using extreme loading criteria for any new facilities with a credible catastrophic flow failure mode, regardless of consequence classification. Risk assessments are performed for all tailings facilities, with the objective of reducing risks to As Low As Reasonably Practicable (ALARP). In some cases, this results in further risk reduction beyond applicable regulatory requirements and is consistent with the GISTM and industry-leading best practice.*

The consequence classification of the TSF was reviewed in 2012 after the completion of the reclamation/closure works and based on the CDA (2007) scheme the TSF was noted to have a **Significant** consequence classification (KCB 2012). The Significant consequence classification was deemed appropriate in the 2018 Dam Safety Review (DSR) (SRK 2020). There have been no material changes to the TSF or the upstream and downstream conditions since the previous review; therefore, there is no change in the TSF's consequence classification.

Evaluations of the TSF under extreme loading have been completed and they concluded that the facility can withstand extreme earthquake and flood events without release of tailings, though the spillway may require repairs after passing an extreme flood (KCB 2023a).

5.4 Physical Performance

5.4.1 Geotechnical Performance

The embankment has performed adequately for over 40 years, and there is no record of slumping or instability since operations ceased in 1975. The reclamation and closure works completed for the TSF in 2010 and 2011 included changes that improved the stability of the embankment, including:

- draining the pond, resulting in a decrease in phreatic levels within the embankment (as discussed in Section 4.2.1); and
- trimming the crest of the west leg of the TSF Embankment, resulting in a reduction in driving forces for potential failure surfaces in that area.

The stability assessment of the TSF was updated in 2022 (KCB 2022b). The assessment included geological and geotechnical site characterization based on available drilling and laboratory testing data for the dam fills and the foundation soils. The 10,000-year earthquake ground motions were considered for Passive Care Closure, in accordance with the GISTM. The results of the assessment show that the TSF meets industry standard factor of safety criteria for static and seismic loading, and the estimated seismic deformation from the 10,000-year earthquake ground motions is 0.3 m or less (which the embankment can accommodate) (KCB 2022b).

5.4.2 Hydrotechnical Performance

Closure Spillway

The Closure Spillway is a free-flowing riprap-lined open channel, which passively releases water from the TSF. There is no storage of water in the TSF. The spillway is lined with large riprap and non-flood flows pass through the riprap with very little, if any, flow over the riprap surface. To the best of our knowledge, the Closure Spillway has not been subjected to any large flood flows since it was constructed in 2010.

The Closure Spillway was designed to route the 24-hour 1000-year rainfall plus 100-year snowmelt event (KCB 2009), which was adequate to meet the CDA (2007) criteria. In 2022, KCB reassessed the capacity of the spillway against the GISTM Passive Care Closure criteria (10,000-year design event). However, CDA (2013) recommends against extrapolating flood statistics for return periods longer than 1,000 years, as the results can be unreliable. Therefore, a design flood event of 1/3 between the 1000-year event and the Probable Maximum Flood (PMF) was used in the assessment, which exceeds the estimated 10,000-year event.

The assessment concluded that the spillway can convey higher design flows without overtopping, but the spillway channel riprap downstream of the embankment toe would likely be damaged in the process (KCB 2023a). An assessment of the potential erosion during this design flood event concluded that erosion initiated at the embankment toe would be “improbable, even under exceptional circumstances” to retrogress upstream of the dam centreline, and thus would not result in a release of tailings (KCB 2023a).

Ed Creek Diversion Channel

Ed Creek Diversion Channel was designed to convey the 1000-year flood event without erosion damage. The right bank of the channel near the TSF Embankment was also designed to contain the PMF with some erosion damage. Observations of the riprap since the construction in 2000 have shown that the riprap is gradually weathering and breaking down. Test pits in 2014 confirmed that the in-place riprap is undersized compared to the original design (KCB 2015a). Observations show that the degradation of the riprap is happening slowly, and the channel could still convey large flood flows, though not to the level of the original design. As a result, there is the potential for an extreme flood event to initiate erosion of the channel. A 100 m section of the channel is located approximately 10 m from the TSF Embankment, and erosion in this area, if left unchecked, could eventually erode the glacial till soils in the right bank and undermine the embankment toe (KCB 2022c). The channel is inspected twice per year and after large precipitation events as per the OMS Manual, so this risk is appropriately managed through surveillance and maintenance. However, a long-term solution is for Teck to re-establish erosion protection, as was first recommended in 2014. A site investigation is planned for Q3 2023 to explore the possibility of realigning the diversion channel away from the TSF in the future.

Vegetation Control

Vegetation should be cleared periodically from the water conveyance structures including the Closure Spillway, Ed Creek Diversion Channel, and ditches or they will not operate to design capacity. This is covered under the vegetation management plan (Spectrum 2017).

5.5 Operational Performance

The TSF has been closed for nearly 50 years and, as indicated in Section 2, there are no operational requirements.

5.6 OMS Manual and EPRP Review

The OMS Manual for the TSF were revised in 2021 (Teck 2021). Teck has indicated that an updated version is in progress, with plan to publish by end of 2023. The EPRP for the TSF is incorporated into the site-wide Mine Emergency Response Plan (MERP), which was revised in 2023 (Teck 2023). These documents are reviewed annually and updated as needed.

6 CONCLUSIONS AND RECOMMENDATIONS

No new issues related to TSF safety were identified during the 2023 AFPR, so there are no new recommendations. Ongoing deficiencies and recommendations from previous years are summarized in Table 6.1. The priorities assigned to each item in Table 6.1 are based on priority ratings developed by Teck (and consistent with HSRC) as follows:

Priority 1 A high probability or actual TSF 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 TSF 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 TSF safety issues.

Priority 4 Best Management Practice as a suggestion for continuous improvement towards industry best practices that could further reduce potential risks.

Inspections were carried out in October 2022 and May 2023 by the Site Surveillance Officer, and in June 2023 by the Engineer of Record.

There were no threshold exceedances in the piezometers in 2022.

The riprap along the Ed Creek Diversion Channel is undersized and is gradually weathering and breaking down. This has reduced the capacity of the channel to convey large flood flows without erosion damage compared to the original design. Part of the channel is located approximately 10 m from the TSF Embankment, and erosion in this area, if left unchecked, could eventually erode the glacial till soils in the right bank and undermine the embankment toe. The channel is inspected twice per year and after large precipitation events as per the OMS Manual, so this risk is appropriately managed through surveillance and maintenance. Notwithstanding the deteriorating riprap in the Ed Creek Diversion Channel, which has both an interim surveillance program and longer-term remedial plan, the TSF appears to be in good condition and there are no major concerns related to TSF safety.

Climate data from the nearest climate station from September 1, 2022 to August 31, 2023 showed that temperature was generally similar to average conditions but precipitation was below average (based on 1991 to 2020 climate normals). Since the water balance is based on annual average climate data, there is no water storage in the TSF, and inflows are limited to direct precipitation and stormwater runoff from upslope, updating the water balance on an annual basis is deemed to be unnecessary.

The OMS Manual was updated by Teck in 2021 (Teck 2021). An updated version is in progress, with plan to publish by end of 2023. The EPRP is incorporated into the site-wide Mine Emergency Response Plan (MERP), which was revised in 2023 (Teck 2023).

Table 6.1 Summary of Deficiencies and Recommendations

Structure	ID No.	Deficiency or Non-Conformance	Applicable Regulation or OMS Reference	Recommended Action	Priority	Recommended Deadline/Status
Previous Recommendations Ongoing						
Ed Creek Diversion Channel	2020-02	The riprap along the Ed Creek Diversion Channel is undersized and is deteriorating due to weathering.	OMS Manual	Select one or two preferred options for upgrading/replacing the existing Ed Creek Diversion Channel that will be advanced to a feasibility level design.	3	In progress – Site investigation planned for Q3 2023 to explore realignment options.
TSF	*2021-01*	*A small beaver dam (0.8 m high) was observed in the ditch that runs parallel to the toe of the east leg of the TSF Embankment.*	*OMS Manual*	*Remove beaver dam from the toe of the east leg of the TSF Embankment to discourage beaver activity in the area.*	*4*	*CLOSED – The beaver dam was removed in October 2022.*
2023 Recommendations						
No new recommendations						

7 CLOSING

We 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.
B.C. Permit to Practice No. 1000171

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. R. KLASSEN
39699

Daniel Klassen, P.Eng.
Geotechnical Engineer

Sep. 7, 2023

REFERENCES

Canadian Dam Association (CDA). 2007. “Dam Safety Guidelines 2007.”

Canadian Dam Association (CDA). 2013. “Dam Safety Guidelines 2007 (Revised 2013).”

Ecofor Consulting Ltd. (Ecofor). 2022. Pinchi Mine Fall 2022 TSF Inspection. October 31.

Ecofor Consulting Ltd. (Ecofor). 2023. Pinchi Mine Spring 2023 TSF Inspection. May 26.

Fell, R., M. Foster, R. Davidson, J. Cyganiewicz, G. Sills and N. Vroman. 2008. “A Unified Method for Estimating Probabilities of Failure of Embankment Dams by Internal Erosion and Piping.” UNICIV Report R-46, The School of Civil and Environmental Engineering, University of New South Wales, Sydney, Australia. July.

