Klohn Crippen Berger

Teck Highland Valley Copper Partnership

2022 Annual Facility Performance Report

Highland Tailings Storage Facility

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March 2023

March 30, 2023

Teck Highland Valley Copper Partnership
PO Box 1500
Logan Lake, British Columbia
V0K 1W0

Mr. Bryan Bale, P.Eng.
Chief Tailings Engineer

Dear Mr. Bale:

2022 Annual Facility Performance Report
Highland Tailings Storage Facility

We are pleased to submit the of the Highland Tailings Storage Facility 2022 Annual Facility Performance Report. The review period for this document is from December 2021 through November 2022.

Yours truly,

KLOHN CRIPPEN BERGER LTD.

Rick Friedel, P.Eng.
Engineer of Record, Representative
Senior Geotechnical Engineer, Principal

RF:cd/jc

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Teck Highland Valley Copper Partnership

2022 Annual Facility Performance Report

Highland Tailings Storage Facility

EXECUTIVE SUMMARY

Klohn Crippen Berger Ltd. (KCB) was engaged by Teck Highland Valley Copper Partnership (HVC) to complete the 2022 Annual Facility Performance Report (AFPR) for the Highland Tailings Storage Facility (TSF) for the review period of December 2021 to November 2022. The Highland TSF is the primary active storage facility for the Highland Valley Copper Mine, which is owned and operated by HVC.

Based on the review of measured performance and observations summarized herein, KCB concludes the Highland TSF was operated and performed as expected and within design requirements during the review period.

The Highland TSF Structures

The review covers the following structures, which comprise the Highland TSF:

- The L-L Dam is a cycloned sand dam with a vertically raised, central glacial till core and underdrainage beneath the downstream slope. At the end of the review period, the crest of the L-L Dam is at El. 1272.0 m.
- The H-H Dam is an earthfill dam constructed of local borrow and pit waste materials. The H-H Dam is supported downstream by mine waste dumps. The crest of the H-H Dam is between El. 1282.0 m and El. 1287.0 m.
- The 24 Mile Emergency TSF stores overflow tailings from the H-H Pumphouse. The facility is surrounded by waste dumps; a portion of the tailings area is being covered by the 24 Mile Waste Dump. The exposed area, where tailings were discharged during the review period, is referred to as 24 Mile TSF.
- Seepage and sediment ponds downstream of the L-L Dam collect mine-affected surface water and seepage for reclaim back to the impoundment with no off-site discharge.

During the review period, the following key roles, according to the definitions in the Health, Safety and Reclamation Code for Mines in BC (HSRC[1]), were filled as follows:

- Mr. Bryan Bale, P.Eng. (HVC Chief Engineer – Tailings), acted in the role of TSF Qualified Person (QP); and
- Mr. Rick Friedel, P.Eng., was the Engineer of Record (EoR), as a representative of KCB.

Operation and Construction

During the review period, the Highland TSF was operated to comply with the design basis and the specified operational conditions of the approved design (KCB 2020a).

[1] EMLCI. 2021b. "Health, Safety and Reclamation Code for Mines in British Columbia, Revised." February.

Approximately 45.6 million tonnes (Mt) of tailings were discharged into the Highland TSF during 2022, and the facility was operated with flood storage and tailings storage capacity in excess of the design requirements.

The L-L Dam crest was raised 2.5 m as planned and consistent with the design intent. As planned, the crest of the H-H Dam was not raised. Supplementary projects were completed at the H-H Dam to remove infrastructure from the 2023 construction area.

Governance and Surveillance

The Operations, Maintenance and Surveillance (OMS) Manual[2], which includes the Emergency Preparedness and Response Plan (EPRP), was updated during the review period. This was a routine update to the documents, which included updates to the surveillance program agreed with the EoR.

On October 26, 2022, participants from HVC's operation team (including site management), including a representative designated by the HVC QP, and the EoR participated in a functional test of the TSF site emergency response plan.

HVC's governance program for the Highland TSF includes an independent Tailings Review Board (TRB). During the review period, three meetings with the TRB were held. The TRB provides non-binding advice to HVC regarding operations at the facility. The TRB prepared feedback from each meeting and stated that, based on the information presented, they concurred with the EoR and HVC conclusions that the L-L Dam and H-H Dam are being constructed in accordance with the design and performing as intended.

The Highland TSF surveillance program is extensive and includes visual inspections, measured behaviour from more than 300 instruments (e.g., piezometers, inclinometers, and settlement), pond level readings, and a Trigger-Action-Response Plan (TARP). HVC executed the surveillance program, in accordance with the OMS Manual, during the review period.

The instrumentation at each dam includes appropriate redundancy so that the surveillance controls are maintained as intended, even during temporary loss of service for some instruments. To maintain redundancy and expand the coverage of the surveillance program further, the following additional instruments were installed during the review period:

- L-L Dam: 3 replacement inclinometers and 6 new piezometers; and
- H-H Dam: 10 new piezometers.

The replacement inclinometers at the L-L Dam and new piezometers installed at the H-H Dam address recommendations from KCB, including one from a previous AFPR (Table 1). HVC attempted to replace a defunct inclinometer at the VBB (LL-I15-24) but was unsuccessful.

[2] Teck Highland Valley Copper Partnership (HVC). 2022. "Highland Tailings Storage Facility – Operation, Maintenance, and Surveillance Manual." October.

2022 Dam Safety Review

HVC commissioned a Dam Safety Review during 2022. The site visit was completed during the review period and the summary report will be issued by March 2023 (as indicated by HVC). Preliminary findings, provided by the DSR review team, state that the Highland TSF is a well-operated facility and no significant dam safety issues have been identified.

Highland TSF Performance

Both dams are expected to respond to increased loading from construction and to rising tailings and pond levels. The performance of each dam was reviewed monthly by the EoR based on measured behaviour and other surveillance observations. In addition, routine engineering reviews were triggered by the first level of the TARP, referred to as the Notification Level, in response to a localized deviation from historic or expected behaviour.

KCB made the following key observations regarding the L-L Dam and the H-H Dam performance during the review period:

1. None of the routine engineering reviews triggered by a Notification Level exceedance or visual observations identified an issue of dam safety concern or unacceptable performance.
2. Over the review period, the pond rose 0.9 m, and the L-L Dam crest was raised by 2.5 m.
3. At the end of the review period, the Highland TSF had approximately 161 Mm^3 of storage available below the minimum flood freeboard level (El. 1270.0 m). This is sufficient to store forecasted tailings to be produced in 2023 and more than two Inflow Design Flood[3] (IDF) events.
4. HVC maintained minimum beach widths required in the design throughout the review period and achieved target beach widths across the majority of the crest length except for the South Dam, which is a focus deposition area for 2023.
5. The vertical distance between the tailings surface and the crest of the H-H Dam, referred to as the buffer, was maintained greater than the 1 m permit requirement. At the end of the review period, the buffer ranged from 3.4 m to 6.4 m along the dam crest.
6. The magnitude and deformation pattern measured at the L-L Dam and the H-H Dam were consistent with expected behaviour in response to construction activities during the review period, specifically:
   a. Deformations that where measured, as expected, below the upper portions of the downstream shell do not extend to the toe (i.e., deformations are contained), which is the design intent.
   b. Consistent with past performance and expected performance, the deformation rate in some dam fill and foundation units increased during loading (i.e., fill placement), and then decreased to the expected range for non-loading periods, after loading was completed.

[3] The IDF for Highland TSF is 120-hour duration Probable Maximum Flood and requires 50.3 Mm^3 of flood storage.

   c. The magnitude and deformation pattern measured within the Lower-Glaciolacustrine at the VBB agree with those predicted by the calibrated stress-deformation model and expected based on the design. The measured deformation rates were below triggers that would initiate implementation of the Contingency Case.

7. Measured piezometric levels at the L-L Dam and the H-H Dam were consistent with expected behaviour for construction and operational activities during the review period, specifically:
   a. Measured piezometric levels downstream of the core zone at each dam are significantly lower than upstream levels. This demonstrates that the core zones are effective low-permeability barriers to seepage, which is consistent with the design intent.
   b. Piezometric response at the L-L Dam was consistent with expected performance and governed by typical seasonal trends, response to hydraulic placement, and beaching. Temporary piezometric responses measured as a response to hydraulic placement of cycloned sand attenuated after construction was completed.
   c. Piezometric response at the H-H Dam was consistent with expected performance. Piezometric levels were typically steady, with the exception of an expected rise in the foundation during a temporary disruption of groundwater pumping from the H-H Gland Wells.

Design Basis and Failure Mode Reviews

A review of the design basis and failure modes by HVC and KCB concluded the following:

- there had been no significant change to conditions (e.g., infrastructure, land use) downstream of the Highland TSF during the review period;
- potential failure modes are appropriately characterized and managed by existing controls; and
- the current IDF and earthquake design ground motion (EDGM) for each of the Highland TSF structures meet or exceed the equivalent requirements under the HSRC.

At the request of HVC, the AFPR does not include any reference to a consequence classification, as proposed by the CDA[4], for the Highland TSF facilities because the components of that system do not align with HVC's safety culture.

Recommendations

The status of dam safety recommendations identified during past AFPRs are summarized in Table 1. Closed recommendations are shown in *italics*. During the review period, one of the two recommendations scheduled for completion was closed. HVC attempted to install a replacement inclinometer at the VBB (LL-I15-24) but was unsuccessful and is pursuing efforts to close this out in 2023.

[4] Canadian Dam Association (CDA). 2013. "Dam Safety Guidelines 2007 (Revised 2013)."

KCB has included two new recommendations during this review, both related to instrumentation (Table 2) and have been assigned a Priority 4, meaning they are not required to address a potential dam safety concern but are appropriate improvements to the surveillance program.

Table 1 Previous Recommendations Related to Facility Performance – Status Update

ID No.	Performance Area	Recommended Action	Priority(1)	Deadline (Status)
L-L Dam				
LL-2019-02	Surveillance	Install new seepage weirs along the downstream toe after the SWRP has been replaced and the L-L Dam constructed to the ultimate toe (DSR recommendation LL-2017-06).	3	Q4 2021 (Open; location of new weirs defined and HVC preparing an installation plan)
LL-2021-01	Surveillance	Install a replacement inclinometer for LL-I15-24 at the VBB.	3	Q4 2022 (Open; attempt to replace instrument was unsuccessful; attempt again in 2023)
H-H Dam				
HH-2021-01	*Surveillance*	*Install 3 (minimum) piezometers in the waste fill between the H-H Dam slope and the 24 Mile TSF to increase coverage and monitoring points for piezometric levels in the area that affects the H-H Dam design.*	*3*	*CLOSED*

Notes:
1. Recommendation priority guidelines, specified by Teck and assigned by KCB:
   - *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 2 2022 Recommendations Related to Facility Performance

ID No.	Performance Area	Recommended Action	Priority(1)	Deadline
L-L Dam				
LL-2022-01	Maintenance	HVC to repair L-L Dam Weather Station to measure precipitation and temperature at the Highland TSF.	4	Q1 2024
LL-2022-02	Surveillance	HVC to install additional piezometer monitoring points at the South Dam to increase monitoring points for piezometric levels in the area. Locations to be agreed upon with the EoR.	4	August 2024

Notes:
1. Refer to Notes for Table 1.

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CLARIFICATIONS REGARDING THIS REPORT

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the use of Teck Highland Valley Copper Partnership (Client) for the specific application to the 2022 Dam Safety Support Project, and may be published or disclosed by the Client to the BC Ministry of Energy, Mines, and Low Carbon Innovation.

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; however, the use of this report will be at the user's sole risk absolutely and in all respects, and KCB makes no warranty, express or implied. This report may not be relied upon by any person other than the Client or BC Ministry of Energy, Mines, and Low Carbon Innovation without KCB's written consent.

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

Klohn Crippen Berger Ltd. (KCB) was engaged by Teck Highland Valley Copper Partnership (HVC) to complete the 2022 Annual Facility Performance Report (AFPR) for the Highland Tailings Storage Facility (TSF). The review period for this document is December 2021 to November 2022.

The Highland TSF comprises the structures summarized in Table 1.1 and is the primary active storage facility for operations during the review period. The facility is located on the Highland Valley Copper Mine Site (HVC Mine Site). Refer to Figure 1 for an overview of the HVC Mine Site and to Figure 2 and Figure 6 for layouts of the L-L Dam and H-H Dam areas, respectively.

Table 1.1 Highland TSF Structures

Structure [1,2]	Function
L-L Dam	Cross-valley retaining dam at the northwest end of the Highland TSF.
H-H Dam	Cross-valley retaining dam at the southeast end of the Highland TSF.
24 Mile TSF	Receives seepage from the H-H Dam and acts as storage for tailings from the H-H Pumphouse. This facility makes up the southern portion of the 24 Mile Emergency TSF, which has been used historically to store tailings and is now partially covered by the 24 Mile Waste Dump (Figure 2.6).
Seepage Water Reclaim Pond (SWRP)	Primary collection pond downstream of the L-L Dam for water from local runoff and flow from sediment ponds and seepage ponds. Water is pumped from the facility back into the impoundment.
Seepage Pond 2	Collects overflow from Sediment Pond 2, local runoff, and dam seepage. Discharges via gravity pipe/ditch to the SWRP.
Sediment Pond 1	Temporary storage of overflow and sediment from the L-L Dam downstream hydraulic cell construction. Since 2021 construction, the pond was subdivided into two sub-cells: North and South. Discharges via gravity pipe to the SWRP.
Sediment Pond 2	Temporary storage of overflow and sediment from the L-L Dam downstream hydraulic cell construction. Discharges via gravity pipe to the SWRP.
Sediment Pond 4	Contingency storage for overflow and sediments from the L-L Dam downstream hydraulic cell construction. Was not required for this purpose during the review period but does store local runoff. Discharges via overflow culvert to the SWRP.

During the review period, Mr. Bryan Bale, P.Eng. (HVC Chief Engineer – Tailings), acted in the role of the TSF qualified person (QP), and Mr. Rick Friedel, P.Eng., was the engineer of record (EoR), as a representative of KCB. These roles are consistent with the definitions in the Health, Safety and Reclamation Code for Mines in British Columbia (HSRC) (EMCLI 2021b).

The AFPR scope of work consisted of:

- a site visit to observe the physical conditions of the various containment facilities;
- review of surveillance data for the review period provided by HVC;
- review of climate and water balance data for the facility;
- review of the Operations, Maintenance and Surveillance (OMS) Manual and Emergency Preparedness and Response Plan (EPRP) to confirm they are appropriate for the facility; and
- review of construction activities completed at the site during the review period, if any.

The site visits to support the AFPR were completed by KCB representatives Mr. Friedel (EoR) on September 21 and October 19, 2022, and were accompanied by a member of HVC's Dam Safety team during the visit.

The Highland TSF is operated under the following permits:

- British Columbia Ministry of Energy, Mines and Low Carbon Innovation (EMLCI) M-11 Permit (EMLCI 2021a) – This permit covers the approved mine life and related operations, including the tailings facilities.
- British Columbia Ministry of Environment (MOE) Water Licenses 46527 and 46528 – These licences allow the diversion and storage of water from Pukaist Creek on Crown Land.
- British Columbia MOE Effluent Permit PE-376 (MECCS 2022) – This permit allows the storage of tailings and effluent in the Highland TSF.

2 FACILITY DESCRIPTION

2.1 Highland TSF

The HVC Mine Site (Figure 1) is located near Logan Lake, approximately 47 km southwest of Kamloops, in the British Columbia Interior. The Highland TSF is located approximately 6.5 km northwest of the operating Highland Mill and is approximately 10 km long.

Tailings are retained in the Highland TSF by the L-L Dam (northwest end) and the H-H Dam (southeast end), which are built across the Highland Valley at each end of the facility. The H-H Dam is constructed of local borrow and waste materials from the Valley Pit, while the L-L Dam is constructed of local borrow materials, processed filter materials, and cycloned tailings sand. Construction of the Highland TSF began in 1971 with the J-J Starter Dam, which was located approximately halfway between the H-H Dam and the L-L Dam. In 1972, the H-H Starter Dam was built, followed by the L-L Starter Dam between 1976 and 1979. By 1991, the tailings level between the H-H Dam and the L-L Dam rose above the crest of the J-J Dam.

Tailings slurry is discharged from the Highland Mill to the H-H Pumphouse at the toe of the H-H Dam. From the pumphouse, tailings are pumped to the various spigot points at the H-H Dam or to the L-L Cyclone House, which distributes tailings at the L-L Dam. Tailings are periodically discharged from the H-H Pumphouse to the 24 Mile TSF downstream of the H-H Dam.

The majority of the tailings have historically been, and continue to be, discharged from spigots near the east and west abutments of the H-H Dam. As a result, the tailings beach slopes from the H-H Dam towards the tailings pond, which is more than 7 km away, near the L-L Dam. No significant ponding occurs at the H-H Dam. Tailings are also spigotted from the L-L Dam to maintain a tailings beach between the tailings pond and the dam core. Water from the tailings pond is recirculated, via floating barges, back to the mill for use in processing.

Sections 2.2, 2.3, and 2.4 include additional information for the L-L Dam, the H-H Dam, and the 24 Mile TSF, respectively. General information regarding each retaining structure and those that manage water and sediment downstrem of the L-L Dam are summarized in Table 2.1.

Table 2.1 Containment Facilities at the Highland TSF (as of November 2022)

Structure [1]	Containment or Design Type	Crest Length (m)	Est. Crest El. (m)	Max Downstream Slope Height (m)
L-L Dam	Cycloned sand dam with a glacial till core. The dam has been raised using the centreline method. Refer to Section 2.2 for details.	2,980	1272.0	167.0
H-H Dam	Granular fill dam using the centreline method. A glacial till core has been raised through the majority of the dam. Refer to Section 2.3 for details.	1,800	1281.0 to 1287.0	57.0 [2]
24 Mile TSF	Tailings are stored below existing ground, encapsulated on all sides by waste rock. Refer to Section 2.4 for details.	n/a	1225.0 [3]	n/a [4]
SWRP	A portion of the pond is formed by excavation into natural ground with an embankment on the west side. Embankment is homogeneous glacial till with downstream sand and gravel filter. Pond is unlined.	95	1103.2	5.0
Seepage Pond 2	Excavated into natural ground on three sides, with a homogenous glacial till embankment on the north side of the pond. Pond is lined with geomembrane.	80	1116.6	1.8
Sediment Pond 1	Excavated into natural ground. Excavation has been backfilled with compacted sand and gravel to El. 1102.0 m. Containment is provided by natural ground, the L-L Dam toe, and internal berms.	700 (North) 600 (South)	1104.2	2.5
Sediment Pond 2	Excavated into natural ground on three sides, with a homogeneous glacial till embankment on the south side. Pond is lined with geomembrane.	100	1126.9	10.0
Sediment Pond 4	Excavated into natural ground with a compacted glacial till berm to provide separation from the SWRP.	n/a	1104.0	<2.0

Notes:
1. Refer to Table 1.1 for the function of each structure.
2. Existing ground downstream of the H-H Dam was formed by a waste dump that is approximately 40 m above natural ground (i.e., the H-H Dam crest is up to 97 m above natural ground).
3. Minimum elevation of surrounding waste dumps that provided containment from spill down the Roman Haul Road towards the Valley Pit.
4. The crest of the waste dump providing containment to the 24 Mile TSF is more than 1 km wide and there are no credible failure modes for the dump that could result in an uncontrolled release of tailings downstream (KCB 2018).

2.2 L-L Dam

The approved design for the L-L Dam is based on the Highland TSF 2019 Design Update (KCB 2020a), which received regulatory approval in June 2021 (EMLCI 2021a). The configuration of the L-L Dam in September 2022 is shown in Figure 2.

The L-L Dam is divided into six design segments based on foundation conditions (Figure 2):

- the South Dam;
- the Valley Buttress Berm (VBB);
- the Valley Buttress Berm Extension (VBBE);
- the North Buttress Berm (NBB);
- North Dam Bedrock; and
- North Dam Upper-Glaciolacustrine Unit (U-GLU).

The geologic and geotechnical characterization of the L-L Dam foundation is summarized in KCB (2022c), which is consistent with the requirements recommended by the Site Characterization for Dam Foundations in BC professional practice document (APEGBC 2016).

The overall downstream slope, measured from the downstream edge of the crest and the downstream toe, is 2.5H:1V except where foundation conditions govern the need for additional buttressing (i.e., VBB, VBBE, NBB, and North Dam U-GLU).

Figure 2.1 shows a typical schematic section through the VBB of the L-L Dam. General construction staging of the VBB through 2022 is shown in Figure 2.2. Figure 2.3 shows the crest elevation over the life of the structure.

The dam includes a glacial till core for seepage control, which is keyed into the foundation and extends vertically to the existing crest. The Starter Dam crest has been raised using the centreline method, with the core supported by compacted cycloned sand on the downstream side and a combination of cycloned sand and tailings beach on the upstream side. The majority of the cycloned sand fill in the dam has been placed and densified hydraulically, rather than by conventional construction equipment.

The downstream cycloned sand shell is underlain by a sand and gravel blanket drain with gravel underdrains to increase drainage capacity. The purpose of the underdrainage system is to maintain low piezometric pressures in the downstream shell to intercept upward seepage from the natural ground and to promote downward drainage during hydraulic placement of the cycloned sand dam fill. The majority of seepage intercepted by the underdrainage system flows towards the low point of the natural valley and discharges from the dam at the VBB toe. Some seepage discharges from the gravel underdrains that daylight at the toe of the VBBE but is collected by drains that report to the SWRP.

Since 2018, HVC has used cells in the downstream shell of the dam to temporarily store sediments generated by hydraulic cell placement. These pose no risk to dam performance and are beneficial, relative to the downstream sediment ponds, as they cause no downstream disturbance when they are built and are more efficient for sediment removal.

Seepage from the impoundment through the foundation (i.e., flow that is not intercepted by the underdrainage system) is managed by HVC as part of the Sulphate Adaptive Management Plan (SAMP). The SAMP system includes a diversion of Woods Creek flow around the Highland TSF to Pukaist Creek and a network of interception wells downstream of the L-L Dam. Neither component of the SAMP system is considered a design feature of the L-L Dam (KCB 2020a) but is a requirement of HVC under the conditions of the M-11 Permit (EMLCI 2021a). Water-quality monitoring is reported by HVC in a separate report as discussed in Section 5.4.

The purpose of the downstream seepage and sediment ponds is to collect mine-affected surface water and seepage with no off-site discharge. The SWRP, located downstream of the VBB toe, is the primary collection pond where all water reports and is then pumped into the Highland TSF tailings pond via a pipeline.

Figure 2.1 End of 2022 Configuration and Schematic Section Through the VBB of the L-L Dam

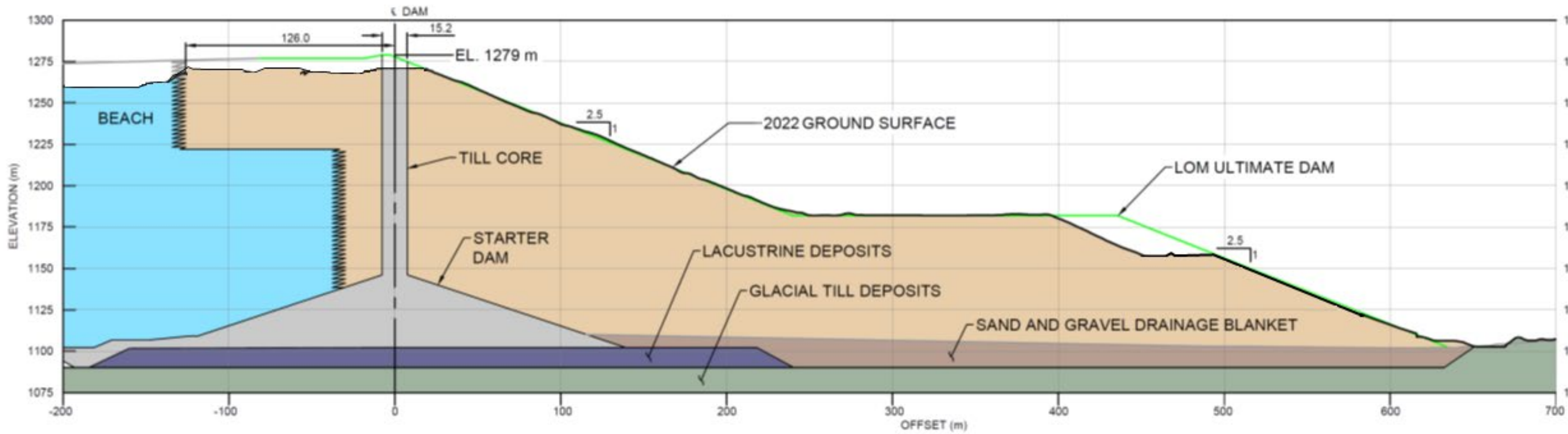


Figure 2.2 Schematic Construction Sequence, through 2022, at the VBB of the L-L Dam

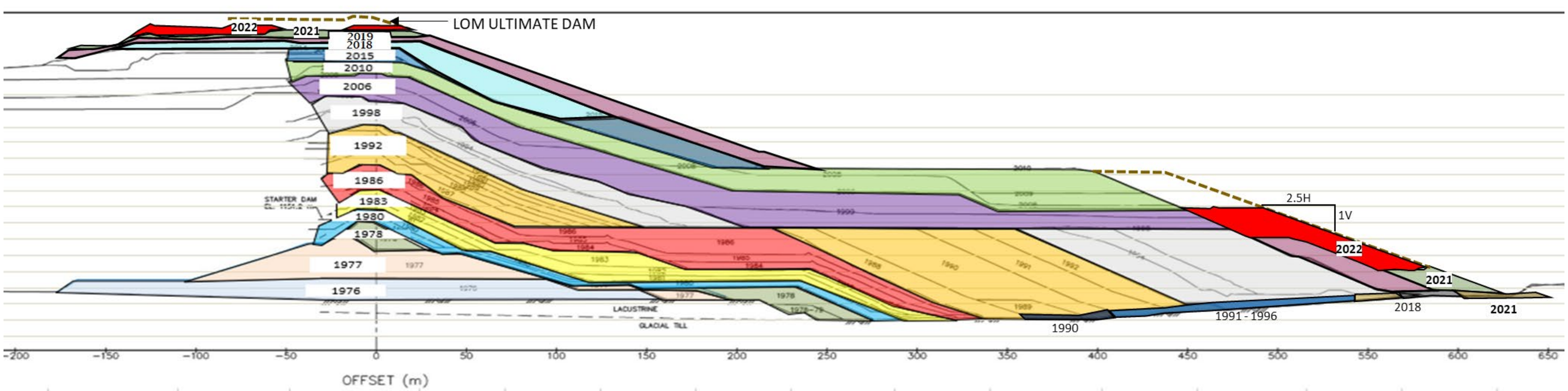
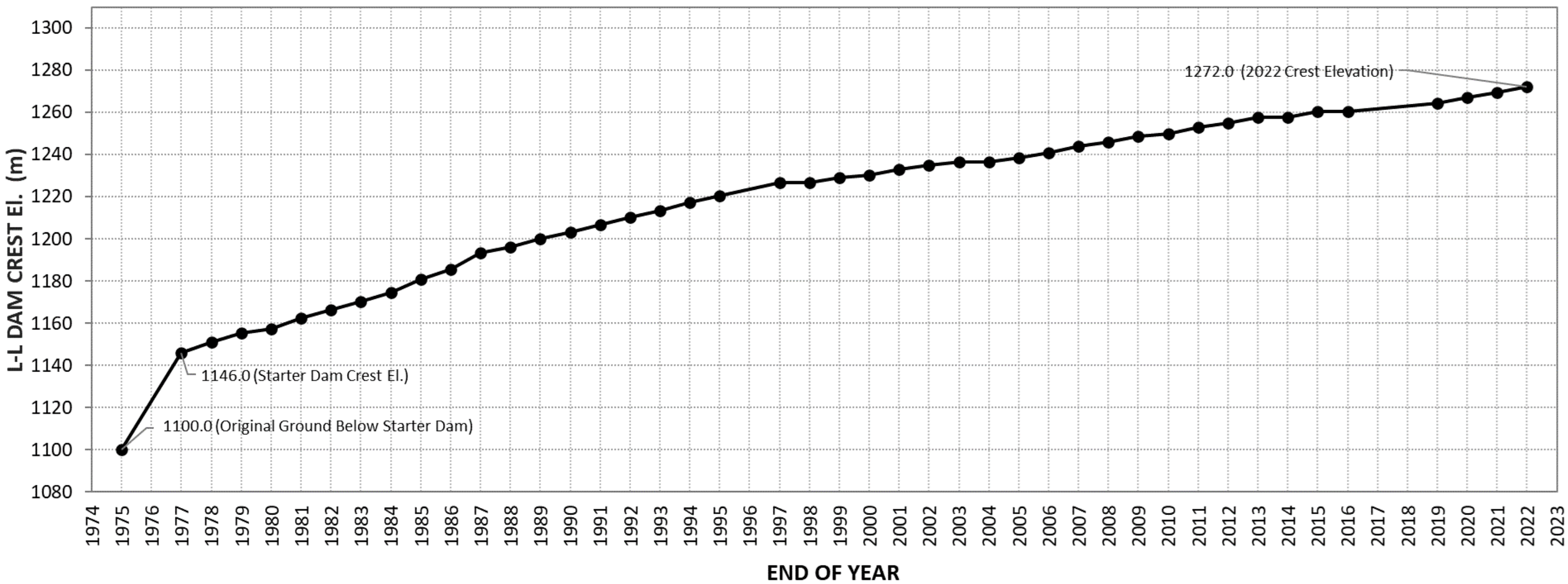


Figure 2.3 L-L Dam Crest Elevation vs. Time



2.3 H-H Dam

Similar to the L-L Dam, the approved design for the H-H Dam is based on KCB (2020a), which received regulatory approval in June 2021 (EMLCI 2021a). Figure 2.4 shows a typical schematic section near station (Sta.) 1+400 of the H-H Dam centreline. Figure 2.5 shows the crest elevation over the life of the structure.

The dam crest has been raised using the centreline method with a low-permeability core and filter zones supported by granular fills on the upstream and downstream sides. The low-permeability core, constructed of glacial till, was keyed into the foundation and elevated with each raise until it was no longer required by design (KCB 2020a). The last raise to the core was during the 2020 crest raise. The sand-and-gravel filter zone was built over the core during the 2021 crest raise (Figure 2.4) and will continue to be raised to the ultimate crest to prevent the migration of tailings into the downstream shell and waste dumps.

The majority of the downstream shell has been placed by the HVC mining fleet. Waste dumps built downstream of the H-H Dam have raised the existing ground up to 40 m above the original ground level. Near Sta. 1+400, where the downstream slope is highest at approximately 56 m, the original ground is approximately 38 m below the toe of the existing downstream slope, as shown in Figure 2.4. The waste dumps downstream of the H-H Dam are relied upon for stability, and the approved design (KCB 2020a) defines minimum buttressing requirements to be met by the 24 Mile Waste Dump.

No overtopping concern is present at the H-H Dam because the crest is higher than the L-L Dam crest (9 m at the end of the review period) and the tailings beach slopes away from the dam. Therefore, the H-H Dam crest is sloped to match the forecasted beach profile immediately upstream of the dam, not to match the rising horizontal pond surface.

Seepage from the H-H Dam reports to the 24 Mile TSF or is intercepted by the H-H Gland Wells, near the toe of the downstream slope (Figure 7), which supply water to the H-H Pumphouse.

Figure 2.4 End of 2022 Configuration and Schematic Section Through the H-H Dam Near Sta. 1+400

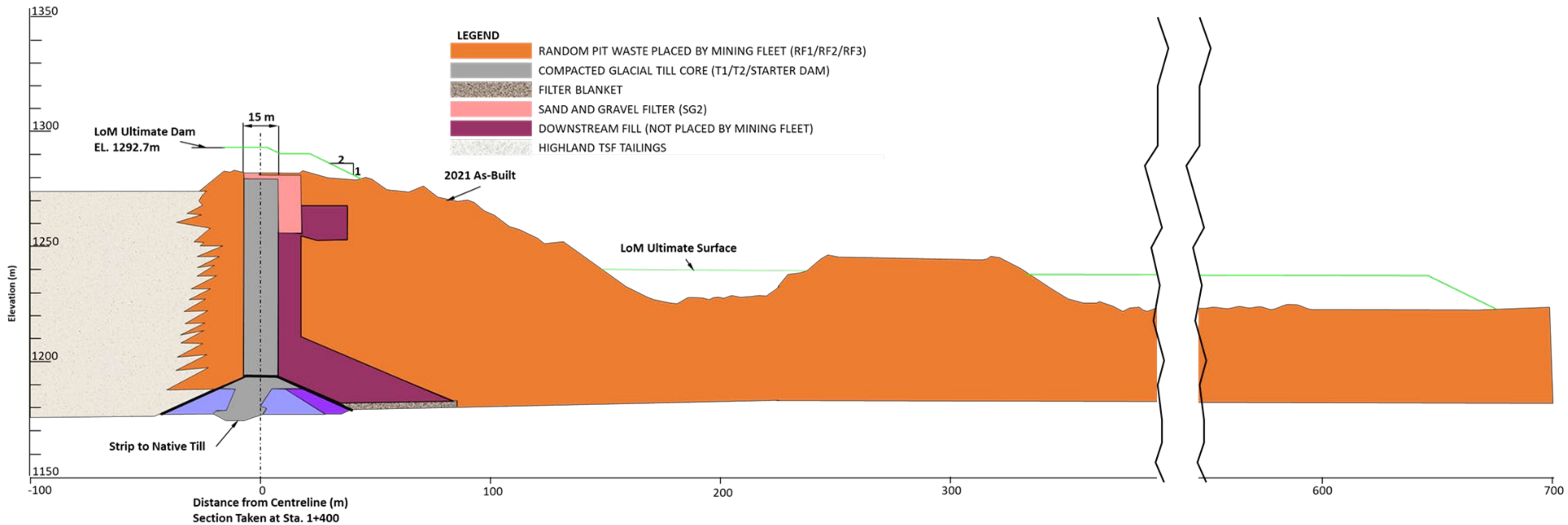
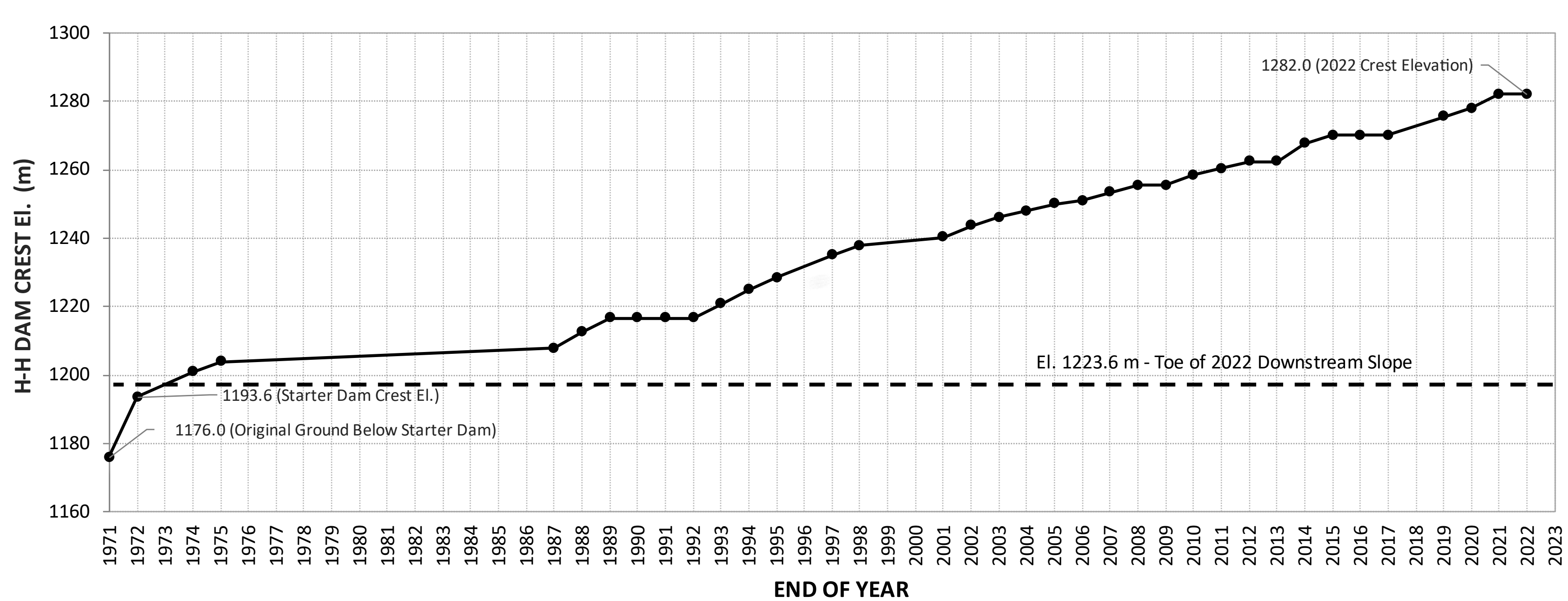


Figure 2.5 H-H Dam Crest Elevation vs. Time



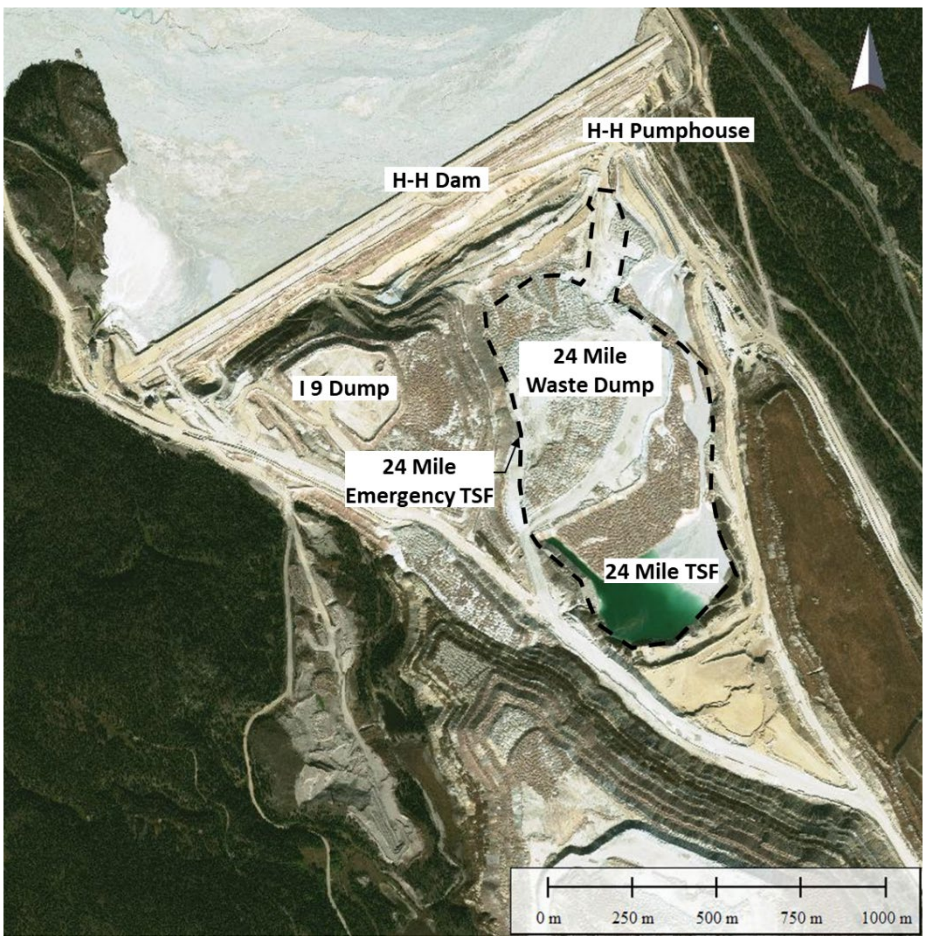
2.4 24 Mile TSF

The 24 Mile Emergency TSF is located downstream of the H-H Dam (Figure 2.6) and has been used to store overflow tailings from the H-H Pumphouse during upset or emergency conditions. Tailings, approximately 20 m thick, are contained by waste dumps around the perimeter.

Starting in 2019, HVC began capping the northern end of the 24 Mile Emergency TSF with waste rock, which has segregated the area into the following (Figure 2.6):

- 24 Mile Waste Dump – The northern portion of the 24 Mile Emergency TSF, which is being capped with waste rock. This dump provides stabilization to the H-H Dam.
- 24 Mile TSF – The southern portion of the 24 Mile Emergency TSF is uncapped and is used to store overflow tailings from the H-H Pumphouse and surface runoff. This area must be capped at the end of operations (KCB 2020a).

Figure 2.6 Plan View of the 24 Mile TSF (September 2022)



3 2022 OPERATIONS

3.1 Tailings Deposition and Available Storage

The maximum permitted ore throughput, and subsequently tailings production, allowed by the M-11 Permit (EMLCI 2021a) is 200,000 tonnes per day (tpd) calculated on an annual average basis. During 2022, the Highland Mill generated approximately 50.0 million tonnes (Mt) of tailings or approximately 137,000 tpd (Table 3.1).

Estimates of tailings deposition during 2022 are summarized in Table 3.1. Highland TSF tailings spigot locations are shown in Figure 3.1. In addition, a portion of the tailings were cycloned and used as fill to construct the L-L Dam as per design. Some tailings were discharged into the 7-Day Pond TSF during upset conditions at the Highland Mill (Figure 1) and the 24 Mile TSF during upset conditions at the H-H Pumphouse (Table 3.1). Tailings deposition in the 24 Mile TSF (0.4 Mm^3) was less than the annual forecast (0.5 Mm^3) assumed in the OMS Manual (HVC 2022).

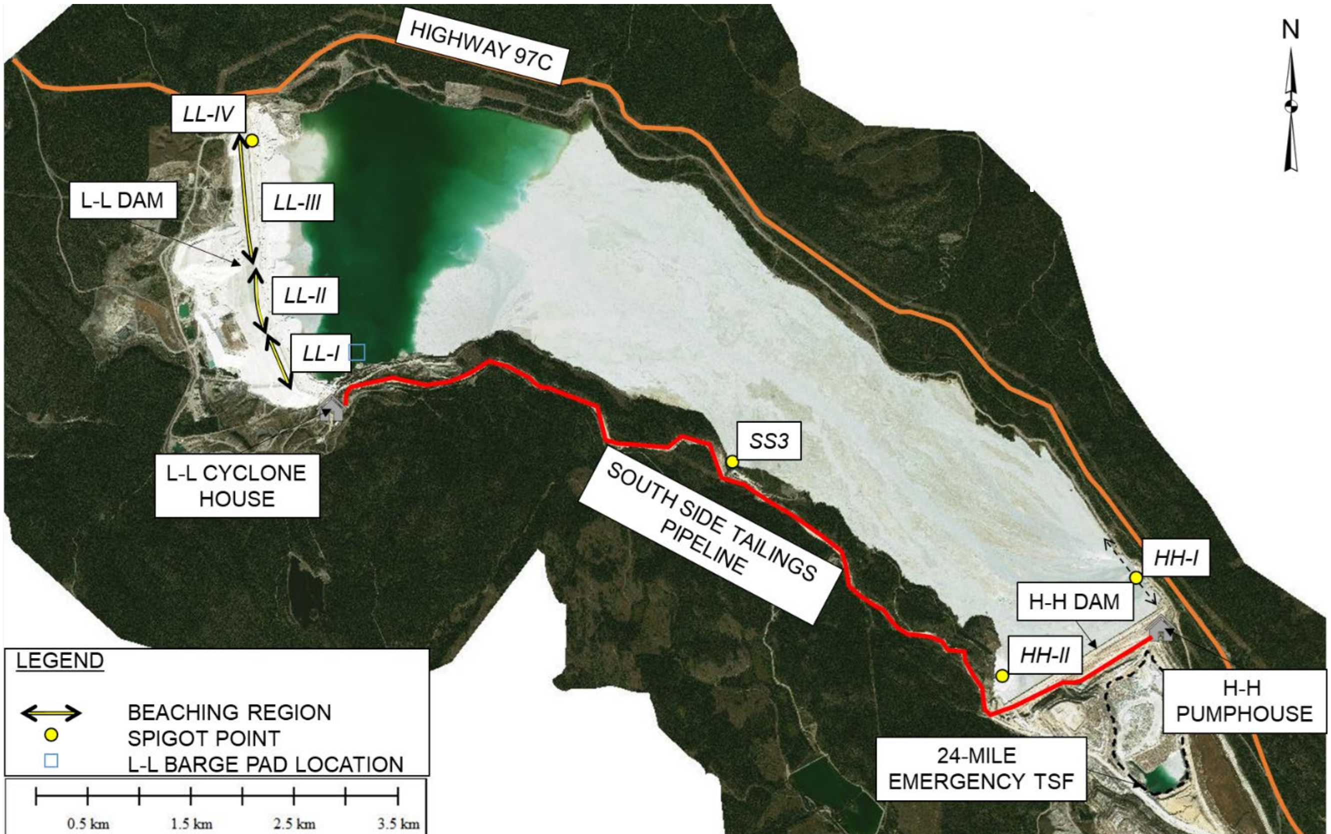
Table 3.1 2022 Tailings Deposition Summary

Discharge Area[1]	Spigot Location(s)[1]	Notes	Tailings Discharged (dry weight – Mt)[2]
HIGHLAND TSF			
H-H Dam	HH-I, HH-II	H-H Dam abutments	46.0
L-L Dam into Impoundment	LL-I, LL-II, LL-III, LL-IV	Tailings are discharged as cyclone overflow or underflow via the L-L Cyclone House or secondary cyclones on the dam crest	
L-L Dam Cycloned Sand Fill	n/a	Cycloned sand placed in the dam	3.6
24 Mile TSF	n/a	Overflow from the H-H Pumphouse	0.4 [3]
7-Day Pond	n/a	Overflow from the Highland Mill	<0.01
		Total 2022 Tailings:	50.0

Notes:
1. Refer to Figure 3.1 for spigot locations.
2. Tailings discharge quantities are provided by HVC, and estimates are based on the process-flow diagram.
3. Estimated tailings deposited from October 2021 through September 2022.

Based on deposition modelling (KCB 2022a), the dam crests at the end of 2022 are sufficient to store the estimate 50 Mt of tailings forecast to be produced by the Highland Mill during 2023 and maintain the flood storage and freeboard required by the design.

Figure 3.1 2022 Highland TSF Spigot Locations



Dam	Spigot Details			Tailings Type Discharged During 2022
	ID	Location/Station Range	No. of Points	
L-L	LL-I	0+850 to 1+650	6	Secondary Underflow and Primary Underflow
	LL-II	1+800 to 2+200	3	Secondary Overflow and Primary Underflow
	LL-III	2+600 to 3+600	6	Secondary Overflow and Primary Overflow
	LL-IV	3+800	1	Primary Overflow
H-H	HH-I	H-H East Abutment (250 m)	1	Whole Tailings
	HH-II	H-H West Abutment	1	Whole Tailings
Impoundment	SS3	SS3 – Mid-impoundment	1	Whole Tailings

3.2 2022 Dam Construction Activities

3.2.1 L-L Dam

Consistent with the life-of-mine construction plan, the L-L Dam crest was raised to El. 1272.0 m (2.5 m) during the review period. The 2022 Construction Summary Report is a record of the 2022 crest raise construction activities. This report is was being prepared at the time of writing this AFPR and will be submitted to the EMLCI prior to March 31, 2023. General activities completed at the L-L Dam are summarized in Table 3.2, and the main work areas are shown in Figure 6. In total, approximately 2.8 Mm^3 of fill were placed on the L-L Dam.

Overall, 2022 construction at the L-L Dam met with the design intent and complied with the Issued for Construction specifications and drawings. There are no outstanding non-compliances that require further action.

In addition to the activities summarized in Table 3.2, the following supporting activities were undertaken during 2022 (refer to Figure 8):

- Accumulated sediments were excavated from downstream sediment ponds and temporary on-dam sediment storage cells.
- Designated borrow areas were developed and managed.
- The Seepage Water Reclaim Pipeline was uncovered and moved onto a new pipe grade above the north abutment. The old pipe grade was mechanically backfilled with fill as per specification.

Table 3.2 Summary of 2022 Construction Activities at the L-L Dam

Construction Activity	Dam Area				
	North Dam	NBB	VBBE	VBB	South Dam
Glacial Till Core Raise	✓	✓	✓	✓	✓
Upstream Fill (Cycloned Sand – Hydraulic / Mechanical)	✓	✓	✓	✓	✓
Downstream Fill (Cycloned Sand – Hydraulic / Mechanical)	✓	✓	✓	✓	✓
Autment Preparation (includes key-in of core zone)	✓	x	x	x	✓
Foundation Preparation / Underdrainage	x	x	x	x	x

Notes:
1. Details and locations of construction activities are shown in Figure 8.

3.2.2 H-H Dam

The H-H Dam was not raised as there is adequate capacity to store tailings through the end of 2023 (Section 3.1). Some construction activities were completed around the dam during the review period and are discussed in the 2022 Construction Summary Report. One of these activities involved raising the H-H Gland Well No. 5 and No. 7 casings and the surrounding fill at the toe of the H-H Dam. During this period, gland well pumping was temporarily disrupted, which resulted in an expected change in piezometric levels in the foundation as discussed in Section 5.3.2.3.

3.3 Dam Safety Incidents

During the review period, no incidents that could have compromised the integrity of either dam or required remedial actions be taken were observed by KCB, reported by HVC, or initiated through the Trigger-Action-Response Plan (Section 5.1).

4 2022 WATER MANAGEMENT

4.1 Climate

HVC provided weather data from the L-L Dam Weather Station and the Shula Weather Station for the review period to KCB. KCB adjusted the Historical Average Lornex Synthetic Record data using the Highland TSF Area adjustment factors provided in the site-wide hydrology document (Golder 2021); refer to Table 4.1.

The L-L Weather Station stopped recording data in early August 2022 due to an equipment or electrical failure. As of December 2022, the station has not been brought back online. The Shula Weather Station was upgraded in March 2022 with new equipment (e.g., sensors, modem, power supplies).

Table 4.1 summarizes the monthly precipitation during the review period for the reference climate stations, as well as monthly average values, corrected based on the TSF area factors (Golder 2021), for comparison. The monthly precipitation record for the reporting period is shown in

Figure 4.1. Overall observations regarding precipitation trends are as follows:

- The overall precipitation patterns were similar to but magnitude was less than historic averages at both stations.
- For months that had >85% of daily readings, February to July, the L-L Dam Weather Station reported higher precipitation than the Shula Weather Station, except for April. The higher precipitation measured in April was associated with snowfall events on two days that were not measured at the L-L Dam station. Only the L-L Dam Weather Station measured monthly precipitation greater than the historic average (June and July).
- Precipitation from December 2021 through April 2022 was 53% of the historic average, based on the L-L Dam Weather Station. The lowest rain in magnitude and relative to historic averages was during March and April 2022; as will be discussed later, this was also the period when snowmelt occurred.
- The low precipitation recorded at the L-L Dam Weather Station during March and April, followed by the above-average precipitation in June and July, is a better match to the observed freshet intensity shown by the Shula Weater Station data.
- Precipitation from August 2022 through October 2022 was 22% of the historic average, based on the Shula Weather Station.
- The L-L Dam Weather Station has been the primary reference for precipitation magnitudes and trends at the Highland TSF. Although the overall trends at the Shula Weather Station are similar to those at the L-L Dam Weather Station, there are differences in precipitation magnitude measured at each station. KCB recommends that HVC repair the L-L Dam Weather Station to monitor precipitation and temperature.

KCB also reviewed the available rainfall data for storm events and noted the following:

- Rainfall storm events during the review period were less than the 10-year return period annual rainfall event: 40 mm in 24 hours (Golder 2021).
- The largest 24-hour rainfall events measured at the L-L Dam Weather Station during the review period were: 20.4 mm on July 3, 2022, and 15.5 mm on June 14, 2022.

Table 4.1 Monthly Precipitation for the Review Period (December 2021 to November 2022)

Month	Availability of Data (%)		Precipitation (mm)		
	L-L Dam Weather Station	Shula Weather Station	L-L Dam Weather Station Data	Shula Weather Station Data (Corrected)(1)	Historic Monthly Average Climate Values (Corrected)(2)
Dec 2021	100	*Not provided*	34.3	*Not provided*	32.1
Jan 2022	100	74	22.3	12.5	37.5
Feb 2022	100	100	14.0	8.8	40.6
Mar 2022	100	87	7.3	7.7	36.2
Apr 2022	100	97	11.5	19.2	22.9
May 2022	100	100	32.9	26.3	20.7
Jun 2022	100	100	74.8	43.8	21.6
Jul 2022	98	100	37.9	27.6	40.2
Aug 2022	24	100	8.2	7.3	44.8
Sep 2022	0	100	*No readings*	12.2	35.0
Oct 2022	0	100	*No readings*	6.4	33.2
Nov 2022	0	100	*No readings*	37.6	31.4
Annual Total	–	–	243.2 (9 months)	209.4 (11 months)	396.2

Notes:
1. Monthly precipitation recorded at the Shula Weather Station, converted based on adjustment factors provided in Golder (2021).
2. Historical monthly averages based on the Lornex synthetic climate record, converted based on TSF Area adjustment factors provided in Golder (2021).

Seasonal snowpack depth is not measured at the L-L Dam Weather Station. Instead, HVC monitors snowpack with monthly measurements at the Highland Valley Snow Survey Station (Station No. 1C09A). Snowpack measurements during the review period are reported in Figure 4.2 in snow-water equivalent (SWE) along with temperature data from the L-L Dam Weather Station. The following observations are inferred from this data:

- The daily temperatures recorded between January and June 2022 are generally within the historic monthly average records (Golder 2021), with some notable cold periods prior to March 2022.
- Snowpack melt started in March, but the majority of the melt occurred during April, with the snow gone by the beginning of May. This is consistent with the historical warming period and forecast snowmelt pattern used in the site-wide water balance (Golder 2020a).

- Consistent with historic observations, temperature, not rain, is the primary factor that drove snowmelt during the review period. Snowmelt started in March, when daily temperatures started to rise and were consistently above 0°C, and had completed by the end of April. During that same period, precipitation was less that 50% of the historic averages based on the L-L Dam weather Station (Table 4.1).

Figure 4.1 Highland TSF Monthly Precipitation Summary: December 2021 to November 2022

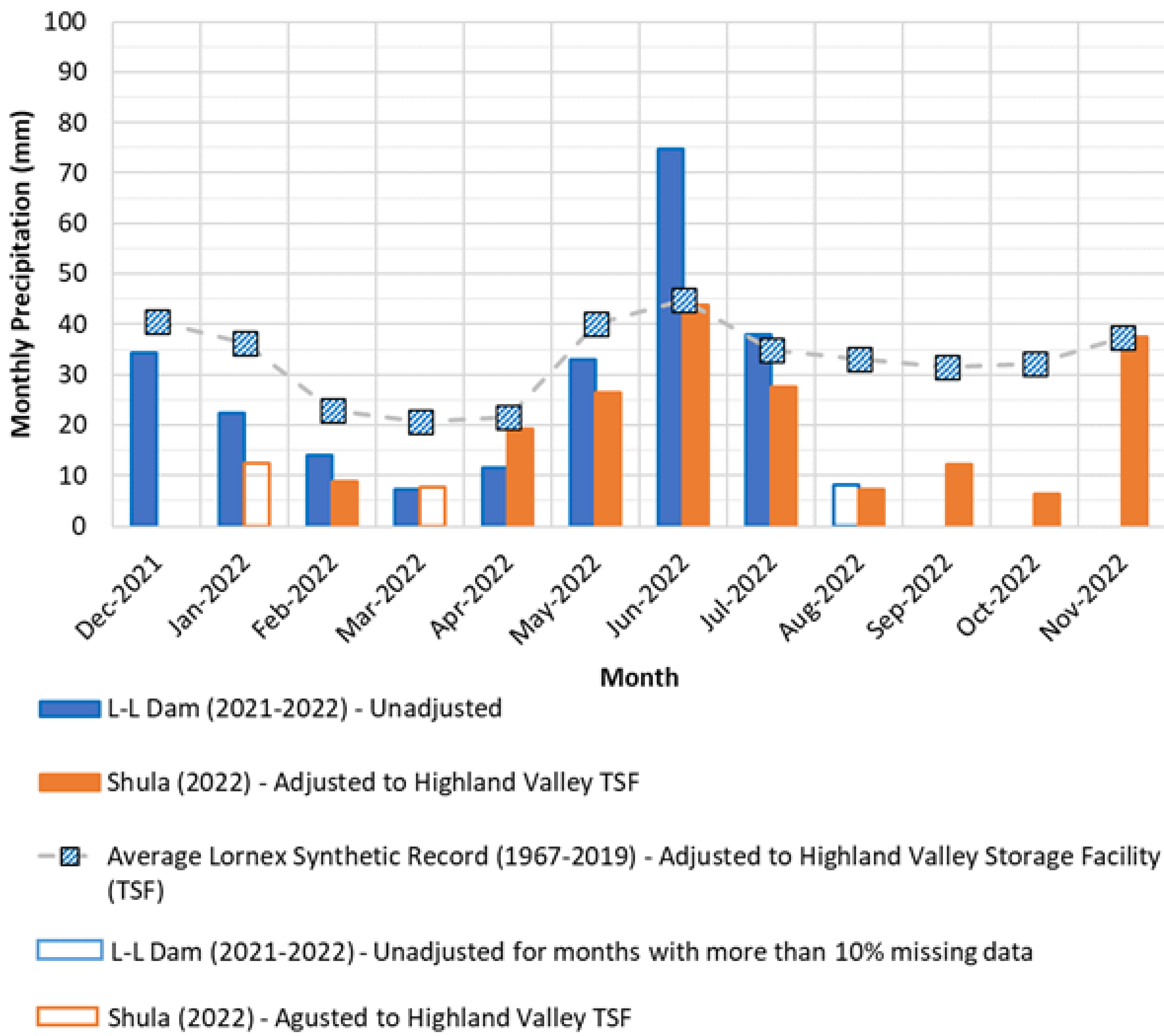
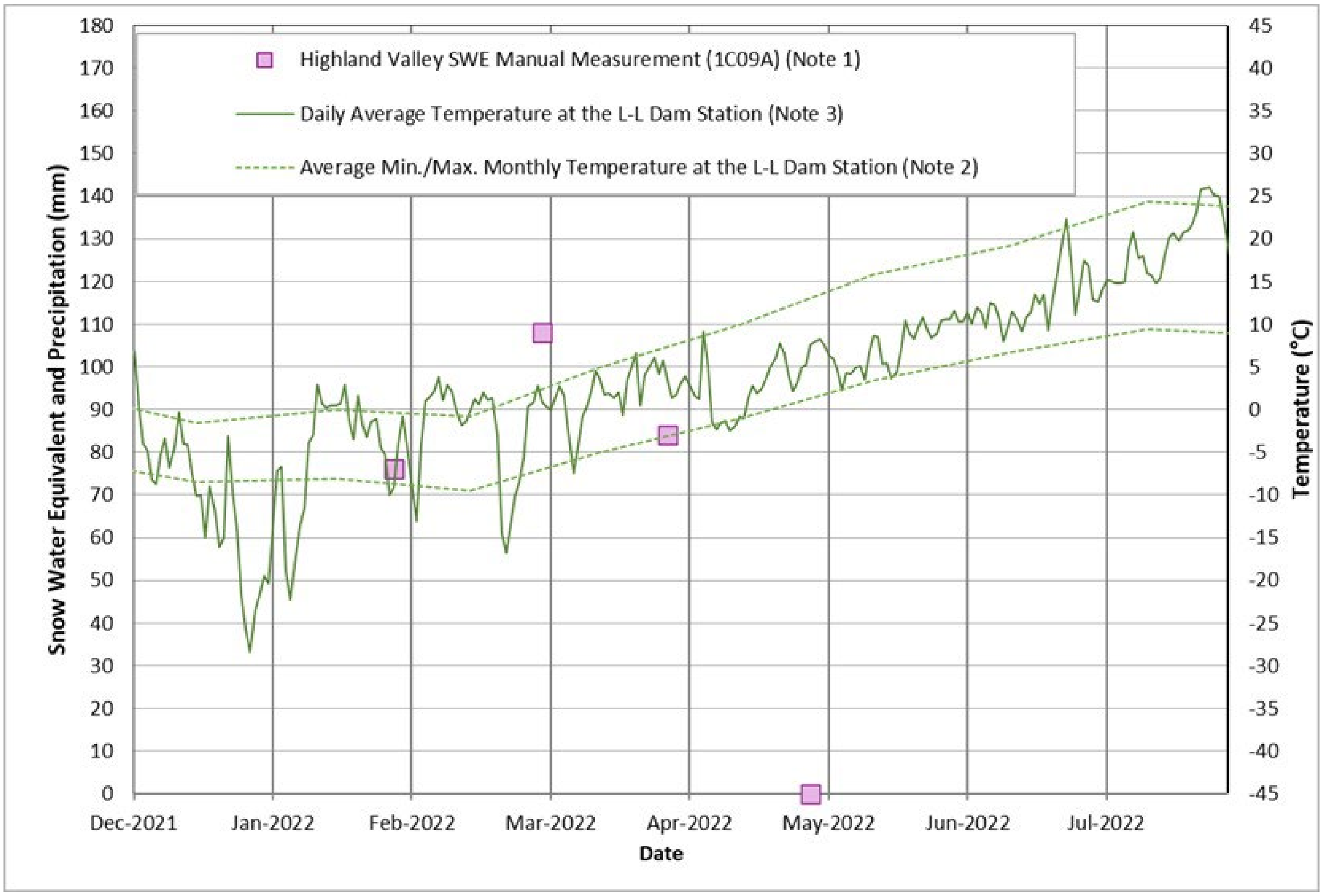


Figure 4.2 Measured Temperature and Snowpack: December 2021 and July 2022



Notes:
1. SWE is manually measured at the Highland Valley snow pillow station (1C09A).
2. Daily average temperature data at the L-L Dam Weather Station for 2022 was provided by HVC.
3. The average maximum and minimum monthly temperatures at the L-L Dam Weather Station were developed by Golder (2021).

4.2 Water Balance

HVC manages the Highland TSF tailings pond to maintain volumes within a target range of 8 Mm^3 to 25 Mm^3 as described in the OMS Manual (HVC 2022). If the pond volume is temporarily outside this target range, the dam is still in compliance with design-provided flood storage, freeboard, and beach width criteria being met.

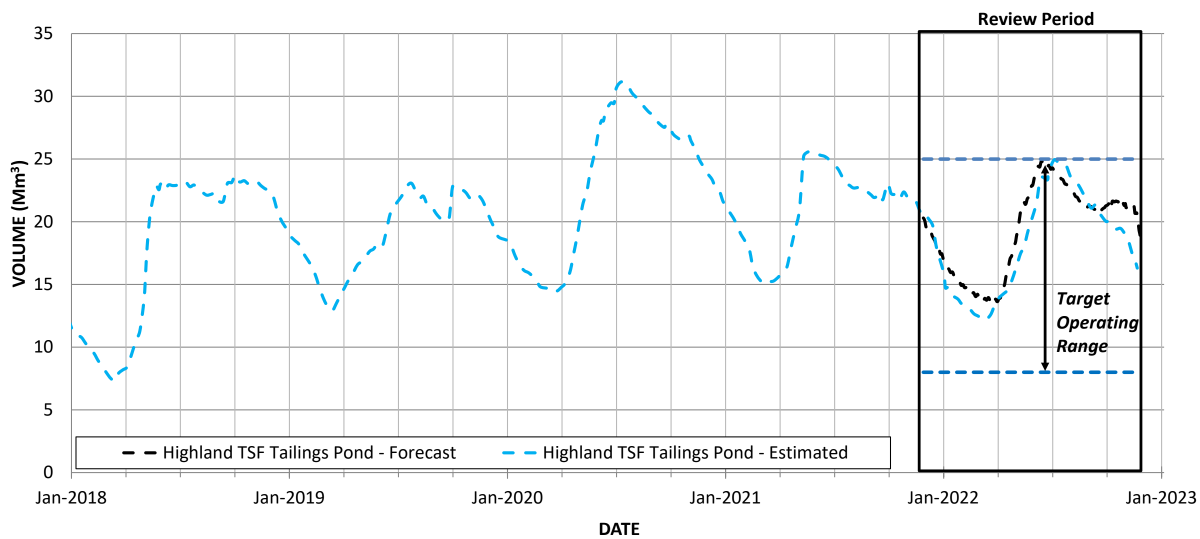
There are no surface water discharges from the facility directly to the environment. Mill water reclaim, evaporation, and entrainment are the major sources of water loss from the Highland TSF. Seasonal climate fluctuations have the greatest influence on pond volume changes. Pond volumes are typically decreasing except during freshet. The magnitude of freshet typically has the greatest impact on the annual change in pond volume.

HVC maintains a predictive water balance, based on the process-flow diagram shown in Figure 10 to forecast tailings pond volume. These predictions are used in tailings deposition and crest rate of rise estimates. HVC also tracks pond volume based on estimates from bathymetric surveys and measured pond levels for comparison with forecast values and to support model calibrations. Figure 4.3 plots the measured estimates of Highland TSF pond volume since 2017 and pond volume forecast[5] for the review period provided by HVC.

There was very good agreement between estimated pond volumes during the review period and those predicted by the model (Figure 4.3). The general pattern from both was consistent with typical seasonal fluctuation and was maintained within the target operating range. The predictive model showed a pond volume increase starting in September 2022, which was not realized based on volume estimates but is not significant relative to performance. The absence of this late-year increase in pond volume resulted in the estimated pond volume being approximately 4.3 Mm^3 less than forecast (Table 4.2).

The impact of the Highland TSF water balance on pond levels during the review period are discussed in Section 5.2.1.

Figure 4.3 Highland TSF Pond Volume: 2017 to 2022



[5] Forecast shown is based on the predictive modelling done by HVC during 2022, assuming average climatic conditions.

Table 4.2 Change in Pond Volume During the Review Period for the Highland TSF

Metric		Volume (Mm^3)
Estimated Pond Volume Based on Pond Level and Bathymetric Survey	Pond volume on November 26, 2021	20.8
	Pond volume on November 20, 2022	16.5
	Est. Annual Change in Pond Volume	4.3

4.3 Flood Management

The Highland TSF flood management structures are summarized in Table 4.3, along with the applicable design criteria and flood characteristics. The results of flood-routing analysis at each structure are discussed below:

- All of the structures can safely manage or store the applicable Inflow Design Flood (IDF) (see Table 4.3) without off-site discharge.
- Flood requirements for Sediment Ponds 1 and 4 are not reported, as both drain directly into the SWRP before overtopping the perimeter crest and are included in flood routing for the SWRP.
- The SWRP relies on pumping to maintain water levels year-round. During the IDF, the pond may inundate the surrounding area, mainly Sediment Pond 1 (KCB 2020a), potentially impacting HVC operations. However, the downstream Laura Lake public road (El. 1108.0 m) prevents an off-site discharge. HVC increased the SWRP reclaim pumping capacity from 8,100 gpm to 8,800 gpm, which increases the magnitude of flood that can be accommodated before inundating the adjacent area.
- During the review period, KCB updated flood routing for Seepage Pond 2 (KCB 2022b) based on the most recent site hydrology (Golder 2021) and storm distribution based on the BC Extreme Flood Project. The revised modelling concluded that the existing Seepage Pond 2 has the capacity to route the IDF. Based on this finding, HVC demobilized the temporary pump that had been stationed to increase discharge capacity.

Table 4.3 Inflow Design Flood Requirements for the Highland TSF Structures

Facility	Routed or Stored (Outflow)	Inflow Design Flood[1]	Design Event	Design Outflow / Stored Volume
Highland TSF	Stored	PMF	PMF 120-hour	50.3 Mm^3
24 Mile TSF	Stored	1/3 between 1,000-year and PMF	1/3 between 1,000-year and PMF 72-hour	3.2 Mm^3
Seepage Pond 2	Routed (Pipe)[3]	Between 100-year and 1,000-year	100-year, 24-hour[2]	3.2 m^3/s
Sediment Pond 2	Routed (Pipe)[3]	Between 100-year and 1,000-year	100-year, 24-hour[4]	0.2 m^3/s
SWRP	Routed / Stored[5]	Between 100-year and 1,000-year	100-year, 72-hour[2]	0.3 Mm^3

Notes:
1. The IDF events meet the requirements under the HSRC (EMLCI 2021b) as discussed in Section 7.1.
2. Based on KCB (2020a).
3. Seepage Pond 2 and Sediment Pond 2 IDFs are routed to the SWRP.
4. Based on KCB (2022b).
5. During the IDF, some water would be reclaimed back to the Highland TSF, but the majority of flow would be stored.

5 2022 DAM SURVEILLANCE SUMMARY

5.1 Surveillance Program

The OMS Manual (HVC 2022) was updated and reissued during the review period. This was a routine update to the document, which included revisions to the surveillance program agreed with the EoR. The surveillance program in the OMS Manual (HVC 2022) remains appropriate for the Highland TSF facility and includes the following: visual inspections, measured behaviour from more than 300 instruments (e.g., piezometers, inclinometers, and settlement), pond level readings, and a Trigger-Action-Response Plan (TARP).

HVC completed the Highland TSF surveillance activities defined in the OMS Manual (HVC 2022) at the specified frequencies as summarized in Table 5.1.

The following reviews of measured behaviour and performance are included as routine activities in the surveillance program:

- HVC Weekly Surveillance Review Meeting – A summary of routine inspections, surveillance data, and activities at the Highland TSF is reviewed by the HVC Tailings Group, including the QP, during a weekly intradepartmental meeting.
- Monthly EoR Surveillance Reviews – The EoR completes a monthly review of the L-L Dam and the H-H Dam surveillance information, which is documented in a Routine Monitoring Review (RMR) memo. The RMR summarizes the interpretation of instrument exceedances, construction and beaching activity, comments on general trends observed, changes to instrumentation (e.g., repairs/replacement, operational status), and a register of short-term actions related to instrumentation and monitoring. The EoR presents a summary of the interpreted performance to the HVC Tailings Review Board (TRB) at each meeting (three during the review period) to keep the TRB apprised of the status and to give them an opportunity to provide feedback. Based on the information presented at each meeting, the TRB concurred with the EoR's interpretation that the structures are performing as intended.
- Routine EoR Review of Localized Response – A localized deviation from historic or expected behaviour at an instrument will trigger the first level of the TARP[6], referred to as "Notification Level." An exceedance of the Notification Level does not represent a dam safety concern or unacceptable performance but requires a review by the EoR that focuses on the following:
    - assess the cause for the measured response (e.g., faulty instrument, change in soil behaviour, change in loading or operational activity such as beaching);
    - review the measured response in nearby instruments to identify whether the response is localized or regional;
    - confirm the behaviour does not indicate unacceptable behaviour and/or if a higher TARP level should be triggered;

[6] TARP = Trigger-Action-Response Plan.

- recommend appropriate actions, if any, as follow-up (e.g., repeat reading, confirm recent activity in area, revise thresholds or triggers based on new interpretation); and
- document the review.

As planned, HVC commissioned a Dam Safety Review (DSR) during 2022. The site visit was completed during the review period and a summary report will be issued in 2023. Preliminary findings, provided by the DSR review team, state that the Highland TSF is a well-operated facility and no significant dam safety issues have been identified. Governance, review, and risk management processes are highly advanced and appear to have full site and corporate support.

HVC has been collecting INSAR data since January 2021 as part of a site-wide trial. The information will be reviewed as a potential supplementary method for monitoring deformation at the Highland TSF during 2023.

Table 5.1 Summary of Highland TSF Surveillance Activities During the Review Period

Monitoring Activity	Facility	Minimum Frequency[1]	Documentation	Review Period Compliance[1]	Notes for the Review Period
Inspections					
Routine Visual Inspections [2]	L-L Dam / H-H Dam	Weekly	HVC Inspection Reports	Yes (refer to Notes)	HVC completed weekly inspections throughout the review period at the L-L Dam and H-H Dam. ▪ One weekly inspection form was not available for the L-L Dam, but daily inspection records by inspection demonstrate inspections were completed.
	24 Mile TSF / Waste Dump	Quarterly			
	Sediment and Water Ponds	Monthly			
Event-Driven Visual Inspections	L-L Dam / H-H Dam / 24 Mile TSF / Sediment and Water Ponds	When triggered [3]	HVC Inspection Reports	N/A	No event-driven inspections were triggered during 2022.
EOR Visual Inspection	Highland TSF	Quarterly	AFPR	Yes	Dates: March 10, May 13, September 21, and October 19.
Annual Facility Performance Report	Highland TSF	Annual	AFPR	Yes	This report.
Dam Safety Review (DSR)	Highland TSF	Every 5 years	DSR Report	Yes	HVC commissioned DSR in 2022; report to be finalized in 2023.
Visual Inspection of Beach Length	L-L Dam	Weekly (visual)	HVC Inspection Reports	Yes	
Instrumentation Monitoring					
Pond Level	Highland TSF / 24 Mile TSF	Weekly	Pond Level Tracking Register	Yes	Pond level readings at SWRP and Seepage Pond 2 converted from visual to instrumented pond level readings in 2022.
	Sediment and Water Ponds	Monthly and weekly during freshet			
Instrumentation – Piezometers	L-L Dam / H-H Dam	Varies [4]	GeoExplorer Database	Yes	There were temporary periods where some piezometers and inclinometers were out of service. However, due to redundancy throughout the system, there was no period when the dam did not have adequate functional instrumentation to monitor performance.
Instrumentation – Inclinometers	L-L Dam / H-H Dam	Varies [4]	GeoExplorer Database	Yes	
Instrumentation – Sondex (Settlement)	H-H Dam	Every 2 Months	Sondex Tracking Register	Yes	–
Survey Monuments	H-H Dam Lock-block Wall	Monthly (no construction) / Weekly (construction)	Survey Tracking Register	Yes	No surveys completed while there was snow cover obstructing.
Instrumentation – Seepage Weirs	L-L Dam	Weekly	HVC Inspection Reports	Yes	–
Surveys					
Construction Record Surveys	L-L Dam / H-H Dam / 24 Mile TSF	Annually	Construction Record Report and Drawings	Yes	Issued as a separate report.
Tailings Pond Bathymetric Surveys	Highland TSF	Twice per year	Facility Performance Report	Yes	Surveys completed in May and September 2022.
Tailings Level (Buffer)	H-H Dam	Weekly	HVC Inspection Reports	Yes	–
Survey of Beach Length	L-L Dam	Twice per year	HVC Inspection Reports	Yes	Aerial images completed in May and September 2022.

Notes:
1. As defined in OMS Manual (HVC 2022).
2. Visual inspections include pond level measurements and observations for evidence of unusual conditions and/or dam safety concerns (e.g., settlement, sinkholes, slope sloughing, erosion, seepage, piping, etc.).
3. HVC staff are to complete an event-driven inspection in response to one of the following events: earthquake greater than magnitude 5, within 100 km of the site, or any earthquake felt at the site; and rainfall event greater than the 10-year, 24-hour duration storm: 40 mm (Golder 2020b).
4. The monitoring frequency of instruments is defined by the EoR and varies based on several factors such as monitoring purpose, location, and instrument type.

Instrumentation System and Health

Table 5.2 summarizes the functional geotechnical instruments at the L-L Dam and H-H Dam. The number of instruments is sufficient to demonstrate the dams are performing within acceptable limits and consistent with design. Instrument locations are shown in Figure 3, Figure 4, Figure 5, and Figure 7. The instrumentation system includes sufficient redundancy to mitigate the impact of an instrument loss. During the review period, eight instruments were reported as defunct at the L-L Dam, whereas nine were reported defunct at the H-H Dam.

New instruments installed at both dams are summarized in Table 5.3. The installations were intended to address two AFPR recommendations (Table 8.1). The primary purpose of drilling at the L-L Dam was to install replacement inclinometers and additional piezometers. Drilling at the H-H Dam was primarily intended to install additional piezometers to increase coverage area and redundancy.

The attempt to replace the defunct inclinometer LL-I15-24 at the VBB, as recommended in the 2021 AFPR (Table 8.1), was unsuccessful. HVC has scheduled another attempt during 2023.

Table 5.2 Active Geotechnical Instrumentation at the L-L Dam and H-H Dam (November 2022)

Instrument	Type	Reading (1)	L-L Dam		H-H Dam	
			No.	Total	No.	Total
Piezometers	Standpipe	Manual	63	217	0	38
	Converted Standpipe to Vibrating Wire	Automated	53		38	
	Vibrating Wire	Automated	101		0	
Inclinometers	Down-Hole Casing	Manual	15	37	4	7
	In-Place Inclinometer (IPI) (2)	Automated	1		0	
	ShapeArray (SAA or SAAV) (2)	Automated	21		3	
Settlement	Sondex (3)	Manual	0	0	4	4
Seepage Weir	–	Manual	2	2	0	0

Notes:
1. Automated readings are transmitted through the remote monitoring system to increase data capture and summarize instrumentation.
2. SAA/SAAV are installed in down-hole casing inclinometers over the elevation range defined by the EoR to target the monitoring zone.
3. Sondex settlement monitoring systems were installed at the HH17 series inclinometers.

Table 5.3 Geotechnical Instruments Installed at the L-L Dam and H-H Dam During the Review Period

<table>
<tr><th>Design Segment</th><th>Instrument Type</th><th>Instrument ID</th><th>Target Monitoring Unit</th><th>Primary Purpose</th></tr>
<tr><td colspan="5">L-L DAM</td></tr>
<tr><td rowspan="4">VBB</td><td rowspan="3">Vibrating Wire Piezometer</td><td>LL-VWP22-09A</td><td>Granodiorite</td><td rowspan="3">Hole drilled to replace defunct inclinometer (LL-I15-24) but was unsuccessful.</td></tr>
<tr><td>LL-VWP22-09B</td><td>D-GLU</td></tr>
<tr><td>LL-VWP22-09C</td><td>L-GLU</td></tr>
<tr><td>Inclinometer</td><td>LL-I21-14</td><td>L-GLU</td><td>Replacement for inclinometer LL-I10-06, which became defunct.</td></tr>
<tr><td>NBB</td><td>Inclinometer</td><td>LL-I22-08</td><td>Mudstone Layers</td><td>Replacement for inclinometer LL-I21-05, which was unsuccessfully installed in 2021.</td></tr>
<tr><td rowspan="4">North Dam U-GLU</td><td>Inclinometer</td><td>LL-I22-07</td><td>U-GLU</td><td rowspan="4">Replacement for inclinometer LL-I99-06, which became defunct in 2021.</td></tr>
<tr><td rowspan="3">Vibrating Wire Piezometer</td><td>LL-VWP22-07A</td><td>Glaciofluvial</td></tr>
<tr><td>LL-VWP22-07B</td><td>Stratified Till</td></tr>
<tr><td>LL-VWP22-07C</td><td>Fill / Glacial Till Contact</td></tr>
<tr><td colspan="5">H-H DAM</td></tr>
<tr><td rowspan="6">Mid-Segment (Buttress)</td><td rowspan="6">Vibrating Wire Piezometer</td><td>HH-VWP22-01A</td><td>Sand and Gravel</td><td rowspan="6">Increase monitoring coverage and redundancy in key buttress area downstream of existing dam slope.</td></tr>
<tr><td>HH-VWP22-01B</td><td>Glacial Till</td></tr>
<tr><td>HH-VWP22-03A</td><td>Clay Layer 2</td></tr>
<tr><td>HH-VWP22-03B</td><td>Waste Rock</td></tr>
<tr><td>HH-VWP22-04A</td><td>Glacial Till</td></tr>
<tr><td>HH-VWP22-04B</td><td>Waste Rock</td></tr>
<tr><td rowspan="4">West Abutment</td><td rowspan="4">Vibrating Wire Piezometer</td><td>HH-VWP22-05A</td><td>Granodiorite</td><td rowspan="4">Piezometer monitoring upstream and downstream of centreline to monitor piezometric levels and gradients through the abutment.</td></tr>
<tr><td>HH-VWP22-05B</td><td>Waste Rock</td></tr>
<tr><td>HH-VWP22-06A</td><td>Granodiorite</td></tr>
<tr><td>HH-VWP22-06B</td><td>Waste Rock</td></tr>
</table>

Trigger-Action-Response Plan

The Highland TSF surveillance program includes a TARP with four levels that represent conditions of potentially increasing concern ranging from a routine engineering review to a design assumption deviation, up to initiation of the EPRP. The TARP defines what actions must be taken, within what timeframe, and who is responsible if a defined level is exceeded. Triggers define when a TARP level has been exceeded. Triggers and related instrument threshold values were reviewed and updated by the EoR during the review period and included in the OMS Manual (HVC 2022).

Instrumentation triggers for the first level of the TARP, referred to as the Notification Level, are based on exceedance of the threshold value at a single instrument. Instrumentation triggers for all other levels of the TARP require an exceedance at multiple instruments and potentially other observations of unusual performance (e.g., visual observation), indicative of a regional rather than a localized response.

No TARP levels, other than the Notification Level, were triggered by instrument readings for the EoR review during the review period. Notification Level exceedances at each dam are summarized in Sections 5.2.3.1 and 5.3.2.1. These exceedances should not be interpreted as an indicator of unacceptable performance or a dam safety concern. Notification Level thresholds are set to inform the EoR and HVC of variation from typical or expected responses to initiate a proactive review of the instrument readings (i.e., Routine EoR Review of Localized Response) to ensure such deviations do not go unnoticed in the extensive instrumentation record.

5.2 L-L Dam Performance Summary

5.2.1 Pond Levels and Freeboard

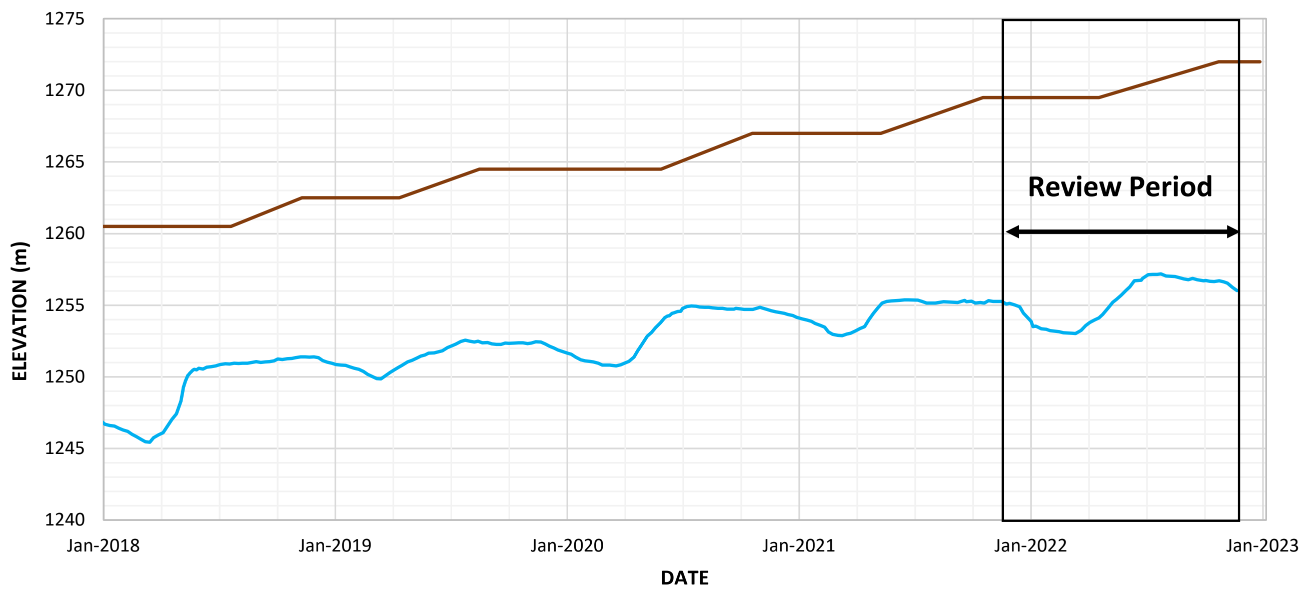
Figure 5.1 plots the measured Highland TSF tailings pond elevation and the L-L Dam crest since 2017. Figure 5.2 plots pond elevations and estimated volumes during the review period. The annual pond rise during 2022, based on peak levels, was consistent with the average since 2017 (Table 5.4).

Over the review period, the pond rose 0.9 m, approximately half of the average value since 2017. The L-L Dam crest was raised by 2.5 m over that same period. This has no impact on life-of-mine construction planning as the crest rate of rise at both dams is governed by tailings beach level, not flood storage.

Table 5.4 Highland TSF Changes in Pond Elevation During the Review Period

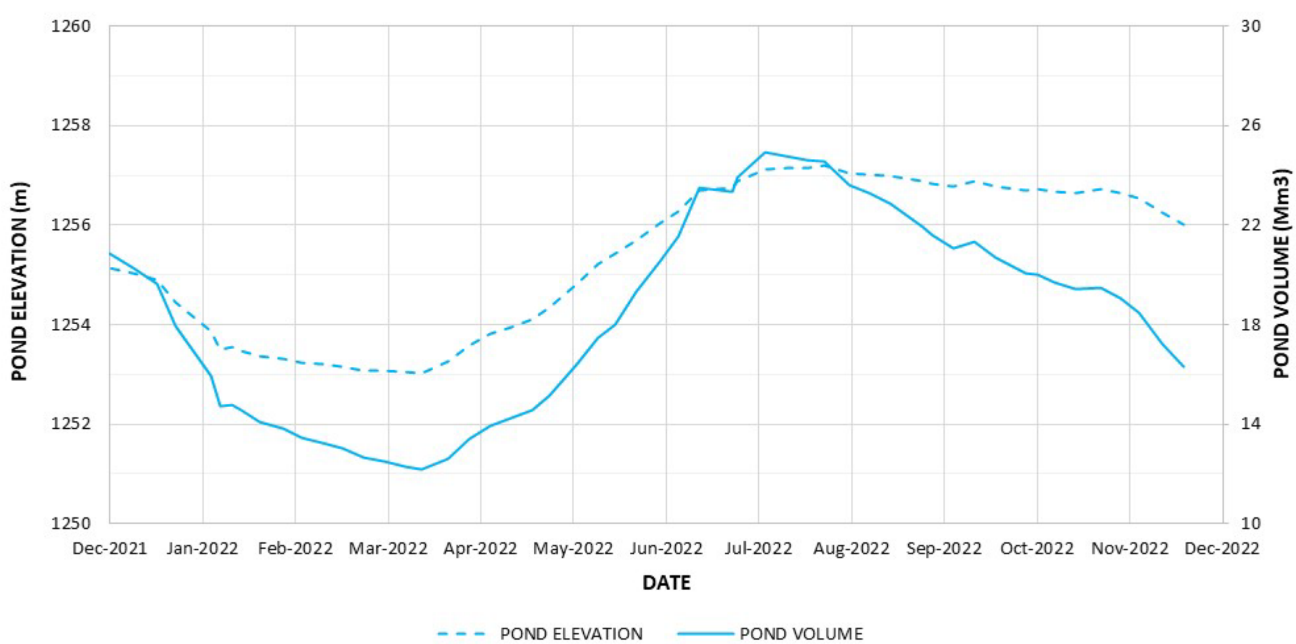
Annual Measured Change (Relative to Prior Year)	Reporting Period	Range of Annual Pond Level Change 2017 to 2021
Peak Pond Level	1.8 m	0.4 m to 3.4 m (avg. 1.8 m)
Pond Level at End of Review Period	0.9 m	0.5 m to 3.9 m (avg. 1.7 m)

Figure 5.1 Highland TSF Tailings Pond and Crest Elevations: 2017 to 2022



Note: There was no crest raise of the L-L Dam during 2017.

Figure 5.2 Highland TSF Tailings Pond Elevations and Estimated Volumes During the Review Period



The minimum freeboard measured during the review period at the L-L Dam and the downstream ponds are summarized in Table 5.5. Target flood freeboard requirements were met at all facilities during the review period. The minimum freeboard measured at the L-L Dam (12.3 m) was measured in July at peak pond level, prior to completion of the 2022 crest raise. At the end of the review period (November 2022), freeboard at the L-L Dam had increased to 16 m relative to 14.5 m at the end of November 2021.

Table 5.5 Summary of Freeboard Requirements and Minimum During the Review Period

Facility	Minimum Freeboard		
	Required During IDF(1)	Predicted During Peak Design Flood Level	Observed During the Review Period
Highland TSF	2.0 m	7.0 m (2)	12.3 m (3)
Sediment Pond 1	0.5 m	0.5 m	2.0 m (4)
Seepage Pond 2	0.5 m	0.5 m	1.5 m
Sediment Pond 2	0.5 m	0.5 m	1.5 m
Seepage Water Reclaim Pond	0.5 m	see Note 5	1.8 m (6)

Notes:

1. Refers to the minimum vertical distance between peak pond level during the IDF and the low point of the crest.
2. The minimum estimated freeboard at the L-L Dam if the IDF had occurred at peak 2022 pond level (July 2022) and the L-L Dam crest elevation at the time (El. 1269.5 m).
3. Based on peak 2022 pond level (El. 1257.2 m, July 2022) and the L-L Dam crest elevation at the time (El. 1269.5 m).
4. Measured relative to the overflow point into the SWRP.
5. During the IDF, water from the SWRP would flood the adjacent area, mainly Sediment Pond 1, potentially impacting HVC operations but resulting in no off-site discharge. The peak flood level during the IDF (El. 1105.3 m) is 2.7 m below the elevation required to discharge off-site (El. 1108.0 m, crest of downstream Laura Lake public road).
6. SWRP freeboard during 2022 is measured relative to the spill point where water would start to flood the surrounding area (El. 1103.2 m). The freeboard relative to an off-site spill is 4.8 m higher than the value reported in the table.

HVC has defined alert levels that, if exceeded, trigger escalating action to mitigate flooding-related risks (e.g., increased monitoring, active measures to drawdown pond level). These alert levels are integrated with the site-wide emergency response plan, where appropriate. Pond alert levels for the Highland TSF were reviewed and updated based on current conditions. Similar alert levels have been defined for the downstream sediment and seepage ponds. All alert levels are defined in the revised OMS Manual (HVC 2022), and none were exceeded at any of the ponds during the review period.

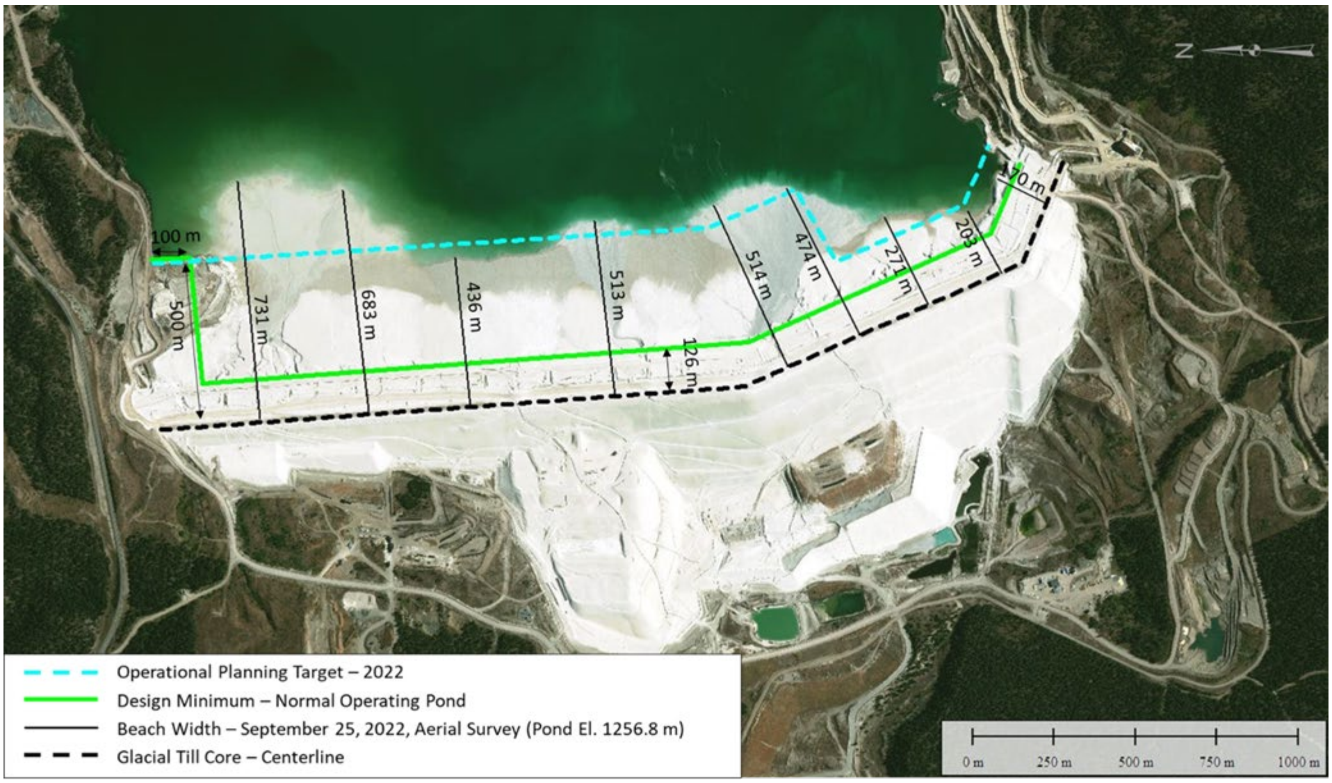
5.2.2 Beach Width

The minimum beach widths required by the design (KCB 2020a), under normal operating pond levels, were met throughout the review period (Figure 5.3): 500 m (minimum) at the north abutment, and 126 m (minimum) along the remainder of the crest.