International Council on Mining & Metals (ICMM). 2021. “Tailings Management – Good Practice Guide.” May.

Klohn Crippen Berger Ltd. (KCB). 2009. Pinchi Lake Mine Tailings Facility - Closure Spillway Design. July 3.

Klohn Crippen Berger Ltd. (KCB). 2012. Pinchi Lake Mine – Post-Reclamation Monitoring Requirements. April 20.

Klohn Crippen Berger Ltd. (KCB). 2015a. Pinchi Lake Mine Tailings Storage Facility – 2014 Site Investigation and Maintenance. February 24.

Klohn Crippen Berger Ltd. (KCB). 2015b. Pinchi Lake Mine Tailings Storage Facility – Response to MEM Memorandum dated February 3, 2015. June 30.

Klohn Crippen Berger (KCB). 2017. Pinchi Lake Mine Tailings Storage Facility – 2016 Dam Safety Inspection. February 9.

Klohn Crippen Berger Ltd. (KCB). 2020. Pinchi Lake Mine Tailings Storage Facility – 2019 Seismic Hazard Assessment. September 21.

Klohn Crippen Berger Ltd. (KCB). 2022a. Pinchi Lake Mine Tailings Storage Facility – Review of Pinchi TSF Surveillance. January 12.

Klohn Crippen Berger Ltd. (KCB). 2022b. Pinchi Lake Mine Tailings Storage Facility – TSF Stability Assessment. August 26.

Klohn Crippen Berger Ltd. (KCB). 2022c. Ed Creek Diversion – Natural Channel Conceptual Design. September 27.

Klohn Crippen Berger Ltd. (KCB). 2022d. Pinchi Lake Mine – Site-Wide Hydrology Reference. August 26.

Klohn Crippen Berger Ltd. (KCB). 2023a. Pinchi Lake Mine – TSF Closure Spillway Assessment. April 26.

Klohn Crippen Berger Ltd. (KCB). 2023b. Pinchi Lake Mine Tailings Storage Facility – 2022 Water Balance. August 28.

Ministry of Energy and Mines (MEM). 2016. “Guidance Document – Health, Safety and Reclamation Code for Mines in British Columbia.” July 20.

Ministry of Energy, Mines and Low Carbon Innovation (EMLI). 2022. “Health, Safety and Reclamation Code for Mines in British Columbia.” November.

Spectrum Resource Group Inc. (Spectrum). 2017. Pinchi Lake Mine – Site Integrated Vegetation Management Plan. December 12.

SRK Consulting Inc. (SRK). 2020. Pinchi Lake Mine TSF: 2018 Dam Safety Review – Final. December.

Teck Resources Ltd. (Teck). 2019. Guideline for Tailings and Water Related Structures. January.

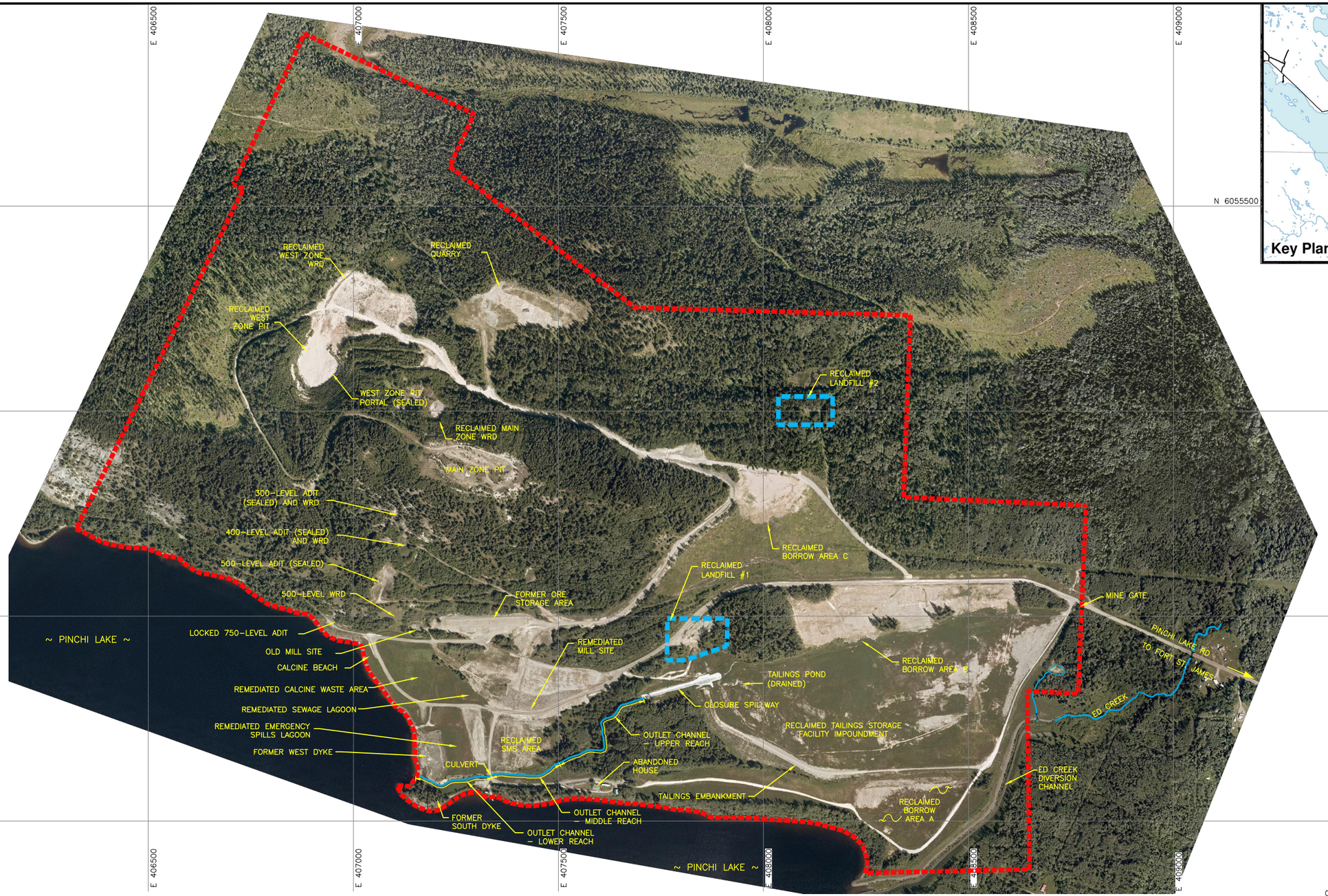
Teck Resources Ltd. (Teck). 2021. Pinchi Lake Mine Tailings Storage Facility Operation, Maintenance and Surveillance Manual. November 1.

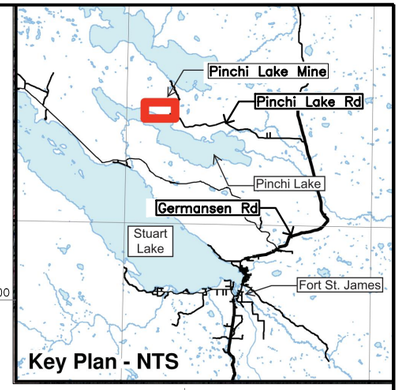
Teck Resources Ltd. (Teck). 2023. Pinchi Lake Mine Emergency Response Plan. March 22.

FIGURES

E 406000 E 406500 E 407000 E 407500 E 408000 E 408500 E 409000 E 409500

N 6055500 N 6055000 N 6054500 N 6054000





LEGEND

PROPERTY BOUNDARY

WRD WASTE ROCK DUMP

NOTES

1. ORTHOPHOTO IMAGE TAKEN IN 2013 (PROVIDED BY TECK).
2. COORDINATES ARE UTM ZONE 10, NAD83.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED SEPTEMBER 2023