The increased beach width at the north abutment is required to reduce seepage flows and gradients through the foundation in this area (see Section 7.4.2). Similar to recent years, the beach width in this area was maintained by a combination of spigotted tailings and a waste pile of foundation preparation spoils and overflow sediments from hydraulic placement. As the pond level rises, it encroaches more onto the spoils pile, narrowing the beach. Starting in 2023, the minimum beach requirement is forecast to be met by spigotted tailings as the spoils pile becomes buried by the beach.

During September 2022 (Figure 5.3), the beach width along all the dam segments, except the South Dam, was near the 500 m target. Beach development at the South Dam met design requirements but was less than the target for the year. This was due to a delay in upgrade works to the tailings distribution works, which are required to allow beach building upstream of the South Dam without impacting the reclaim barge. These works are to be commissioned for 2023, and HVC expects to reach target widths next year and is still on track to establish the target 500 m width across the dam during 2025.

Figure 5.3 Status of the L-L Dam Beach as of September 2022



5.2.3 Instrumentation Trends

5.2.3.1 Overview

This section provides an overview of measured piezometric and deformation behaviour at the L-L Dam, based on instrumentation readings, during the review period. November 2022 instrumentation readings are shown on select design cross sections of the L-L Dam (Figure 11 to Figure 18). The L-L Dam instrumentation system is summarized in Table 5.2. Summary plots of instrumentation readings are included in Appendix II-A (piezometers) and Appendix II-B (inclinometers).

The accuracy of inclinometers provided by the manufacturer is +/–2 mm over a 25 m length. This can be significant when interpreting typical deformation rates measured at the L-L Dam (<1 mm/month). Inclinometer plots are interpreted by HVC and KCB teams as part of routine surveillance. Deformation rates are typically calculated based on the most recent 3 or more readings. This helps to filter out the influence of outlier readings related to the measurement method. Over the past five years, HVC has started to use in-place ShapeArrays (SAAV) at priority monitoring locations (e.g., near the dam toe or used to implement the Observational Method at the VBB), which have demonstrated a higher accuracy in practice (i.e., less variance between readings).

5.2.3.2 Notification Level Exceedances

During the review period, Notification Level exceedances were measured at 15 instruments. Of those, five were confirmed to be related to the measurement reading or processing error and were not representative of the actual behaviour of the dam.

As discussed in Section 5.1, exceedance of a Notification Level does not represent a dam safety concern or unacceptable performance but requires a review by the EoR. Each of the exceedances were reviewed by the EoR, as per the OMS Manual (HVC 2022). None of the exceedances were elevated to a higher level of the TARP or required mitigative action be taken at the dam.

A discussion of the Notification Level exceedances at each instrument, not related to measurement error, is included in the subsequent performance summary of the corresponding dam segment in the following sections.

5.2.3.3 South Dam

November 2022 instrumentation readings from the south abutment near Sta. 1+200 are projected onto a dam cross section (Figure 11). Instrument behaviour shown in Figure 11 is representative of behaviour north of Sta. 1+100. As shown in Figure 8, the only construction activity in the South Dam segment during the review period was a crest raise. The downstream slope has been built to ultimate configuration.

Piezometers

Measured behaviour during the review period was consistent with the expected behaviour and conditions assumed in the design. During the review period, two piezometers became defunct, but there remains sufficient coverage to achieve minimum surveillance control requirements. However, KCB recommends that HVC install additional piezometers in the area to re-establish redundancy and to provide better coverage in the area. The location and number of instruments to be agreed with the EoR.

South of Sta. 1+100

Measured piezometric levels during the review period and in the past 5 years are shown in Figure II-A-1 and Figure II-A-2 (1 year) and Figure II-A-101 and Figure II-A-102 (5 years) in Appendix II-A.

Downstream hydraulic placement was completed near the abutment in 2018. Since that time, pond level change has governed piezometric response near the abutment upstream and downstream of the core zone.

Figure 5.4 plots measured response at select piezometers near Sta. 1+050 since December 2020 to show typical behaviour in this segment of the dam. South of Sta. 1+100, where these instruments are located, the dam was initially raised entirely with glacial till fill (i.e., no hydraulic cycloned sand). The response measured in the glacial till fill (LL-VWP17-03C), near centreline, is representative of the piezometric level in the core zone rather than the downstream cycloned sand. Downstream of the glacial till fill, where the dam was raised with cycloned sand and underdrains are present, the piezometric levels in the cycloned sand fill and foundation reduce (e.g., LL-VWP02-03 and LL-P13-04).

The piezometric response to pond rise downstream of the core and in the glacial till fill during the review period was similar to 2021. The beach width during 2021 was approximately 225 m compared to approximately 170 m during the review period (Figure 5.3). This comparison suggests that the core, and not the beach, was the primary seepage control measure at the south abutment and the narrower beach did not have significant impact on downstream piezometric response.

HVC poured water in the LL-VWP02-03 piezometer standpipe (Glacial Till) during the review period as a test to confirm the tip elevation. This rise, and the subsequent dissipation, is shown in Figure II-A-2 in Appendix II-A.

Sta. 1+100 to Sta. 1+600

Piezometers in this segment of the dam were relatively stable throughout the review period, which is consistent with expected performance now that downstream hydraulic placement has been completed in this area of the dam.

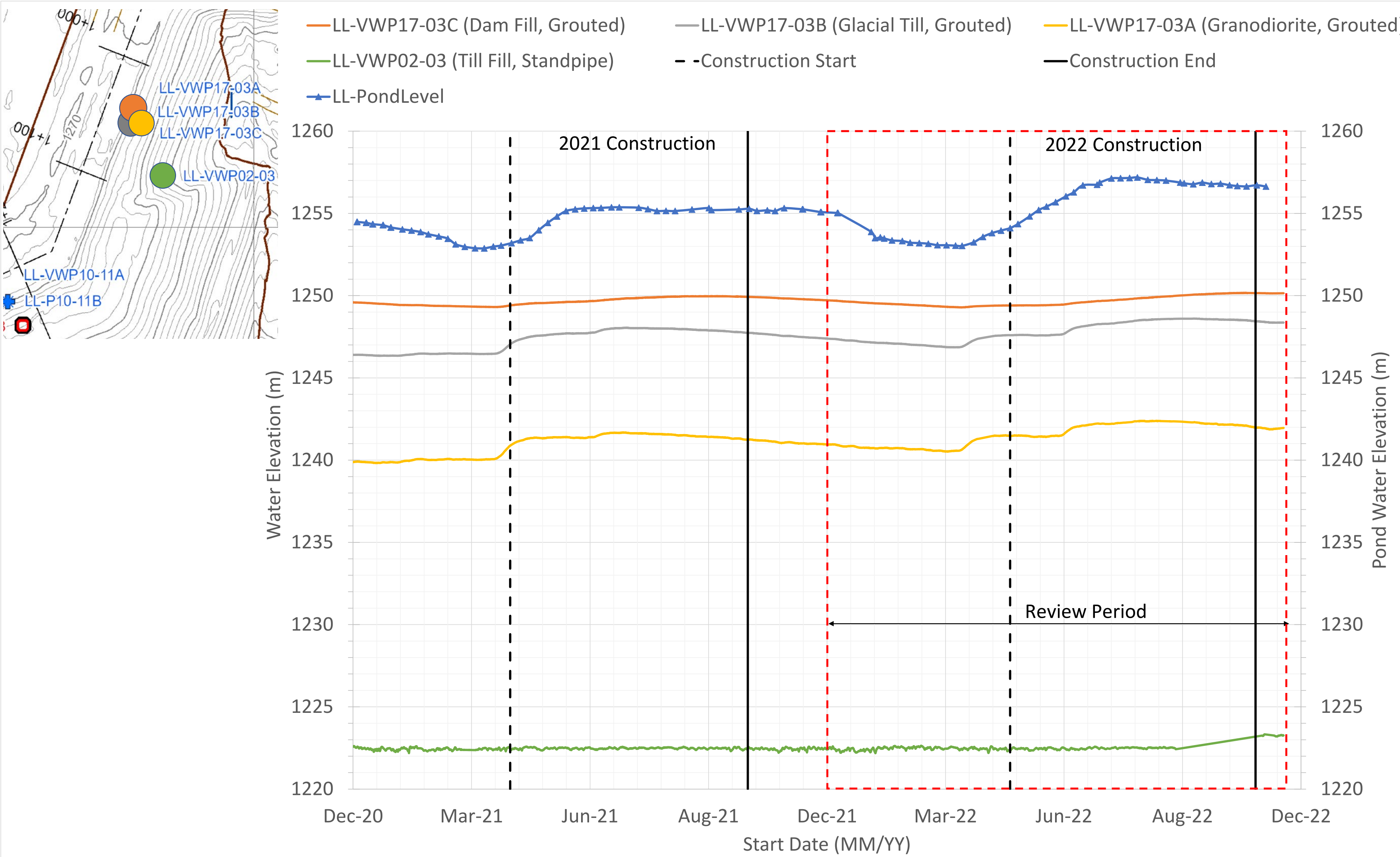
Inclinometers

Summary of inclinometer readings during the review period are shown on Figure II-B-1 and Figure II-B-2 in Appendix II-B.

Inclinometers are located in the South Dam (LL-I10-01 and LL-I10-08) target deformation near the base of the fill and foundation above bedrock. Measured deformations were consistent with typical behaviour through the review period, with no defined shear or deformation zones of concern.

In some cases, the inclinometer casing has been raised through the dam fill by placing an outer corrugated pipe around the casing to separate it from the dam fill. This prevents compaction and settlement of the fill from damaging the casing, which was a reoccurring issue in the past. Some inclinometers raised in this manner, for example, LL-I10-01 (refer to Figure II-B-1), indicate deformation through the compacted fill. However, this is due to the inclinometer casing moving within the open annulus between it and the outer pipe. This is not reflective of actual deformations within the fill, which is compacted to the target density confirmed by quality control and quality assurance testing.

Figure 5.4 Measured Piezometric Response at the South Dam (Sta. 1+050): December 2020 to November 2022



5.2.3.4 Valley Buttress Berm

November 2022 instrumentation readings near Sta. 1+850 are projected onto a dam cross section (Figure 12). As shown in Figure 8, construction activity in the VBB area during 2022 included a crest raise and hydraulic fill placement at the downstream toe.

Piezometers

Measured piezometric levels during the review period and in the past 5 years are shown in Figure II-A-3 to Figure II-A-6 (1 year) and Figure II-A-103 to Figure II-A-106 (5 years).

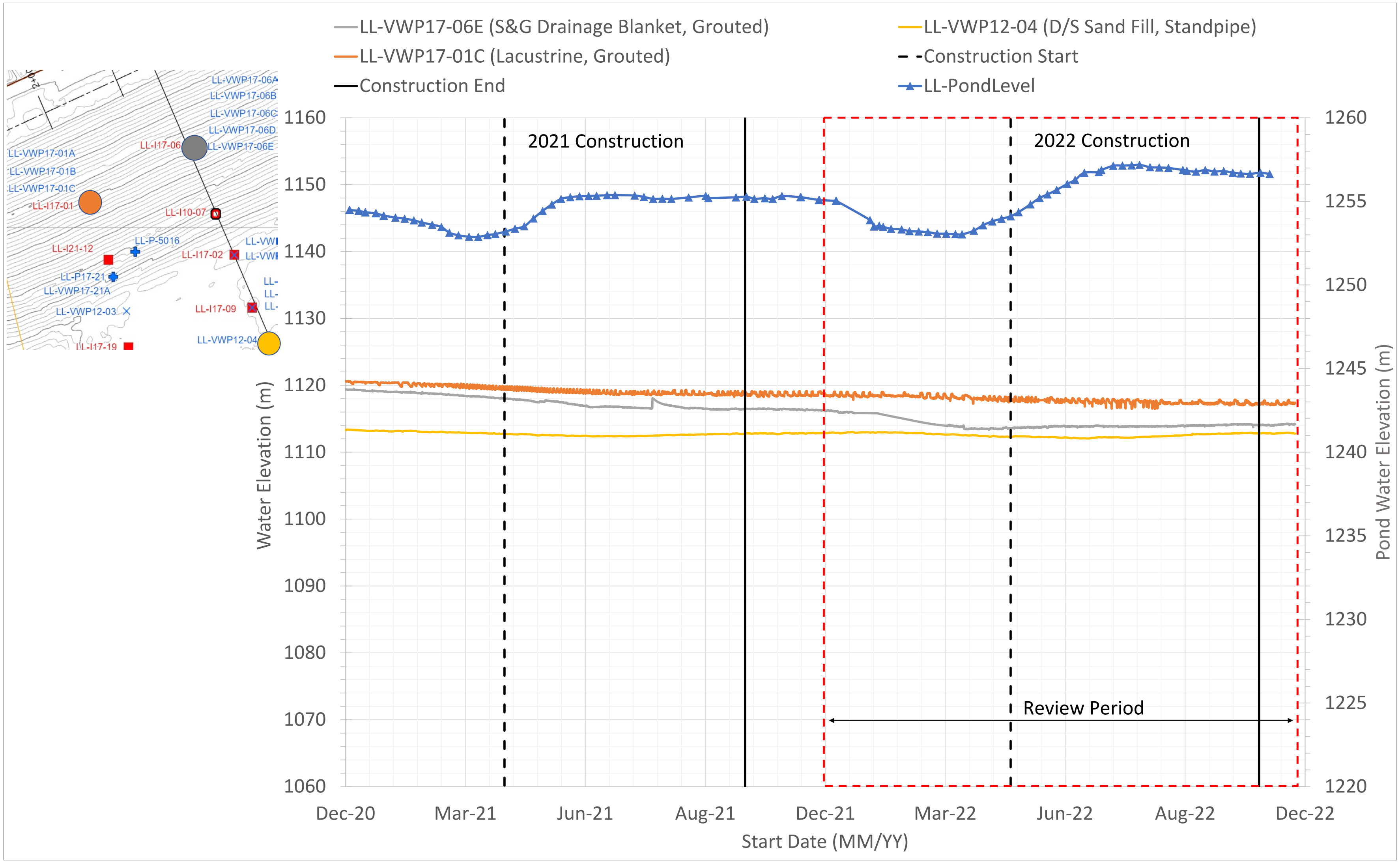
Overall piezometric levels in the dam fill and foundation were consistent with expected performance based on construction activity. Piezometric levels below the Glacial Till (e.g., Lower Sand and Gravel) continued to show no response to rising pond levels.

The blanket drain at the VBB is the low point of the dam where seepage through the downstream shell reports. The Lacustrine Unit is present below the Starter Dam but has been excavated from the cycloned sand shell. Historically, piezometric response in the Lacustrine Unit has been similar to that of the drainage blanket. This is because the drainage blanket was placed against the excavation face of the Lacustrine Unit, leading to both materials being hydraulically connected through horizontal flow. Measured piezometric levels since December 2020 from select piezometers in the drainage blanket and the native Lacustrine Unit are shown in Figure 5.5.

Piezometric levels in the these units were steady or dissipated during the review period. Overall, these levels are consistent with historic levels during multiple years of significant hydraulic dam fill placement, such has been the case since 2018.

The piezometric level in the drainage blanket is more than 140 m lower than the pond level, which demonstrates the core zone and cutoff into the foundation is an effective seepage control and is performing as per design.

Figure 5.5 Measured Piezometric Response at the VBB Dam Fill and Shallow Foundation: December 2020 to November 2022



Pore pressures in the U-GLU and L-GLU at the VBB have typically responded to construction loading once the applied load of the dam is near or exceeds the preconsolidation pressure applied by the glacier. When the applied dam load is significantly less than the preconsolidation pressure, no significant pore pressure response to loading has been measured. This was the general response measured during the review period in the L-GLU and U-GLU near the toe where construction loading occurred; refer to Figure 5.6. None of the piezometric responses exceeded Notification Level threshold values and dissipated shortly after construction was completed.

The response measured in the L-GLU at LL-VWP15-24B (Figure 5.6) in September 2022 was a response to drilling activity during the unsuccessful attempt to replace inclinometer LL-I15-24. A similar response was recorded at other piezometers near the drilling. As shown in Figure 5.6, the rise had substantially dissipated by the end of the review period.

There was no loading of the upper slope or the mid-bench of the VBB during the review period. Consistent with expected performance, piezometric levels in this area were steady or continued dissipating pore pressure induced during previous loading in 2018 and 2019 (Figure 5.7).

Notification Level exceedances were measured at four piezometers in the VBB during the review period, which were reviewed by the EoR:

- Several piezometers installed in the Glacial Till downstream of the ultimate dam toe measured a piezometric response that coincided with hydraulic placement commencing in the immediate area (Figure 8). Four of the piezometers exceeded the Notification Level threshold (LL-VWP102, LL-VWP10-04, LL-VWP15-03, LL-VWP18-10). The response was related to elevated seepage flows, related to hydraulic placement, through the major (gravel) drain that was excavated in the Glacial Till and runs through this area. The dam fill load at these locations was less than the preconsolidation pressure, and some instruments are downstream of the active placement area. Therefore, the response was not to loading. The stability of the VBB is not sensitive to the magnitude of piezometric response measured in the Glacial Till. All of the piezometers have been dissipating since hydraulic placement was completed in this area (October 2022), and only two remained above Notification Level at the end of the review period.

Figure 5.6 Measured Piezometric Response at the VBB L-GLU and U-GLU Near Dam Toe: December 2020 to November 2022

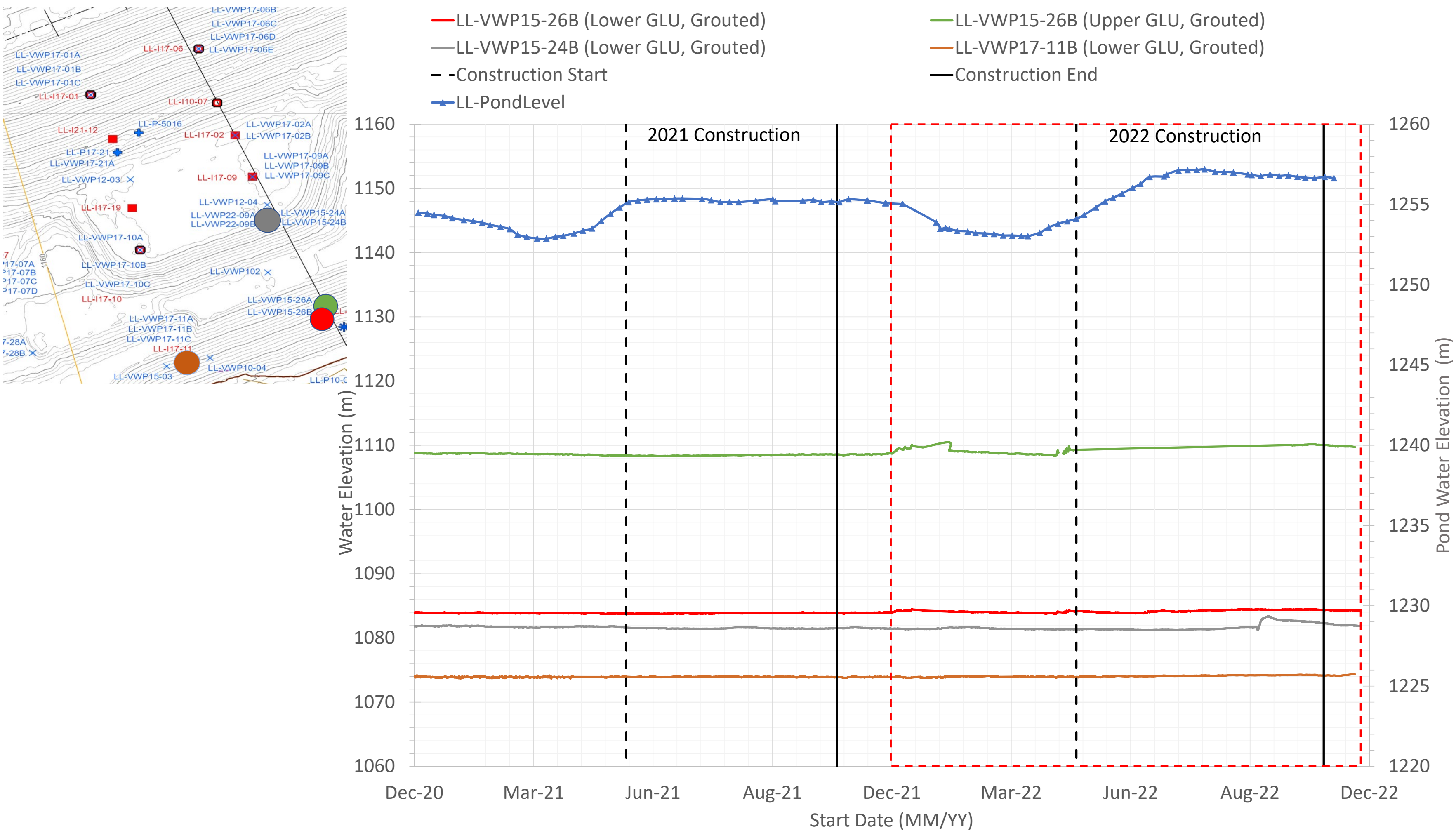
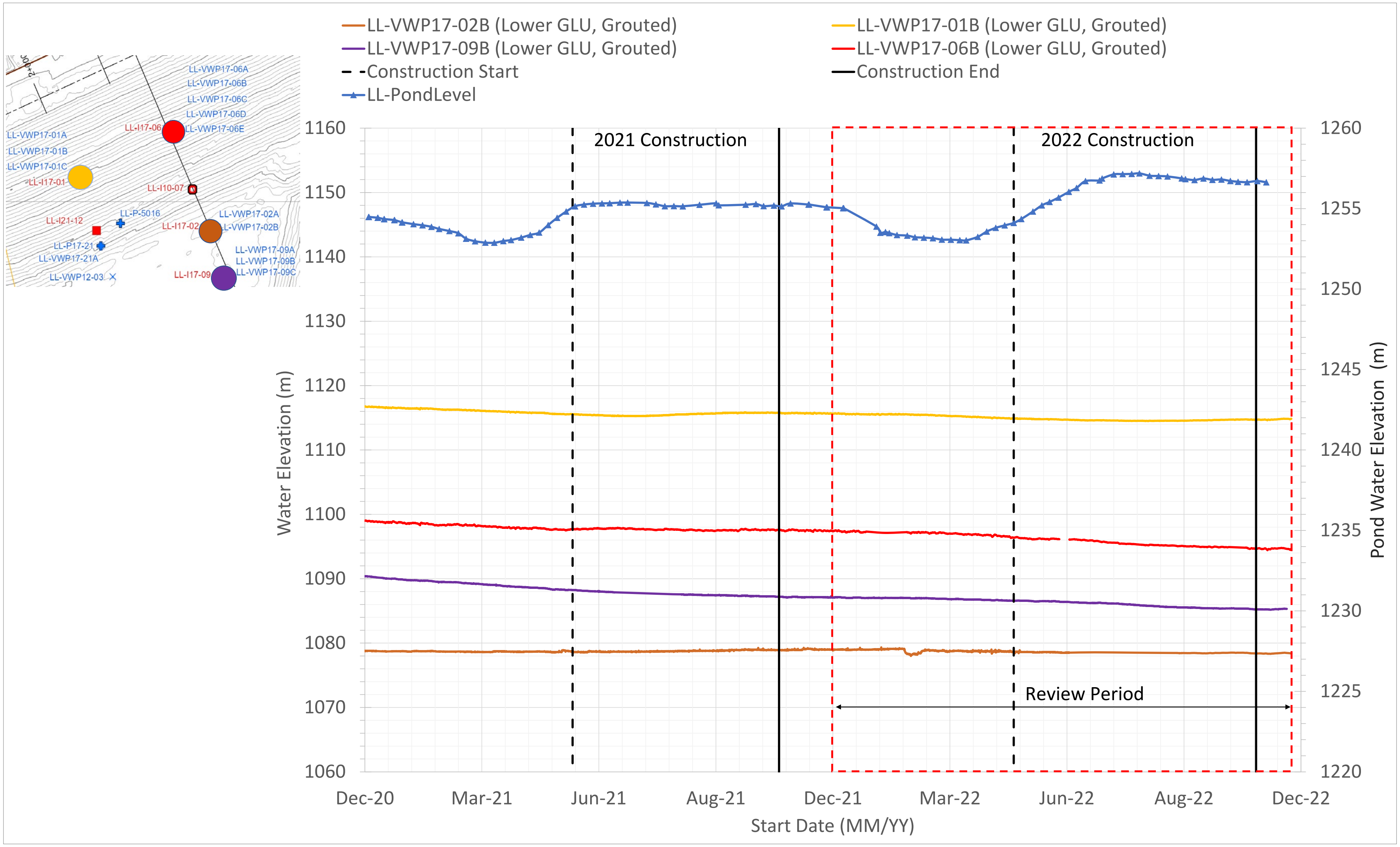


Figure 5.7 Measured Piezometric Response at the VBB L-GLU Below Upper Slope: December 2020 to November 2022



Inclinometers

Summary of inclinometer readings during the review period are shown on Figure II-B-3 to Figure II-B-12 in Appendix II-B.

The approved design of the VBB (KCB 2020a) is governed by the L-GLU, which is continuous beneath the VBB. Based on a calibrated stress-deformation model, deformations in the L-GLU are expected to be measured by the Contingency Case Threshold Inclinometers (yellow zone) shown in Figure 5.8. These deformations are not expected to progress to the toe (i.e., referred to as being contained). Therefore, negligible deformations are expected to be measured by the Downstream Inclinometers (red zone) shown in Figure 5.8. This is consistent with measured behaviour as shown in Figure 24 and summarized in Table 5.6, which both show a significant difference in behaviour measured by inclinometers within the yellow and red zones shown in Figure 5.8.

The magnitude of deformation measured within the L-GLU during the review period was also consistent with expectations based on predictions from the stress-deformation modelling and recent deformation trends. Deformations below the upper slope are related to crest raise and increased load from the rising tailings level in the impoundment. The deformation rate at each inclinometer has been relatively steady since 2020 (Table 5.6). The deformation rate at LL-I17-06 has increased over the past 3 years; however, the rate of increase is still consistent with expected performance and the deformation rate at the adjacent inclinometer (LL-I17-01) has reduced during the same period. The deformation rate of the nearest inclinometer downstream (LL-I10-07) has been reducing over the past 2 years and was actually measuring no deformation at the end of the review period.

Figure 5.8 VBB Inclinometer Location ID

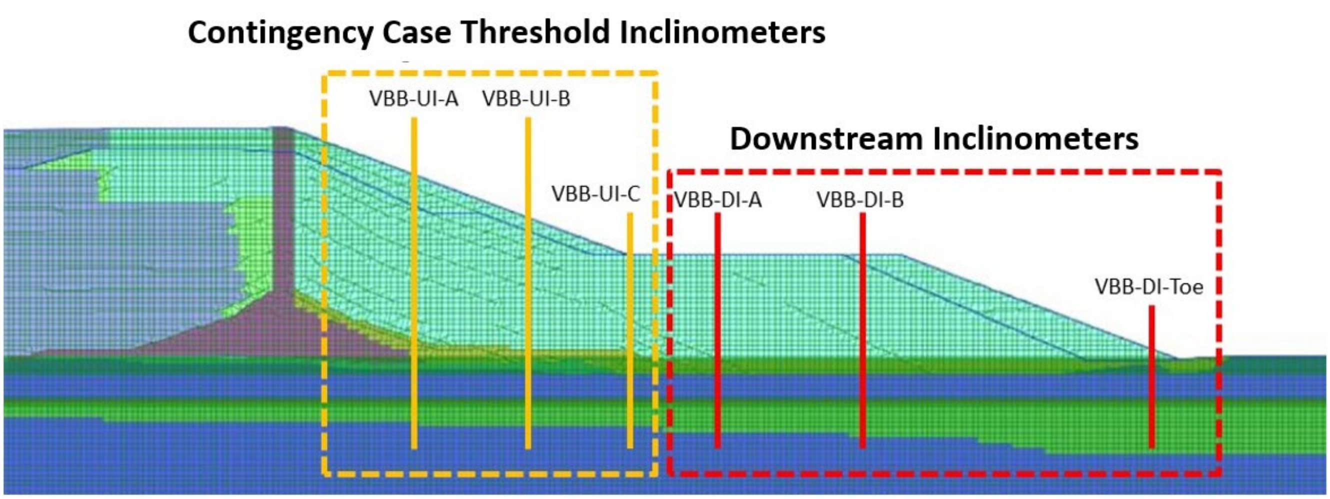


Table 5.6 Summary of Average Deformation Rate in the VBB Foundation L-GLU

Inclinometer	Measurement	Average 2020 Deformation Rate	Average 2021 Deformation Rate	Average 2022 Deformation Rate
Contingency Case Threshold Inclinometers				
LL-I17-06	SAAV	2 mm/year	4 mm/year	5 mm/year
LL-I17-01	SAAV	4 mm/year	3 mm/year	3 mm/year
LL-I10-07	Manual/SAAV	n/a	4 mm/year	0 to 2 mm/year
LL-I17-02	Manual	2 mm/year	0 mm/year	0 mm/year
Downstream Inclinometers				
LL-I17-09	Manual	0 mm/year	0 mm/year	0 mm/year
LL-I17-19	Manual	1 mm/year	1 mm/year	1 mm/year
LL-I17-10	Manual/SAAV	1 mm/year	n/a	0 mm/year
LL-I15-27	SAAV	0 mm/year	0 mm/year	0 mm/year
LL-I17-11	SAAV	0 mm/year	0 mm/year	0 mm/year

Horizontal deformations measured within the Lacustrine Unit (e.g., LL-I17-01), where present, are consistent with historic behaviour for similar loading periods, as expected. The Lacustrine Unit has been removed from the majority of the downstream footprint and replaced with compacted fill (Figure 2.1). Therefore, deformations within the unit are contained and cannot extend to the downstream toe; this is confirmed by inclinometers farther downstream that show no shear zones through the dam fill.

A Notification Level exceedance was measured at one inclinometer at the VBB during the review period, which was reviewed by the EoR:

- The Notification Level threshold in the U-GLU at LL-I15-27 was exceeded during hydraulic placement immediately upslope of the area. This response was flagged by HVC and KCB prior to the exceedance. Although the threshold was exceeded in the U-GLU, the majority of the movement was occurring in the compacted sand-and-gravel fill. This is not a typical response and suggests that something else may be influencing the measurement. Neither of these units govern the design of the VBB, but this instrument was at the toe, with active construction in the area; therefore, a comprehensive review of the response was appropriate:
  - Drilling records at this location confirm that a portion of drill casing was left in the hole; the movement in the compacted sand and gravel was occurring just below the bottom of the drill casing. The movement was interpreted to be a localized response related to the casing left in the ground rather than a dam safety concern.
  - Consistent with this interpretation, no similar response was measured at nearby inclinometers (e.g., LL-I17-11, LL-I17-09), and there were no visual observations of instability (e.g., cracking or slumping) observed in the area. This response was initiated by fill loading immediately upslope, and once completed, the movement rate attenuated and dropped below the Notification Level threshold.

- The influence of casing has been noted for consideration when interpreting similar responses within the compacted sand-and-gravel fill at this instrument. The inclinometer continues to add value in monitoring movements along the rest of the casing.

Status of Observational Method Implementation

The design of the VBB (KCB 2020a) is based on two assumed conditions within the Lower-Glaciolacustrine (L-GLU) deposit beneath the dam:

- Most Likely Case (MLC); and
- Reasonably Worse Case (RWC).

The VBB design is stable with acceptable performance (i.e., deformations within the L-GLU are contained) for MLC and RWC conditions. The VBB meets the factor of safety (FOS) criteria specified by the HSRC (EMLCI 2021b) under MLC conditions (KCB 2020a). If deformations appreciably less favourable than MLC are measured, an extension to the VBB, referred to as the Contingency Case, is to be built. The sole purpose of the Contingency Case is to raise the FOS to meet the HSRC (EMLCI 2021b) criteria. Implementation of this design approach is based on the Observational Method (Peck 1969) as described in the design report (KCB 2020a).

The 2022 crest raise, to El. 1272.0 m, was the first raise where an appreciable difference between deformations under MLC or RWC was predicted based on the stress-deformation model (KCB 2020a). However, the deformation rates summarized in Table 5.6 remain consistent with predictions for MLC conditions and were below triggers that would initiate the Contingency Case.

The VBB stress-deformation model was calibrated during the review period, based on measured performance, to April 2022. This is a routine task to improve the model and to reduce uncertainty in design assumptions as the dam is built. An important finding from this update was that measured performance to date supports more favourable conditions than were assumed in the design, specifically the assumed pre-consolidation pressure of the L-GLU. Overall, the model calibration and measured performance to date reduce the likelihood that the Contingency Case will be required.

5.2.3.5 Valley Buttress Berm Extension

November 2022 instrumentation readings near Sta. 2+250 are projected onto a dam cross section (Figure 13). As shown in Figure 8, construction activity in the VBB area during 2022 included a crest raise, hydraulic fill placement at the downstream toe, and operation of the temporary on-dam sediment storage cell.

Piezometers

Measured piezometric levels during the review period and in the past 5 years are shown in Figure II-A-7 and Figure II-A-8 (1 year) and Figure II-A-107 to Figure II-A-108 (5 years).

The piezometric levels in the VBBE foundation remained steady throughout the review period, which is consistent with expected behaviour. The one exception was the response measured at one piezometer in the Glacial Till downstream of the toe (LL-VWP15-02), which exceeded the Notification Level threshold. As discussed in Section 5.2.3.1, this was a response to hydraulic placement, and the VBBE stability is not sensitive to this magnitude of piezometric response in Glacial Till. Measured piezometric levels since December 2020 from select piezometers in the VBBE foundation are shown in Figure 5.9.

No response to hydraulic placement or the operation of the temporary on-dam sediment cell was measured in the drainage blanket during the review period.

Notification Level exceedances were measured at two piezometers in the VBBE during the review period, which were reviewed by the EoR:

- LL-VWP10-06A (Sedimentary) exceeded Notification Level twice during the review period. Since 2019, the response measured by this piezometer has varied from other nearby instruments installed in the dam foundation. The cause of this behaviour could be related to a localized condition or an instrument error. Regardless, the measured piezometric levels do not represent a concern and are below those assumed in the design analysis. Since July 2022 readings have been relatively steady and below threshold.
- LL-VWP15-02 (Glacial Till) exceeded Notificiation Level as a response to hydraulic placement at the dam toe. Refer to the VBB (Section 5.2.3.4) for a discussion of the mechanism. At the end of the review period, the piezometer was below threshold.

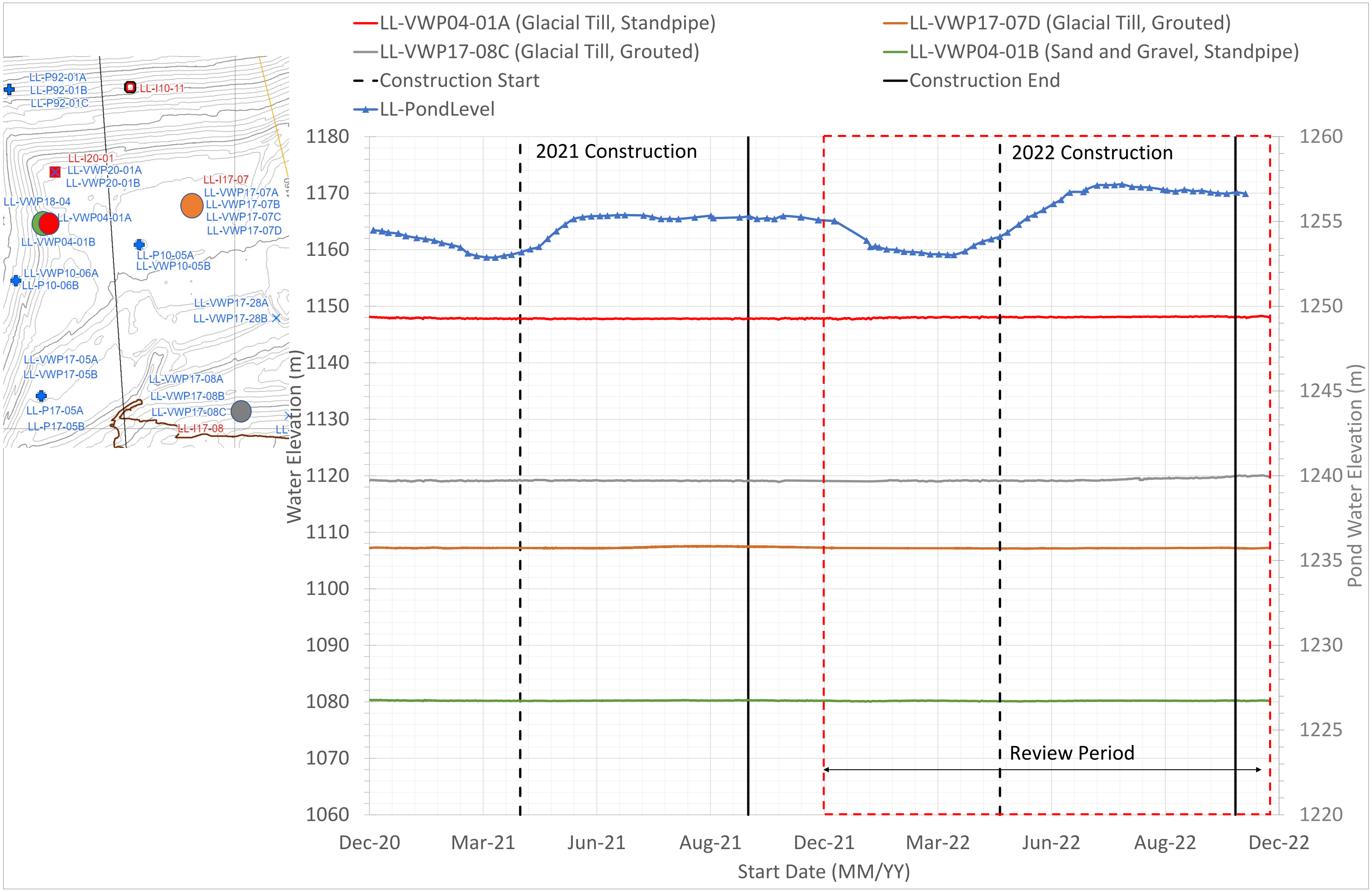
Inclinometers

Summary of inclinometer readings during the review period are shown on Figure II-B-13 to Figure II-B-16 in Appendix II-B.

Measured deformations at the VBBE were consistent with typical behaviour through the review period, with no defined shear or deformation zones of concern. Based on the geologic characterization of the L-L Dam foundation (KCB 2022c), the mudstone layers, which govern the design of the NBB, are not continuous or, where present, are too deep to govern the design of the VBBE (KCB 2020a). The measured response at all inclinometers at the VBBE continue to support this interpretation (i.e., no discrete shear zones similar to those measured at the NBB have been identified).

Based on the geologic characterization, GLU deposits are present in the VBBE foundation but are not continuous. Consistent with that interpretation, a lens of GLU is identified between the bedrock and the Lower Sand and Gravel at inclinometer LL-I10-11 (located mid-slope). This is characterized as a lens, not a continuous layer, as it cannot be traced in adjacent drillholes or inclinometers (e.g., I17-07 and I17-08). During the review period, less than 2 mm of movement was measured within this zone, which is less than that measured during 2021 but consistent with historic performance.

Figure 5.9 Measured Piezometric Response in the Foundation of the VBBE: December 2020 to November 2022



5.2.3.6 North Buttress Berm

November 2022 instrumentation readings near Sta. 2+564 and Sta. 2+690 are projected onto a dam cross section (Figure 14 and Figure 15). As shown in Figure 8, construction activity in the NBB area during 2022 included a crest raise, placement along the south side toe, and operation of the temporary on-dam sediment storage cell.

Piezometers

Measured piezometric levels during the review period and in the past 5 years are shown in Figure II-A-9 to Figure II-A-11 (1 year) and Figure II-A-109 to Figure II-A-111 (5 years).

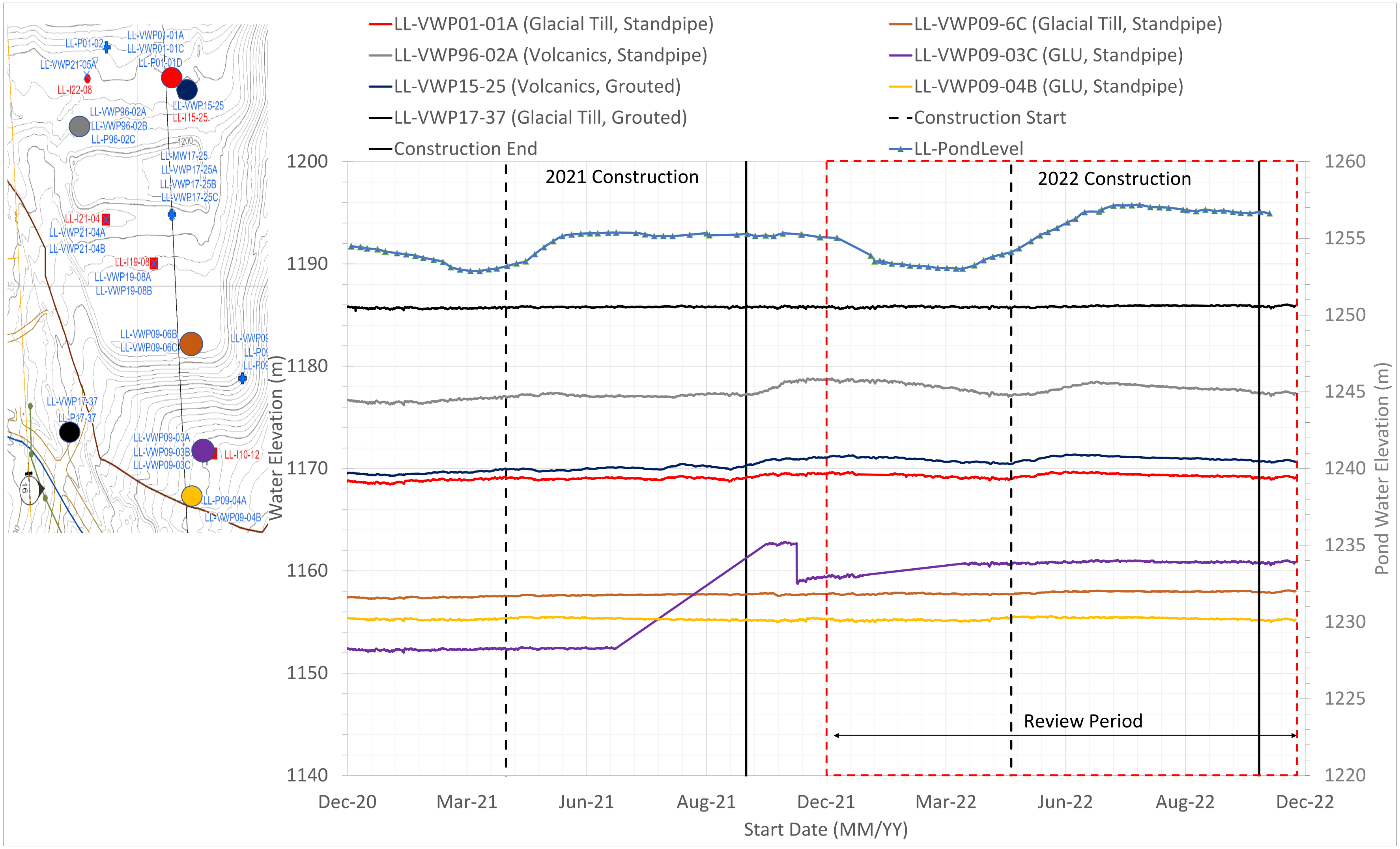
The piezometric levels in the foundation generally remained steady throughout the review period, with a temporary rise measured in some shallow foundation piezometers during May and June as a response to seepage from hydraulic placement at the North Dam Buttress flowing through the underdrain to the VBB. This can be seen in Figure 5.10, which plots measured piezometric levels since December 2020 from select piezometers in the NBB foundation.

Another outlier response was measured at LL-VWP09-03C (Figure 5.10) and was discussed during the 2021 AFPR (KCB 2022d). As follow-up to that discussion, HVC replaced the piezometer at this location in April 2022 and confirmed the tip elevation during installation. Since that time, the piezometric level has remained consistent, and KCB and HVC have confidence that the levels being reported are representative of field conditions.

A Notification Level exceedance was measured at one piezometer at the NBB during the review period, which was reviewed by the EoR:

- A positive pressure reading was measured at a standpipe piezometer, LL-P12-06 (Volcanic Bedrock at NBB), previously measuring as “dry” (i.e., no tip is above the water table). The Notification Level threshold for “dry” instruments is set to notify when positive pressures are measured. The measured piezometric levels were consistent with nearby instruments in the same geologic unit and are below levels assumed in the design analysis. KCB defined new Notification Level thresholds consistent with nearby instruments.

Figure 5.10 Measured Piezometric Response in the Foundation of the NBB: December 2020 to November 2022



Inclinometers

Summary of inclinometer readings during the review period are shown on Figure II-B-17 to Figure II-B-24 in Appendix II-B.

Deformation along discrete shear planes within the mudstones layers has been measured in the foundation near the upper bench of the downstream slope (e.g., LL-I17-24) since the early 1990s and is expected to continue. The mudstone layers are within the Medial Sedimentary bedrock unit. Typically, deformation rates increase temporarily during construction loading, and then decrease after loading is completed. This pattern continued along both mudstone layers identified at inclinometer LL-I17-24 during the review period (Figure 5.11). Inclinometers downstream of LL-I17-24 that were monitored during the review period include LL-I20-03, LL-I20-02, LL-I17-22, and LL-I15-25. Mudstone layers have been identified at each of these locations. HVC installed an SAAV at LL-I20-03 and started collecting readings in October 2022. As a result, there are insufficient readings to interpret a response at this instrument for the review period.