SCALE 0 250 m

CLIENT Teck

Klohn Crippen Berger

PROJECT
PINCHI LAKE MINE TSF
2023 ANNUAL FACILITY PERFORMANCE REVIEW

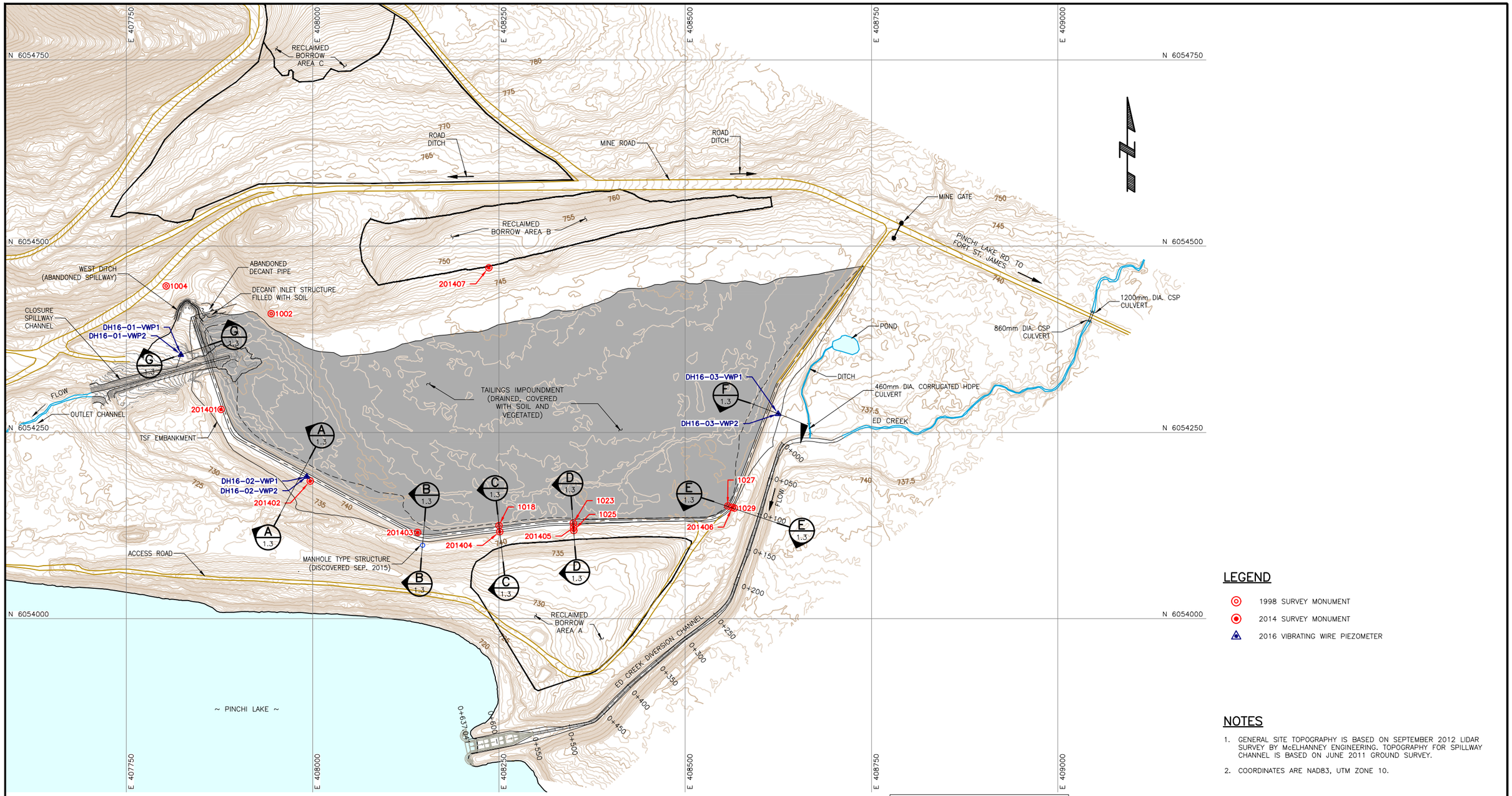
TITLE
MINE SITE PLAN

PROJECT No. M07728 A39

FIG. No. 1.1

KCB-R-MLB

Time: 13:14:23
Date: 9/5/2023
Scale: 1:2.5849(PS)
Drawing File: \\nt.klohn.com\ProjData\M\VCR\M07728A39-TML-Pinchi Lake 2023 Services\400 Drawings\CAD\05-FIGURES\2023 AFPR\Fig1.1 - MineSitePlan.dwg (thawker)
Xref File(s): Pinchi-2013-20cm_R
Image File(s): Pinchi-2013-20cm_R



LEGEND

- 1998 SURVEY MONUMENT
- 2014 SURVEY MONUMENT
- 2016 VIBRATING WIRE PIEZOMETER

NOTES

1. GENERAL SITE TOPOGRAPHY IS BASED ON SEPTEMBER 2012 LIDAR SURVEY BY McELHANNEY ENGINEERING. TOPOGRAPHY FOR SPILLWAY CHANNEL IS BASED ON JUNE 2011 GROUND SURVEY.
2. COORDINATES ARE NAD83, UTM ZONE 10.

REFERENCE DRAWINGS:
CHAINAGE FOR ED CREEK DIVERSION CHANNEL IS FROM KLOHN CRIPPEN DWG No. D-6101.

NOT FOR CONTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED SEPTEMBER 2023

SCALE 0 100 m

CLIENT: Teck

Klohn Crippen Berger

PROJECT: PINCHI LAKE MINE TSF
2023 ANNUAL FACILITY PERFORMANCE REVIEW

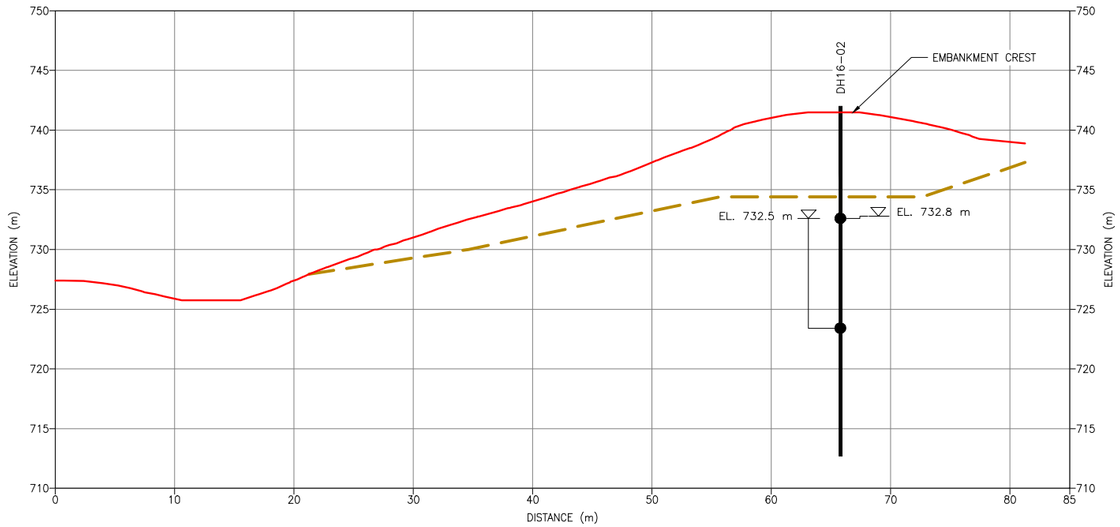
TITLE: TAILINGS STORAGE FACILITY PLAN

PROJECT No. M07728 A39

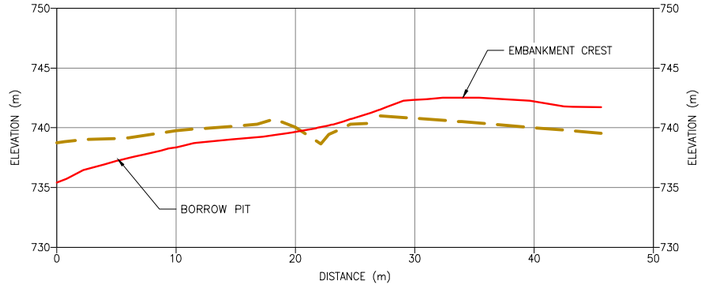
FIG. No. 1.2

KCB-R-MLB

Time: 13:14:19
Date: 9/5/2023
Scale: 1:2.5849(PS)
Drawing File: \\int.klohn.com\ProData\M\VCR\M07728A39-TML-Pinchi Lake 2023 Services\400 Drawings\CAD\05-FIGURES\2023 AFPR\Fig1.2 - TSF-Plan.dwg (thawker)
Xref File(s): BM-Pinchi-10July13_ACAD-Pinchi_Lake_407700E_6053000Nv12
Image File(s):

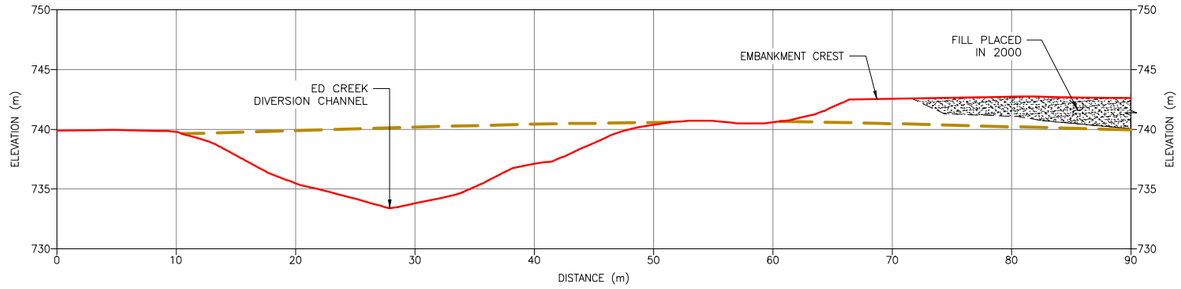


SECTION A 1:2

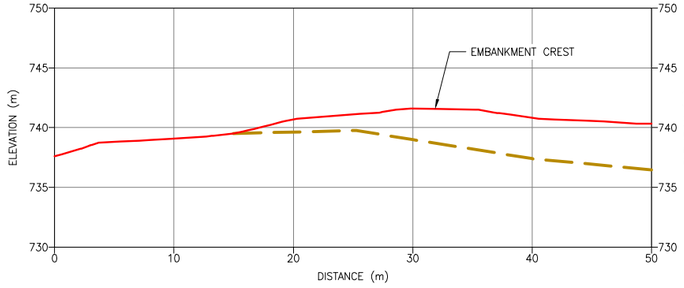


SECTION D 1:2

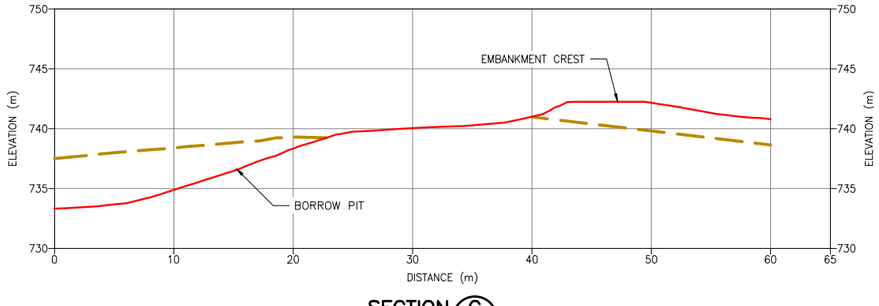
EMBANKMENT HEIGHT AND SLOPE			OVERALL SLOPE (NOTE 2)
SECTION	EMBANKMENT HEIGHT (m)	SLOPE OF D/S FACE	
A	14.0	2.7H:1V	2.7H:1V
B	2.5	2.7H:1V	2.4H:1V
C	1.8	2.3H:1V	4.5H:1V
D	1.5	2.0H:1V	4.3H:1V
E	1.8	4.3H:1V	4.3H:1V
F	4.7	1.9H:1V	1.9H:1V
G	4.0	2.9H:1V	2.9H:1V



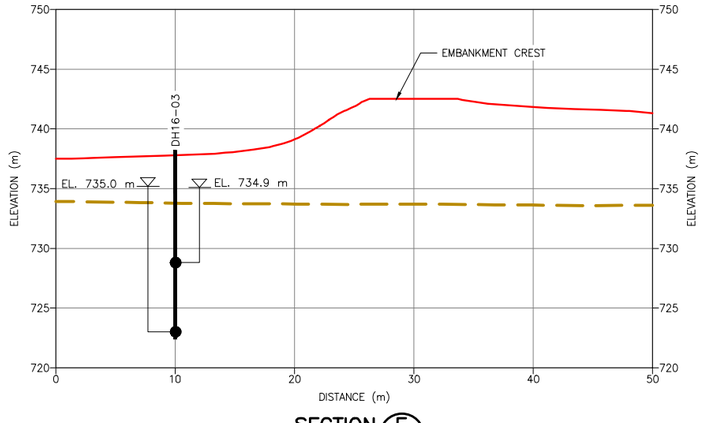
SECTION E 1:2



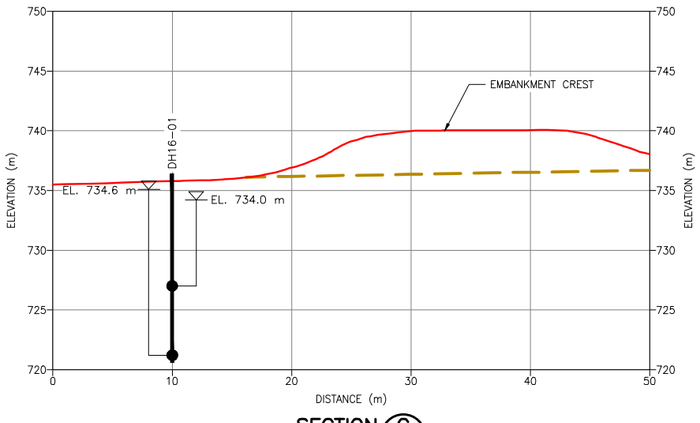
SECTION B 1:2



SECTION C 1:2



SECTION F 1:2



SECTION G 1:2

LEGEND:

- PIEZOMETER TIP/SCREEN
- 732.6 m — JUNE 21, 2023 READING (m)
- ORIGINAL GROUND SURFACE PRE-1967
- GROUND SURFACE AFTER 2010/11 RECLAMATION/CLOSURE WORKS (SEP. 2012 LIDAR SURVEY)

NOTES:

1. ORIGINAL GROUND SURFACE HAS BEEN EXTRACTED FROM DWG. PLM-D-3, REV.1 AND IS APPROXIMATE.
2. OVERALL SLOPE IS MEASURED FROM DOWNSTREAM EDGE OF EMBANKMENT CREST TO TOE OF NATURAL GROUND SLOPE (SECTIONS A, B, F AND G), TOE OF BORROW PIT SLOPE (SECTIONS C AND D) OR BASE OF ED CREEK DIVERSION CHANNEL (SECTION E).

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED SEPTEMBER 2023

SCALE 0 10 m

CLIENT: Teck

Klohn Crippen Berger

PROJECT: PINCHI LAKE MINE TSF
2023 ANNUAL FACILITY PERFORMANCE REVIEW

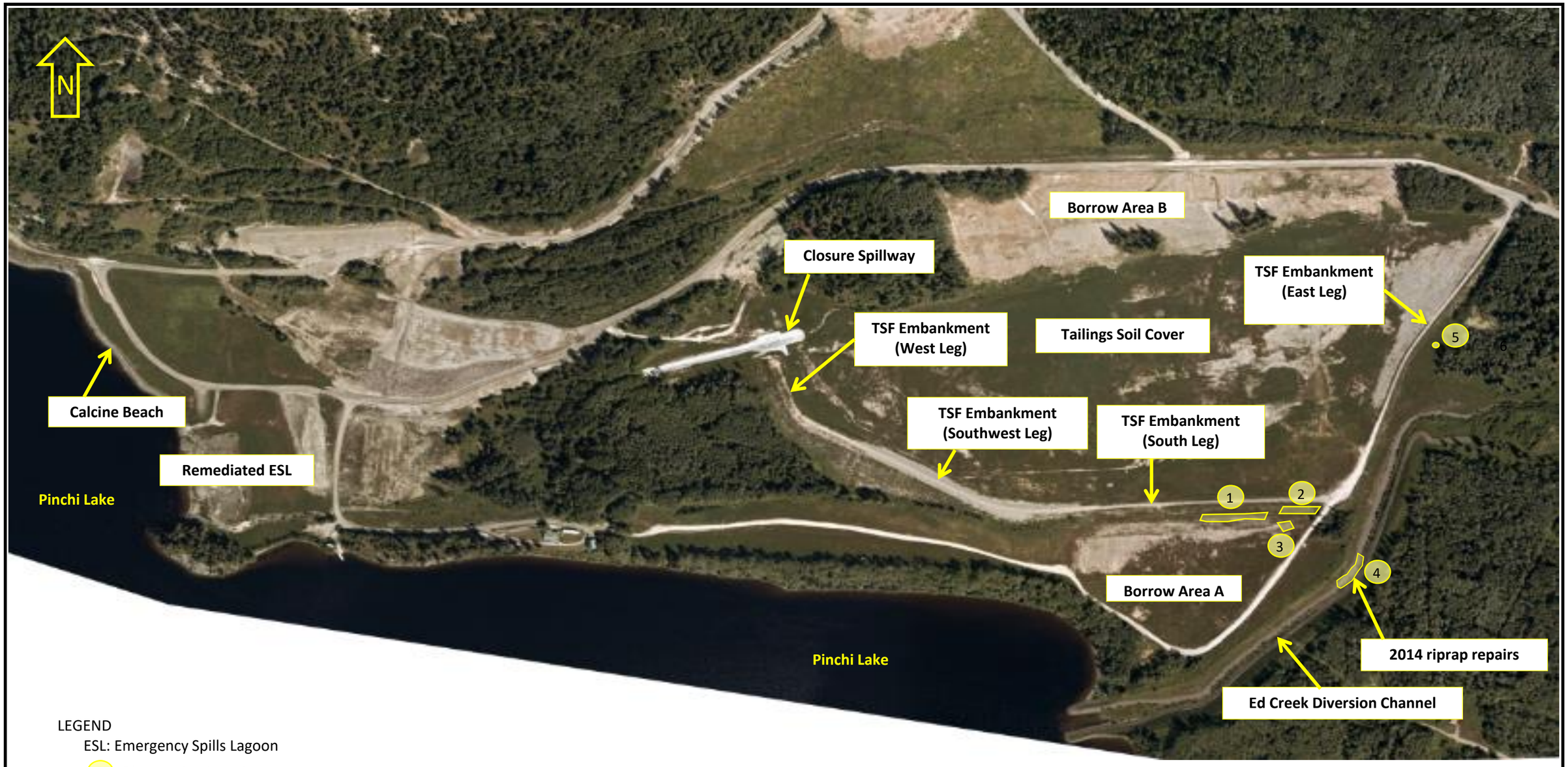
TITLE: TAILINGS STORAGE FACILITY
EMBANKMENT CROSS SECTIONS

PROJECT No. M07728 A39

FIG. No. 1.3

KCB-R-MLB

Time: 13:20:45
Date: 9/5/2023
Scale: 1:2.5849(PS)
Drawing File: \\Int.klohn.com\ProjData\M\VCR\M07728A39-TML-Pinchi Lake 2023 Services\400 Drawings\CAD\05-FIGURES\2023 APRR\Fig1.3 - Sections.dwg (thawker)
Xref File(s):
Image File(s): Teckcominco-color-logo