Measured deformation along the mudstone layers at LL-I20-02 and LL-I15-25 are also plotted in Figure 5.11, and typical rates are summarized in Table 5.7. This suggests that shear movements may be progressing to LL-I20-02 but have not yet reached LL-I15-25. This is consistent with expected behaviour based on the stress-deformation modelling of the NBB.

No deformation characteristic of a mudstone layer has been measured at LL-I17-22 (Sta. 2+564) to date; refer to Figure 5.11, which is a similar location along the downstream slope as LL-I20-02. This is also consistent with the geologic interpretation of the NBB, where the mudstone-bearing Medial Sedimentary bedrock is believed to have been eroded from this location. Deformation monitoring at the NBB has been an effective means of improving confidence and reducing uncertainty in the geologic interpretation of the mudstone layers that govern design.

Deformation rates are expected to increase during periods of loading, and then attenuate, which is also consistent with monitoring during the review period (Table 5.7).

Figure 5.11 NBB Inclinometers Deformation Along Mudstone Layers: December 2020 to November 2022

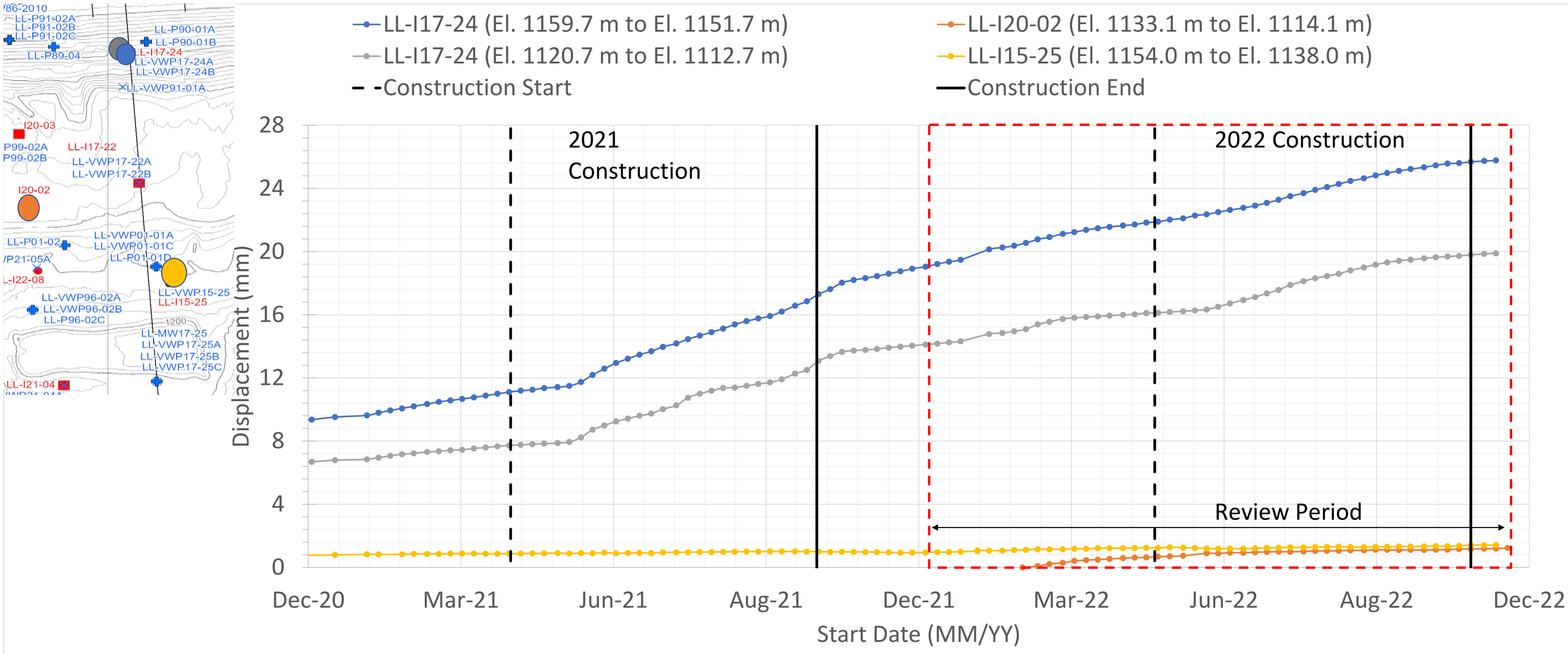


Table 5.7 Summary of NBB Deformation Rates Along Mudstone Layers: December 2020 to November 2022

Instrument Name	Geological Unit	Measurement Elevation (m)	2021 No Construction – Typical Rate	2021 Construction – Maximum Rate	2022 No Construction – Typical Rate	2022 Construction – Maximum Rate
LL-I17-24	Medial Sedimentary	1159.7 to 1151.7	0.3 mm/month	1.5 mm/month	0.2 mm/month	0.8 mm/month
LL-I17-24	Medial Sedimentary	1120.7 to 1112.7	0.2 mm/month	1.5 mm/month	0.2 mm/month	0.8 mm/month
LL-I20-02	Medial Sedimentary	1133.1 to 1114.1	N/A (Note 1)	N/A (Note 1)	<0.1 mm/month	0.2 mm/month
LL-I15-25	Medial Sedimentary	1154.0 to 1138.0	<0.1 mm/month	0.1 mm/month	<0.1 mm/month	0.1 mm/month

Notes:
1. SAAV at LL-I20-02 was installed and monitoring started in January 2022.

5.2.3.7 North Dam Bedrock

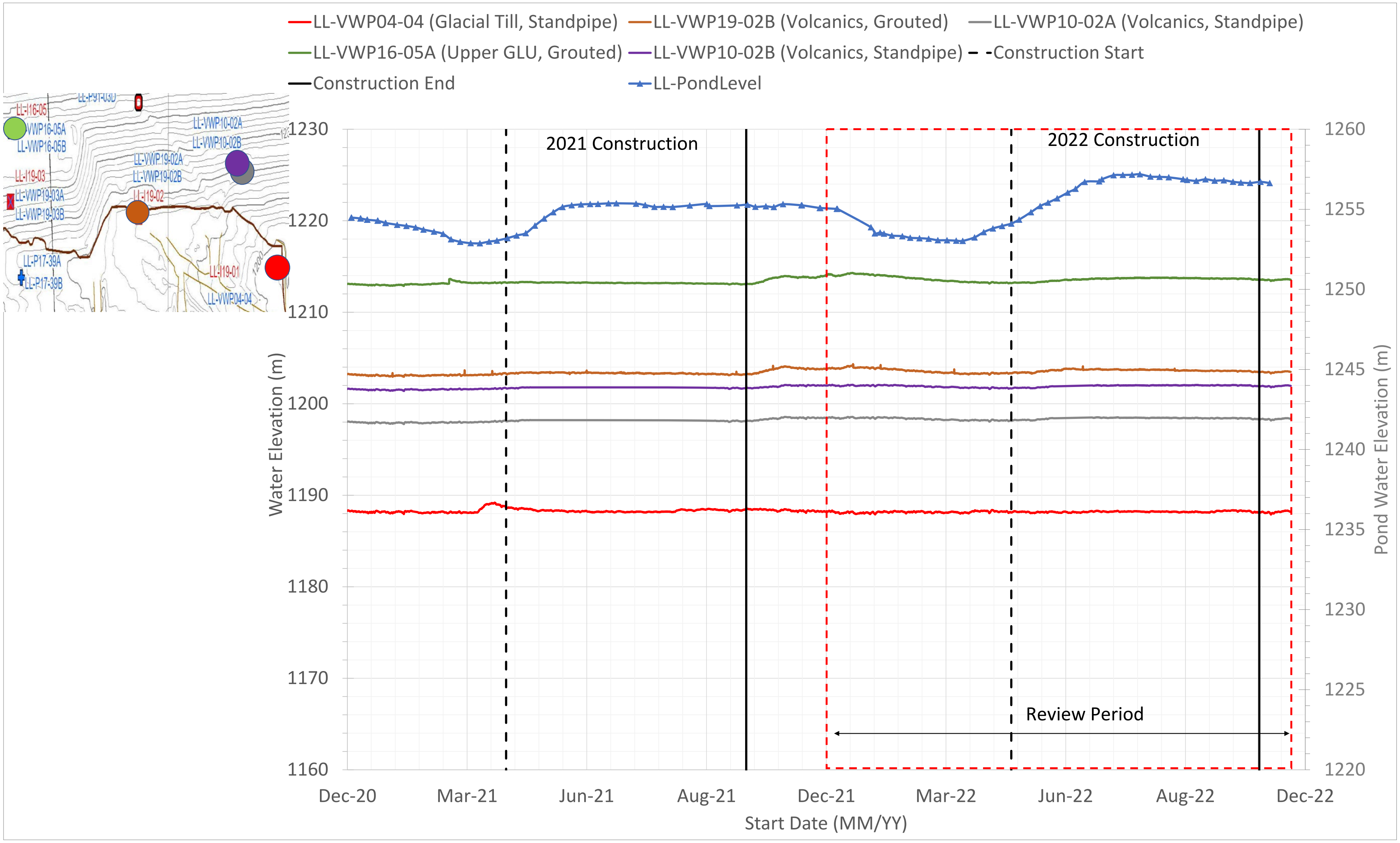
November 2022 instrumentation readings near Sta. 2+800 and Sta. 3+300 are projected onto a dam cross section (Figure 16 and Figure 17). As shown in Figure 8, the only construction activity in the North Dam Bedrock area during the review period was a crest raise. The downstream slope has been built to the ultimate configuration.

Piezometers

Measured piezometric levels during the review period and in the past 5 years are shown in Figure II-A-12 and Figure II-A-13 (1 year) and Figure II-A-112 to Figure II-A-113 (5 years).

The piezometric levels in the foundation remained steady throughout the review period. Figure 5.12 plots measured piezometric levels since December 2020 from select piezometers in the North Dam Bedrock foundation.

Figure 5.12 Measured Piezometric Response in the Foundation of North Dam Bedrock: December 2020 to November 2022



Inclinometers

Summary of inclinometer readings during the review period are shown on Figure II-B-25 to Figure II-B-31 in Appendix II-B.

Similar to the NBB, the Medial Sedimentary bedrock unit with mudstone layers is present in the North Dam Bedrock foundation area. In comparison to the NBB, the mudstone layers in the North Dam Bedrock foundation are overlain by a thicker zone of volcanic bedrock and glacial overburden, which provides adequate stabilization to meet the design criteria without additional buttressing. Throughout the review period, no shear zones were measured within the volcanic bedrock at the toe of the slope (LL-I19-01 and LL-I19-02), as is expected based on the design.

The same deformation response to loading discussed for the mudstone layers at the NBB (Section 5.2.3.6) applies to the North Dam Bedrock inclinometers. Deformation along the mudstone layers at the North Dam Bedrock inclinometers measured since December 2020 are plotted in Figure 5.13, and typical deformation rates are summarized in Table 5.8. Similar to the NBB, the inclinometers nearest to the crest (LL-I98-03 and LL-I99-05) show a response to the crest raise but minimal response farther downstream at LL-I98-02.

North of Sta. 3+000, at LL-I10-03 and LL-I19-02, where the mudstone layers are deeper and not do not influence the dam design, no shear deformations were measured in the foundation.

Figure 5.13 North Dam Bedrock Inclinometers Deformation Along Mudstone Layers: December 2020 to November 2022

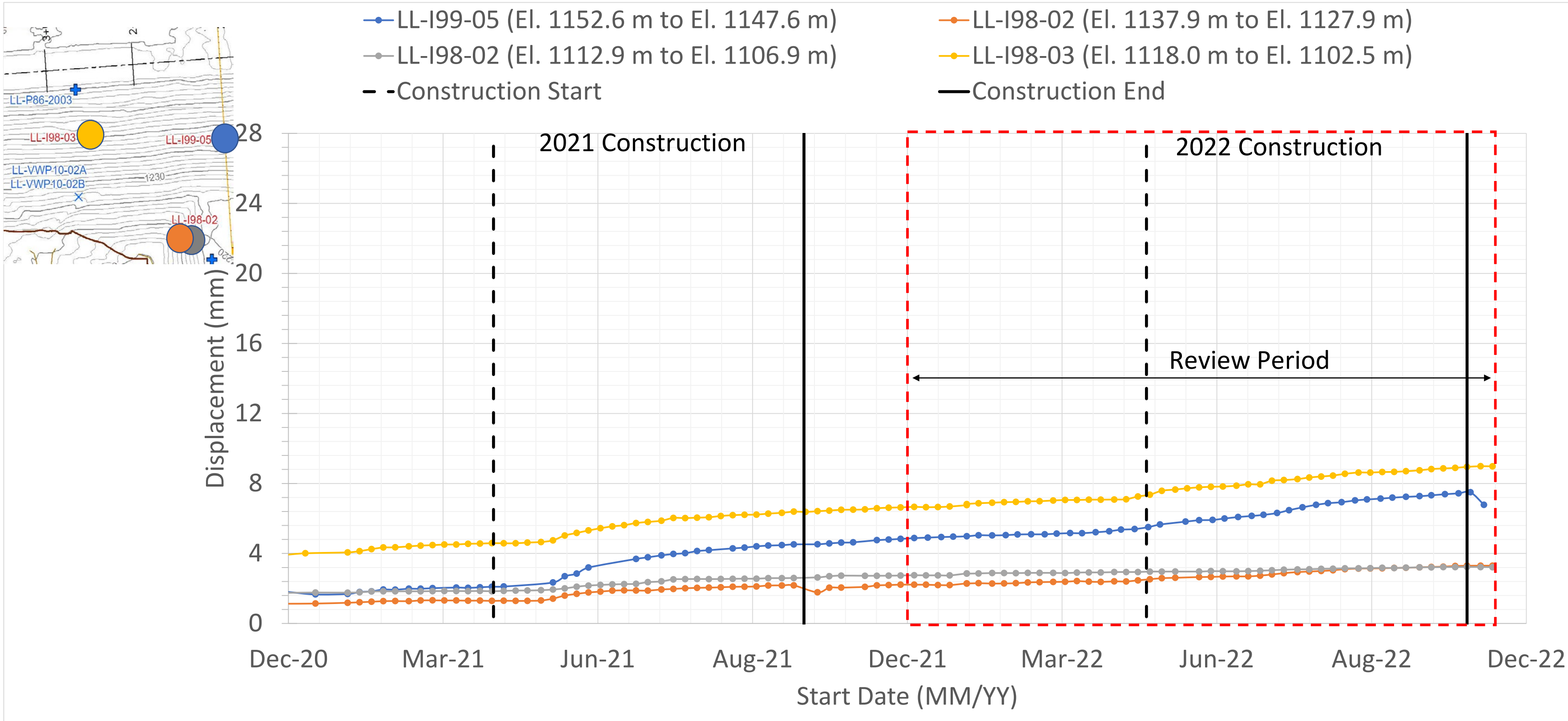


Table 5.8 Summary of North Dam Bedrock Deformation Rates Along Mudstone Layers: December 2020 to November 2022

Instrument Name	Geological Unit	Measurement Elevation (m)	2021 No Construction – Typical Rate	2021 Construction – Maximum Rate	2022 No Construction – Typical Rate	2022 Construction – Maximum Rate
LL-I99-05	Medial Sedimentary	1152.6 to 1147.6	0.1 mm/month	1.2 mm/month	<0.1 mm/month	0.6 mm/month
LL-I98-02	Medial Sedimentary	1137.9 to 1127.9	<0.1 mm/month	0.5 mm/month	<0.1 mm/month	0.2 mm/month
LL-I98-02	Medial Sedimentary	1112.9 to 1106.9	<0.1 mm/month	0.3 mm/month	<0.1 mm/month	0.1 mm/month
LL-I98-03	Medial Sedimentary	1118.0 to 1102.5	0.1 mm/month	0.7 mm/month	0.1 mm/month	0.6 mm/month

5.2.3.8 North Dam U-GLU

November 2022 instrumentation readings near Sta. 3+630 are projected onto a dam cross section (Figure 18). As shown in Figure 8, construction activity in the North Dam U-GLU area during 2022 included a crest raise and completion of the North Dam Buttress. Following 2022 construction, the downstream slope of this segment has been built to the ultimate configuration.

Piezometers

Measured piezometric levels during the review period and in the past 5 years are shown in Figure II-A-14 to Figure II-A-17 (1 year) and Figure II-A-114 to Figure II-A-117 (5 years).

In the North Dam U-GLU (north of Sta. 3+400), piezometric levels downstream of the core zone are governed by pond level rise. This response is expected because, north of approximately Sta. 3+600, the core zone is not keyed into Glacial Till or bedrock due to the depth of excavation required. A minimum beach width (500 m) at the north abutment is specified in the design (KCB 2020a) to accommodate the absence or key-in of the core zone. The minimum beach was maintained through the review period as discussed in Section 5.2.2.

Piezometric levels in the foundation also show a temporary response to beaching and upstream cycloned sand placement north of Sta. 3+400. This is typically a more sudden rate of rise and dissipation; for example, refer to LL-VWP16-01B in Figure 5.14. This is because, during both activities, the beach surface is wetted and the flow path length to the piezometers is much shorter than during pond rise, when the beach keeps the pond 500 m (minimum) away from the core.

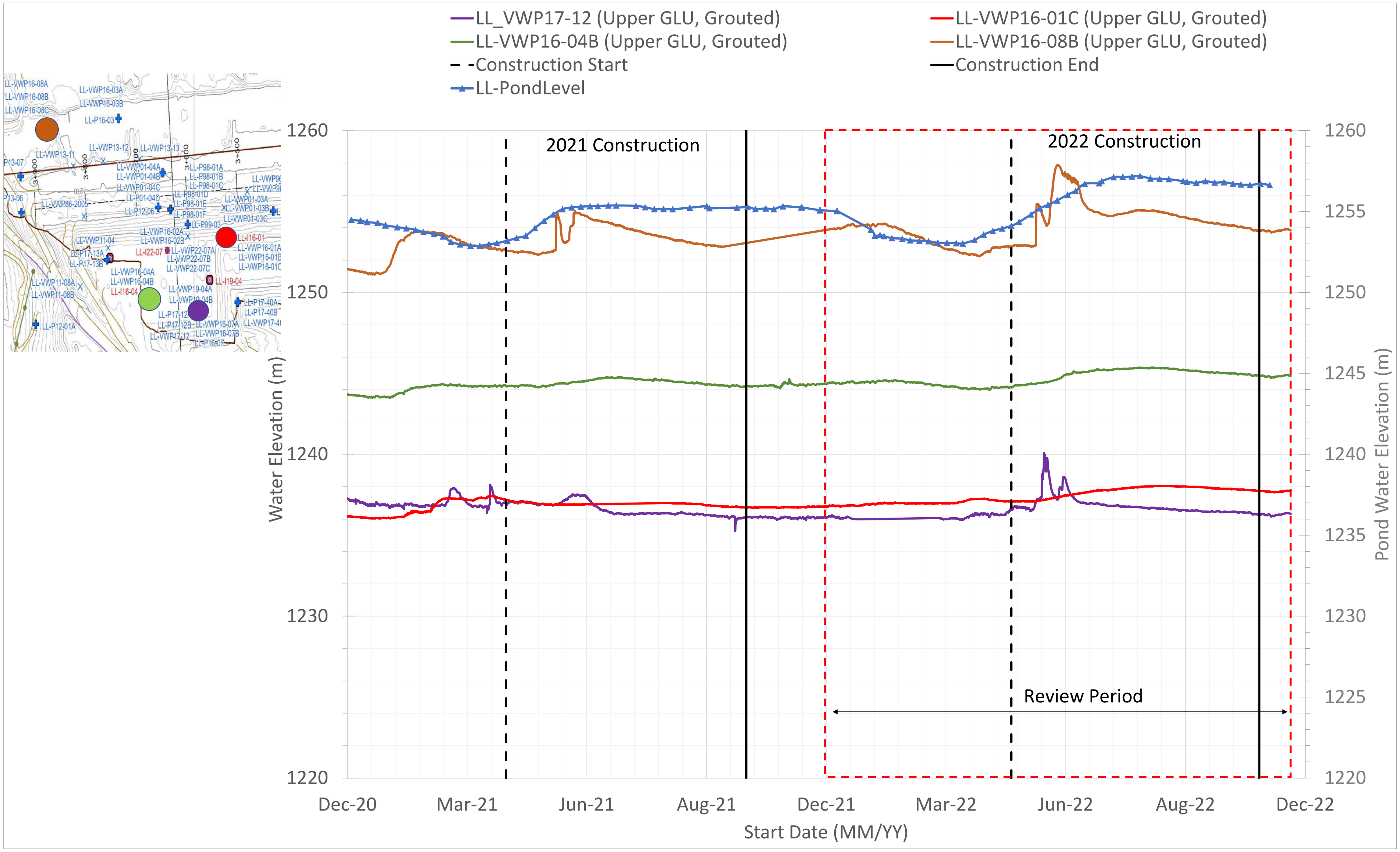
Figure 5.14 plots measured piezometric levels since December 2020 from select piezometers in the North Dam Bedrock foundation. During the review period, the piezometric response and trends were consistent with historic trends and the rate of rise assumed in the design:

- Piezometric rise upstream of the core is greater than downstream and is similar to pond rise.
- Downstream of the core, the typical rate of rise during the review period was 1 m/year or less and generally decreases farther downstream of the core and to the south.

Notification Level exceedances were measured at two piezometers in the North Dam U-GLU during the review period, which were reviewed by the EoR:

- LL-VWP17-12 (U-GLU) directly below the North Dam Buttress exceeded the Notification Level threshold during hydraulic placement. The response was likely related to both loading and increased seepage related to hydraulic placement. The peak piezometric level did not exceed the level assumed in the design analysis and dissipated relatively quickly (Figure 5.14) after loading was suspended or completed. Similar response to construction activity has been observed at this instrument since 2018.
- Similar to the exceedance described at the NBB (Section 5.2.3.6), a positive piezometric pressure was measured at a standpipe piezometer LL-P99-02A (Glacial Till) previously reported as “dry.” KCB defined a new Notification Level threshold consistent with nearby instruments.

Figure 5.14 Measured Piezometric Response in the U-GLU Near the North Abutment: December 2020 to November 2022



Inclinometers

Summary of inclinometer readings during the review period are shown on Figure II-B-32 and Figure II-B-35 in Appendix II-B.

In response to changes in loading conditions, some horizontal deformation is expected within the U-GLU that governs the dam design in this area. South of approximately Sta. 3+600, the U-GLU was excavated from the footprint of the 2018 raise (30 m to 40 m wide zone) and from the North Dam Buttress footprint during the review period. North of Sta. 3+600, the U-GLU was too deep to excavate, which has been accounted for in the design by specifying a wider buttress in this area.

Where the U-GLU is present, measured deformation rates in the U-GLU during the review period were small (<0.1 mm/month even under construction loading). No defined deformation zones were identified at the inclinometers nearest to the toe, where the U-GLU is present (LL-I16-04) or is not present (LL-I19-03 and LL-I19-04), indicating that deformations that may be occurring are contained as per the design.

Deformations are observed in the compacted cycloned sand fill at some of the inclinometers, similar to the discussion at the South Dam (Section 5.2.3.3). This is related to deformation of the casing within an outer protective casing that is placed around the instrument as it is raised through the fill.

5.2.4 Seepage

Flow measurements, since 2018, from seepage weirs installed downstream of the L-L Dam are shown in Figure 25. Note that two seepage weirs were removed when the toe of the dam was shifted to the ultimate downstream extent. As discussed in Section 7.3, HVC plans to install new seepage weirs along the downstream toe in 2023.

Visual inspections of seepage from the L-L Dam downstream slope and toe did not observe turbid flow or other unsatisfactory conditions. Summary of the two active seepage weirs during the review period are as follows:

LL–FS-01

- Measures seepage flow from a major drain that discharges on the south side of the NBB and surface water flow from the dam slopes and local catchment, which is routed to Seepage Pond 2.
- Flow rates were within the typical range of flows with a typical base flow between 15 L/s and 20 L/s. Temporary periods of elevated flow (up to 33 L/s) were coincident with freshet flows or periods of hydraulic placement north of the VBBE, which increases flow through the major drain that discharges upstream of the weir.

LL–FS-04

- Measures discharge from Seepage Pond 2, which is routed to the SWRP.
- Flow rates were similar to the typical range of flows. The typical base flow was similar to LL–FS-01. This makes sense as the primary flow into Seepage Pond 2, while there is no hydraulic placement ongoing, is flow from LL–FS-01.

- The peak flow rates at LL–FS-04 were up to 125 L/s, which are associated with increased inflow into Seepage Pond 2, routed through Sediment Pond 2, during hydraulic placement.

5.3 H-H Dam Performance Summary

5.3.1 Vertical Buffer Above the Tailings Surface

There is no risk of overtopping at the H-H Dam (Section 2.3). Therefore, freeboard is not an applicable metric at the H-H Dam. The M-11 permit (EMLCI 2021a) requires that a minimum 1 m buffer[7] be maintained throughout operations. HVC targets maintaining a minimum 2 m buffer along the dam when planning crest raises. Buffer values from the November 9, 2022, survey are shown in Figure 5.15, as well as the peak buffer readings during the review period.

The buffer reduced approximately 2 m to 4 m east of Sta. 1+120. Figure 5.16 plots tailings beach elevations, since 2017, near the upstream face of the H-H Dam at various stations along the crest. The tailings beach rate of rise during the review period was within the historic rate of rise and consistent with assumptions made in crest raise sequencing. The next dam crest raise is planned for 2023.

Overall, there has been a consistent rate of rise in the beach since April 2021, driven by beaching from the spigots upstream of the east abutment. Prior to this, the beach had been relatively constant for the prior 18 months. The stepped pattern in beach rise shown in Figure 5.16 is related to the location of eastern spigots relative to the upstream face of the dam. For example, when spigots are discharging near the dam, the rate of rise is generally the greatest, as was the case during the review period. As the spigots advance farther upstream, there is a period where tailings slurry generally flows directly towards the tailings pond with minimal deposition near the dam.

[7] Vertical distance between the tailings surface at the upstream dam face and the dam crest in that area.

Figure 5.15 H-H Dam Tailings Buffer – November 9, 2022, Tailings Beach

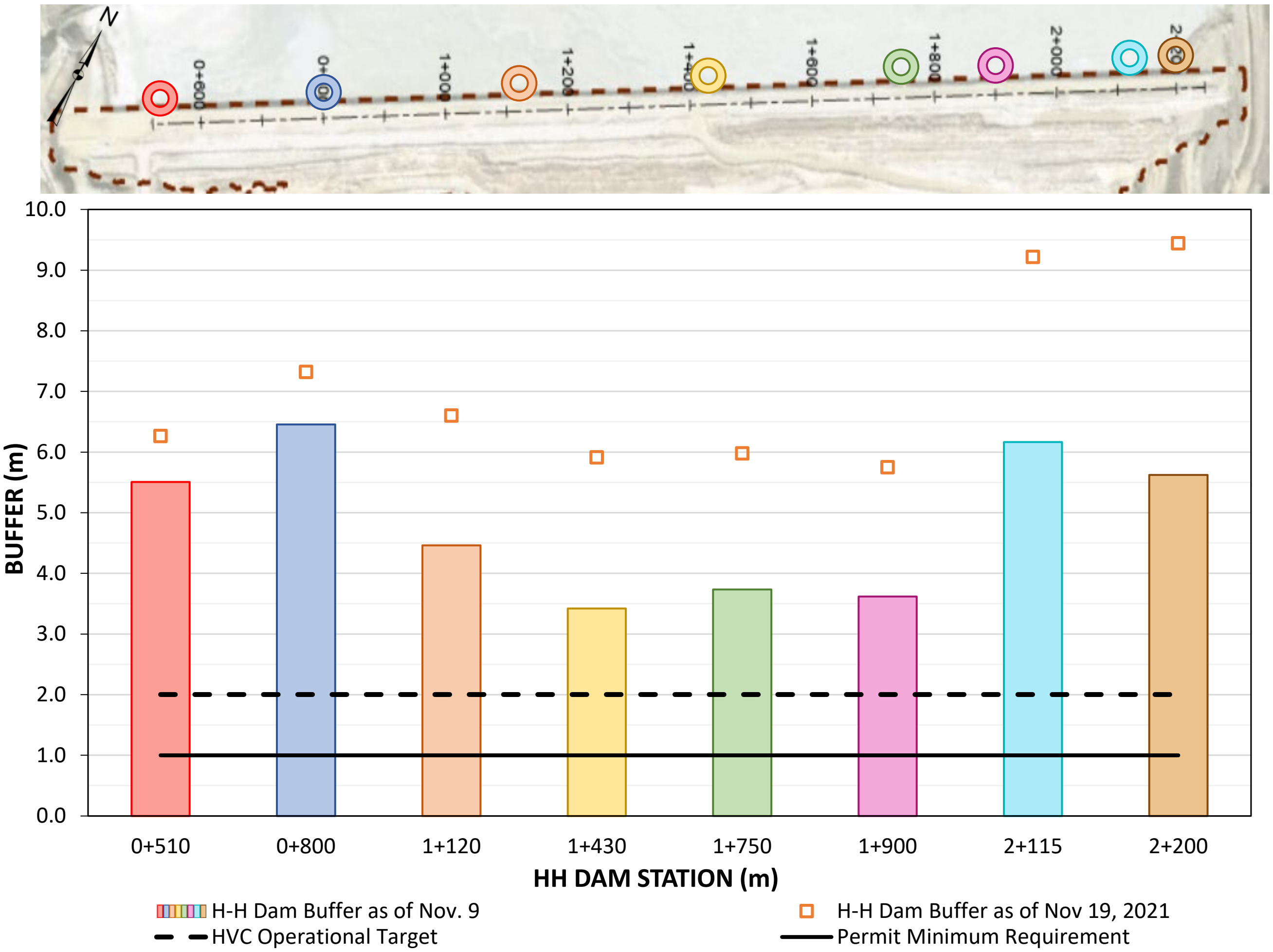
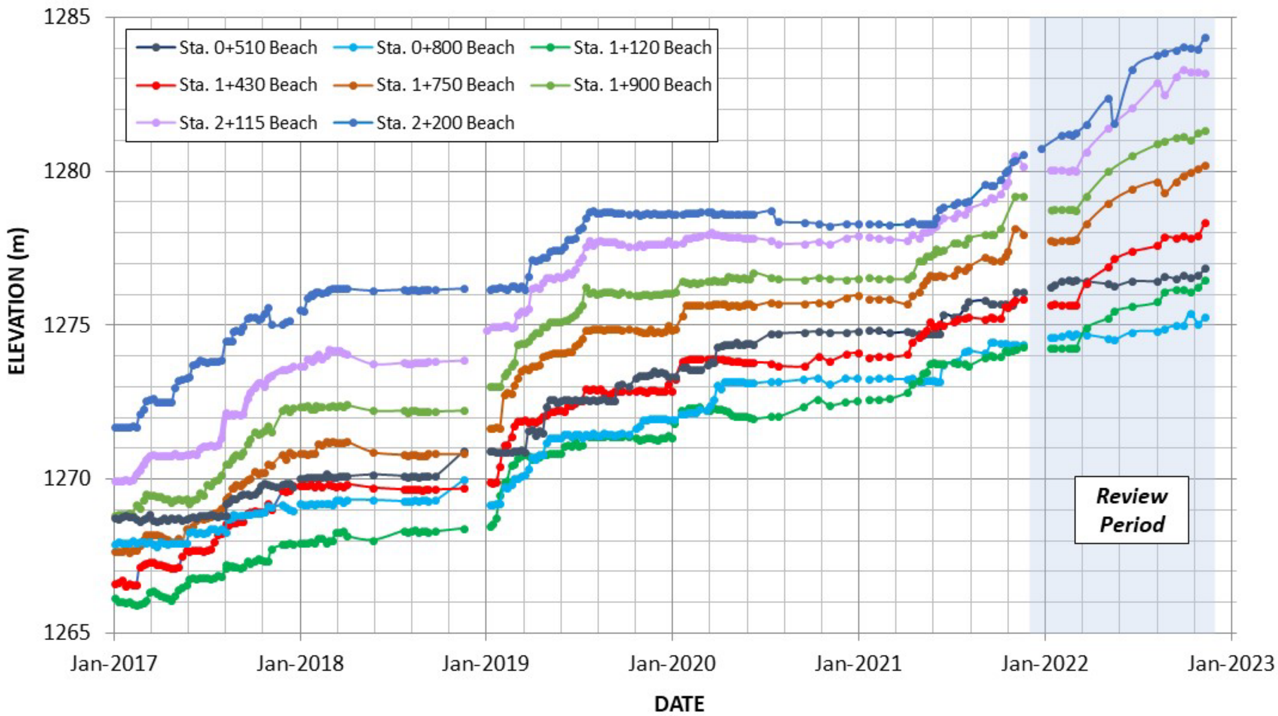


Figure 5.16 H-H Dam Tailings Beach Elevations Along the Crest: 2017 to 2022



5.3.2 Instrumentation Trends

5.3.2.1 Overview

This section provides an overview of general piezometric and deformation behaviour, based on instrument readings during the review period at the H-H Dam. November 2022 instrumentation readings are shown on select cross sections of the H-H Dam (Figure 19 to Figure 23). Instrumentation installed at the H-H Dam is summarized in Table 5.2. Summary plots of instrumentation readings are included in Appendix III-A (piezometers) and Appendix III-B (inclinometers).

5.3.2.2 Notification Level Exceedances

During the review period, Notification Level exceedances were measured at 12 instruments. All were related to expected piezometric responses to intermittent pumping of the H-H Gland Wells between July 2022 and late October 2022; refer to Section 5.3.2.3 for further discussion. Each of the exceedances were reviewed by the EoR, as per the OMS Manual (HVC 2022). None of the exceedances were elevated to a higher level of the TARP or required that mitigative action be taken at the dam.

5.3.2.3 Piezometers

Piezometric levels in the dam fill and foundation downstream of the core zone are governed by pumping of the H-H Gland Wells and pond level in the 24 Mile TSF. While the H-H Gland Wells are in operation, piezometric response in the dam fill and foundation units responds to fluctuations in the 24 Mile TSF pond level. When gland well pumping is suspended or throttled, piezometric levels in the

Glacial Till and underlying foundation units rise. No piezometric response has been measured to date in the dam fill due to fluctuations in H-H Gland Well pumping. Pumping of the wells is not a design requirement as the H-H Dam design analysis is based on piezometric levels assuming the H-H Gland Wells are not operating.

Measured piezometric levels during the review period and in the past 5 years are shown in Figure III-A-1 to Figure III-A-5 (1 year) and Figure II-A-101 to Figure II-A-105 (5 years).

As mentioned in Section 5.3.2.1, between July 2022 and October 2022, there was intermittent pumping from the H-H Gland Wells. This triggered a sudden rise in the piezometric levels measured in the Glacial Till and underlying foundation units (Figure 5.17). A similar disruption in pumping occurred between mid-2020 and January 2021. The corresponding drawdown from that event, after pumping was resumed, is also shown in Figure 5.17. The behaviour during both pumping disruptions was similar.

In general, the peak piezometric levels measured during the 2022 pumping disruption were similar to or greater than the peak levels measured during the 2020 pumping disruption; refer to Table 5.9. Piezometers that measured a higher peak level were those closest to the pumping wells and farthest from the 24 Mile TSF.

The peak piezometric level measured at all piezometers, including those that did not respond to the pumping disruption, were less than the piezometric level assumed in the design analysis.

All Notification Level exceedances measured at the H-H Dam during the review period were related to the pumping disruption. Notification Level thresholds are set assuming the H-H Gland Wells are operating. When pumping is suspended and the piezometric levels rise, the thresholds are expected to be exceeded. At that time, the EoR recommends setting temporary Notification Level thresholds until pumping is resumed. Since the disruption in pumping was planned, the exceedances were expected.

When H-H Gland Well pumping resumed at typical capacity (approximately 1,100 gpm), piezometric drawdown occurred. At the end of the review period, piezometric levels were continuing to drawdown but were all below temporary Notification Level thresholds, and some were starting to level off near piezometric levels prior to pumping disruption.

Piezometers in the dam fill or foundation units above the Glacial Till (Figure 5.18) did not measure a response to the pumping disruption, as expected. A piezometric rise was measured during this period but was related to a rise in the 24 Mile TSF pond level (Figure 5.19). During the pumping disruption, HVC sourced gland water from the 24 Mile TSF. To accommodate the increased reclaim from the facility, HVC raised the operating pond level. Prior to raising the 24 Mile TSF pond level, these piezometers were relatively steady throughout the review period.

Figure 5.17 H-H Dam Piezometric Response in Glacial Till and Underlying Units: December 2020 to November 2022

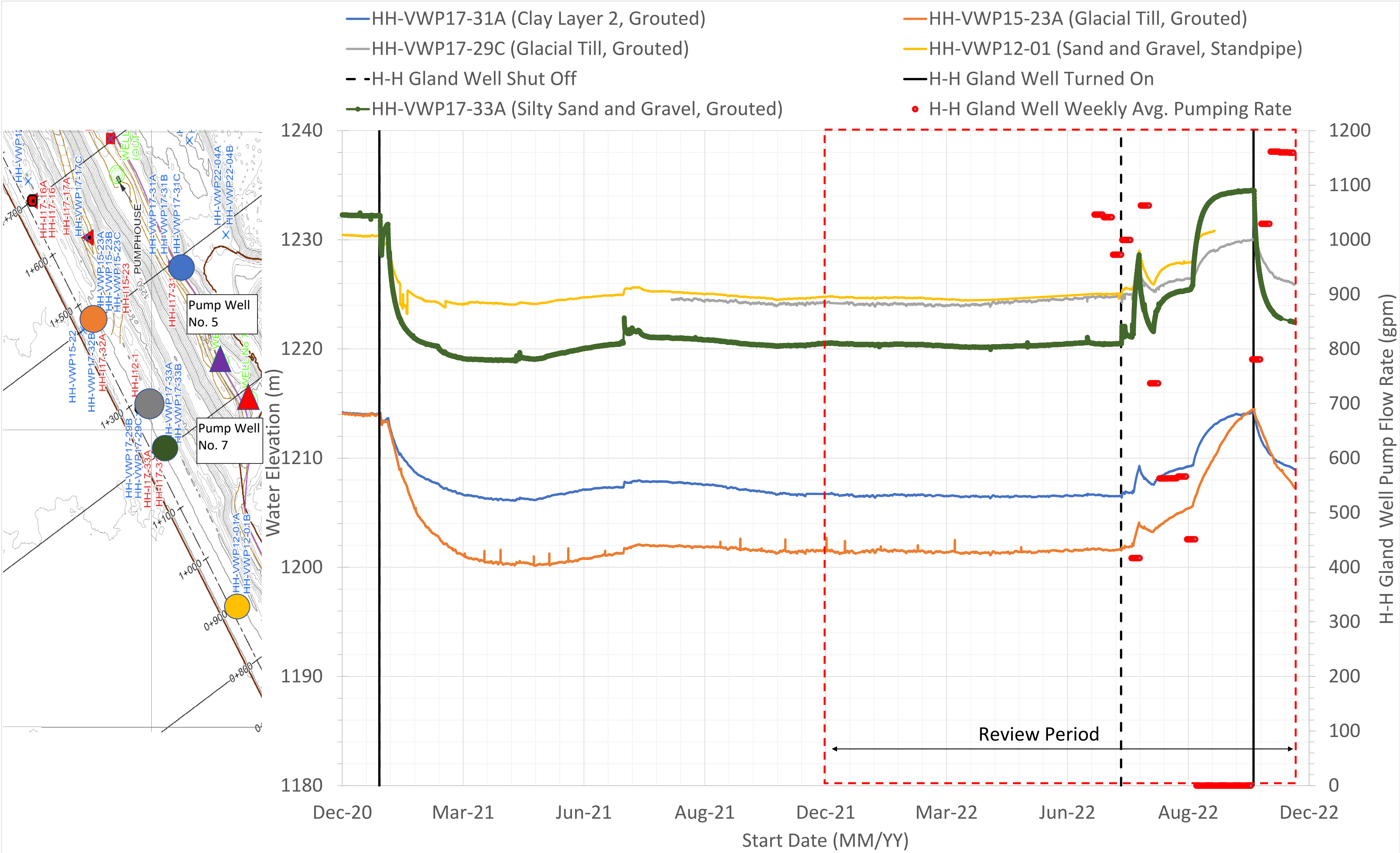


Figure 5.18 H-H Dam Piezometric Response in the Dam Fill and Foundation Above Glacial Till: December 2020 to November 2022

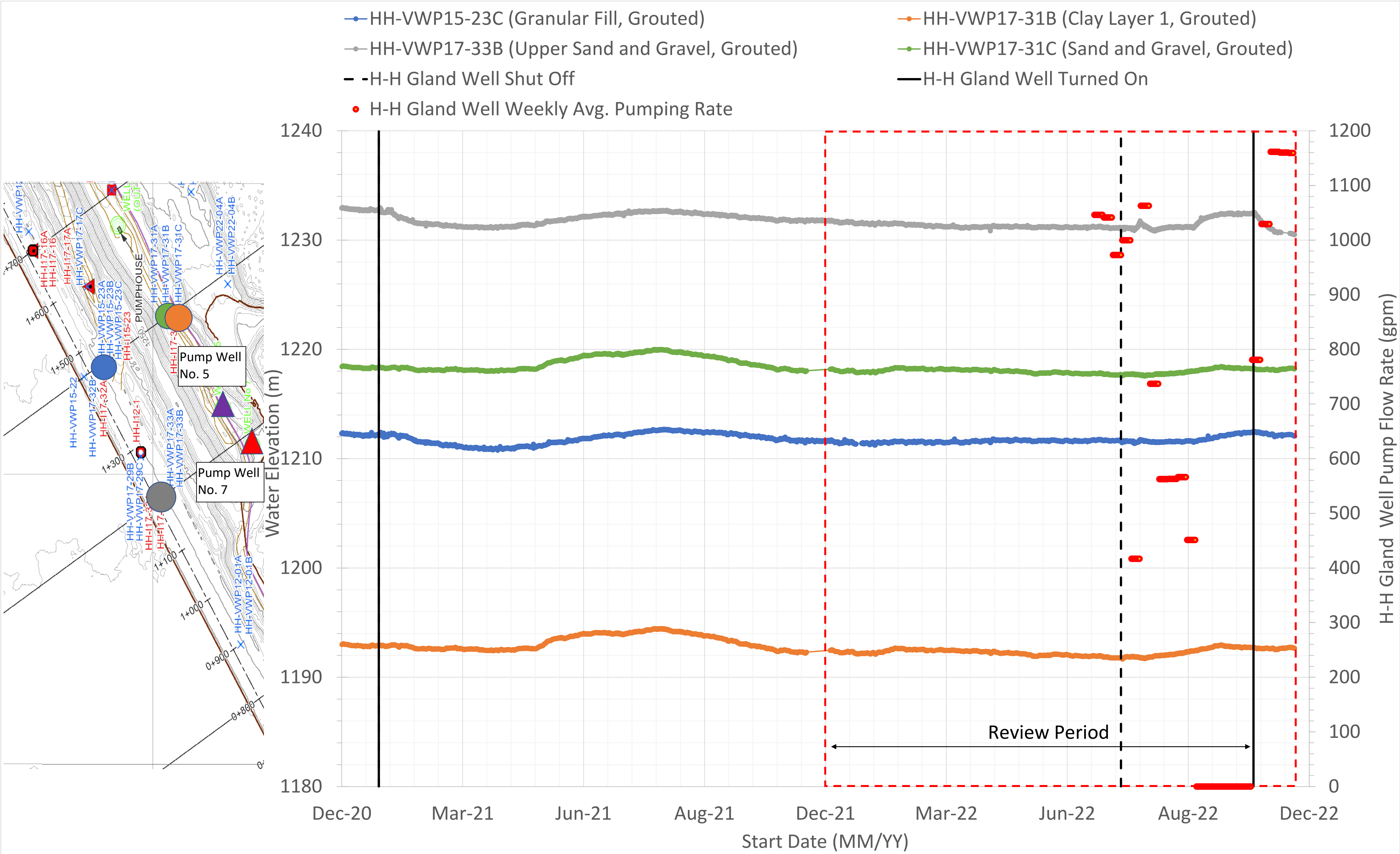


Figure 5.19 H-H Dam Piezometric Response in the Dam Fill and 24 Mile TSF Pond Level: December 2020 to November 2022

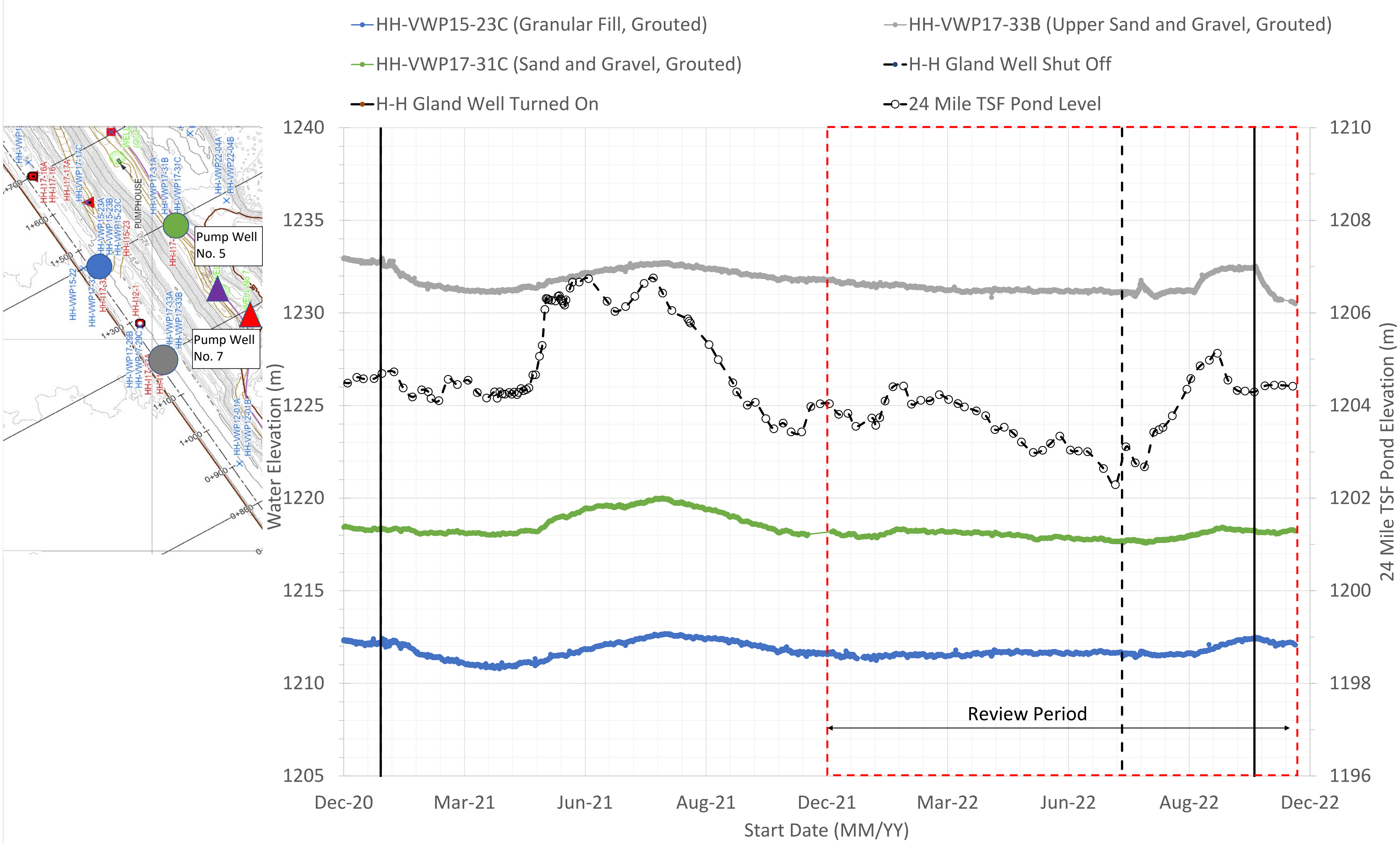


Table 5.9 Comparison of the Peak Piezometric Level of Piezometers Impacted by H-H Gland Well Pumping

Instrument Name	Geological Unit	2020 Peak Piezometric Level (m)	2022 Peak Piezometric Level (m)
HH-VWP17-31A	Clay Layer 2	1214.1	1214.1
HH-VWP15-23A	Glacial Till	1214.2	1214.3
HH-VWP12-01A	Sand and Gravel	1230.7	1231.1
HH-VWP17-29C	Glacial TIll	N/A	1230.4
HH-VWP17-33A	Silty Sand and Gravel	1232.7	1234.5

5.3.2.4 Inclinometers and Settlement

Summary of inclinometer readings during the review period are shown on Figure III-B-1 to Figure III-A-7 in Appendix III-B.