LEGEND

ESL: Emergency Spills Lagoon

3 Observation Location

Not to Scale

NOTES:

1. All Locations shown are approximate.

TO BE READ WITH KCB REPORT DATED: SEPTEMBER 2023

CLIENT: Teck

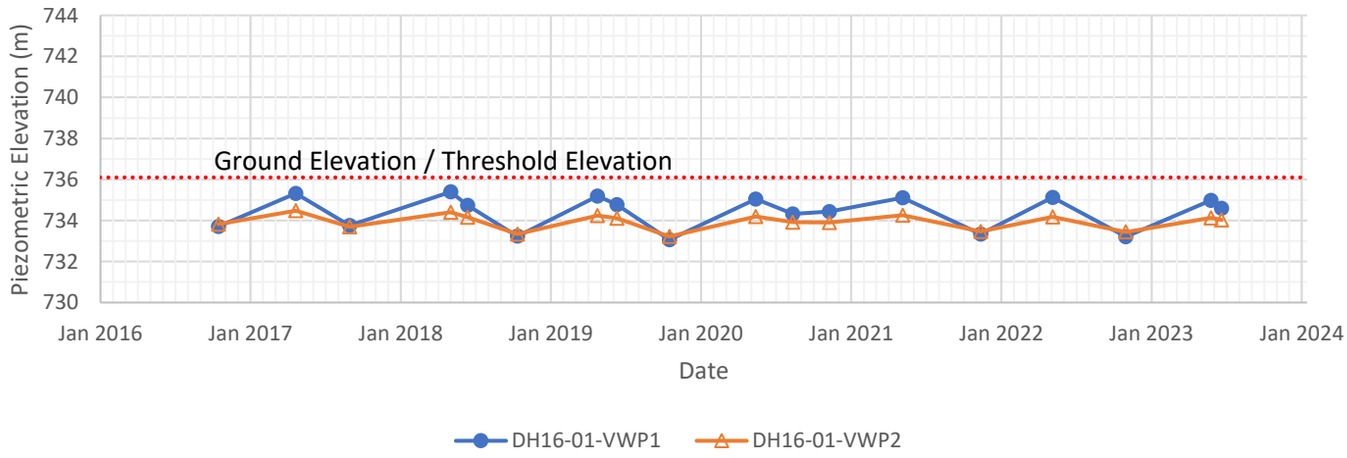
Klohn Crippen Berger

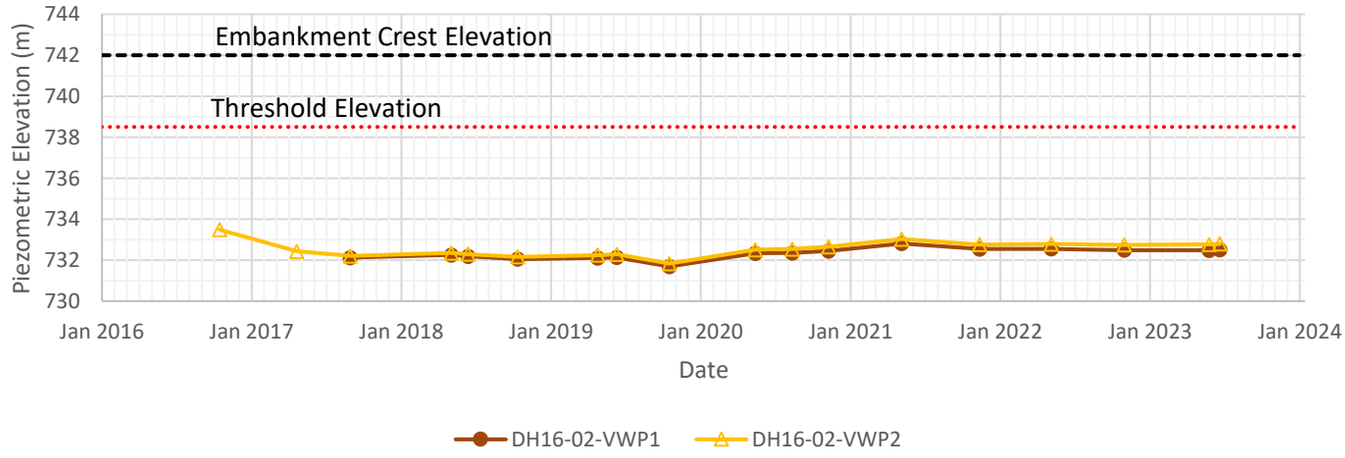
PROJECT: PINCHI LAKE MINE TSF
2023 ANNUAL FACILITY PERFORMANCE REVIEW

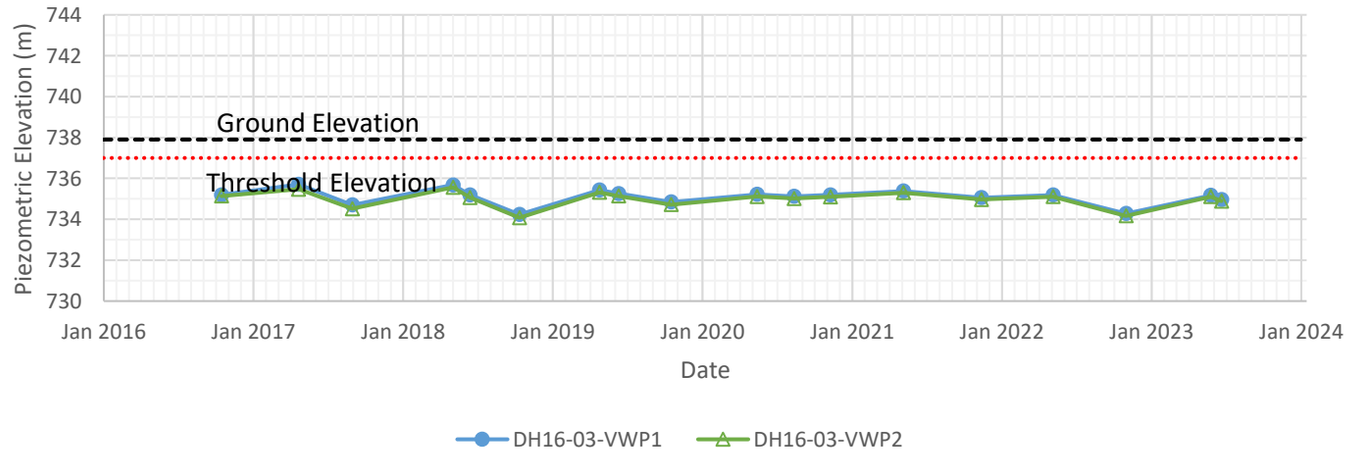
TITLE: JUNE 2023 OBSERVATION LOCATIONS

PROJECT No.: M07728A39

FIG No.: 4.1







TO BE READ WITH KCB REPORT DATED: SEPTEMBER 2023

CLIENT

Teck

Klohn Crippen Berger

PROJECT PINCHI LAKE MINE TSF - 2023 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE

PIEZOMETER READINGS

PROJECT No. M07728A39

FIG No. 4.2

APPENDIX I

Facility Data Sheet

Appendix I
Facility Data Sheet

PINCHI LAKE MINE TSF EMBANKMENT

PHYSICAL DESCRIPTION

Embankment Type	Earthfill
Maximum Embankment Height	15 m
Embankment Length	1300 m
Embankment Crest Width	6 m to 8 m May be wider in some areas.
Impoundment Area	24 ha (surface area of covered tailings)
Volume of Tailings	1 million m^3 approximate
Reservoir Capacity	This is a “dry” tailings impoundment. There is no storage of water and the impoundment is normally dry. Storage capacity between the spillway invert (El. 735.25 m) and the minimum embankment crest (El. 740.2 m) is 29,600 m^3.
Spillway Capacity	Spillway has capacity to route 1/3 between 1,000-year and PMF with > 4 m freeboard in the impoundment, and 0.5 m in the spillway channel. However, riprap from the embankment toe to the downstream end of the spillway channel is undersized for the IDF and may be damaged. Estimated peak spillway discharge = 7 m^3/s
Catchment Area	33 ha (normal conditions, assuming road ditch is operating) 55 ha (flood conditions, assuming road ditch fails)
Access to Embankment	Vehicle access to the mine from Fort St. James is 25 km north along Germansen Road, and then 20 km west along Pinchi Lake Road. Both roads are gravel surfaced. The access road into the mine site is gated and locked. The mine site can also be reached by water over Pinchi Lake. The lake usually has ice cover from November to mid-April.

APPENDIX II

June 2023 Photographs

Appendix II
June 2023 Photographs

Photo II-1 Tailings Impoundment – Looking north from ~150 m northeast of TSF Embankment southwest leg

Photo II-2 Tailings Impoundment – Local depression on cover. No signs of erosion or standing water in low spot

Photo II-3 Tailings Impoundment – Looking south, ~140 m north of TSF Embankment southwest leg

Photo II-4 TSF Embankment – East leg, looking south

Photo II-5 TSF Embankment – East leg, pond near toe

Photo II-6 TSF Embankment – East leg, looking north along downstream slope

Photo II-7 TSF Embankment – East leg, looking north

Photo II-8 TSF Embankment – East leg, looking west at the covered tailings surface

Photo II-9 TSF Embankment – South leg, looking east

Photo II-10 TSF Embankment – South leg, looking north at the covered tailings surface

Photo II-11 TSF Embankment – South leg, looking west along downstream slope

Photo II-12 TSF Embankment – Southwest leg, looking northwest along the crest

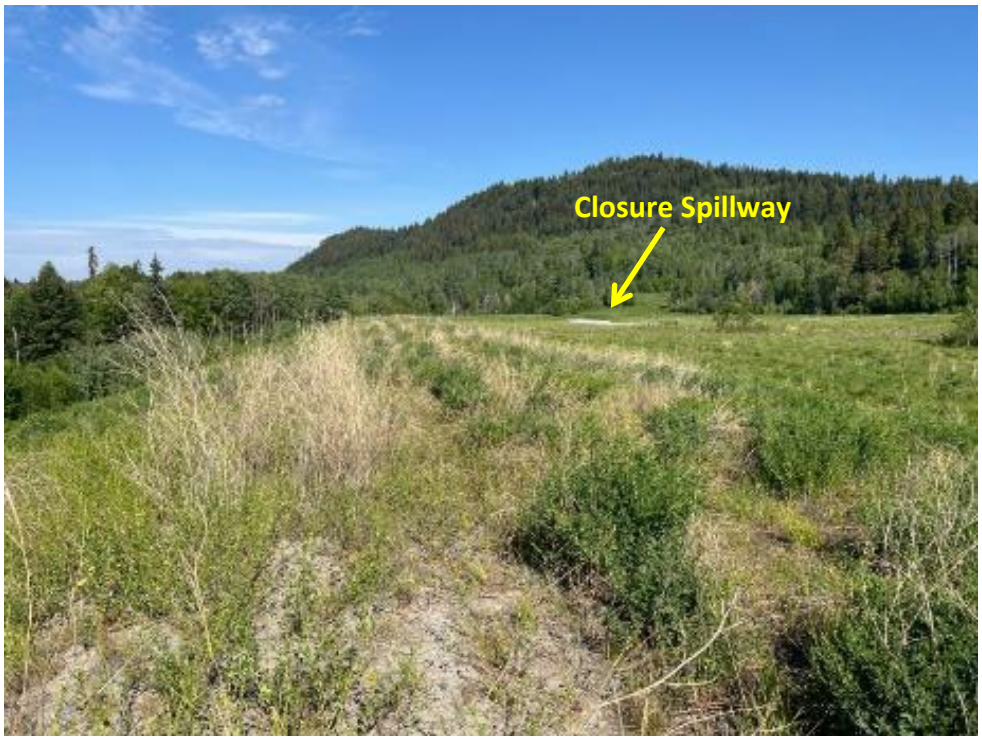


Photo II-13 TSF Embankment – Southwest leg, looking southeast along downstream slope

Photo II-14 TSF Embankment – Southwest leg, looking downstream from the crest

Photo II-15 TSF Embankment – Southwest leg, looking northwest along the downstream slope

Photo II-16 TSF Embankment – West leg, looking north along downstream slope

Photo II-17 TSF Embankment – West leg, looking south along downstream slope

Photo II-18 Closure Spillway – Inlet apron

Photo II-19 Closure Spillway – Spillway inlet

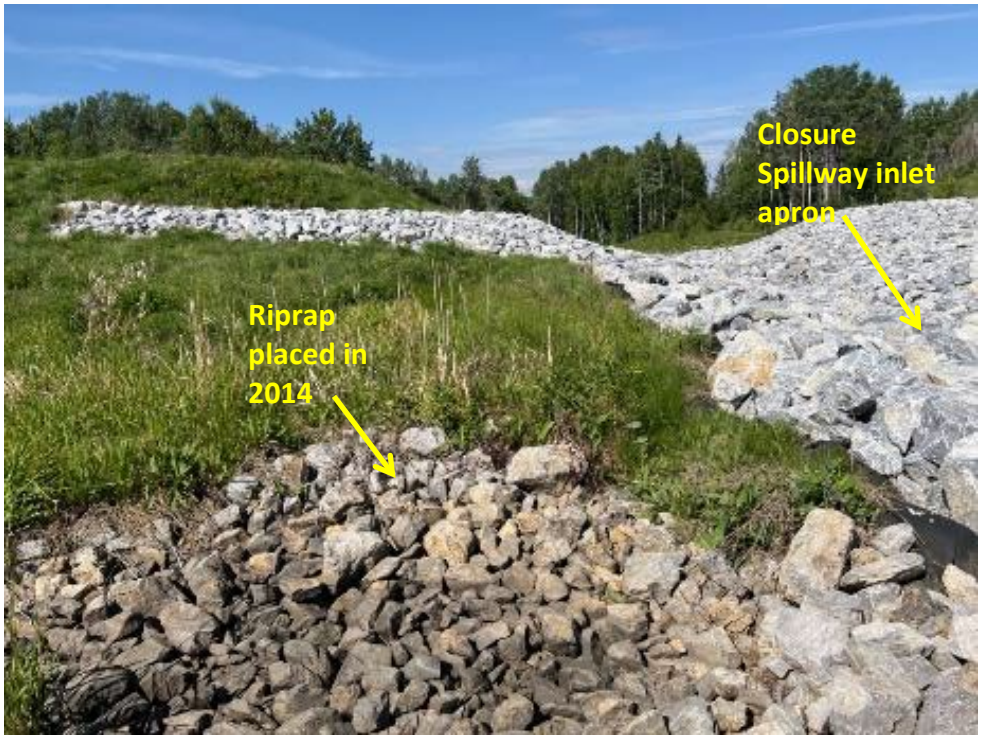


Photo II-20 Spillway inlet looking downstream (dry)

Photo II-21 Closure Spillway – Looking downstream from embankment crest

Photo II-22 Closure Spillway – Looking upstream

Photo II-23 Closure Spillway – Slump feature looking north on right bank of spillway; no recent movement

Photo II-24 Closure spillway – Pond at downstream end of riprap

Photo II-25 Outlet Channel – Middle Reach, looking upstream from road between the South of Mill Site (SMS) and Emergency Spills Lagoon (ESL) areas

Photo II-26 Outlet Channel – Culvert inlet and flow monitoring station. Vegetation cleared in October 2022

Photo II-27 Outlet Channel – Culvert outlet and flow monitoring station. Vegetation cleared in October 2022

Photo II-28 Borrow Area A – Looking east along the slope

Photo II-29 Borrow Area A – Crack monitoring rod

Photo II-30 Borrow Area A – Wet spot in northeast corner

Photo II-31 Borrow Area A – Looking northwest towards slope from access road along east side

Photo II-32 Ed Creek Diversion Channel – Looking downstream at outlet at Pinchi Lake

Photo II-33 Ed Creek Diversion Channel – Looking downstream towards outlet

Photo II-34 Ed Creek Diversion Channel – Looking downstream from between second and third bends

Photo II-35 Ed Creek Diversion Channel – Vegetation in channel, looking upstream from between second and third bends

Photo II-36 Ed Creek Diversion Channel – Looking upstream from near second bend. Light coloured area of riprap was replaced in 2014 and is in good condition

Photo II-37 Ed Creek Diversion Channel – Riprap on right bank, showing weathering and breakage

Photo II-38 Ed Creek Diversion Channel – Looking downstream from between first and second bends

Photo II-39 Ed Creek Diversion Channel – Looking upstream from between first and second bends

Photo II-40 Ed Creek Diversion Channel – Looking downstream from near first bend

Photo II-41 Outlet of 460 mm culvert on north bank of Ed Creek Diversion Channel

Photo II-42 Inlet of 460 mm culvert on north bank of Ed Creek Diversion Channel. Vegetation cleared near inlet in October 2022