Horizontal deformations in the H-H Dam fill are interpreted as a response to settlement in the downstream fill, which was placed by the mining fleet in thick lifts (up to 10 m). Consistent with this interpretation, locations where the largest settlement is measured (e.g., HH-I17-16) correspond to the areas where horizontal deformations are also largest. In comparison, the least amount of settlement and horizontal deformation in the fill has been measured at HH-I17-33. As there was no construction loading on the downstream slope during the review period, there was less settlement and associated horizontal deformation measured at the H-H Dam than in recent years.

The measured horizontal deformations (<0.7 mm/month to 4.2 mm/month) and settlement (<100 mm) in the fill during the review period were within the range of those observed since the instruments were installed. The settlement measured during the review period was a continued response to the fill placement during 2020 and 2021. Figure 5.20 shows the horizontal deformations measured in the dam fill at two typical inclinometers: HH-I17-16 and HH-I12-01. Relative to 2021, deformation rates were notably less (Table 5.10), which was expected since there was no fill placed on the downstream slope during 2022. This magnitude of deformation can be accommodated by the structure without compromising design function. There were no visual observations of significant cracking or deformation of the fill over the crest area.

No shear deformation zones within the natural foundation were measured along the dam, which is consistent with historic and expected future behaviour.

Figure 5.20 Measured Horizontal Deformation Within Downstream Fill: HH-I17-16 and HH-I12-01

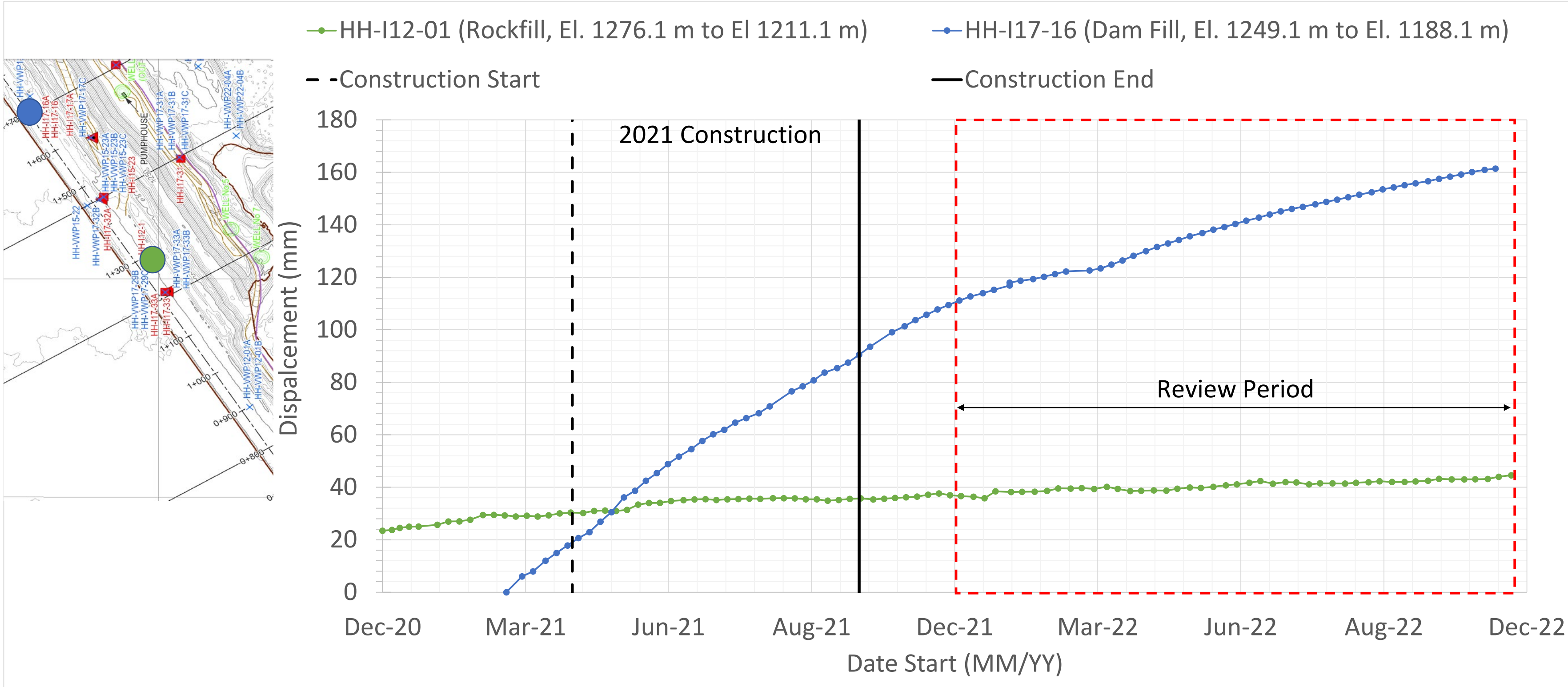


Table 5.10 Typical Horizontal Deformation Rates Within Downstream Fill: HH-I17-16 and HH-I12-01

Instrument Name	Geological Unit	Measurement Elevation (m)	2021 Movement Rates	2022 Movement Rates
HH-I17-16	Downstream Pit Waste Shell	1249.1 to 1188.1	9.8 to 14.5 mm/month	2.6 to 4.8 mm/month
HH-I12-01	Downstream Pit Waste Shell	1276.1 to 1211.1	1.3 mm/month (average)	0.2 mm/month (average)

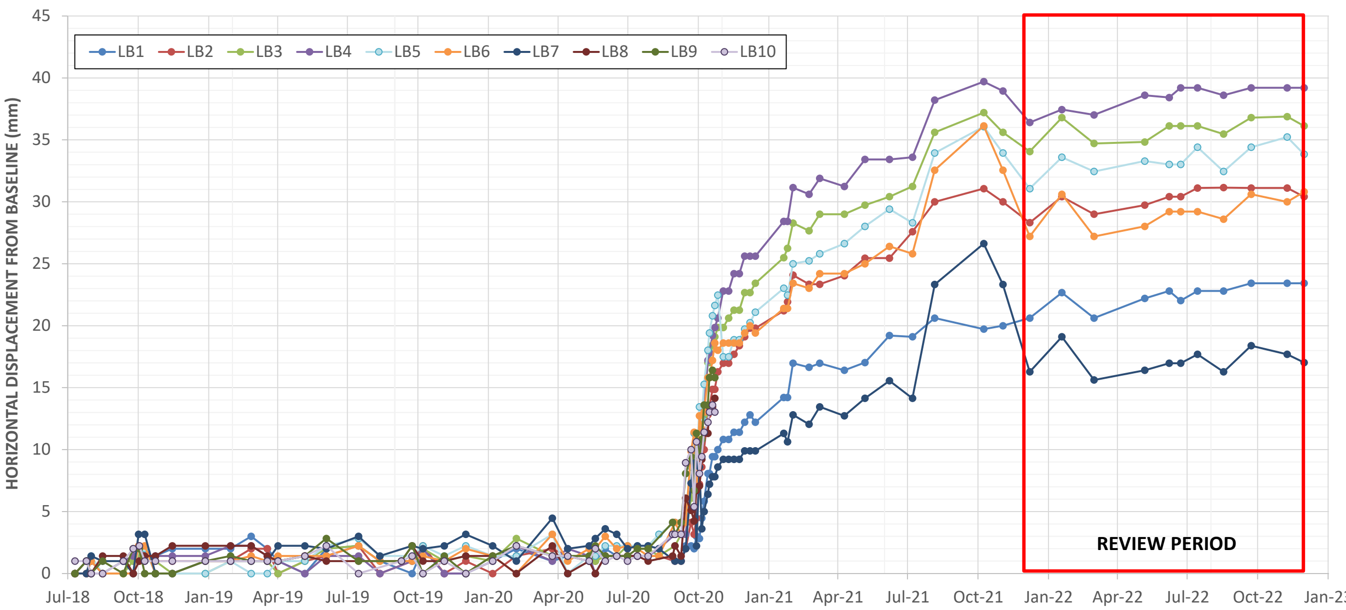
5.3.3 Lock-Block Wall Survey Monuments

The purpose of the lock-block wall at the toe of the H-H Dam, near the H-H Pumphouse (near Sta. 2+025), is to increase the setback of the dam toe to the H-H Pumphouse. If the lock-block wall were to fail, it would pose no risk to the overall integrity of the H-H Dam. However, such an event could pose a risk to workers or equipment in the area. Therefore, monitoring of the wall is part of the H-H Dam surveillance program.

During 2020, deflection of the lock-block wall increased in response to fill placement immediately upstream of the wall by the HVC mining fleet. Although no issues of wall instability were observed, HVC took the precautionary step of placing fill downstream to support the lower half of the wall, which had an immediate impact on reducing the deformation rates. The lower three monuments (LB8, LB9, and LB10) were buried by the fill.

No fill was placed upslope of the lock-block wall during the review period. As expected, wall deflections from 2020 and 2021 construction have attenuated and levelled off (Figure 5.21). In addition, no issues of instability were observed during visual inspections.

Figure 5.21 Lock-Block Wall Monuments: Horizontal Displacement from Baseline (2018 to 2022)



Note: Monuments LB8, LB9, and LB10 were buried by fill placed downstream of the wall in October 2020.

5.4 Water Quality

HVC's Water Quality Monitoring and Reporting Plan, approved under the PE-376 effluent permit (MECCS 2022), specifies minimum water-quality sampling requirements at the HVC Mine Site, including downstream of the Highland TSF. Water-sampling activities and results during the review period are reported in HVC's annual water-quality monitoring report, prepared by an appropriately qualified professional. The annual water-quality monitoring report was being prepared at the time of writing this AFPR and will be submitted to the Ministry of Environment and Climate Change Strategy and the Ministry of Mines prior to March 31, 2023. This report, when available, should be referred to for monitoring data and for a discussion of the results. HVC has confirmed that the water-quality monitoring requirements, related to the Highland TSF, were met during the review period.

With regards to the operation of the Highland TSF, there were no surface discharges from the impoundment or downstream collection ponds. The primary seepage controls (i.e., core zone, tailings beach, downstream collection ditch, and ponds) were in place, and instrumentation measurements suggest they performed consistent with expectations during the review period. SAMP operation during the review period is documented in the 2022 annual SAMP report that is prepared by an appropriately qualified professional.

6 2022 SITE VISIT VISUAL OBSERVATIONS

Visual observations made during the site visits (September 21, 2022, and October 19, 2022) to support the AFPR, together with copies of the field observation forms and select photographs, are included in Appendix I. Two additional site visits of the facility were made by the EoR during the review period. Select observations are as follows:

L-L Dam

- No visual indications of a dam safety concern were observed. The dam was visually in good physical condition, which agrees with other surveillance observations and data at the time.
- As discussed in Section 5.2.2, minimum beach requirements at the north abutment (>500 m) were met, and beach widths were nearing HVC's 500 m target width across the dam except at the South Dam.
- Active construction areas during the site visits included hydraulic fill placement upstream of the core and in the downstream shell at the VBB and VBBE, and raising the glacial till core zone. The temporary on-dam sediment cells at the VBBE, as well as Sediment Pond 1 and Sediment 2, were in operation.
- The North Dam Buttress, in the North Dam U-GLU segment, was completed to the ultimate configuration earlier in 2022; north of the NBB, the downstream slope of the dam has now been built to the ultimate configuration, except for remaining crest raises.
- Downstream surface water and sediment ponds were being operated within operating pond limits.

H-H Dam

- No visual indications of a dam safety concern were observed. The dam was visually in good physical condition, which agrees with other surveillance observations and data at the time.
- There was no crest raise during 2022. Raising of the H-H Gland Wells downstream of the H-H Dam slope was in progress; refer to Section 3.2.2.
- HVC constructed and was using the new lined channel to convey overflow tailings from the H-H Pumphouse to the 24 Mile TSF. Tailings were not settling or accumulating in the channel, consistent with expected performance. The previous channel will be backfilled as part of 2023 buttress fill placement.
- There was no active haulage of pit waste to the 24 Mile Waste Dump, but survey and comparison of photos show that additional pit waste material had been placed since the 2021 AFPR site visit.

7 2022 DAM SAFETY ASSESSMENT

7.1 Review of Potential Downstream Consequences

Conditions and land use downstream of all tailings and water retaining structures were reviewed by HVC and KCB during the review period as part of the failure mode review (Section 7.4.1), and no significant changes were identified.

7.2 Design Basis

An updated consolidated design basis memorandum for the L-L Dam and the H-H Dam was prepared for and included in the recent design update (KCB 2020a). No changes were made to the design basis of either the L-L Dam or the H-H Dam during the review period. Throughout the review period, the Highland TSF was operated in compliance with design and regulatory criteria defined in the design report (KCB 2020a).

The L-L Dam is designed to the maximum flood (i.e., PMF) and earthquake (i.e., 10,000-year) event prescribed by HSRC (EMLCI 2021b), regardless of consequence class. The earthquake design ground motion (EDGM) for the H-H Dam (5,000-year return period) meets the requirements of the HSRC (EMLCI 2021b) as discussed in KCB (2020a).

HVC and KCB reviewed the current IDF and EDGM for the downstream sediment and seepage ponds to confirm they meet or exceed the equivalent requirements under the HSRC (EMLCI 2021b).

At the request of HVC, the AFPR does not include any reference to a consequence classification for the Highland TSF facilities. Consequence classification is not part of HVC’s tailings management governance and stewardship because there are components of that system that do not align with HVC’s safety culture, where any fatality represents an unacceptable consequence. HVC’s internal governance has been developed to align with the GISTM (2020) requirements and to meet or exceed requirements under the HSRC (EMLCI 2021b).

7.3 Status of 2017 Dam Safety Review Recommendations

The last DSR was conducted in 2017 by representatives of Stantec Consulting Ltd. (Stantec 2018), which identified no unsafe or unacceptable conditions at the dams in relation to design, construction, surveillance, or maintenance. Stantec (2018) concluded that the dams at the Highland TSF comply with the 19 dam safety principles from the CDA (2013).

All DSR recommendations from Stantec (2018), except for one, were addressed by 2020. The outstanding recommendation is related to the installation of additional seepage-monitoring points along the toe of the L-L Dam; completion of this has been delayed related to archeological approval times. HVC and KCB have agreed on locations to establish the weirs along the L-L Dam ultimate toe ditch. This recommendation was added to the AFPR recommendations (LL-2019-02; Table 8.1) for tracking.

As discussed in Section 5.1, HVC commissioned a DSR for the Highland TSF during 2022. This report will be finalized in early 2023 and an action plan developed by HVC and KCB to address the included recommendations.

7.4 Failure Modes

7.4.1 2022 Failure Mode Review

HVC's stated long-term goal for their TSFs is to reach landform status, with all potential failure modes that could result in a catastrophic release of tailings and/or water being either reduced to non-credible or managed to ALARP (i.e., as low as reasonably practicable) under appropriate loading conditions. KCB fully supports this goal, which is also consistent with the GISTM (2020).

The L-L Dam and the H-H Dam design review (KCB 2020a) concluded that the controls specified in the design and implemented by HVC are appropriate to manage potential dam failure modes applicable to each structure. Where applicable, qualitative performance objectives to measure the effectiveness of those controls have been defined in the surveillance program and integrated with the TARPs. There were no changes during the review period that would alter this conclusion.

Design and operational controls in place to manage potential failure modes, and their status at the end of the review period, are summarized below.

7.4.2 L-L Dam

Overtopping

To manage overtopping risks, the Highland TSF is designed to store the 120-hour duration PMF (50.3 Mm^3) (Table 4.3) with an additional 2 m of flood freeboard to account for wave run-up, settlement, and added contingency. Under the existing operating conditions, there are additional controls and factors that significantly reduce the potential for overtopping:

- The pond is operated with excess capacity to store approximately one year of tailings production as contingency for construction delays. At the end of the review period, the pond level was 16 m below the L-L Dam crest, and the Highland TSF had approximately 161 Mm^3 of storage available below the minimum flood freeboard level (El. 1270.0 m). This is sufficient to store forecasted tailings to be produced in 2023 and more than two IDF events. This far exceeds minimum design and regulatory flood requirements.
- The duration of the IDF (120-hour) is longer than required by the HSRC (EMLCI 2021b) for facilities that store floods (i.e., 72-hour).
- Even under extreme flood conditions, the pond is separated from the downstream slope by a wide crest (>130 m).

With such robust and redundant controls and level of supervision, the potential for overtopping under existing conditions is negligible.

Internal Erosion and Piping – Through Dam Fill

The L-L Dam includes controls that restrict the required conditions for internal erosion to develop and/or propagate through the dam fill:

- Interfaces between fill zones within the dam were designed to be filter compatible so that fine particles cannot be washed through coarse dam fills, and comprehensive quality control/quality assurance programs are in place to confirm fills placed in the dam meet the design intent.
- The low-permeability core, upstream tailings beach, and downstream underdrainage system maintain low seepage gradients in the downstream shell of the dam, which reduces the seepage flow and gradient in the downstream shell.

With these controls in place, the potential for internal erosion through the dam that develops into an overall breach and release of tailings is negligible.

Internal Erosion and Piping – Through Foundation

The L-L Dam includes controls that restrict the required conditions for internal erosion to develop and/or propagate through the dam fill:

- The core zone is keyed into Glacial Till or intact bedrock where practicable (refer to the discussion below).
- The blanket drain below the downstream shell is filter compatible with the foundation to prevent any internal erosion through the foundation that daylights within the dam footprint.
- Where the core zone is not keyed into Glacial Till or intact bedrock, a minimum 500 m beach width is specified to reduce seepage flows and gradients through the foundation.
- The Low-Level Outlet (LLO) close to the south abutment was decommissioned, which included surrounding the downstream outlet with filter-compatible fill to prevent the progression of internal erosion (KCB 2014).

At the North Dam U-GLU segment, where the core zone was not keyed into Glacial Till or bedrock, the minimum 500 m beach was maintained and the seepage gradients through the foundation, near the dam, were <0.1 m. This is less than the lower bound estimate of critical seepage gradient required for the progression of internal erosion (KCB 2020a).

Slope Stability – Static and Seismic Loading

Compliance with slope stability design and regulatory criteria is checked by KCB prior to the construction of each crest raise, with consideration for material behaviour under changing load (e.g., strain softening, compression) and construction-related response (e.g., increased seepage through dam fill, pore pressure generation). Stability analyses give consideration for material behaviour under changing load (e.g., strain softening, compression), construction-related response (e.g., increased seepage through dam fill, pore pressure generation), and performance under the earthquake design (10,000-year return period event).

Characterization of dam fill and foundation soil behaviour is informed by a geologic/geotechnical site characterization (KCB 2022c), which has been developed to supplement knowledge of the dam's historical performance over its +40-year life. The characterization meets the requirements of the Site Characterization for Dam Foundations in BC professional practice document (APEGBC 2016) and has been independently reviewed.

Surveillance observations and measured performance during the review period (Section 5.2.3) concluded dam performance was consistent with expected behaviour based on design and historic typical measured behaviour.

7.4.3 H-H Dam

Internal Erosion and Piping

The H-H Dam includes similar controls to the L-L Dam, which restrict the required conditions for internal erosion to develop through the dam fill, with one exception. There is no sand and gravel filter separating the glacial till in the dam core from the coarse random fill between El. 1216.7 m and El. 1255.5 m (>26 m below the existing crest).

Indicators of internal erosion (e.g., sinkholes in the dam core, upstream fills, or tailings beach) have not been recorded throughout the life of the structure. KCB assessed the risk of internal erosion leading to a structural failure developing due to this gap in the filter, using the method defined by the International Commission on Large Dams (ICOLD 2017). The assessment concluded the existing controls (e.g., upstream tailings beach, >7 km setback from the free water pond, low seepage gradient) would be effective in restricting the progression of any internal erosion along the interface in question (KCB 2020a). As a result, the risk of internal erosion leading to a failure that would result in the uncontrolled release of tailings is considered negligible for the existing structure.

Slope Stability – Static and Seismic Loading

The compliance with slope stability design and regulatory criteria is checked by KCB, under static and earthquake loading (5,000-year return period), prior to the construction of each incremental crest raise, with consideration for planned downstream activity in the 24 Mile Waste Dump and the 24 Mile TSF. Geological and geotechnical characterization (KCB 2020b), which informs stability analyses, are equivalent to those methods for the L-L Dam.

The current condition of the H-H Dam and downstream waste dumps is adequate to maintain compliance with slope stability criteria at the current crest level. Additional downstream buttressing is required to meet design criteria for post-earthquake conditions before the next crest raise in 2023.

7.4.4 24 Mile TSF

Overtopping

To manage overtopping risks, the 24 Mile TSF is operated with sufficient capacity to store at least the IDF[8] (Table 4.3), with freeboard. At the end of the review period, the pond level in the 24 Mile TSF (El. 1204.4 m) was 20.6 m below the perimeter containment level and had approximately 5.3 Mm^3 of storage up to the minimum flood freeboard level (0.5 m). This is sufficient to store the equivalent of 1.6 IDF events (Table 4.3) without exceeding the design freeboard. This far exceeds minimum design or regulatory flood requirements.

The flood storage in the 24 Mile TSF changes as additional waste is placed in the surrounding area, and the stored tailings and pond level rises. A life-of-mine forecast of flood storage is prepared and reviewed annually by the HVC QP and the EoR to confirm whether raising the perimeter area will be required, as required under the OMS Manual (HVC 2022).

7.5 Emergency Preparedness and Response

The Highland TSF EPRP forms part of the OMS Manual (HVC 2022), which was reviewed and revised during the review period. The revision included updating procedures and contacts based on current side-wide emergency plans. The EPRP is appropriate for the existing structure and includes a list of preventative actions that can be taken in response to potential unusual or emergency conditions.

On October 26, 2022, participants from HVC's operation team (including site management), including a representative designated by the HVC QP, and the EoR participated in a simulated exercise to test the TSF mine emergency response plan.

[8] The IDF for the 24 Mile TSF is 72-hour duration, 1/3 between 1,000-year and PMF 72-hour, and requires 3.2 Mm^3 of flood storage.

8 SUMMARY

Based on the review of measured performance and observations summarized herein, KCB concludes that the Highland TSF performed as expected, and within design requirements, during the review period from December 2021 to November 2022.

The status of dam safety recommendations identified during past AFPRs are summarized in Table 8.1. Closed recommendations are shown in *italics*. During the review period, one of the two recommendations scheduled for completion was closed. As discussed in Section 5.1, the attempt to install a replacement inclinometer at the VBB (LL-I15-24) was unsuccessful, but HVC is pursuing efforts to close this out in 2023.

KCB has included two new recommendations during this review, both related to instrumentation (Table 8.2) and have been assigned a Priority 4, meaning they are not required to address a potential dam safety concern but are appropriate improvements to the surveillance program.

Table 8.1 Previous Recommendations Related to Facility Performance – Status Update

ID No.	Performance Area	Recommended Action	Priority(1)	Deadline (Status)
L-L Dam				
LL-2019-02	Surveillance	Install new seepage weirs along the downstream toe after the SWRP has been replaced and the L-L Dam constructed to the ultimate toe (DSR recommendation LL-2017-06).	3	Q4 2021 (Open; location of new weirs defined and HVC preparing an installation plan)
LL-2021-01	Surveillance	Install a replacement inclinometer for LL-I15-24 at the VBB.	3	Q4 2022 (Open; attempt to replace was unsuccessful; attempt again in 2023)
H-H Dam				
HH-2021-01	*Surveillance*	*Install 3 (minimum) piezometers in the waste fill between the H-H Dam slope and the 24 Mile TSF to increase monitoring points for piezometric levels in the area that affects the H-H Dam design.*	*3*	*CLOSED*

Notes:
1. Recommendation priority guidelines, specified by Teck and assigned by KCB:
   - *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 8.2 2022 AFPR Recommendations Related to Facility Performance

ID No.	Performance Area	Recommended Action	Priority(1)	Deadline
L-L Dam				
LL-2022-01	Maintenance	HVC to repair the L-L Dam Weather Station to measure precipitation and temperature at the Highland TSF.	4	Q1 2024
LL-2022-02	Surveillance	HVC to install additional piezometer monitoring points at the South Dam to increase monitoring coverage area. Locations to be agreed upon with the EoR.	4	August 2024

Notes:
1. Refer to Notes for Table 1.

9 CLOSING

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

KLOHN CRIPPEN BERGER LTD.
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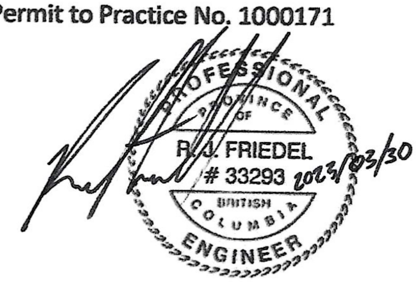

Rick Friedel, P.Eng.
Engineer of Record, Designated Representative
Senior Geotechnical Engineer, Principal

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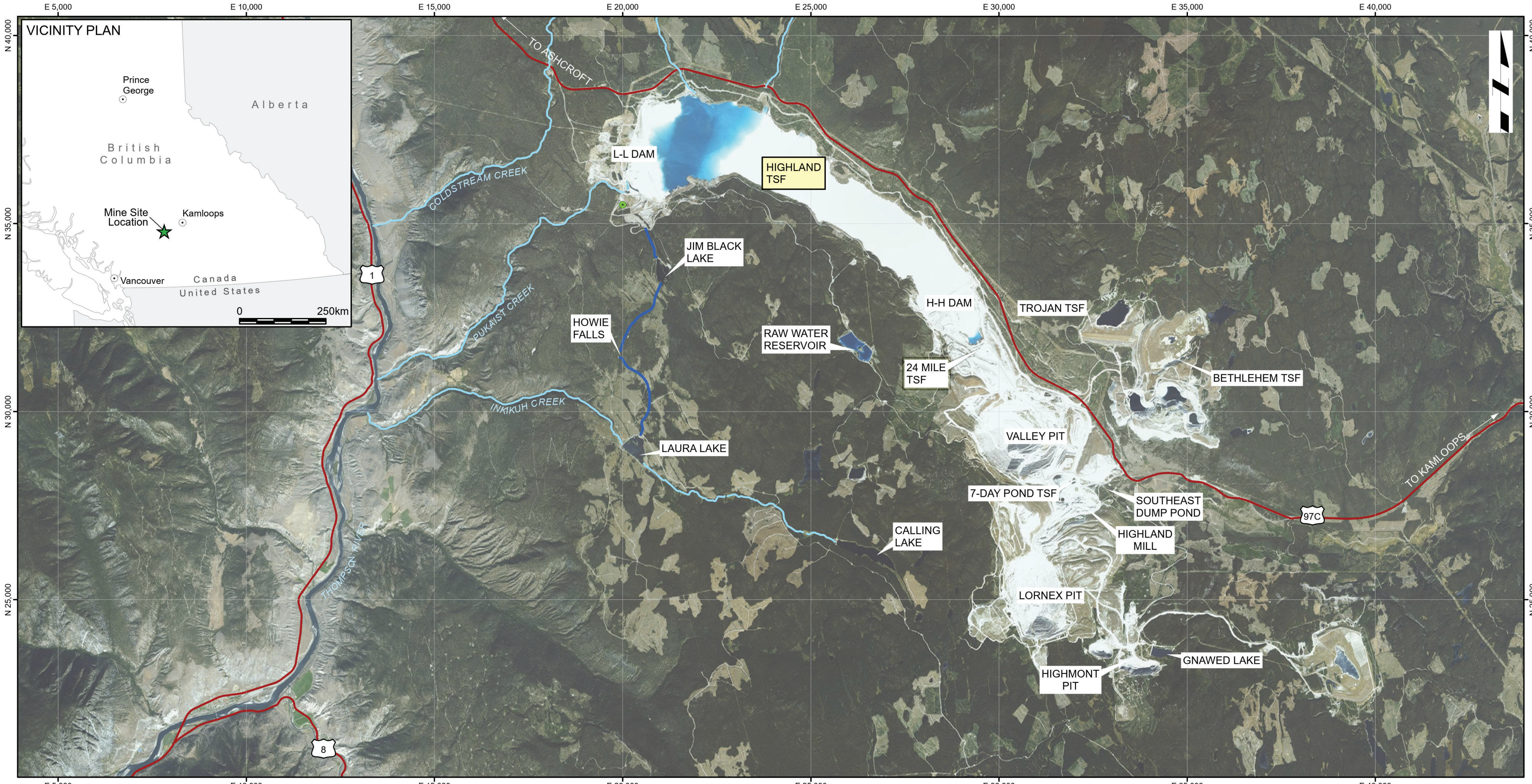
FIGURES



LEGEND

- L-L DAM WEATHER STATION
- CREEK/RIVER
- HIGHWAY
- INKIKUH DIVERSION

NOTES:

1. PROJECTION: HVC MINE GRID.
2. TSF = TAILINGS STORAGE FACILITY.
3. HIGHWAY AND CREEK DATA FROM THE GOVERNMENT OF CANADA (CANVEC).
4. IMAGERY FROM THE ARCGIS MAP SERVICE, WORLD IMAGERY MAPSERVER.

NOT FOR CONSTRUCTION

SCALE 0 5km

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: MINE SITE PLAN
SCALE: AS SHOWN	PROJECT No. M02341C42 · FIG No. 1

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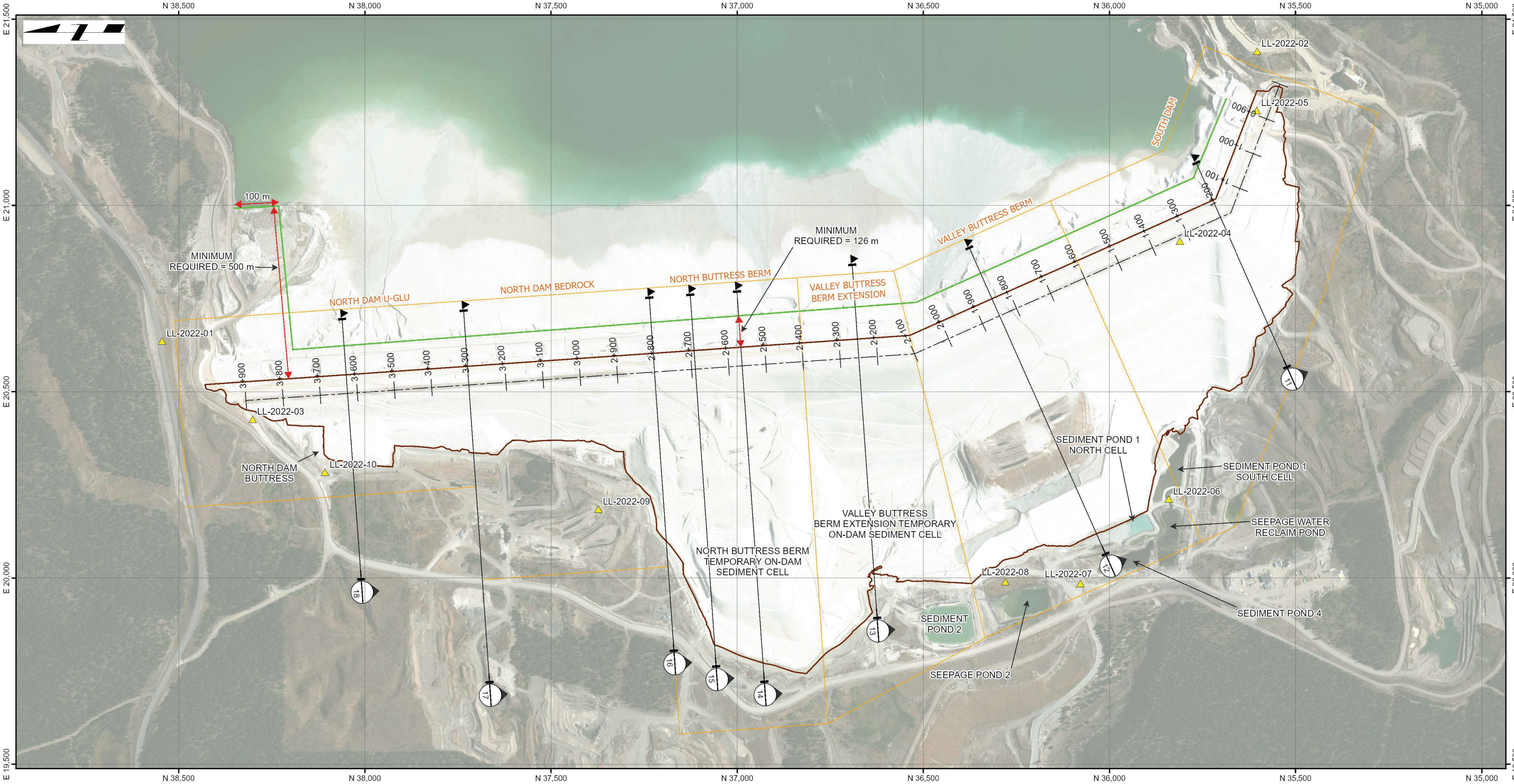

LEGEND

- WAYPOINT (LL-2022-xx)
- ULTIMATE DAM TOE - MODIFIED BASE CASE
- DESIGN MINIMUM - NORMAL OPERATING BEACH
- 3+900 L-L DAM CENTERLINE

NOTES:

1. PROJECTION: HVC MINE GRID.
2. IMAGERY PROVIDED BY TECK HIGHLAND VALLEY COPPER PARTNERSHIP DATED SEPTEMBER, 2022.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

SCALE 0 250m

CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM PLAN (SEPTEMBER 2022)

SCALE	PROJECT No.	FIG No.
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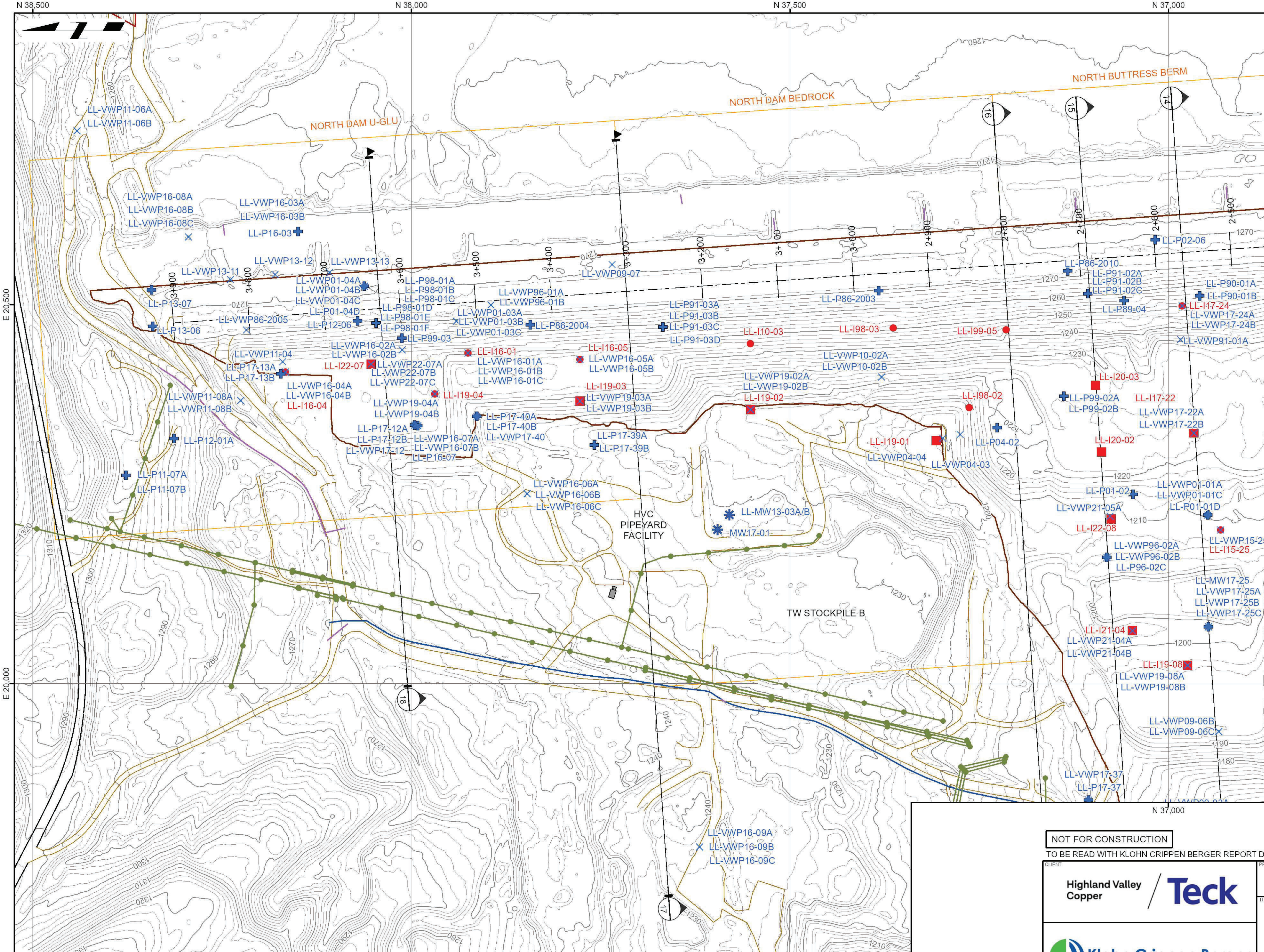

LEGEND

ACTIVE INSTRUMENT

- VIBRATING WIRE PIEZOMETER
- STANDPIPE PIEZOMETER
- SAA OR SAAV INCLINOMETER
- MANUAL INCLINOMETER
- MONITORING WELL
- POWERLINE (OVERHEAD)
- TAILINGS PIPELINE
- SURFACE WATER RECLAIM PIPELINE
- MUSTER AREA
- HAUL ROAD EDGE (2022)
- PUBLIC ROAD EDGE
- ULTIMATE DAM TOE - MODIFIED BASE CASE
- CONTOUR (10 m)
- CONTOUR (2 m)

INSTRUMENT SECTION

3+900

L-L DAM CENTERLINE

NOTES:

1. TOPOGRAPHY PROVIDED BY TECK HIGHLAND VALLEY COPPER PARTNERSHIP, PHOTOSAT SURVEY DATED SEPTEMBER 2022.

2. ACTIVE INSTRUMENTS ARE DEFINED AS ANY INSTRUMENTS SATISFYING ONE OF THE FOLLOWING CRITERIA: CURRENTLY READING AN ACTIVE WATER LEVEL, DRY OR PLUGGED <20 m ABOVE TIP ELEVATION AS THIS COULD SHOW A RESPONSE IN THE FUTURE.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

SCALE 0 150m

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: L-L DAM INSTRUMENTATION LOCATION PLAN NORTH DAM

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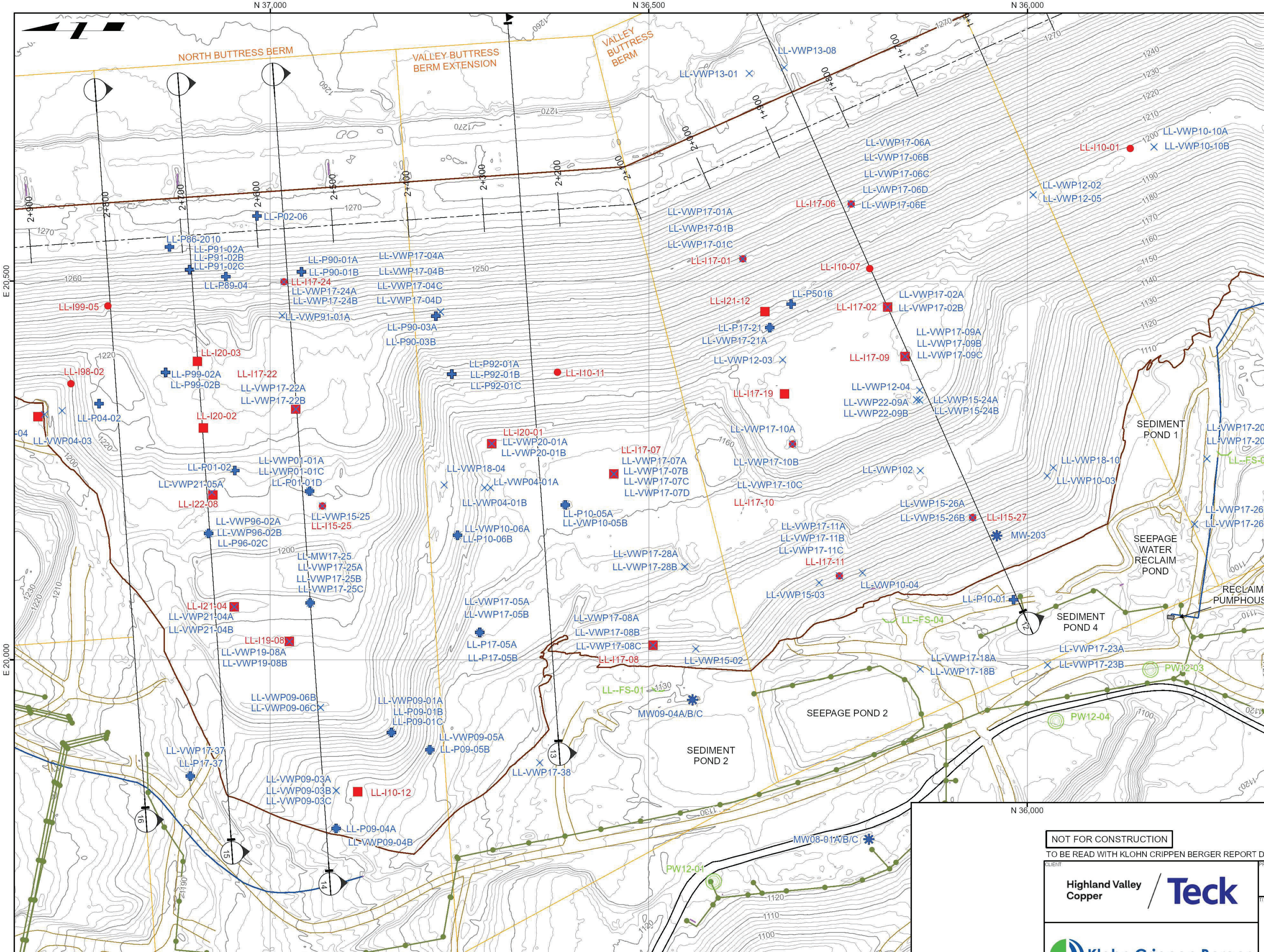

LEGEND

ACTIVE INSTRUMENT

- VIBRATING WIRE PIEZOMETER
- STANDPIPE PIEZOMETER
- SAA OR SAAV INCLINOMETER
- MANUAL INCLINOMETER
- MONITORING WELL
- PUMPING WELL
- FLOW MONITORING STATION
- POWERLINE (OVERHEAD)
- TAILINGS PIPELINE
- SURFACE WATER RECLAIM PIPELINE
- HAUL ROAD EDGE (2022)
- PUBLIC ROAD EDGE
- ULTIMATE DAM TOE - MODIFIED BASE CASE
- CONTOUR (10 m)
- CONTOUR (2 m)

INSTRUMENT SECTION

3+900

L-L DAM CENTERLINE

NOTES:

1. TOPOGRAPHY PROVIDED BY TECK HIGHLAND VALLEY COPPER PARTNERSHIP, PHOTOSAT SURVEY DATED SEPTEMBER 2022.

2. ACTIVE INSTRUMENTS ARE DEFINED AS ANY INSTRUMENTS SATISFYING ONE OF THE FOLLOWING CRITERIA: CURRENTLY READING AN ACTIVE WATER LEVEL, DRY OR PLUGGED <20 m ABOVE TIP ELEVATION AS THIS COULD SHOW A RESPONSE IN THE FUTURE.

SCALE 0 150m

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM INSTRUMENTATION LOCATION PLAN NORTH BUTTRESS BERM AND VALLEY BUTTRESS BERM EXTENSION

SCALE	PROJECT No.	FIG No.
AS SHOWN	M02341C42	4

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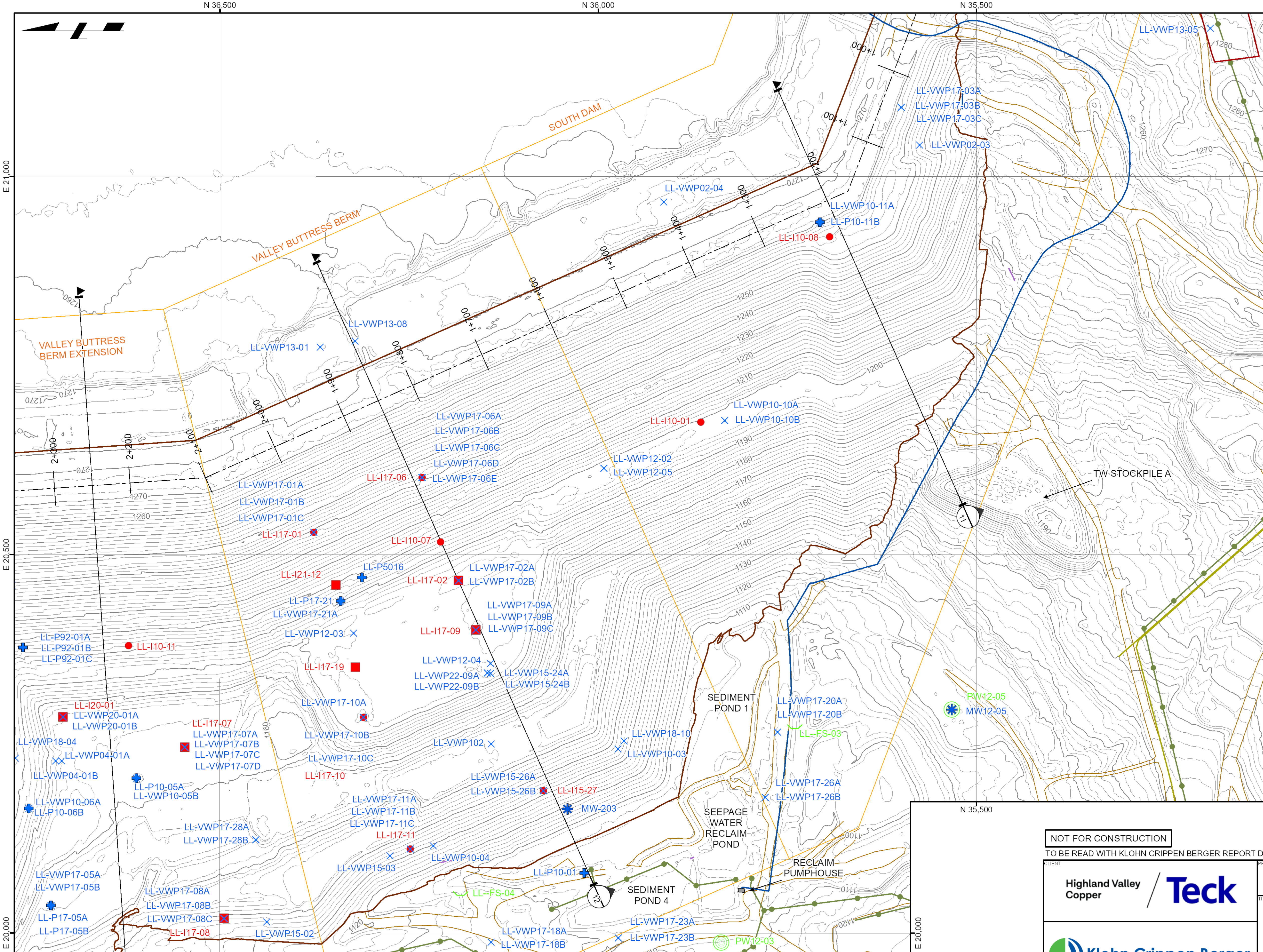

LEGEND

ACTIVE INSTRUMENT

- VIBRATING WIRE PIEZOMETER
- STANDPIPE PIEZOMETER
- SAA OR SAAV INCLINOMETER
- MANUAL INCLINOMETER
- MONITORING WELL
- PUMPING WELL
- FLOW MONITORING STATION
- POWERLINE (OVERHEAD)
- TAILINGS PIPELINE
- SURFACE WATER RECLAIM PIPELINE
- SPATSUM WATER PIPELINE
- MUSTER AREA
- HAUL ROAD EDGE (2022)
- PUBLIC ROAD EDGE
- ULTIMATE DAM TOE - MODIFIED BASE CASE
- CONTOUR (10 m)
- CONTOUR (2 m)

INSTRUMENT SECTION

3+900 L-L DAM CENTERLINE

NOTES:

1. TOPOGRAPHY PROVIDED BY TECK HIGHLAND VALLEY COPPER PARTNERSHIP, PHOTOSAT SURVEY DATED SEPTEMBER 2022.

2. ACTIVE INSTRUMENTS ARE DEFINED AS ANY INSTRUMENTS SATISFYING ONE OF THE FOLLOWING CRITERIA: CURRENTLY READING AN ACTIVE WATER LEVEL, DRY OR PLUGGED <20 m ABOVE TIP ELEVATION AS THIS COULD SHOW A RESPONSE IN THE FUTURE.

SCALE 0 150m

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: L-L DAM INSTRUMENTATION LOCATION PLAN VALLEY BUTTRESS BERM AND SOUTH DAM

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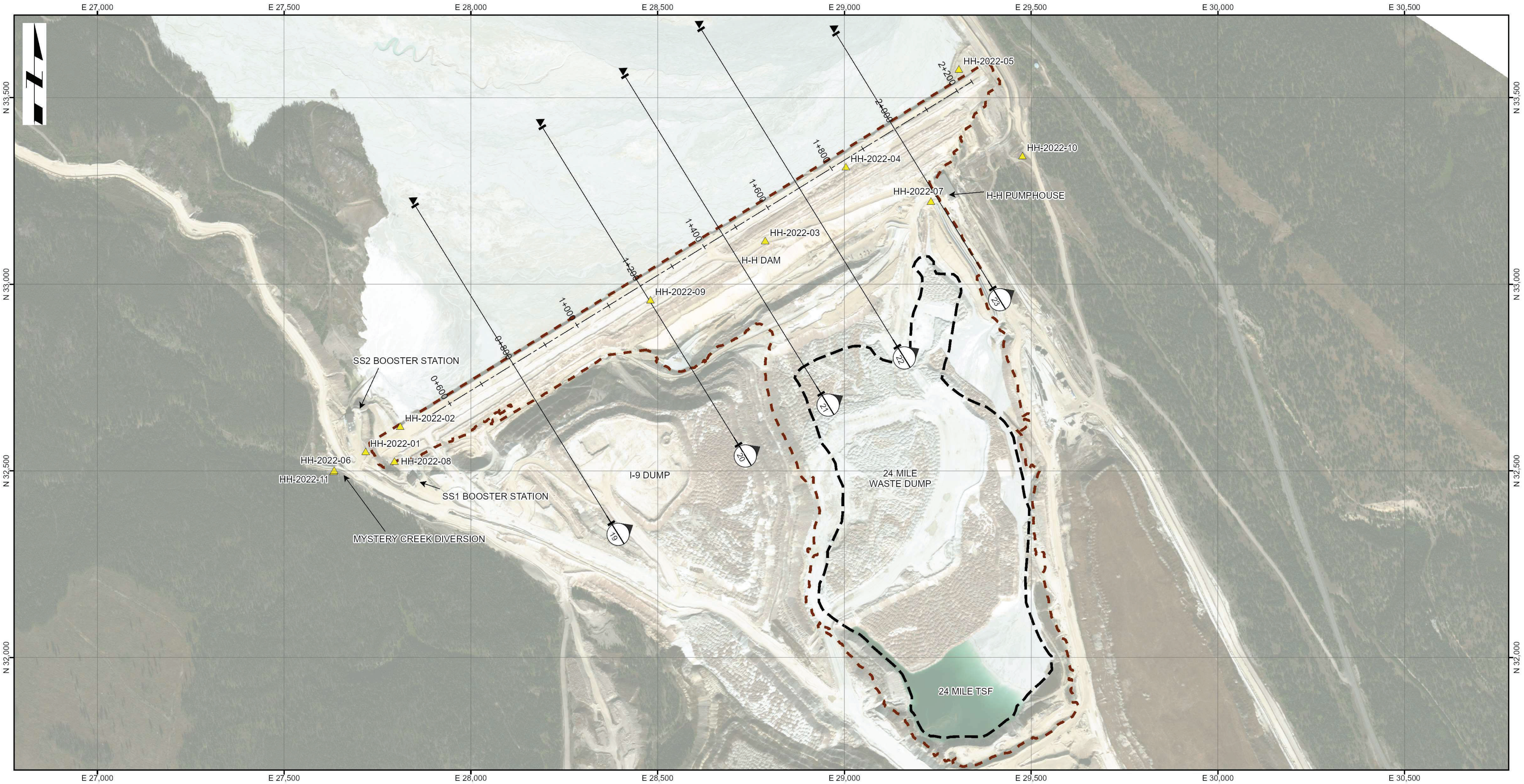

LEGEND

WAYPOINT (HH-2022-xx)

ULTIMATE DAM AND BUTTRESS FOOTPRINT

24 MILE EMERGENCY TSF EXTENT

3+900

H-H DAM CENTERLINE

NOTES:

1. PROJECTION: HVC MINE GRID.

2. IMAGERY PROVIDED BY TECK HIGHLAND VALLEY COPPER PARTNERSHIP DATED SEPTEMBER, 2022.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

SCALE 0 250m

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: H-H DAM PLAN
(SEPTEMBER 2022)

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AS SHOWN	M02341C42	6

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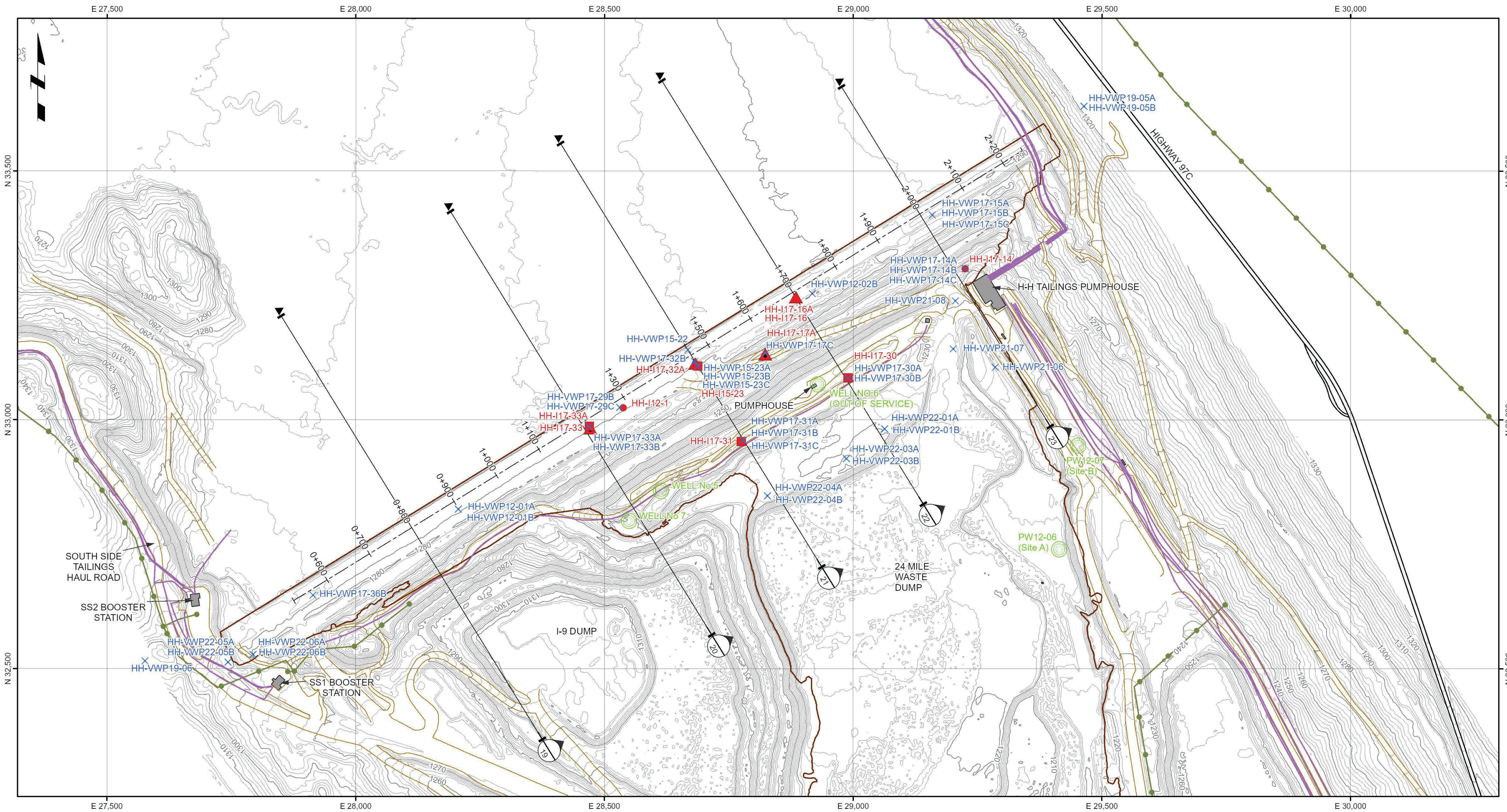

LEGEND

ACTIVE INSTRUMENT

- VIBRATING WIRE PIEZOMETER
- SAA OR SAAV INCLINOMETER
- MANUAL INCLINOMETER
- SONDEX SETTLEMENT MONITORING SYSTEM
- PUMPING WELL
- POWERLINE (OVERHEAD)
- TAILINGS PIPELINE
- ULTIMATE DAM AND BUTTRESS FOOTPRINT
- HAUL ROAD EDGE (2022)
- PUBLIC ROAD EDGE
- CONTOUR (10 m)
- CONTOUR (2 m)

INSTRUMENT SECTION

3+900

H-H DAM CENTERLINE

NOTES:

1. TOPOGRAPHY PROVIDED BY TECK HIGHLAND VALLEY COPPER PARTNERSHIP, PHOTOSAT SURVEY DATED SEPTEMBER 2022.

2. ACTIVE INSTRUMENTS ARE DEFINED AS ANY INSTRUMENTS SATISFYING ONE OF THE FOLLOWING CRITERIA: CURRENTLY READING AN ACTIVE WATER LEVEL, DRY OR PLUGGED <20 m ABOVE TIP ELEVATION AS THIS COULD SHOW A RESPONSE IN THE FUTURE.

SCALE 0 250m

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: H-H DAM
INSTRUMENTATION LOCATION PLAN

SCALE	PROJECT No.	FIG No.
AS SHOWN	M02341C42	7

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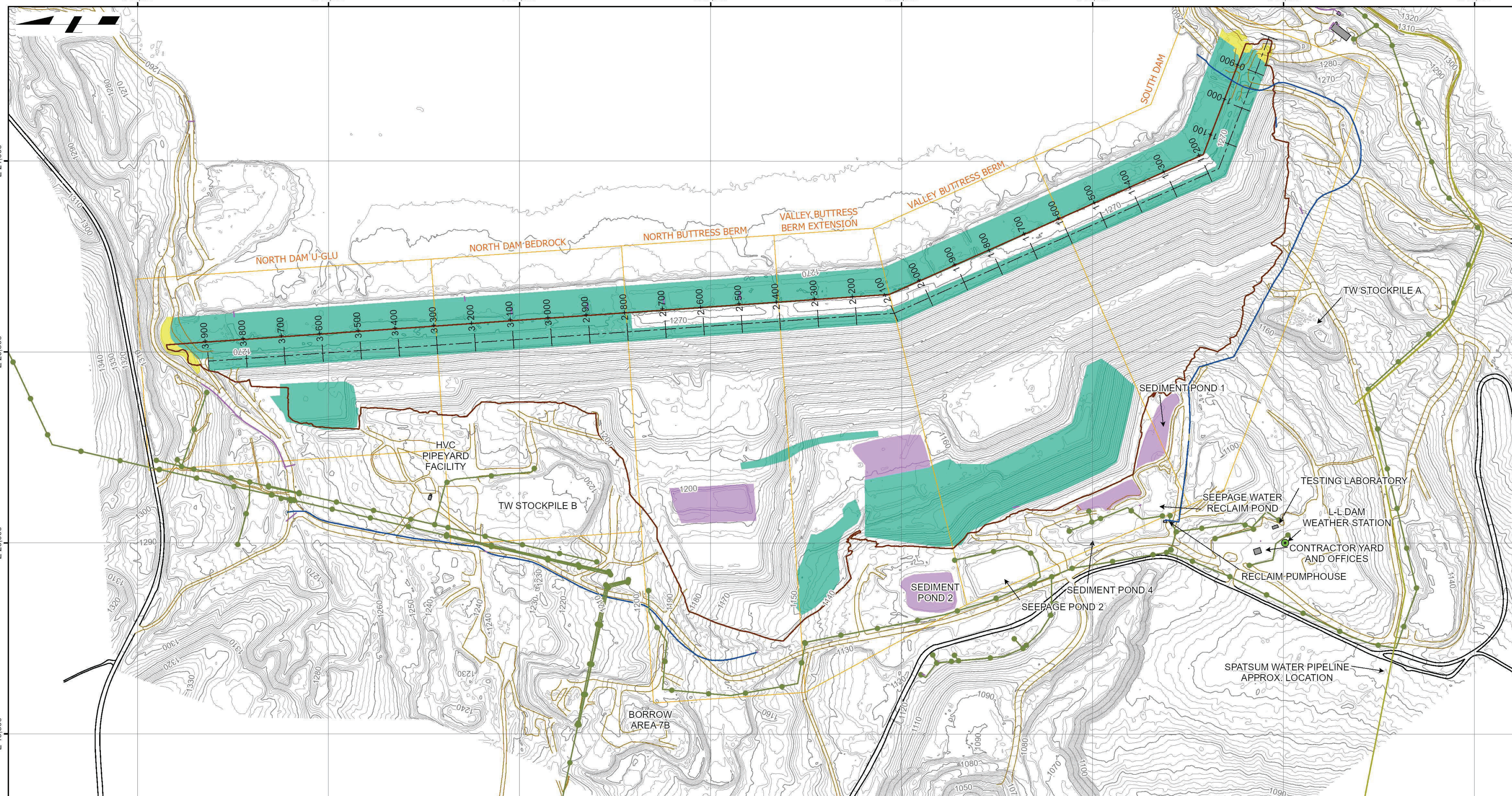

LEGEND

- POWERLINE (OVERHEAD)
- TAILINGS PIPELINE
- SURFACE WATER RECLAIM PIPELINE
- SPATSUM WATER PIPELINE
- ULTIMATE DAM TOE - MODIFIED BASE CASE
- HAUL ROAD EDGE (2022)
- PUBLIC ROAD EDGE
- CONTOUR (10 m)
- CONTOUR (2 m)

CONSTRUCTION AREA

- CYCLONED SAND FILL PLACEMENT
- FOUNDATION PREPARATION
- ACTIVE HYDRAULIC PLACEMENT SEDIMENT POND
- 3+900 L-L DAM CENTERLINE

NOTES:

1. TOPOGRAPHY PROVIDED BY TECK HIGHLAND VALLEY COPPER PARTNERSHIP, PHOTOSAT SURVEY DATED SEPTEMBER 2022.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

SCALE 0 250m

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: L-L DAM - 2022 CONSTRUCTION WORK AREAS

SCALE	PROJECT No.	FIG No.
AS SHOWN	M02341C42	8

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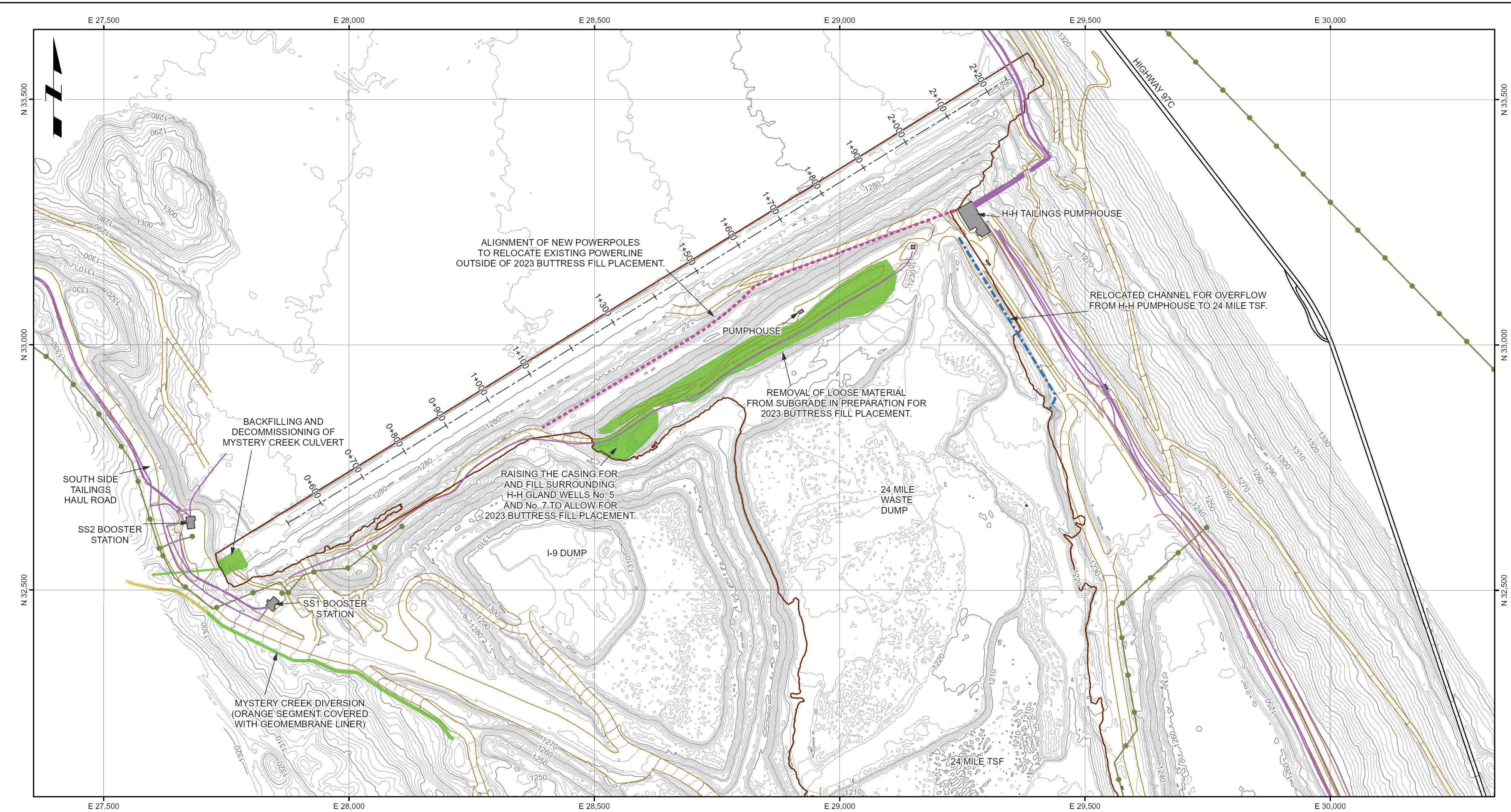

LEGEND

- POWERLINE (OVERHEAD)
- TAILINGS PIPELINE
- ULTIMATE DAM AND BUTTRESS FOOTPRINT
- HAUL ROAD EDGE (2022)
- PUBLIC ROAD EDGE
- CONTOUR (10 m)
- CONTOUR (2 m)
- GEOMEMBRANE LINER
- CONSTRUCTION AREA
- 3+900 H-H DAM CENTERLINE

NOTES:

1. TOPOGRAPHY PROVIDED BY TECK HIGHLAND VALLEY COPPER PARTNERSHIP, PHOTOSAT SURVEY DATED SEPTEMBER 2022.
2. WASTE ROCK PLACED BY HVC MINING FLEET DURING REVIEW PERIOD BUT AREA NOT SHOWN.

SCALE 0 250m

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: H-H DAM -
2022 CONSTRUCTION WORK AREAS

SCALE	PROJECT No.	FIG No.
AS SHOWN	M02341C42	9

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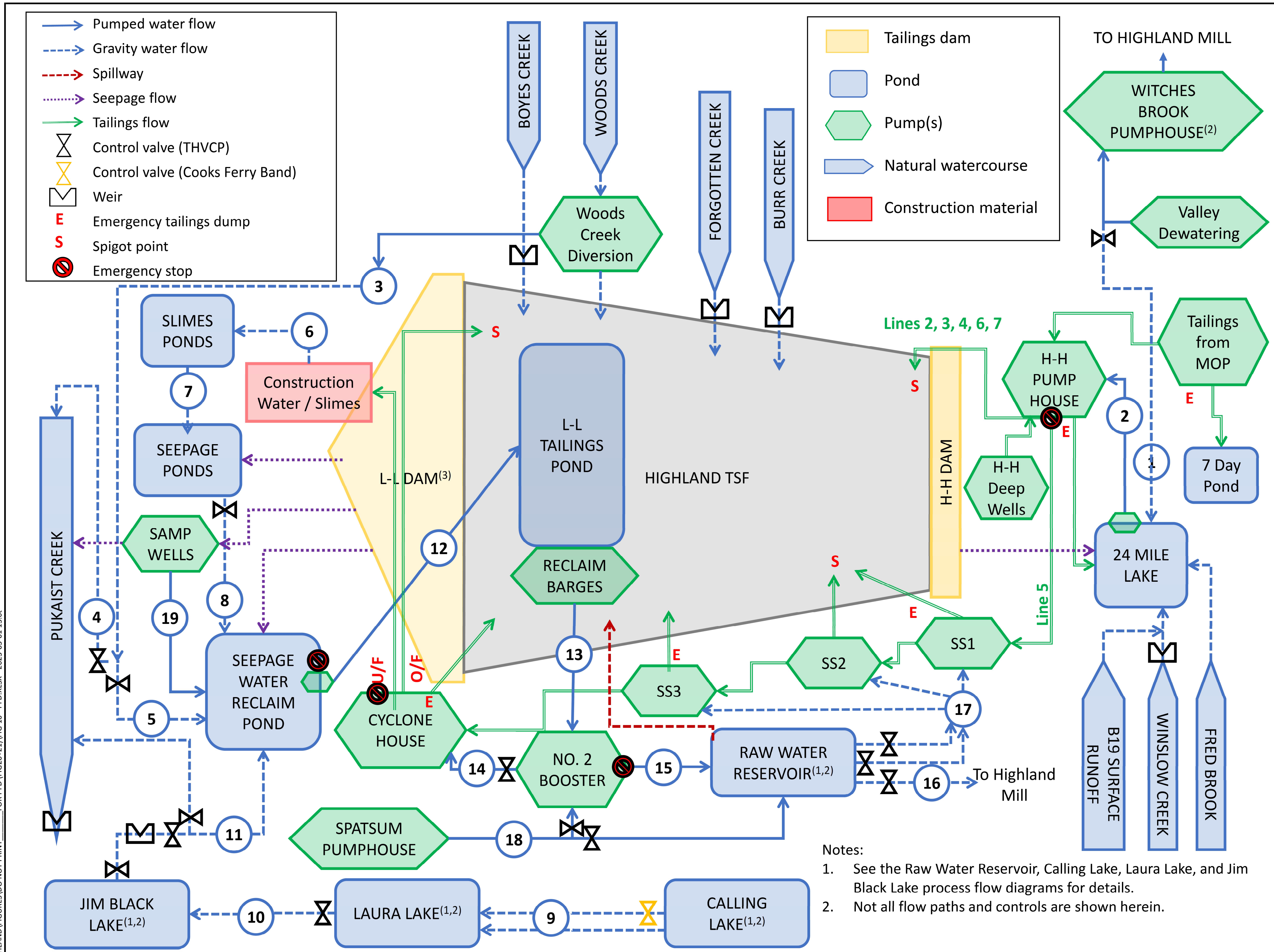

Notes:
1. See the Raw Water Reservoir, Calling Lake, Laura Lake, and Jim Black Lake process flow diagrams for details.
2. Not all flow paths and controls are shown herein.

No.	Name	Description	Status
1	Roman Road Pipeline	1x 20" HDPE pipeline	Operational
2	Dewatering to H-H Pumphouse	1x 12" HDPE pipeline	Operational
3	Woods Creek Diversion	System consists of: i) riprap-lined collection pond below Highway 97c; ii)Pumphouse and motor control center buildings; iii)7 km HDPE pipeline (dia. varies) to Pukaist Creek	Operational
4	Woods Creek Diversion to Pukaist Creek	1x 500 mm dia. HDPE pipeline with knife gate valve	Operational
5	Woods Creek Diversion to SWRP	1x 500 mm dia. HDPE pipeline with knife gate valve	Operational
6	Construction Water / Slimes to Slimes Ponds	Gravity flow of water and slimes from one or more hydraulic cyclone sand cells during construction.	Operational during construction
7	Slimes Ponds to Seepage Ponds	Slimes Pond 1 drains to SWRP, and Slimes Pond 2 drains to Seepage Pond 2.	Operational
8	Seepage Pond 2 Outlet	1x 36" dia. HDPE pipe graded upward for the first 12.1 m, then downward for the next 44 m to the SWRP with control valve	Operational
9	Low-Level Outlet and Spillway (Calling Lake)	Low-level outlet: 12" dia. HDPE pipe with control valve and submerged intake trash rack. Spillway: 12' wide channel.	Operational
10	Diversion Outlet (Laura Lake)	12" dia. HDPE pipe with control valve and intake trash rack	Operational
11	Jim Black Diversion to SWRP/Pukaist	Open channel with U/S y-valve to SWRP, 12" dia. HDPE pipe and open channel to Pukaist Creek	Operational
12	SWRP to TSF	2x permanent pumps in the SWRP pumphouse feeding 2x 18" dia. HDPE pipelines to the L-L Pond	Operational
13	Reclaim Barges	#1 and #2 Reclaim Barges on the south side of the L-L Pond	Operational
14	Bypass via Reclaim Isolation Valve	Bypass line controlled by hydraulic valve	Operational
15	Reclaim to Raw Water	2x 36" dia. HDPE pipelines from No. 2 Booster to Raw Water Reservoir. Section of 20" Spatsum Line from No. 2 Booster to Raw Water Reservoir also used.	Operational
16	Raw Water to Mill	Consists of Low-Level Outlet at East Dam (2x HDPE pipelines with control valves) and #3, #4 Reclaim (2x HDPE pipelines with control valves)	Operational
17	South Side Tailings Gland Water System	Buried pipeline from LLO, backup 10" HDPE pipeline running from reclaim line	Operational
18	Spatsum Water Line	1 x 20" buried steel pipeline	Operational
19	SAMP Wells	4 x deep wells from 5HP to 60HP pumping to a 12" discharge line, draining into the SWRP	Operational

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: FLOW SCHEMATIC FOR HIGHLAND TSF

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	10

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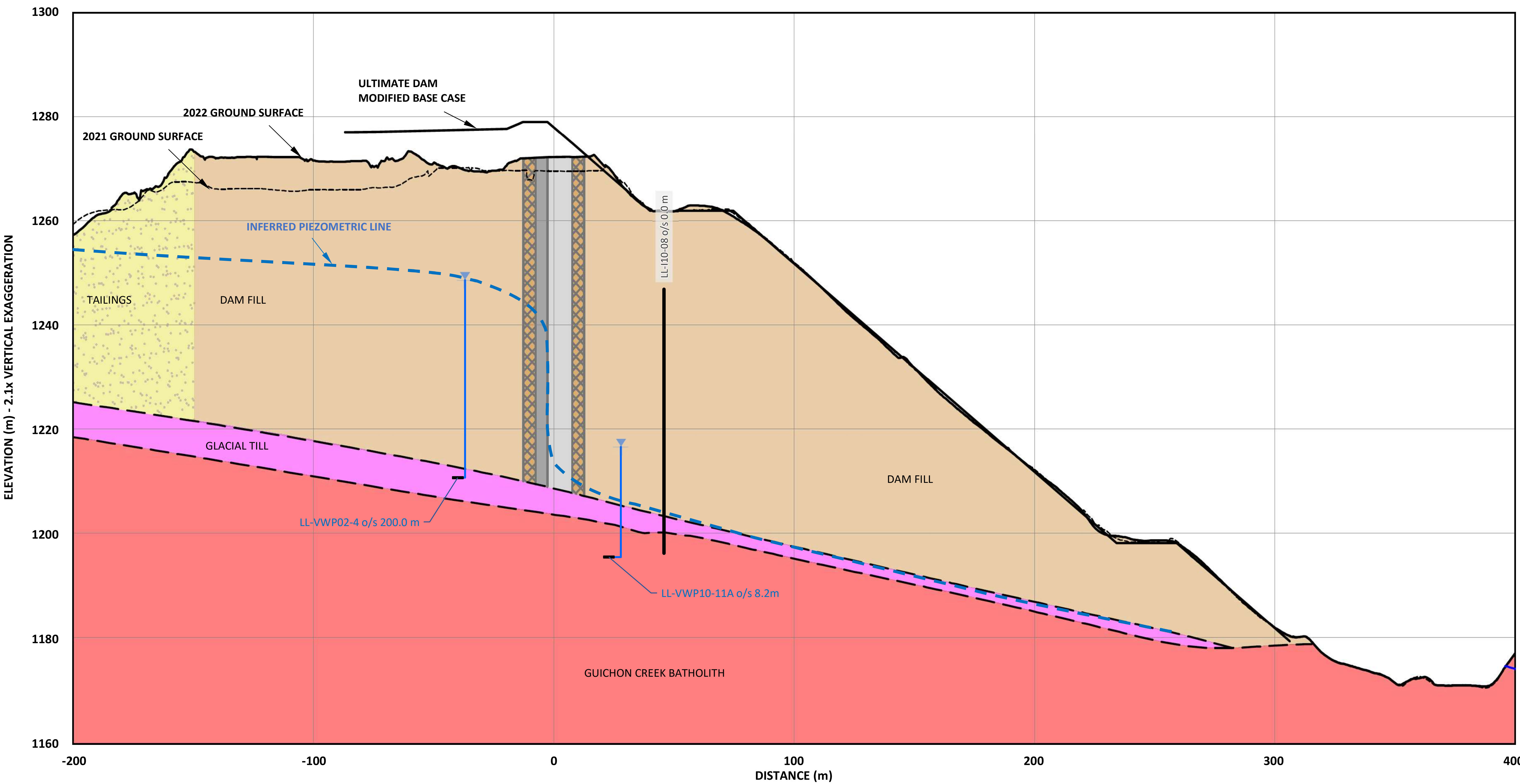

NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. DRAINAGE BLANKET IS NOT DEPICTED IN SECTION AS ITS OWN UNIT, RATHER IT IS INCORPORATED INTO THE DAM FILL UNIT.

LEGEND

- FUNCTIONAL INCLINOMETER
- PIEZOMETER TIP
- WATER EL. AS OF NOVEMBER 30, 2022

LOWER STRENGTH FOUNDATION UNITS INTERCEPTS (NOTE 3) :

- MOVEMENT ZONE: RATE < NOTIFICATION LEVEL (NL)
- MOVEMENT RATE ≥ NL

- DAM FILL
- TAILINGS
- GLACIAL TILL
- GUICHON CREEK BATHOLITH

TILL CORE
T1: SANDY TILL
T2: CLAY TILL
S2: TAILINGS SAND (MECHANICALLY PLACED)
℄ DAM

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM INSTRUMENTATION SECTION Sta. 1+200 - SOUTH DAM INSTRUMENT STATUS IN NOVEMBER 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	11

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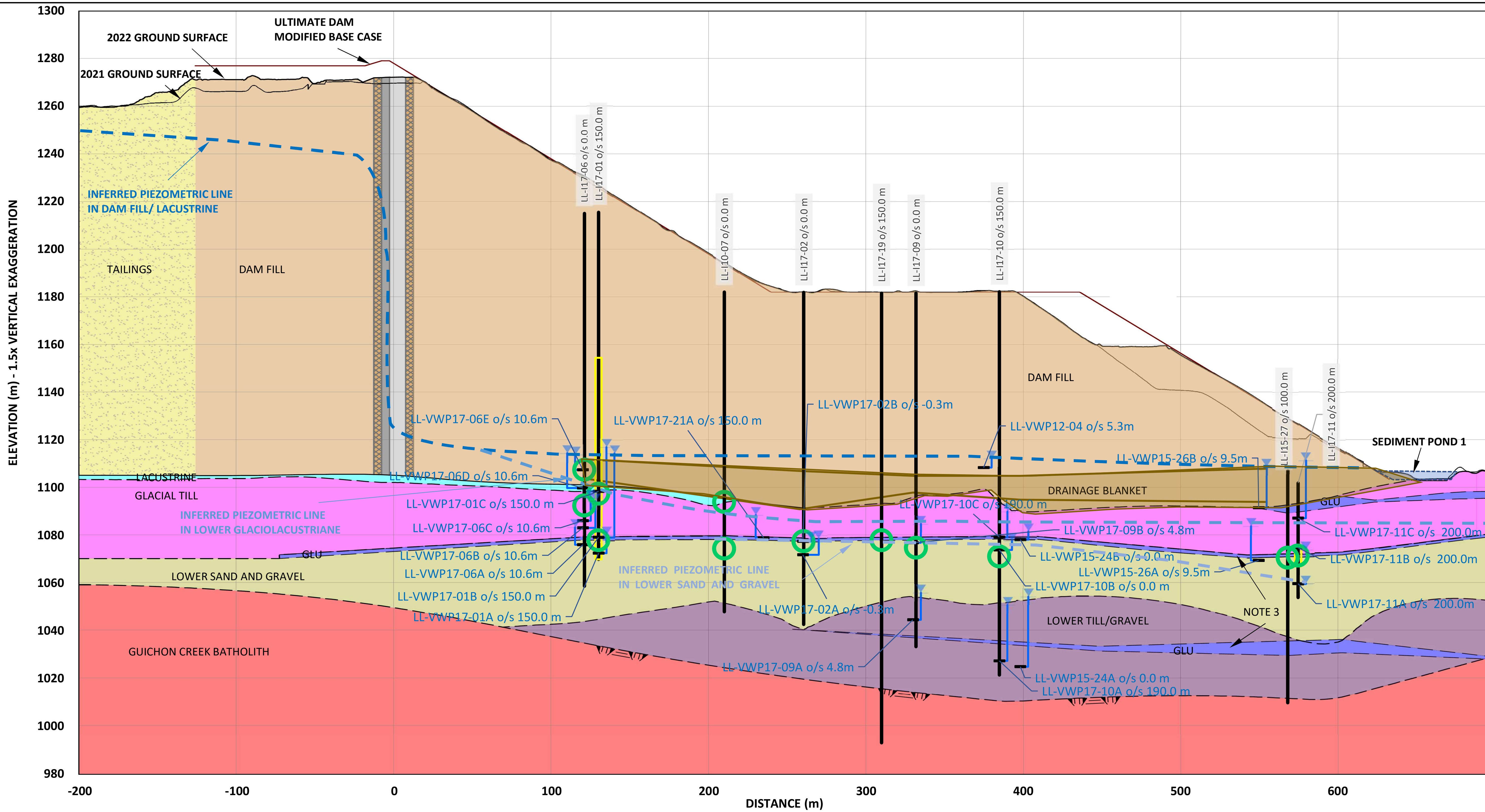

NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. LOWER STRENGTH FOUNDATION UNITS INCLUDE GLACIOLACUSTRINE AND MUDSTONE LAYERS WHICH GOVERN DESIGN, WHERE PRESENT AT VBB, VBBE, NBB AND NORTH DAM.
4. THERE ARE SOME ISSUES WITH PROCESSING OF SAA I12-01 READINGS. THE ISSUE IS WITH OFFSITE SUPPLIER. THVCP AND KCB ARE FOLLOWING UP.

LEGEND

- FUNCTIONAL INCLINOMETERS
- SENSORIZED LENGTH OF IPI/SAAV
- PIEZOMETER TIP
- WATER ELEVATION AS OF NOVEMBER 30, 2022
- INFERRED TOP AND BOTTOM OF DRAINAGE BLANKET

LOWER STRENGTH FOUNDATION UNITS INTERCEPTS (NOTE 3):
- MOVEMENT ZONE: RATE < NOTIFICATION LEVEL (NL)
- MOVEMENT RATE ≥ NL

- DAM FILL
- TAILINGS
- LACUSTRINE
- GLACIOLACUSTRINE (GLU)
- GLACIAL TILL
- LOWER SAND AND GRAVEL
- LOWER TILL/GRAVEL
- GUICHON CREEK BATHOLITH

TILL CORE
T1: SANDY TILL
T2: CLAY TILL
S2: TAILINGS SAND (MECHANICALLY PLACED)
℄ DAM

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT		
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT		
Klohn Crippen Berger	TITLE L-L DAM INSTRUMENTATION SECTION Sta. 1+850 - VALLEY BUTTRESS BERM INSTRUMENT STATUS IN NOVEMBER 2022		
	SCALE NTS	PROJECT No. M02341C42	FIG. No. 12

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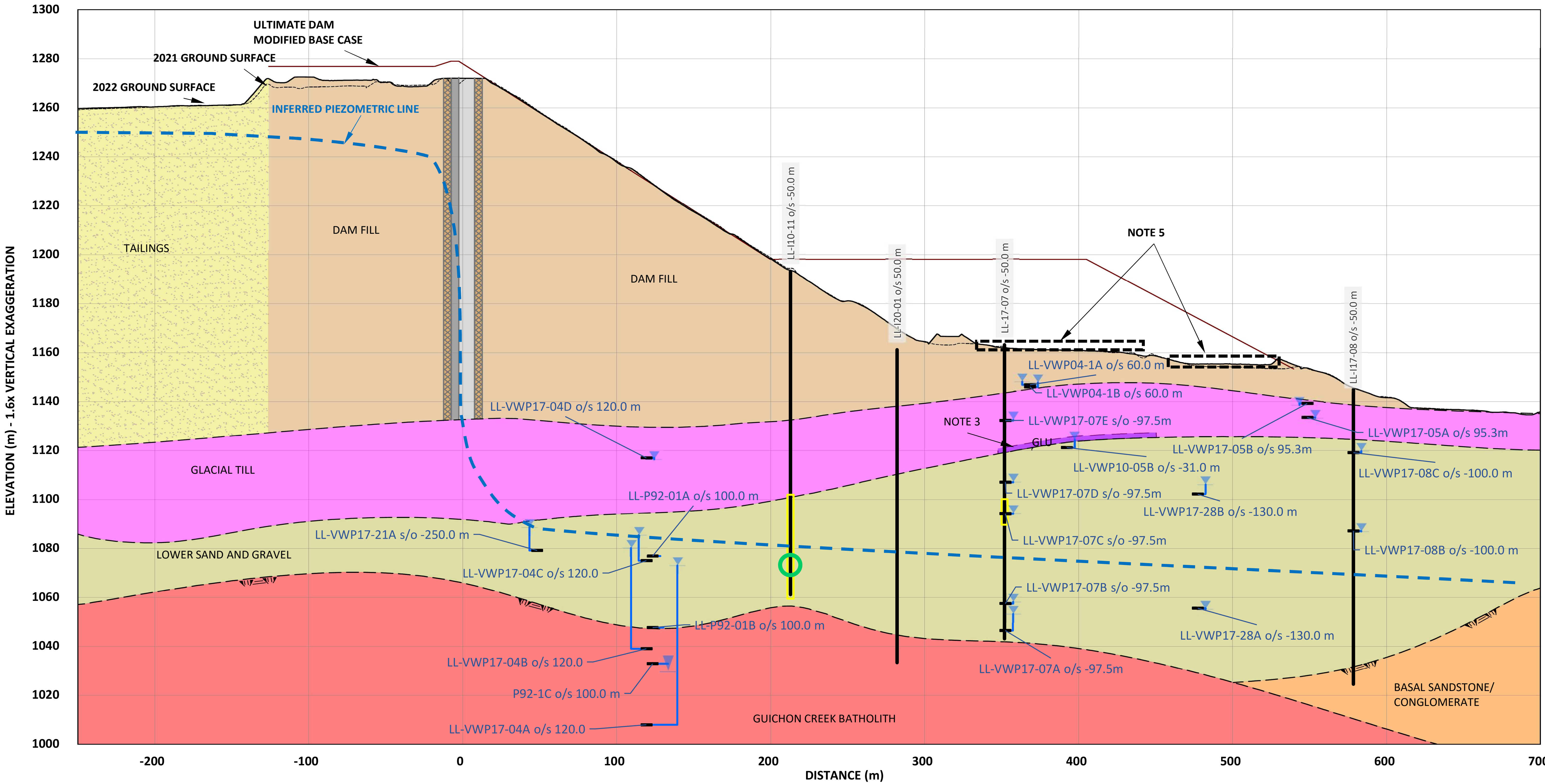

NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. LOWER STRENGTH FOUNDATION UNITS INCLUDE GLACIOLACUSTRINE AND MUDSTONE LAYERS WHICH GOVERN DESIGN, WHERE PRESENT AT VBB, VBBE, NBB AND NORTH DAM.
4. DRAINAGE BLANKET IS NOT DEPICTED IN SECTION AS ITS OWN UNIT, RATHER IT IS INCORPORATED INTO THE DAM FILL UNIT.
5. The VBBE-E and VBBE-W temporary on-dam sediment cells were decommissioned in 2022 and backfilled with hydraulically placed cycloned sand.