Photo II-43 Ditch north of Ed Creek Diversion Channel, looking south

Photo II-44 Beaver dam and pond near East Leg toe, looking north

Photo II-45 Inlet of Ed Creek culverts under Pinchi Lake Road

Photo II-46 Outlet of Ed Creek culverts under Pinchi Lake Road

APPENDIX III

June 2023 Inspection Forms

Pinchi Lake Mine Tailings Storage Facility
Inspection Checklist

TSF EMBANKMENT AND TAILINGS IMPOUNDMENT

Date: June 21, 2023 Inspected By: D. Klassen, S. Mohammad

Time: 8:30 AM to 12:00 PM Pond Water Level: No pond

Weather: Sunny, 22°

Is there any apparent ….	Yes	No	Comments
Cracks			
• Embankment cracks on the embankment crest?		X	
○ Enlargement of cracks or new cracks in SW leg and S leg of embankment (first observed in 2015)?		X	Not visible, see comment 1
• Embankment cracks on the u/s slope?		X	
• Embankment cracks on the d/s slope?		X	
Vegetation Growth and Debris			
• Excessive tree or shrub growth on embankment?		X	Vegetation was cleared on embankment in October 2022.
• Debris in tailings impoundment?		X	
Other Structural Problem			
• Settlement or erosion on the embankment crest?		X	
• Slough, slides, bulges or erosion on u/s slope of embankment?		X	
• Slough, slides, bulges or erosion on d/s slope of embankment?		X	
• Sinkhole on embankment crest?		X	
• Sinkhole on u/s slope of embankment?		X	
• Sinkhole on d/s slope of embankment?		X	
• Sinkhole in tailings pond till cover?		X	
• Erosion of flow channels in tailings pond till cover?		X	
Ponding / Seepage			
• Evidence of water ponding on embankment crest?		X	
• Wet areas or seepage on d/s slope or toe of embankment?		X	
• Evidence of water ponding at d/s toe of embankment?	X		See comment 2 below
• Wet areas or seepage along d/s abutments?		X	
Animal Activity			
• Rodent burrows in embankment?		X	
• Beaver dam in Tailings Pond?		X	Beaver activity noted downstream of east leg toe, see note 3.

Additional comments:

1. Cracks have been observed in this area for several years and are believed to been formed by loosening and drying of the soil as part of the reclamation and seeding and are not considered to be a TSF safety issue. These cracks were not visible during the 2023 inspection.
2. A pond is located near the toe of the east leg of the embankment, which drains to the south through a culvert into Ed Creek Diversion Channel. This pond has been observed in previous inspections and appears to be related to local runoff. The pond level was higher than normal due to the beaver embankment described in note 3. No other ponds were observed near the embankment toe.
3. A small (< 1 m height) beaver dam is present downstream of the east leg of the embankment, in a ditch that leads from the pond area at the embankment toe south towards the culvert at the right bank of Ed Creek Diversion Channel (see Figure 4.1 in the main text for location). The beaver dam was rebuilt after being removed in October 2022.

Pinchi Lake Mine Tailings Storage Facility
Inspection Checklist

CLOSURE SPILLWAY

Date: _June 21, 2023_____ Inspected By: _D. Klassen, S. Mohammad_

Time: _10:30 AM_____

Weather: Sunny, 22°_____

Is the spillway flowing? ____No_____(yes / no) If yes, give approx. flow depth: _____ mm

Is the flow above the riprap? ___No_____(yes / no) If yes, give approx. flow depth above riprap: _____ mm

Is there any apparent …..	**Yes**	**No**	**Comments**
Vegetation Growth and Debris			
• Excessive tree or shrub growth along the channel?		X	A few small shrubs
• Debris in the channel?		X	
Riprap			
• Displaced or broken down riprap in channel bottom?		X	
• Displaced or broken down riprap along the right bank?		X	
• Displaced or broken down riprap along the left bank?		X	
Erosion, cracks, slough, slides or bulges			
• Along the bottom of channel?		X	
• Along the right bank of channel?		X	
○ Any signs of recent movement of slump on right bank?		X	
• Along the left bank of channel?		X	
Seepage			
• Seepage into the channel from right side slope?		X	
• Seepage into the channel from left side slope?		X	
Animal Activity			
• Beaver embankment in spillway channel?		X	
• Any other animal activity?		X	

NOTE: left and right banks are looking downstream along the channel.

Additional comments:

30 cm deep pond at the downstream end of the spillway. No flow.

Pinchi Lake Mine Tailings Storage Facility
Inspection Checklist

OUTLET CHANNEL

Date: _June 21, 2023_____ Inspected By: _D. Klassen, S. Mohammad_

Time: _1:45 PM_____

Weather: _Sunny, 22°_____

Is there flow in the channel? _No_____ (yes / no)

Give location of flow: _____ Give approx. flow depth: _____ mm

Is there any apparent …..	Yes	No	Comments
Middle Reach (along reclaimed SMS area)*			
• Debris in the channel?		X	
• Erosion in the channel?		X	
• Beaver activity in channel?		X	
Culvert under road between SMS and ESL			
• Blockage of culvert inlet or outlet?		X	Vegetation cleared in Oct. 2022
• Structural damage or deformation of culvert pipe?		X	
• Displaced or broken-down riprap?		X	
Lower Reach (along former Emergency Spills Lagoon)*			
• Excessive tree or shrub growth in the channel?		X	Vegetation cleared in Oct. 2022
• Debris in the channel?		X	
• Erosion in the channel?		X	
• Displaced or broken-down riprap in channel?		X	
• Beaver activity in channel?		X	

*NOTE: Middle Reach of Outlet Channel is the flow route along the reclaimed South of Mill Site (SMS) area, from the edge of the trees to the culvert under the road between the SMS and the remediated Emergency Spills Lagoon (ESL). Lower Reach extends from the culvert to Pinchi Lake. Upper Reach is densely vegetated and is not inspected.

Additional comments:

1. Water is ponding locally at the culvert outlet, 4 cm deep.

Pinchi Lake Mine Tailings Storage Facility
Inspection Checklist

ROAD DITCH ABOVE TAILINGS IMPOUNDMENT

Date: _June 21, 2023_____ Inspected By: _D. Klassen, S.Mohammad_

Time: _1:10 PM_____

Weather: Sunny, 22°_____

Is there flow in the channel? _No_____ (yes / no)

Give location of flow: _____ Give approx. flow depth: _____ mm

Is there any apparent …..	Yes	No	Comments
Road Ditch			
• Excessive tree or shrub growth in the channel?	X		Trees growing in ditch near bottom of hill close to the mine gate
• Debris in the channel?		X	
• Erosion in the channel?		X	
• Beaver activity in the channel?		X	

Additional comments:

Pinchi Lake Mine Tailings Storage Facility
Inspection Checklist

BORROW AREA A

Date: _June 21, 2023_____ Inspected By: _D. Klassen, S.Mohammad_

Time: _11:30 AM_____

Weather: Sunny, 22°_____

Is there any apparent …..	**Yes**	**No**	**Comments**
Cracks			
• Cracks on ground between borrow pit and toe of embankment?		X	
• Cracks on borrow pit slope?	X		See comment 1 below
Other Structural Problems			
• Sloughs, slides, bulges or erosion on borrow pit slope?		X	
Ponding / Seepage			
• Wet areas or seepage on borrow pit slope?		X	
• Wet areas or seepage at toe of borrow pit slope?	X		See comment 2 below
• Evidence of water ponding within borrow area?		X	
Animal Activity			
• Rodent burrows in borrow pit slope?		X	

Additional comments:

1. Crack in northeast corner near top of slope, only visible at close range by pushing aside vegetation; 3 cm wide, ≥15 cm deep, 25 m length.
2. One area of wet ground in the northeast corner, but no ponds or flowing water.

Pinchi Lake Mine Tailings Storage Facility
Inspection Checklist

ED CREEK DIVERSION CHANNEL

Date: _June 21, 2023_____ Inspected By: _D. Klassen, S.Mohammad_

Time: _11:50 AM_____

Weather: Sunny, 22°_____

Is there flow in the channel? _no flow, but standing water visible_____ (yes / no)

Give location of flow: _____ Give approx. flow depth: ____ mm

Is there any apparent …..	Yes	No	Comments
Vegetation Growth and Debris			
• Excessive tree or shrub growth along the channel?	X		See comment 1 below
• Debris in the channel?		X	
Riprap			
• Displaced or broken down riprap in channel bottom?	X		See comment 2 below
• Displaced or broken down riprap along the right bank?	X		See comment 2 below
• Displaced or broken down riprap along the left bank?	X		See comment 2 below
Erosion, cracks, slough, slides or bulges			
• Along the bottom of channel?		X	
• Along the right bank of channel?		X	
• Along the left bank of channel?		X	
Seepage			
• Seepage into the channel from right side slope?		X	
• Seepage into the channel from left side slope?		X	
Animal Activity			
• Beaver embankment in spillway channel?		X	
• Any other animal activity?		X	

NOTE: left and right banks are looking downstream along the channel.

Additional comments:

1. Vegetation was observed throughout the base of the channel, including tall grasses and some bushes greater than 1.5 m height.
2. As noted during previous inspections, riprap along entire diversion channel is deteriorating. Visual inspection suggested there were no significant changes from the condition in recent years.