LEGEND

- FUNCTIONAL INCLINOMETER
- SENSORIZED LENGTH OF IPI/SAAV
- PIEZOMETER TIP
- WATER EL. AS OF NOVEMBER 30, 2022

LOWER STRENGTH FOUNDATION UNITS INTERCEPTS (NOTE 3) :

- MOVEMENT ZONE: RATE < NOTIFICATION LEVEL (NL)
- MOVEMENT RATE ≥ NL

- DAM FILL
- TAILINGS
- UPPER SAND AND GRAVEL
- GLACIOLACUSTRINE (GLU)
- GLACIAL TILL
- LOWER SAND AND GRAVEL
- BASAL SEDIMENTARY
- GUICHON CREEK BATHOLITH

TILL CORE
T1: SANDY TILL
T2: CLAY TILL
S2: TAILINGS SAND
(MECHANICALLY PLACED)
℄ DAM

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM INSTRUMENTATION SECTION Sta. 2+250 - VALLEY BUTTRESS BERM EXTENSION INSTRUMENT STATUS IN NOVEMBER 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	13

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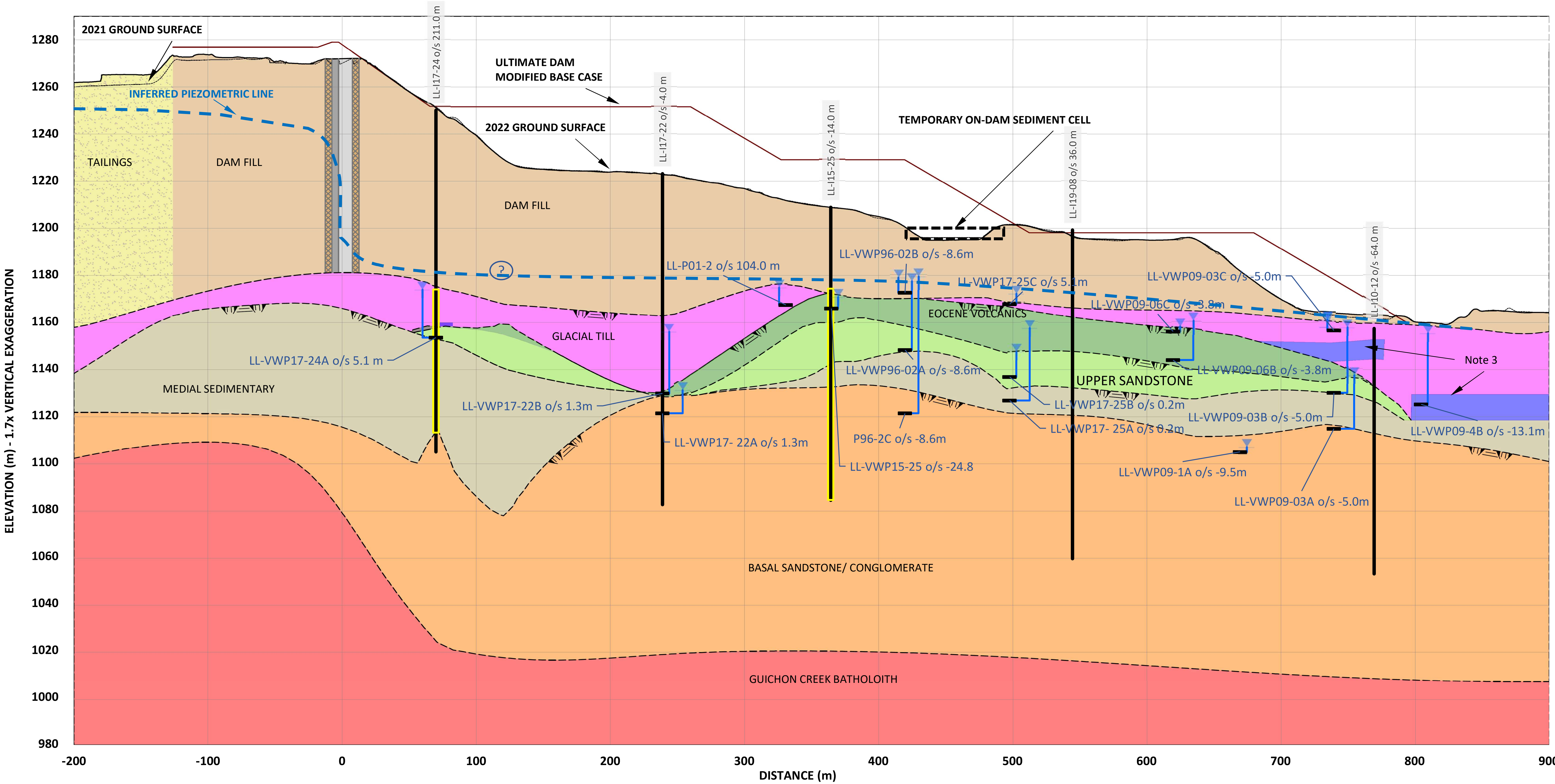

NOTES:

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3. LOWER STRENGTH FOUNDATION UNITS INCLUDE GLACIOLACUSTRINE AND MUDSTONE LAYERS WHICH GOVERN DESIGN, WHERE PRESENT AT VBB, VBBE, NBB AND NORTH DAM.
4. DRAINAGE BLANKET IS NOT DEPICTED IN SECTION AS ITS OWN UNIT, RATHER IT IS INCORPORATED INTO THE DAM FILL UNIT.

LEGEND

- FUNCTIONAL INCLINOMETER
- SENSORIZED LENGTH OF IPI/SAAV
- PIEZOMETER TIP
- WATER EL. AS OF NOVEMBER 30, 2022

LOWER STRENGTH FOUNDATION UNITS INTERCEPTS (NOTE 3) :

- MOVEMENT ZONE: RATE < NOTIFICATION LEVEL (NL)
- MOVEMENT RATE ≥ NL

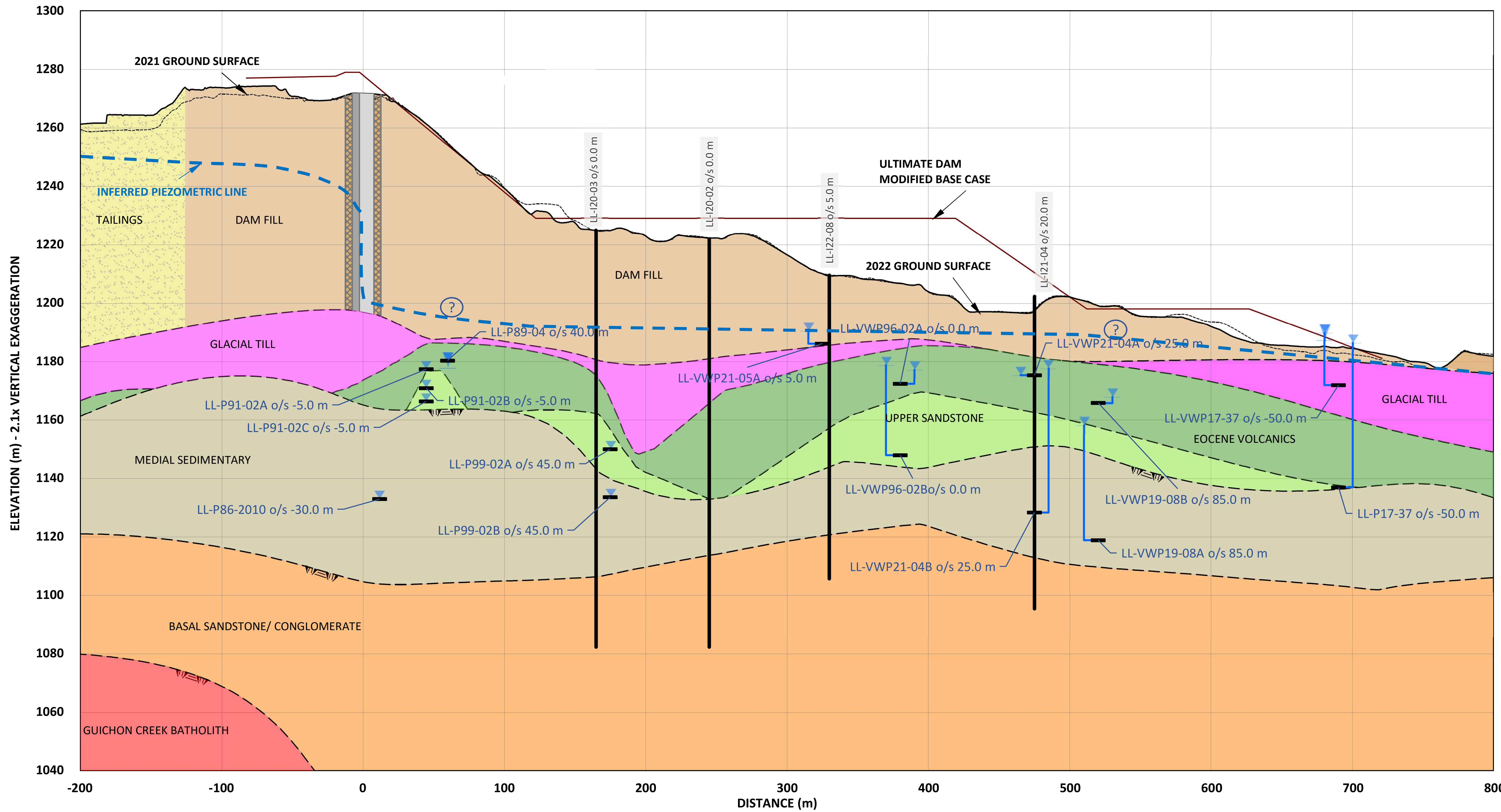
TILL CORE
T1: SANDY TILL
T2: CLAY TILL
S2: TAILINGS SAND (MECHANICALLY PLACED)
℄ DAM

- DAM FILL
- TAILINGS
- GLACIOLACUSTRINE (GLU)
- GLACIAL TILL
- EOCENE VOLCANICS
- UPPER SEDIMENTARY
- MEDIAL SEDIMENTARY
- BASAL SEDIMENTARY
- GUICHON CREEK BATHOLITH

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck; Klohn Crippen Berger	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
	TITLE: L-L DAM INSTRUMENTATION SECTION Sta. 2+564 - NORTH BUTTRESS BERM INSTRUMENT STATUS IN NOVEMBER 2022
	SCALE: NTS · PROJECT No. M02341C42 · FIG. No. 14



NOTES:

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2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. DRAINAGE BLANKET IS NOT DEPICTED IN SECTION AS ITS OWN UNIT, RATHER IT IS INCORPORATED INTO THE DAM FILL UNIT.

LEGEND

- FUNCTIONAL INCLINOMETER
- PIEZOMETER TIP
- WATER EL. AS OF NOVEMBER 30, 2022

LOWER STRENGTH FOUNDATION UNITS INTERCEPTS (NOTE 3) :

- MOVEMENT ZONE: RATE < NOTIFICATION LEVEL (NL)
- MOVEMENT RATE ≥ NL

- DAM FILL
- TAILINGS
- GLACIAL TILL
- EOCENE VOLCANICS
- UPPER SEDIMENTARY
- MEDIAL SEDIMENTARY
- BASAL SEDIMENTARY
- GUICHON CREEK BATHOLITH

TILL CORE
T1: SANDY TILL
T2: CLAY TILL
S2: TAILINGS SAND (MECHANICALLY PLACED)
℄ DAM

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM INSTRUMENTATION SECTION Sta. 2+690 - NORTH BUTTRESS BERM INSTRUMENT STATUS IN NOVEMBER 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	15

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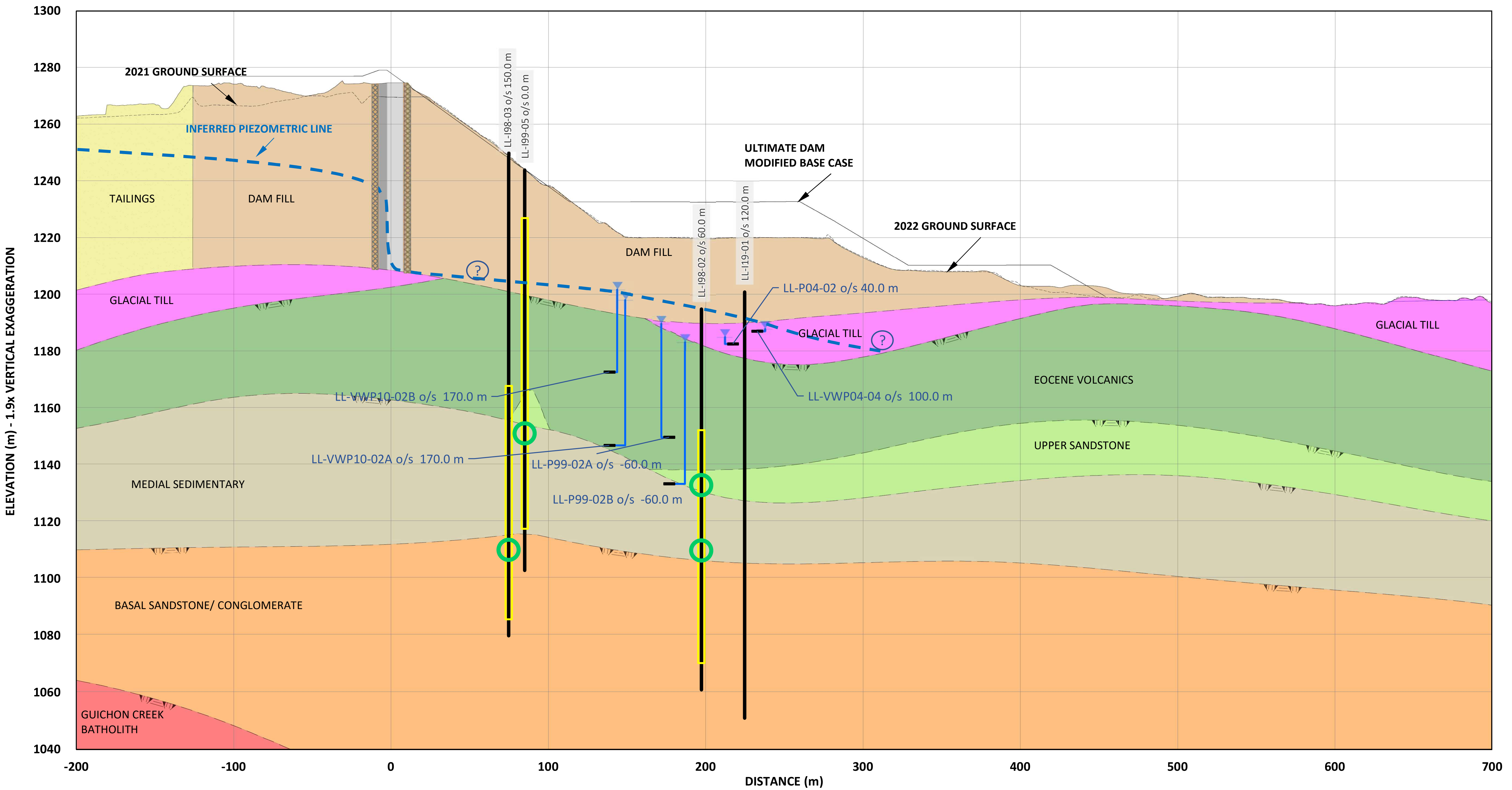


NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. DRAINAGE BLANKET IS NOT DEPICTED IN SECTION AS ITS OWN UNIT, RATHER IT IS INCORPORATED INTO THE DAM FILL UNIT.

LEGEND

- FUNCTIONAL INCLINOMETER
- SENSORIZED LENGTH OF IPI/SAAV
- PIEZOMETER TIP
- WATER EL. AS OF NOVEMBER 30, 2022

LOWER STRENGTH FOUNDATION UNITS INTERCEPTS (NOTE 3) :

- MOVEMENT ZONE: RATE < NOTIFICATION LEVEL (NL)
- MOVEMENT RATE ≥ NL

- DAM FILL
- TAILINGS
- GLACIAL TILL
- EOCENE VOLCANICS
- UPPER SEDIMENTARY
- MEDIAL SEDIMENTARY
- BASAL SEDIMENTARY
- GUICHON CREEK BATHOLITH

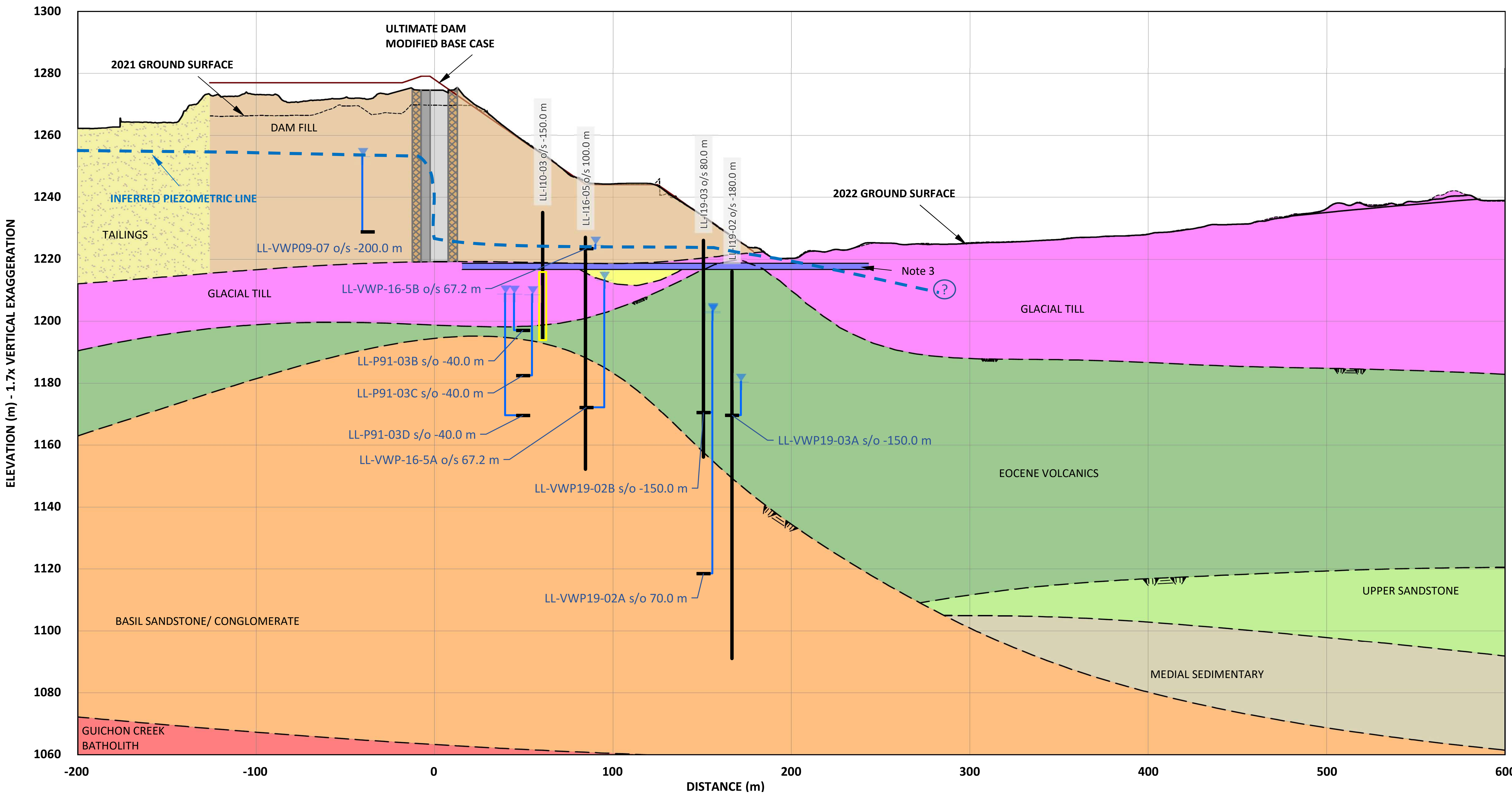
TILL CORE
T1: SANDY TILL
T2: CLAY TILL
S2: TAILINGS SAND (MECHANICALLY PLACED)
℄ DAM

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM INSTRUMENTATION SECTION Sta. 2+800 - NORTH DAM INSTRUMENT STATUS IN NOVEMBER 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	16



NOTES:

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3. LOWER STRENGTH FOUNDATION UNITS INCLUDE GLACIOLACUSTRINE AND MUDSTONE LAYERS WHICH GOVERN DESIGN, WHERE PRESENT AT VBB, VBBE, NBB AND NORTH DAM.
4. DRAINAGE BLANKET IS NOT DEPICTED IN SECTION AS ITS OWN UNIT, RATHER IT IS INCORPORATED INTO THE DAM FILL UNIT.

LEGEND

- FUNCTIONAL INCLINOMETER
- SENSORIZED LENGTH OF IPI/SAAV
- PIEZOMETER TIP
- WATER EL. AS OF NOVEMBER 30, 2022

LOWER STRENGTH FOUNDATION UNITS INTERCEPTS (NOTE 3) :

- MOVEMENT ZONE: RATE < NOTIFICATION LEVEL (NL)
- MOVEMENT RATE ≥ NL

TILL CORE
T1: SANDY TILL
T2: CLAY TILL
S2: TAILINGS SAND (MECHANICALLY PLACED)
℄ DAM

- DAM FILL
- TAILINGS
- UPPER SAND AND GRAVEL
- GLACIOLACUSTRINE (GLU)
- GLACIAL TILL
- EOCENE VOLCANICS
- UPPER SEDIMENTARY
- BASAL SEDIMENTARY
- GUICHON CREEK BATHOLITH

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM INSTRUMENTATION SECTION Sta. 3+300 - NORTH DAM BEDROCK INSTRUMENT STATUS IN NOVEMBER 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	17

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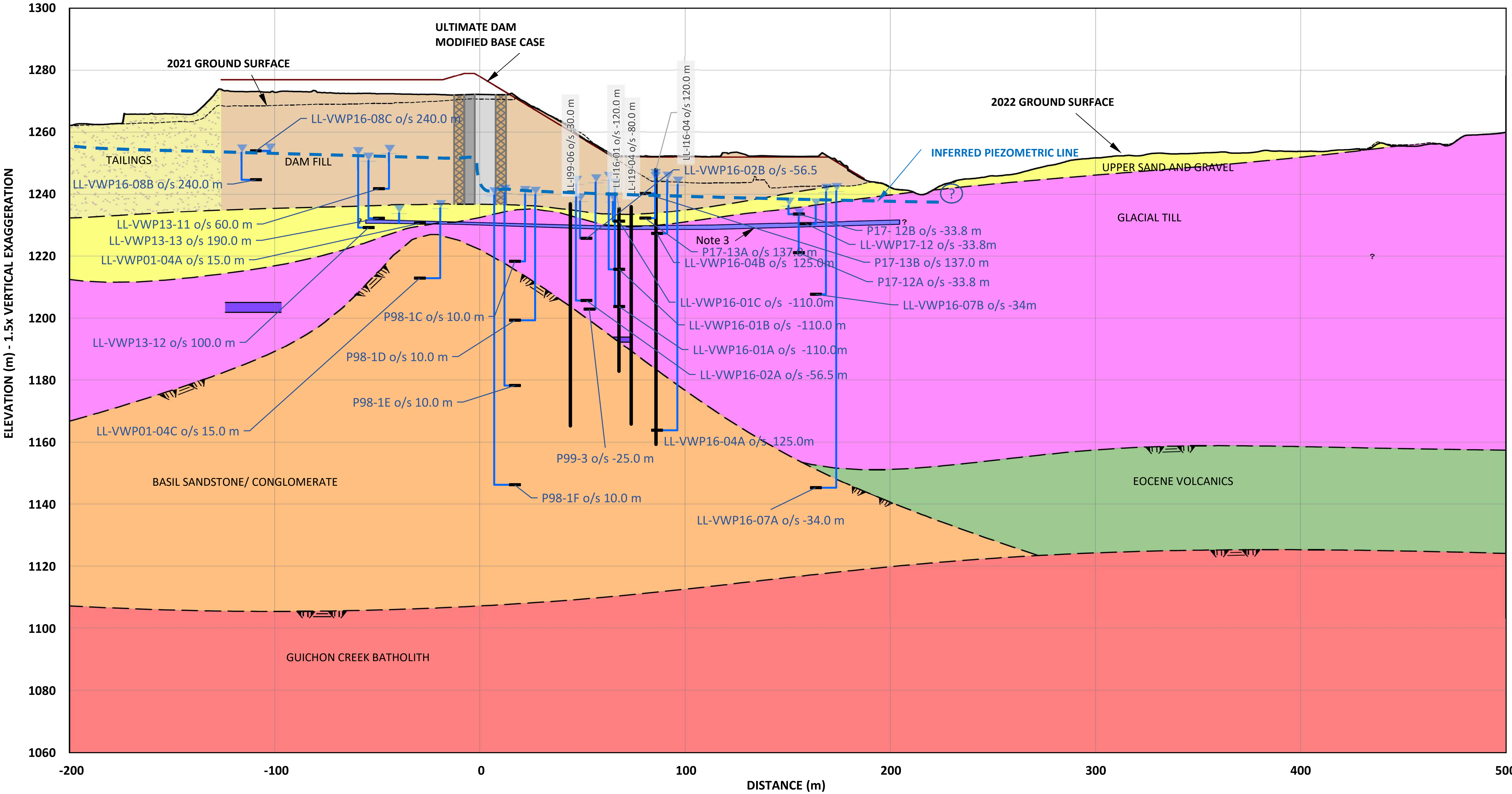

NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
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3. LOWER STRENGTH FOUNDATION UNITS INCLUDE GLACIOLACUSTRINE AND MUDSTONE LAYERS WHICH GOVERN DESIGN, WHERE PRESENT AT VBB, VBBE, NBB AND NORTH DAM.
4. DRAINAGE BLANKET IS NOT DEPICTED IN SECTION AS ITS OWN UNIT, RATHER IT IS INCORPORATED INTO THE DAM FILL UNIT.

LEGEND

- FUNCTIONAL INCLINOMETER
- PIEZOMETER TIP
- WATER EL. AS OF NOVEMBER 30, 2022
- LOWER STRENGTH FOUNDATION UNITS INTERCEPTS (NOTE 3) :
- MOVEMENT ZONE: RATE < NOTIFICATION LEVEL (NL)
- MOVEMENT RATE ≥ NL

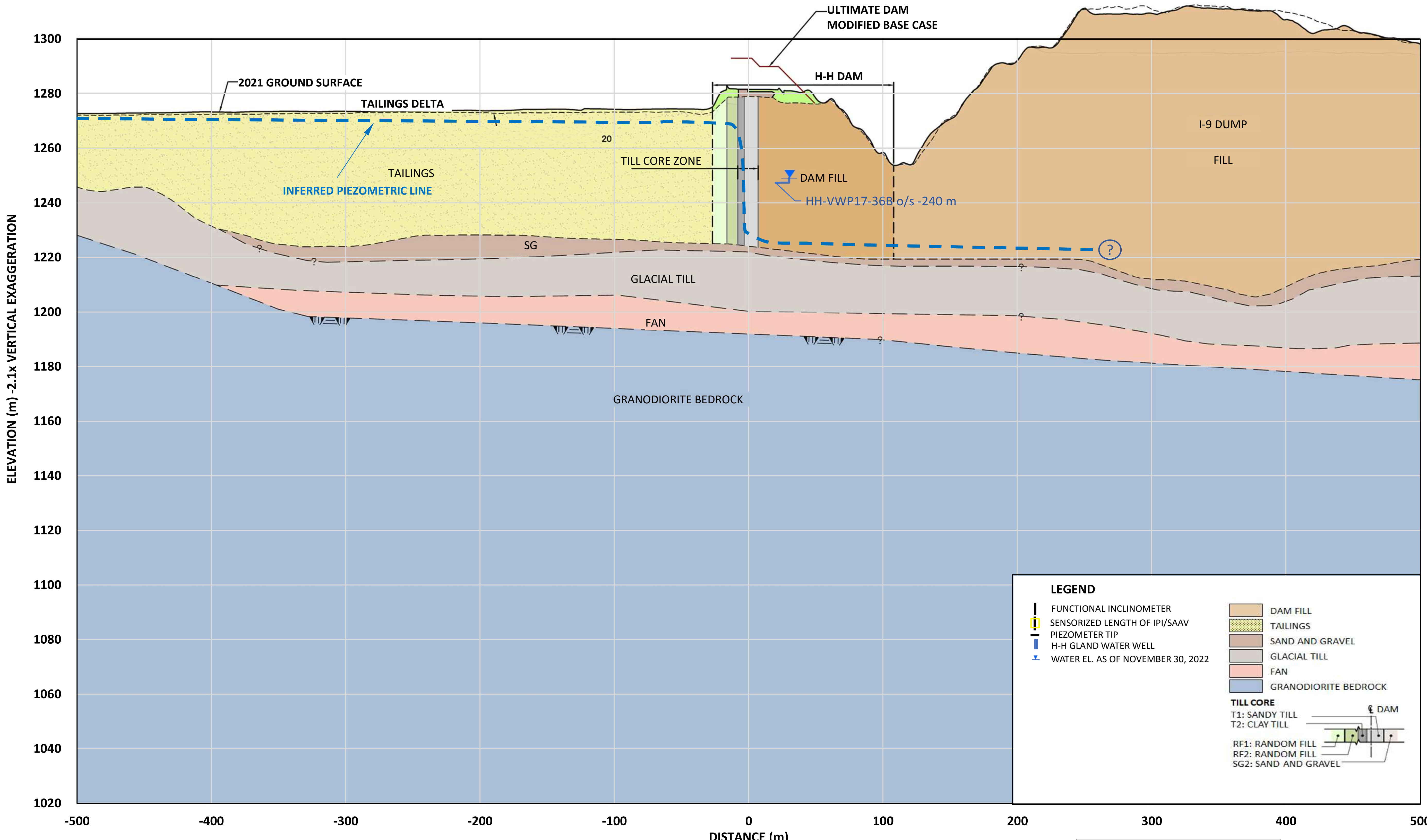
- DAM FILL
- TAILINGS
- UPPER SAND AND GRAVEL
- GLACIOLACUSTRINE (GLU)
- GLACIAL TILL
- EOCENE VOLCANICS
- UPPER SEDIMENTARY
- BASAL SEDIMENTARY
- GUICHON CREEK BATHOLITH

TILL CORE
T1: SANDY TILL
T2: CLAY TILL
S2: TAILINGS SAND (MECHANICALLY PLACED)
℄ DAM

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM INSTRUMENTATION SECTION Sta. 3+630 - NORTH DAM U-GLU SEGMENT INSTRUMENT STATUS IN NOVEMBER 2022
SCALE: NTS	PROJECT No.: M02341C42 — FIG. No.: 18



NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. NO CREST RAISE OCCURED AT THE H-H DAM DURING THE 2022 REVIEW PERIOD.

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM SECTION INSTRUMENTATION SECTION - Sta. 0+800 INSTRUMENT STATUS IN NOVEMBER 2022
SCALE: NTS	PROJECT No.: M02341C42 · FIG. No.: 19

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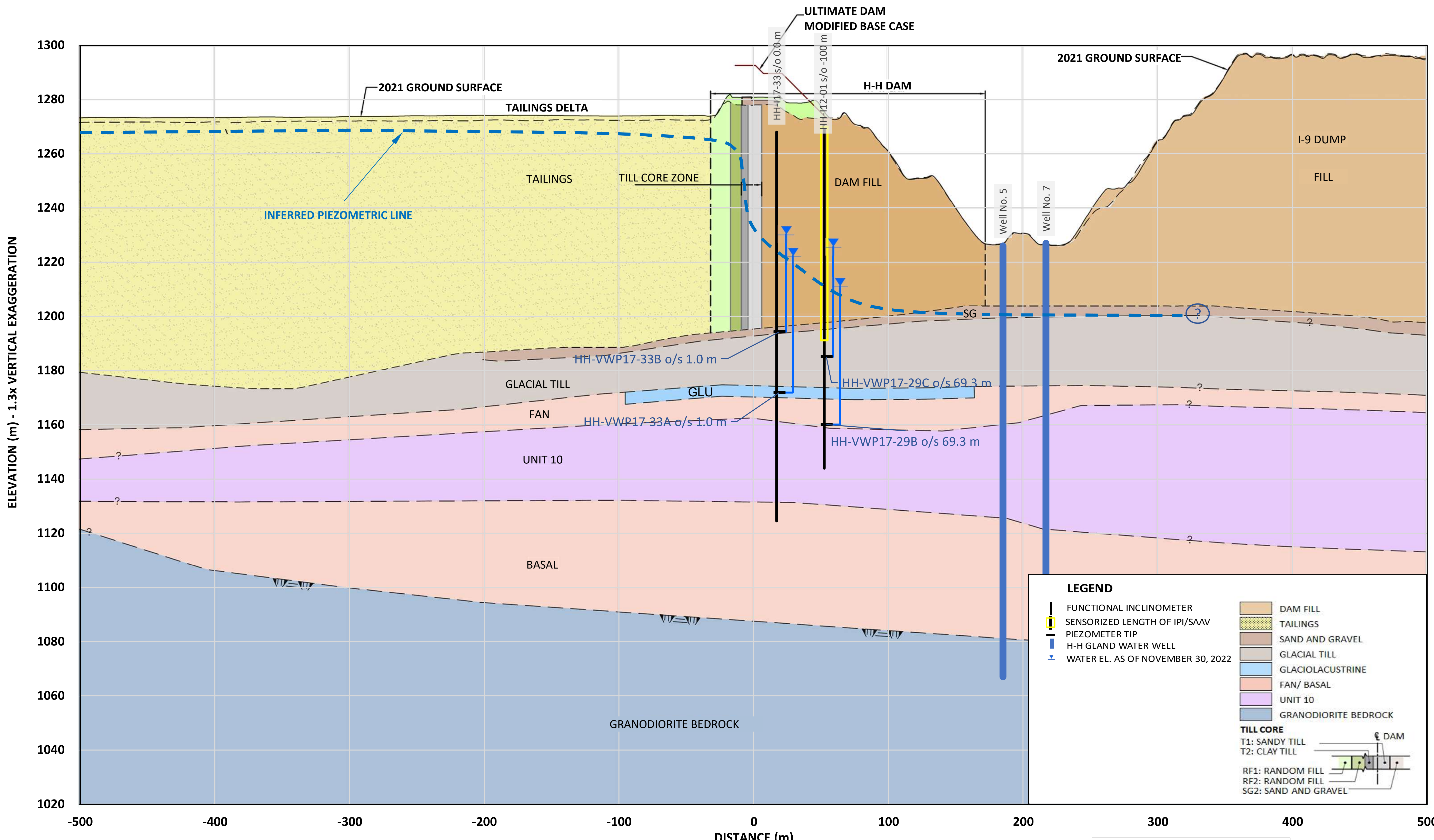


NOT FOR CONSTRUCTION

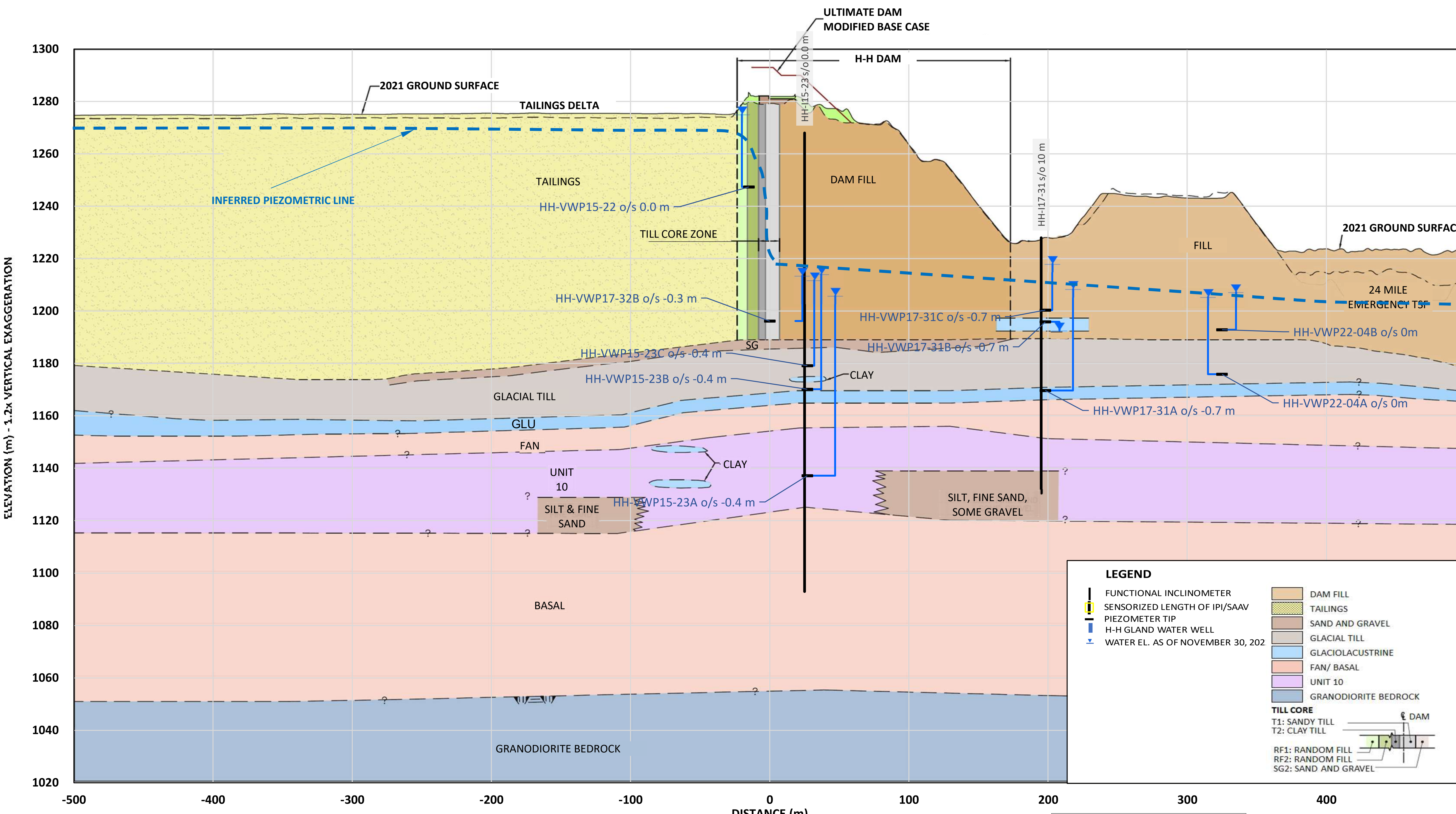
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. LOWER STRENGTH UNITS (CLAY LAYER 1 AND CLAY LAYER 2) ARE PRESENT IN THE H-H DAM FOUNDATION WHICH GOVERN DESIGN AND ARE TYPICALLY WHERE THE MOST MOVEMENT HAS BEEN MEASURED TO DATE. LIMITED MOVEMENTS HAVE BEEN MEASURED IN THE OTHER FOUNDATION UNITS (GLACIAL OVERBURDEN AND BEDROCK).
4. NO DEFINED MOVEMENT ZONE WAS IDENTIFIED AT SAA I12-01 HH.
5. NO CREST RAISE OCCURED AT THE H-H DAM DURING THE 2022 REVIEW PERIOD.

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM SECTION INSTRUMENTATION SECTION - Sta. 1+200 INSTRUMENT STATUS IN NOVEMBER 2022
	SCALE: NTS / PROJECT No. M02341C42 / FIG. No. 20

FILE PATH: Z:\M\VCR\M02341C43-HVC-2022 EOR MONITORING RMR\300 DESIGN\330 INSTRUMENTATION SECTIONS\230228 H-H DAM INSTRUMENTATION SECTIONS - FOR AFPR.XLSX - 2023-03-01 09:17



NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
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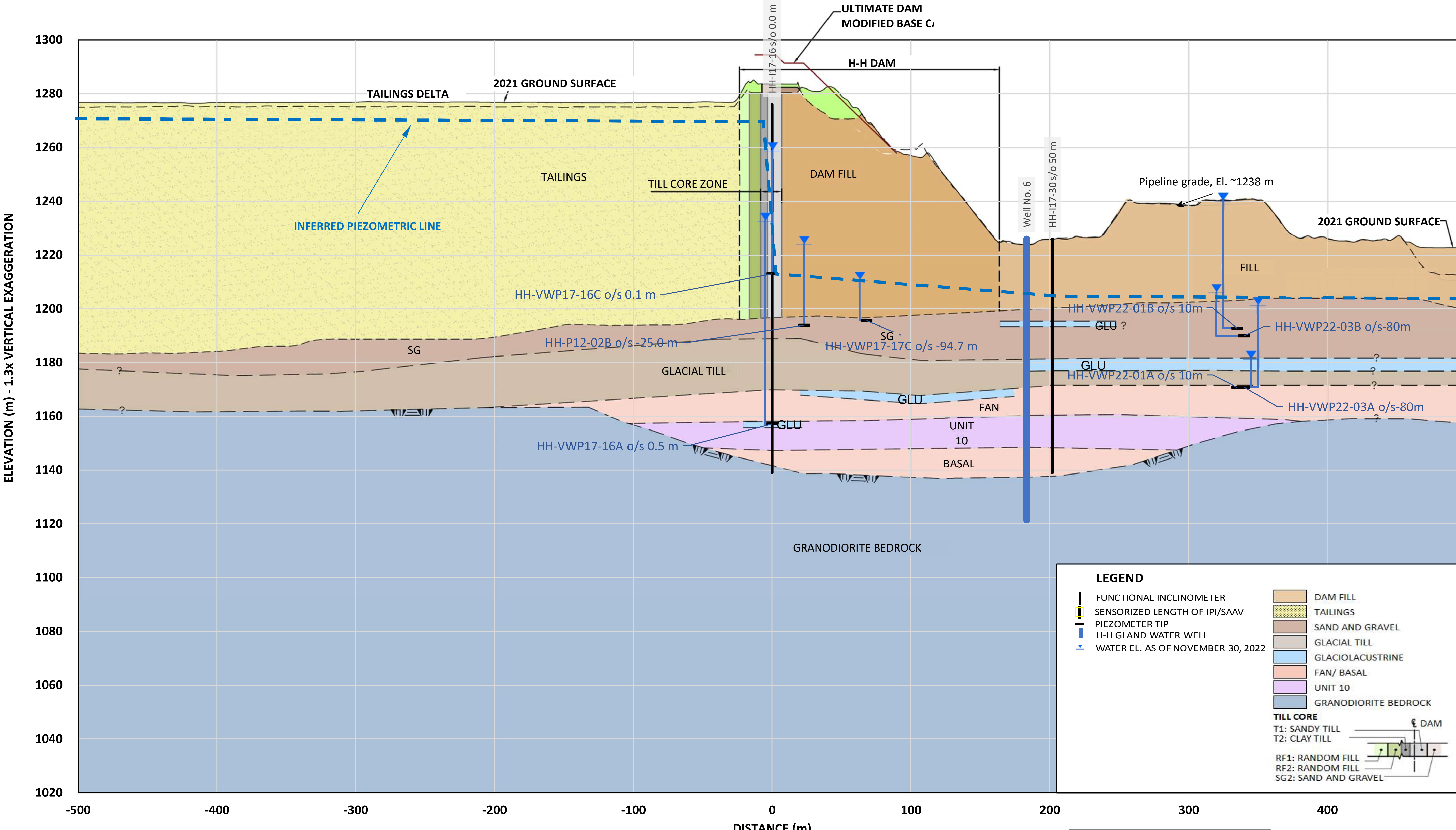
4. NO CREST RAISE OCCURED AT THE H-H DAM DURING THE 2022 REVIEW PERIOD.

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM SECTION INSTRUMENTATION SECTION - Sta. 1+460 INSTRUMENT STATUS IN NOVEMBER 2022
SCALE: NTS	PROJECT No. M02341C42 — FIG. No. 21

FILE PATH: Z:\MVCR\M02341C43-HVC-2022 EOR MONITORING RMR\300 DESIGN\330 INSTRUMENTATION SECTIONS\230228 H-H DAM INSTRUMENTATION SECTIONS - FOR AFPR.XLSX - 2023-03-01 09:17



NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. LOWER STRENGTH UNITS (CLAY LAYER 1 AND CLAY LAYER 2) ARE PRESENT IN THE H-H DAM FOUNDATION WHICH GOVERN DESIGN AND ARE TYPICALLY WHERE THE MOST MOVEMENT HAS BEEN MEASURED TO DATE. LIMITED MOVEMENTS HAVE BEEN MEASURED IN THE OTHER FOUNDATION UNITS (GLACIAL OVERBURDEN AND BEDROCK).
4. NO CREST RAISE OCCURED AT THE H-H DAM DURING THE 2022 REVIEW PERIOD.