Pinchi Lake Mine Tailings Storage Facility
Inspection Checklist

ED CREEK CULVERTS AT PINCHI LAKE ROAD

Date: _June 21, 2023_____ Inspected By: _D. Klassen, S.Mohammad_

Time: _8:10 AM_____

Weather: Sunny, 22°_____

Is there flow in the culverts? _Yes_____ (yes / no)

Give approx. water depth in channel at culvert inlet: _30___ mm

Is there any apparent …..	Yes	No	Comments
Culverts Under Pinchi Lake Road			
• Excessive tree or shrub growth at inlet or outlet?		X	Vegetation cleared in Oct. 2022
• Blockage of culvert inlets or outlets?		X	
• Structural damage or deformation of culvert pipe?	X		See comment 2 below
• Erosion in channel u/s or d/s of culvert?		X	
• Beaver activity in Ed Creek u/s or d/s of culvert?		X	

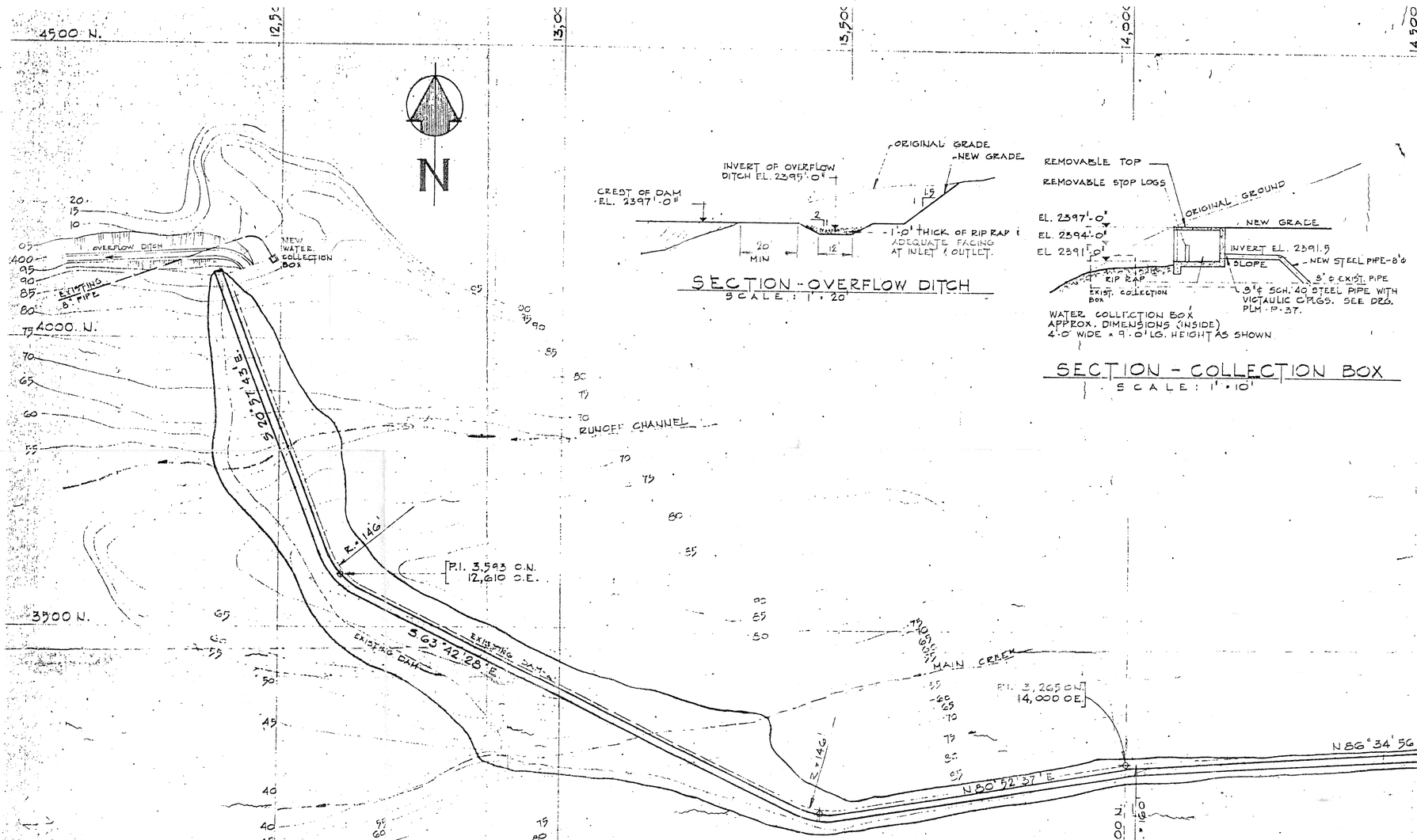
Additional comments:

1. Water depth at culvert inlet is for east culvert. West culvert inlet had no flow.
2. West culvert has corroded holes in the bottom of the pipe allowing water to drain through.

APPENDIX IV

1975 Embankment Drawing

No.	Req'd	Description	Supplied or Made by	Date Ordered	Requisition No.



PLAN - TAILINGS DAM

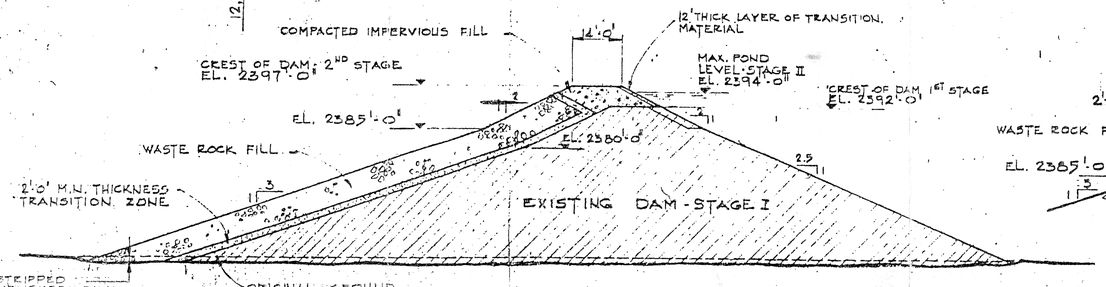
SCALE: 1" = 100'

SECTION - OVERFLOW DITCH

SCALE: 1" = 20'

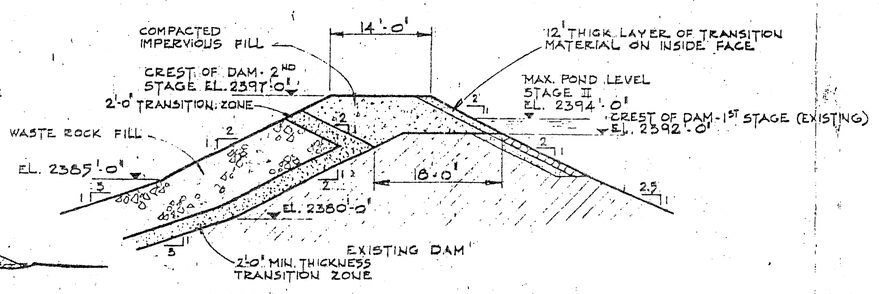
SECTION - COLLECTION BOX

SCALE: 1" = 10'



TYPICAL SECTION THRU DAM

SCALE: 1" = 20'



DETAIL - TOP OF DAM TYPICAL

SCALE: 1" = 10'

Job No. J-7710.003		PLM-P-37, TAILINGS DISPOSAL		Drawn by K. FRICKE	JAN. 14/75	Function MINES	Scale AS NOTED
Drawing No. PLM D 514	Revision 0			Checked by J.E. PRIME	FEB/7/75	Activity PINCHI LAKE MERCURY	Drawing No. PLM D 514
Issued to		Reference		Design Eng.		Section TAILINGS DAM EXTENSION - 1975	Revision 0
Issued to				Proj. Eng.	Approved	Job PLAN & SECTIONS	
			Revisions: No. Made by Date Approved Description			Engineering TRAIL, B.C.	Commoo

210-0650

APPENDIX V

Quantifiable Performance Objectives

Appendix V
Quantifiable Performance Objectives

Quantifiable Performance Objectives for the Pinchi Lake Mine Tailings Storage Facility are as follows.

V-1 PIEZOMETERS

The threshold levels established for piezometers are based on stability analysis and are summarized in Table VI-1. Threshold level exceedances will be reviewed by the Engineer of Record, and further action will be advised based on subsequent engineering analysis.

Table V-1 Threshold Levels for Piezometers

Piezometer ID	Serial	Threshold Value (Piezometric Elevation in metres)
DH16-01-VWP1	VW38610	736.1
DH16-01-VWP2	VW38611	736.1
DH16-02-VWP1	VW38608	738.5
DH16-02-VWP2	VW38609	738.5
DH16-03-VWP1	VW38606	737.0
DH16-03-VWP2	VW38607	737.0

V-2 SURVEY MONUMENTS

Alert criteria for displacement of survey monuments on the embankment are as follows (read on a 10-year frequency basis):

- Vertical displacements over ten years greater than 70 mm.
- Horizontal displacements over ten years, perpendicular to the embankment alignment, greater than 70 mm.
- A continuing trend of movement with cumulative displacements of the embankment in a credible (i.e., plausible) direction greater than 100 mm, relative to the baseline readings.