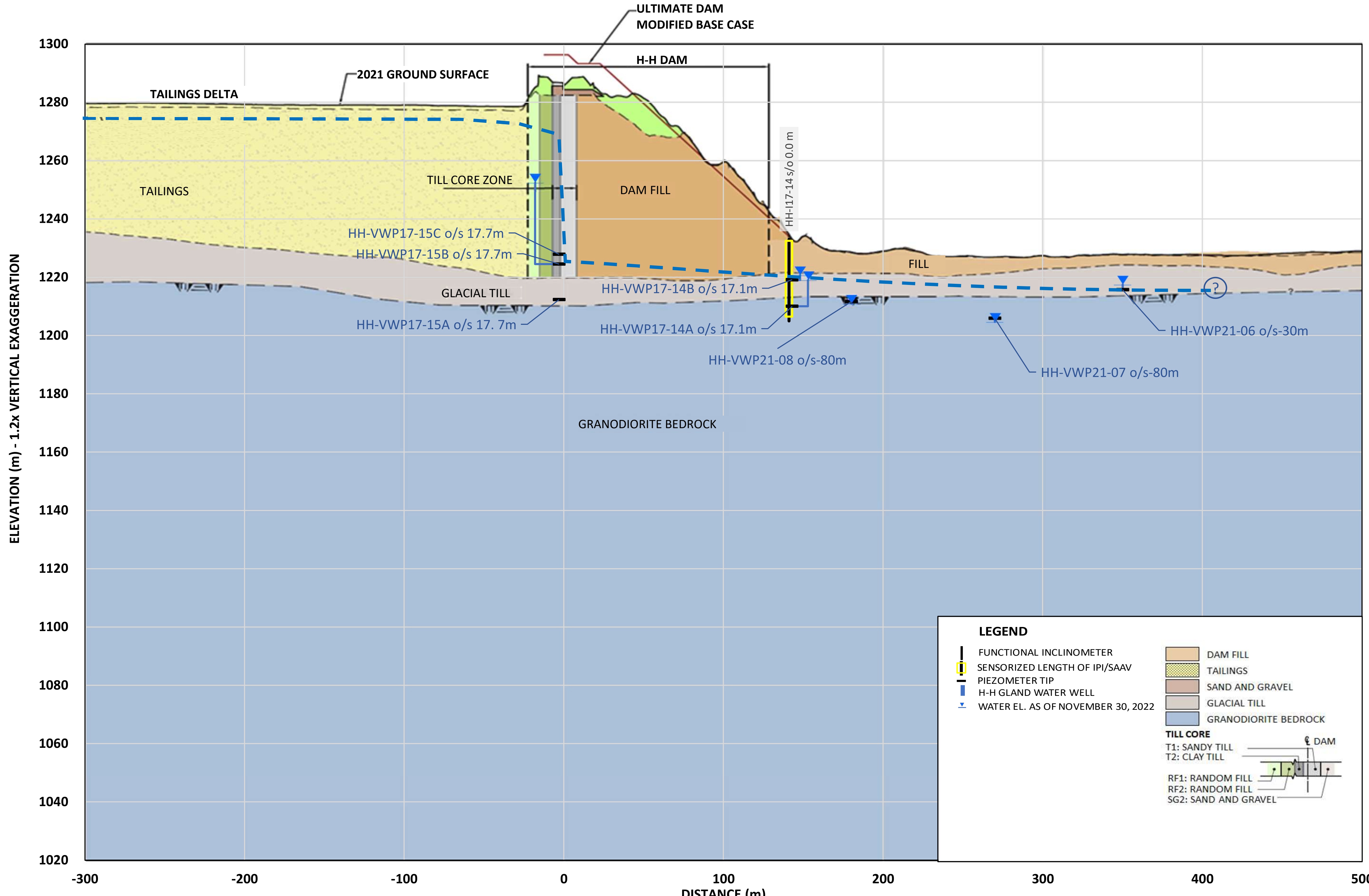
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE H-H DAM SECTION INSTRUMENTATION SECTION - Sta. 1+700 INSTRUMENT STATUS IN NOVEMBER 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	22

FILE PATH: Z:\MVCR\M02341C43-HVC-2022 EOR MONITORING RMR\300 DESIGN\330 INSTRUMENTATION SECTIONS\230228 H-H DAM INSTRUMENTATION SECTIONS - FOR AFPR.XLSX - 2023-03-01 09:17



NOTES:

1. THE LOCATIONS OF THE INSTRUMENTS OFF THE SECTION ARE APPROXIMATE.
2. NEGATIVE OFFSETS ARE IN FRONT OF THE SECTION, POSITIVE OFFSETS ARE BEYOND THIS SECTION.
3. NO DEFINED MOVEMENT ZONE WAS IDENTIFIED AT HHI17-14.
4. NO CREST RAISE OCCURED AT THE H-H DAM DURING THE 2022 REVIEW PERIOD.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

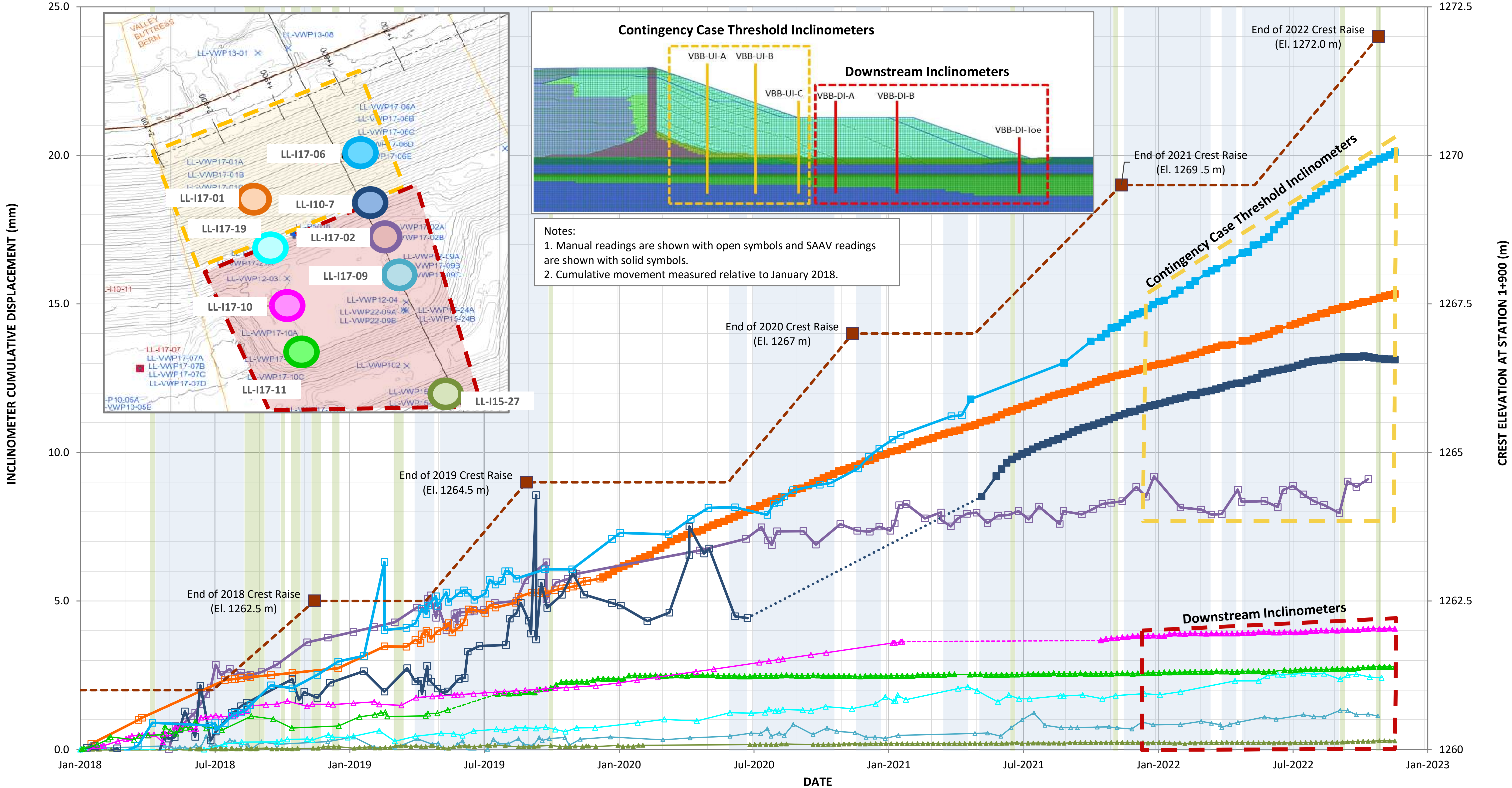
CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: H-H DAM SECTION INSTRUMENTATION SECTION - Sta. 2+000 INSTRUMENT STATUS IN NOVEMBER 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	23



Fill Placement @ VBBE or South Dam but not at VBB
Fill Placement @ VBB (Sta. 1+600 to 2+100)
Crest El. at Station 1+900

Contingency Inclinometers

- LL-I17-06 (VBB-UI-A) El. 1068.0 m to El. 1086.2 m
- LL-I17-01 (VBB-UI-A) El. 1073.9 m to El. 1082.6 m
- LL-I10-7 (VBB-UI-B) El. 1070.0 m to El. 1079.0 m
- LL-I17-02 (VBB-UI-C) El. 1074.0 m to El. 1078.8 m

Downstream Inclinometers

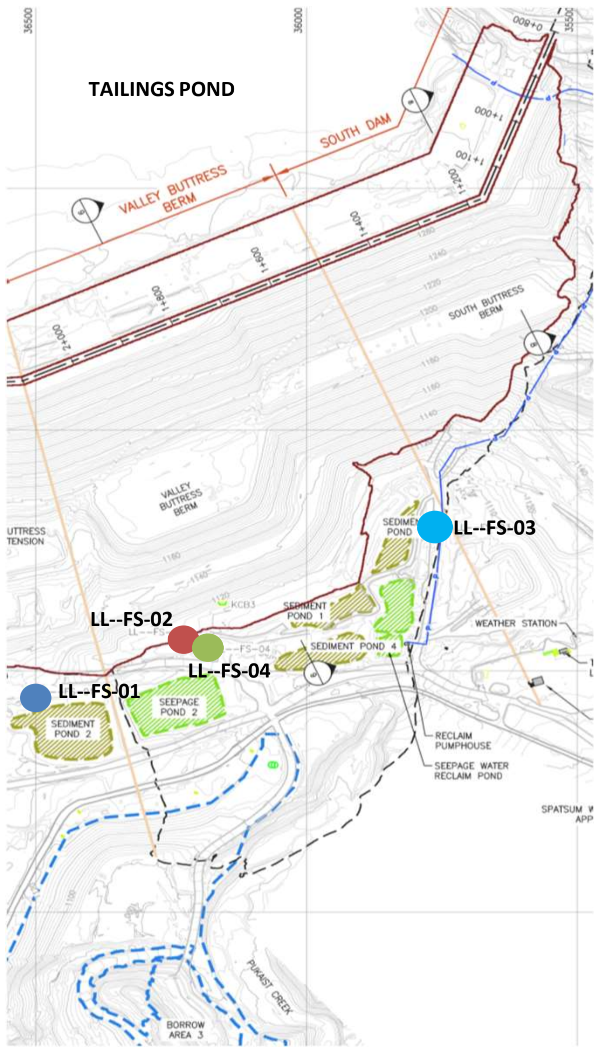
- LL-I17-09 (VBB-DI-A) El. 1072.0 m to El. 1078.7 m
- LL-I17-10 (VBB-DI-B) El. 1069.5 m to El. 1077.5 m
- LL-I17-11 (VBB-DI-Toe) El. 1068.4 m to El. 1075.5 m
- LL-I17-19 (VBB-DI-A) El. 1078.0 m to El. 1080.4 m
- LL-I15-27b (VBB-DI-Toe) El. 1069.8 m to El. 1071.5 m

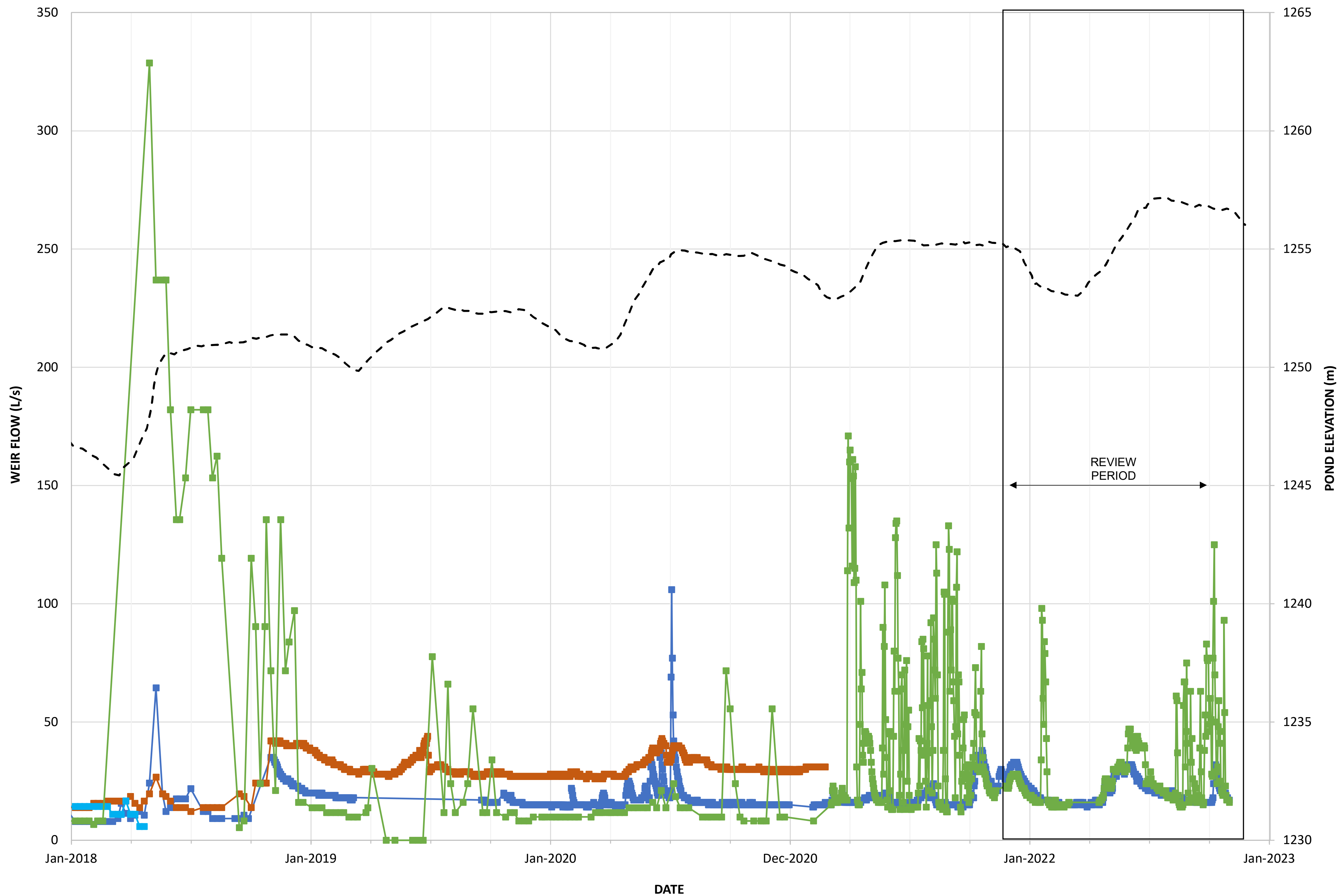
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: VALLEY BUTTRESS BERM SUMMARY OF MEASURED INCLINOMETER MOVEMENTS 2018 TO 2022
	PROJECT No. M02341C42 — FIG No. 24

Date & Time: 2023-02-24 11:53
Figure File: Z:\M\VCR\M02341C42-HVC-2022 AFPR\300 Design\340 Dam Movement Monitoring\341 Inclinometers, SAAVs, IPIs\341-0 VBB INCLOS\[230224 VBB GLU Performance Review-for AFPR (version 1).xlsx]15-27





LEGEND:

- LL-FS-01 - FLOW
- LL-FS-02 - FLOW (NOTE 4)
- SEEPAGE FROM VBB TOE (LL-FS-03 minus LL-JBL-FS-01) (NOTE 2)
- LL-FS-04 - FLOW (NOTE 3)
- HIGHLAND TSF TAILINGS POND EL.

NOTES:
1. PRELIMINARY FLOWS ARE CHECKED ANNUALLY BASED ON ANNUAL WEIR CALIBRATION VERIFICATION.
2. AS OF JUNE 2018, THE SEEPAGE POND WAS BACKFILLED AND THERE WAS NO SEEPAGE REPORTING TO LL-FS-03.
3. VALVE OF LL-FS-04 WAS REPORTED CLOSED FROM APRIL 26, 2019 TO MAY 31, 2019 TO AID IN DREDGING.
4. LL-FS-02 WAS REMOVED IN 2020 DURING DOWNSTREAM FOUNDATION PREPARATION.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM POND LEVEL AND SEEPAGE FLOWS YEARS 2018 TO 2022
PROJECT No. M02341C42	FIG No. 25

March 14, 2023
\\int.klohn.com\Proj\Data\MVCR\M02341C42-HVC-2022 AFPR\300 Design\350 Seepage Data\[Master Sheet_HIGHLAND.xlsx]LL Fig 27

APPENDIX I

Annual Facility Performance Report

Site Visit Checklist, Observations, and Photographs

APPENDIX I-A

L-L Dam

Site Visit Checklist, Observations, and Photographs

Appendix I-A
Annual Facility Performance Report Site Visit Checklist, Observations and Photographs – L-L Dam

SITE VISIT CHECKLIST

Facility:	L-L Dam	**Site Visit Date:**	September 21, 2022 October 19, 2022
Weather:	Sunny	**Completed By:**	Rick Friedel, P.Eng. Andrew Cote, EIT
Freeboard (pond level to dam crest):	Freeboard ~12.9 m based on Q2 2022 bathymetry survey (based on Oct. 20, 2022 pond level)		

Are the following components of your dam in ***SATISFACTORY CONDITION***?
(check one if applicable)

EMBANKMENT	Yes/No
U/S slope	☒ Yes ☐ No
Crest	☒ Yes ☐ No
D/S Slope	☒ Yes ☐ No
D/S Toe	☒ Yes ☐ No

Were any of the following ***POTENTIAL PROBLEM INDICATORS*** found?

INDICATOR	EMBANKMENT	INDICATOR	EMBANKMENT
Piping	☐ Yes ☒ No	Settlement	☐ Yes ☒ No
Sinkholes	☐ Yes ☒ No	Sloughing/Slides	☐ Yes ☒ No
Seepage	☐ Yes ☒ No	Animal Activity	☐ Yes ☒ No
External Erosion	☐ Yes ☒ No	Excessive Growth	☐ Yes ☒ No
Cracks	☐ Yes ☒ No	Excessive Debris	☐ Yes ☒ No

List and describe any deficiencies (all deficiencies require assessment and/or repair):

- No dam safety concerns observed.

Comments / Notes:

- Refer to Site Visit Observations and Photos for further notes.

SITE VISIT OBSERVATIONS

Tailings Beach and Pond

Beach width during the site visit met minimum beach requirements in design, 500 m at North Abutment and 126 m along the remainder of the crest (Photo I-A-1 and Photo I-A-2).

Photo I-A-2 and Photo I-A-3 include similar photos of the beach area for comparison of change between the 2021 AFPR site visit (July 22, 2021) to the 2022 AFPR site visit. In general, the beach width has been maintained or slightly reduced over the past year. Refer to Section 5.2.2 of the main text for discussion of beach width.

At the time of the site visit (October 19, 2022), the pond was at El. 1256.6 m which is 12.9 m below the minimum dam crest at the time of the site visit (El. 1269.5 m). The 2022 crest raise to El. 1272.0 m was completed after the site visit.

Crest and Upstream Slope

No visual indicators of concern or unusual behavior, such as excessive erosion, deformation, or seepage from the cycloned sand slope (Photo I-A-1 to Photo I-A-3).

Near the south abutment (Photo I-A-3), where the pond is nearest to the upstream fill zone, the upstream slope was stepped, and a portion of the slope shallowed to reduce risk of localized instability of the slope. Both controls were effective and no signs of cracking or slumping into the impoundment was observed.

No active hydraulic placement during site visit.

Downstream Slope - North Dam U-GLU and North Dam Bedrock

No visual indicators of concern or unusual behavior (Photo I-A-4 to Photo I-A-6). The downstream slope in these segments of the dam have been built to ultimate configuration.

Downstream Slope - North Buttress Berm (NBB)

No visual indicators of concern or unusual behavior at the time of the site visit (Photo I-A-7). No active construction was occurring at the time of the site visit.

Downstream Slope - Valley Buttress Berm Extension (VBBE) and Valley Buttress Berm (VBB)

No visual indicators of concern or unusual behavior at the time of the site visit (Photo I-A-8). Hydraulic placement along the downstream toe of each segment was the active construction area but no placement ongoing at the time of the site visit.

Downstream Slope – South Dam

No visual indicators of concern or unusual behavior at the time of the site visit (Photo I-A-11). The downstream slope in this segment of the dam have been built to ultimate configuration. Abutment preparation of the 2022 crest raise was ongoing at the time of the October 19 site visit (Photo I-A-9 and Photo I-A-10).

Seepage from Dam Toe

Where present, primarily from the underdrains, seepage emanating from the dam fill was clear with no turbidity. All water reports to a downstream collection pond and is reclaimed back to the impoundment via the Seepage Water Reclaim Pond.

Seepage and Sediment Ponds

All seepage and sediment ponds were in good condition. During 2022 construction, Sediment Pond 1, Sediment Pond 2 and the temporary on-dam cell at the VBBE were in operation supporting hydraulic placement.

SITE VISIT PHOTOGRAPHS

LEGEND:

- LL = L-L Dam.
- LL-2022-## refers to 2022 AFPR waypoints shown on Figure 2.
- Photographs were taken during two separate site visits on September 21 and October 19, 2022.

Photo I-A-1 Tailings beach at north abutment was >500 m wide during the site visit as required by design. (LL-2022-01)

Photo I-A-2 Tailings beach and upstream cycloned sand hydraulic placement cells along North Dam U-GLU and North Dam Bedrock segments during 2021 and 2022 AFPR site visits. (LL-2022-01)

Photo I-A-3 Tailings beach and upstream cycloned sand hydraulic placement cells along South Dam and VBB segments during 2021 and 2022 AFPR site visits. (LL-2022-02)

Photo I-A-4 North Dam U-GLU downstream slope (looking south) including North Dam Buttress which was built to ultimate configuration during 2022 construction. (LL-2022-03)

Photo I-A-5 North Dam U-GLU downstream slope (looking southeast). (LL-2022-10)

Photo I-A-6 North Dam Bedrock downstream slope (looking northeast). (LL-2022-11)

Photo I-A-7 NBB downstream slope, upper slope and mid bench area (looking south). (LL-2022-09)

Photo I-A-8 Overview of VBB and downstream sediment and seepage ponds looking northwest from dam crest. (LL-2022-04)

Photo I-A-9 T2 placement of dam core near south abutment. (LL-2022-05)

Photo I-A-10 Prepared foundation at south abutment. Consistent with expected geology, granodiorite bedrock is shallow in this area and exposed for core key in. (LL-2022-05)

Photo I-A-11 Sediment Pond 1 South Cell and the internal rockfill berm which keeps retained sediments away from pump intakes and Seepage Water Reclaim Pond. (LL-2022-06)

Photo I-A-12 Overview of Sediment Pond 1 North Cell (left) and Sediment Pond 4 (right) which stores local surface runoff but is not used as an active sediment pond. (LL-2022-07)

Photo I-A-13 Seepage Pond 2, northern half, and downstream slope of Sediment Pond 2 which is immediately north. (LL-2022-08)

Photo I-A-14 Seepage Pond 2, southern half. Outlet to Seepage Pond 2 was not obstructed during site visit. (LL-2022-08)

APPENDIX I-B

H-H Dam

Site Visit Checklist, Observations, and Photographs

Appendix I-B
Annual Facility Performance Report Site Visit Checklist, Observations and Photographs – H-H Dam

SITE VISIT CHECKLIST

Facility:	H-H Dam	**Site visit Date:**	September 21, 2022 October 19, 2022
Weather:	Sunny	**Inspector(s):**	Rick Friedel, P.Eng. Andrew Cote, EIT.
Minimum observed buffer height (delta level to dam crest):	Variable along dam crest ranging from 3.9 m to 6.3 m based on October 12, 2022 survey.		

Are the following components of your dam in ***SATISFACTORY CONDITION***?
(check one if applicable)

EMBANKMENT	Yes/No
U/S slope	☒ Yes ☐ No
Crest	☒ Yes ☐ No
D/S Slope	☒ Yes ☐ No
D/S Toe	☒ Yes ☐ No

Were any of the following ***POTENTIAL PROBLEM INDICATORS*** found?

INDICATOR	EMBANKMENT	INDICATOR	EMBANKMENT
Piping	☐ Yes ☒ No	Settlement	☐ Yes ☒ No
Sinkholes	☐ Yes ☒ No	Sloughing/Slides	☐ Yes ☒ No
Seepage	☐ Yes ☒ No	Animal Activity	☐ Yes ☒ No
External Erosion	☐ Yes ☒ No	Excessive Growth	☐ Yes ☒ No
Cracks	☐ Yes ☒ No	Excessive Debris	☐ Yes ☒ No

List and describe any deficiencies (all deficiencies require assessment and/or repair):
- No dam safety concerns observed.

Comments / Notes:
- Refer to Site Visit Observations and Photos for further notes.

SITE VISIT OBSERVATIONS

Tailings Beach

Wet area in low point of tailings beach near the H-H Dam was observed during the site visit which is typical and related to temporary ponding of surface runoff and tailings slurry in the low point of the beach. Water depth is typically less than 1 m.

Based on the October 12, 2022 beach survey, the buffer[1] along the H-H Dam crest ranged from 3.9 m to 3.6 m, which was significantly greater than the minimum specified in design (1 m) or HVC's operating target (2 m). Active tailings discharge from east spigots at the time of the visit (Photo I-B-6).

Crest

No visual indicators of concern or unusual behavior, such as excessive erosion, deformation, or seepage from the rockfill slope. The H-H Dam was not raised during 2022. Typical longitudinal cracking observed on either side of sand and gravel filter zone (SG2). These are related to differential settlement of fill placement upstream and downstream of SG2 and not an indicator or poor or unusual performance.

West Abutment

No visual indicators of concern or unusual behavior (Photo I-B-2). The outlet of the Mystery Creek culvert was backfilled during 2022 (Photo I-B-3).

East Abutment

No visual indicators of concern or unusual behavior. Seepage from the excavation face of the H-H Pipe Bench and access road, upslope of H-H Dam and tailings, was observed but not causing excessive erosion or damage. (Photo-I-B-7)

Downstream Slope and Buttress Area

No visual indicators of concern or unusual behavior (Photo I-B-8 to I-B-10). In preparation for fill placement in the buttress by the mining fleet, the H-H Gland Well No. 5 and No. 7, and surrounding fill, were raised. In addition, HVC installed new powerlines which extend up the downstream face of the dam so the existing powerlines along the downstream toe can be removed to allow buttress construction.

Seepage

No seepage was observed at the toe of the H-H Dam. Seepage typically flows through downstream waste rock towards the 24 Mile Area.

[1] Buffer is the vertical distance between the tailings surface and H-H Dam crest at that location.

24 Mile Waste Dump

No active dumping in the 24 Mile Waste Dump at the time of the site visit but additional fill had been placed since 2021 AFPR site visit (Photo I-B-12). No fill placement was required in the H-H Dam buttress area during 2022.

24 Mile TSF

Water levels in 24 Mile TSF were above HVC operating targets at the time of the site visit. This was necessary to accommodate a temporary increase in pumping required while H-H Gland Wells pumping was intermittent during raise. Although pond levels were above operating targets the available flood storage exceeded requirements.

SITE VISIT PHOTOGRAPHS

LEGEND:

- HH = H-H Dam.
- HH-2022-## refers to 2022 AFPR waypoints shown on Figure 4.
- All photographs taken during the site visit on September 21 and October 19, 2022.

Photo I-B-1 Overview of H-H Dam crest looking northeast from west abutment. The surface of the crest is the sand and gravel filter zone (SG2) and downstream rockfill (RF2). There was no crest raise during 2022. (HH-2022-01)

Photo I-B-2 Downstream slope are area looking east, from west abutment. Decommissioning of the Mystery Creek culvert outlet was completed during 2022, including backfilling the area. (HH-2022-01)

Photo I-B-3 The inlet of the Mystery Creek culvert that extends west of the south side mine road. The pipe was grouted and inlet capped during decommissioning. (HH-2022-11)

Photo I-B-4 Tailings beach upstream of west abutment. (HH-2022-02)

Photo I-B-5 View of upstream slope face and beach from east abutment, looking southwest. (HH-2022-05)

Photo I-B-6 Active tailings spigots ~250 m upstream of west abutment. (HH-2022-05)

Photo I-B-7 H-H Pipe Bench and access road which crosses dam crest and waste fill platform extended onto tailings beach immediately upstream of west abutment. (HH-2022-05)

Photo I-B-8 Mid-Segment downstream slope, upper portion, looking northeast from the H-H Dam access ramp. (HH-2022-03)

Photo I-B-9 H-H Dam downstream slope and 24 Mile Waste Dump / buttress area looking southwest from north side haul road. Power line along the toe of slope to be relocated out of area to allow 2023 buttress fill placement. Replacement power poles are visible along access road built into downstream slope. (HH-2022-10)

Photo I-B-10 H-H Dam downstream slope near east abutment looking west from north side haul road. (HH-2022-10)

PhotoI-B-11 H-H Gland Well casings (No. 5 and No. 7) and surrounding fill are being raised in preparation for 2023 buttress fill placement. (HH-2022-09)

Photo I-B-12 24 Mile Waste Dump and 24 Mile TSF downstream of H-H Dam, looking south near Sta. 1+850. (HH-2022-04)

Photo I-B-13 Overview of 24 Mile Waste Dump downstream of H-H Dam, looking southwest. (HH-2022-10)

PhotoI-B-14 Upstream segment of the replacement discharge channel, built in 2022, to convey overflow from HH Pumphouse to 24 Mile TSF. (HH-2022-07)

Photo I-B-15 Mystery Creek diversion excavated to replace decommissioned Mystery Creek culvert. In November 2022, as recommended by EoR, HVC installed a geomembrane liner over the segment of ditch excavated in fill (shown in photo) to reduce seepage losses. (HH-2022-06)

APPENDIX II

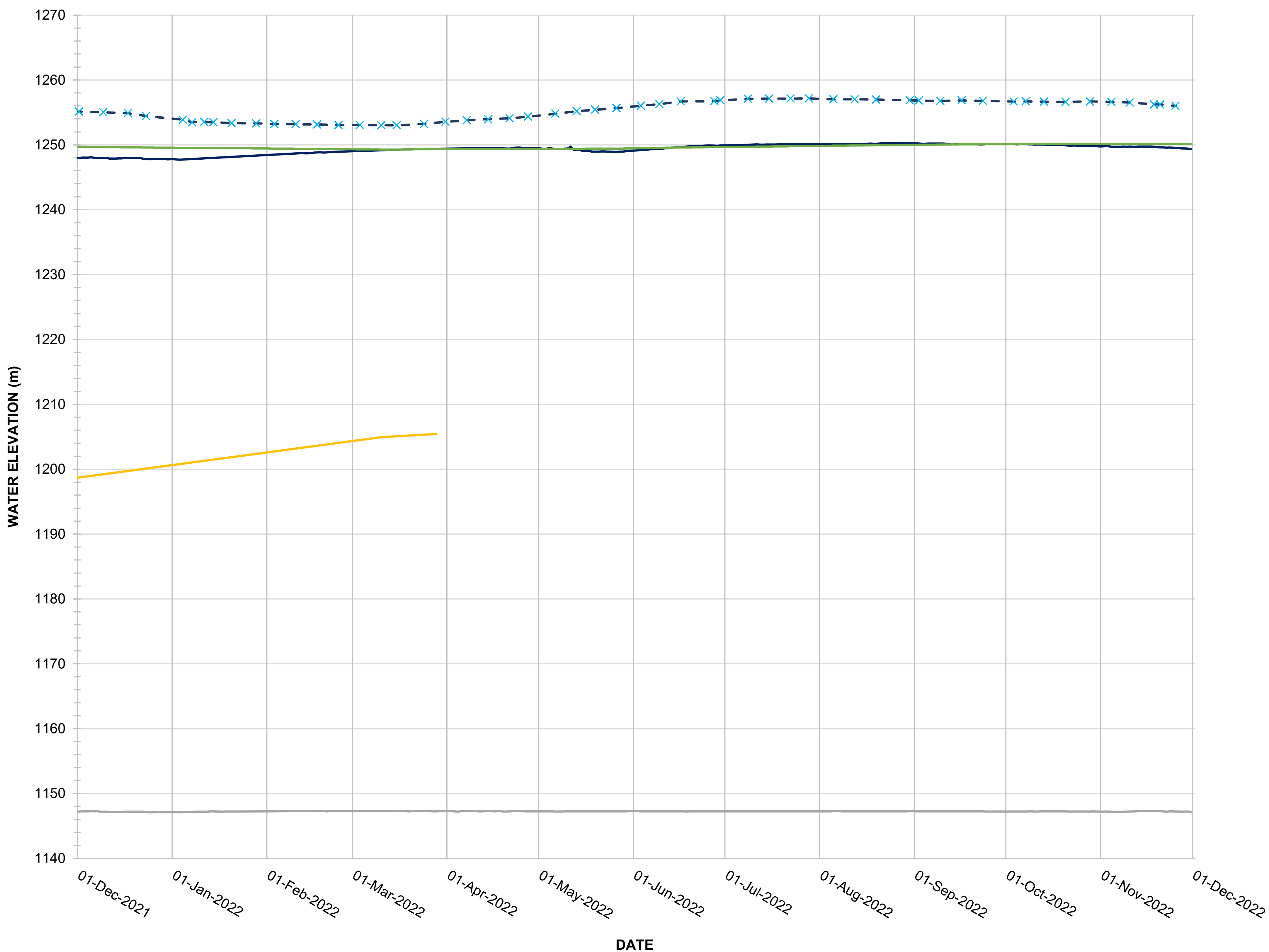
L-L Dam Instrumentation Summary

APPENDIX II-A

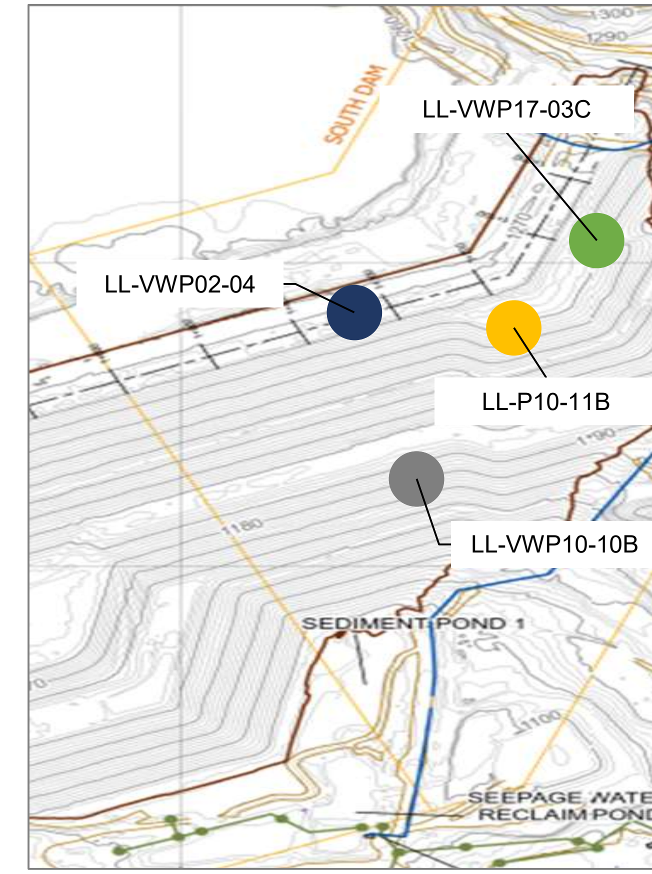
L-L Dam Piezometer Plots

L-L DAM PIEZOMETER PLOTS:

December 1, 2021 to November 30, 2022



INSET INSTRUMENT VIEW



LEGEND

- LL-P10-11B (Sand Fill)
- LL-VWP02-04 (Sand Fill)
- LL-VWP10-10B (Sand and Gravel Drain)
- LL-VWP17-03C (Glacial Till)
- L-L TAILINGS POND

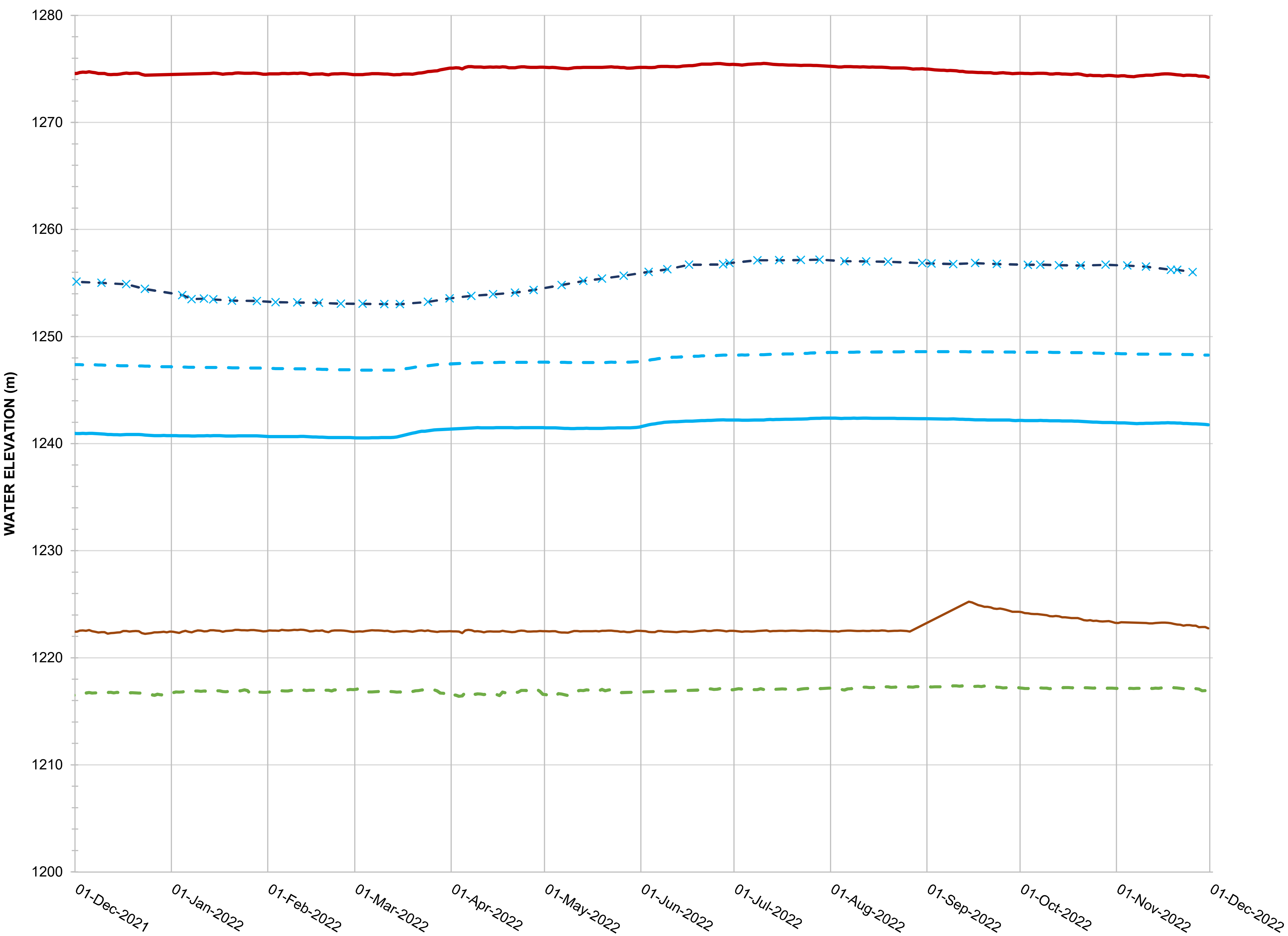
NOTES

NOT FOR CONSTRUCTION

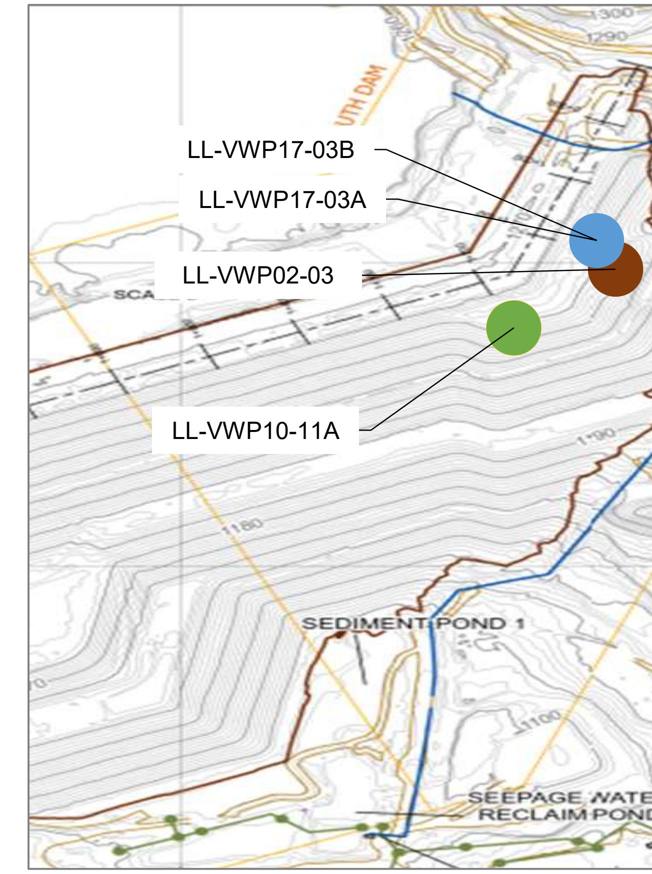
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM SOUTH DAM DAM FILL DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS
	SCALE: AS SHOWN / PROJECT No. M02341C42 / FIG. No. II-A-1

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX INCLINOMETER PLOTS\10-01 - COMPLETED\FIGURE - NEEDS TO BE UPDATED.XLSX - 2023-03-28 10:10



INSET INSTRUMENT VIEW



LEGEND

- LL-VWP02-03 (Glacial Till Fill)
- LL-VWP10-11A (Granodiorite)
- LL-VWP13-05 (Granodiorite)
- LL-VWP17-03A (Granodiorite)
- LL-VWP17-03B (Glacial Till)
- L-L TAILINGS POND

NOTES

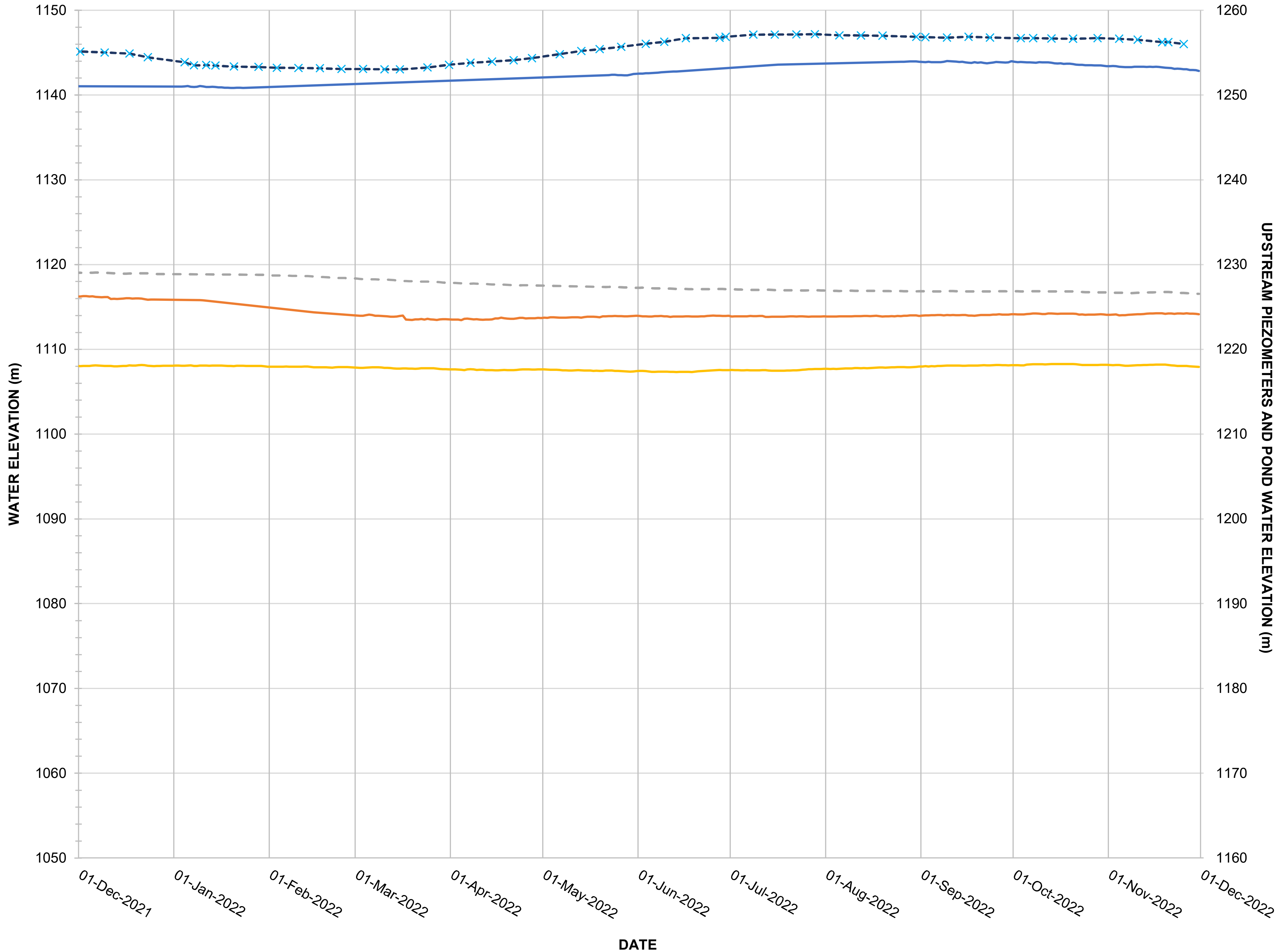
1. LL-VWP13-05 IS LOCATED TO THE RIGHT OF THE DEPICTED INSET FIGURE.

NOT FOR CONSTRUCTION

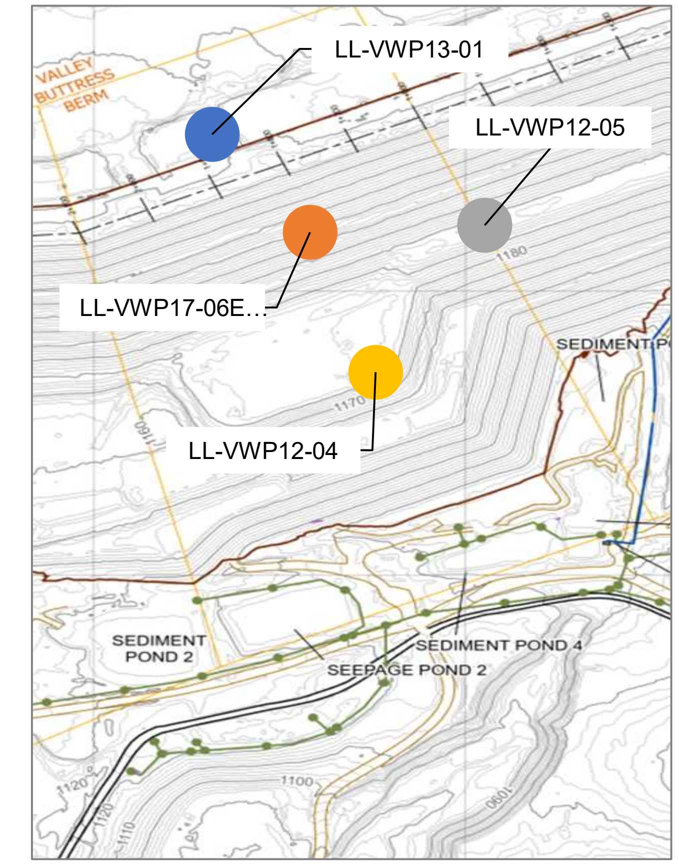
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM SOUTH DAM GRANODIORITE, FOUNDATION ROCK, AND GLACIAL TILL DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-2



INSET INSTRUMENT VIEW



LEGEND

- LL-VWP12-04 (Sand Fill)
- LL-VWP12-05 (Sand Fill)
- LL-VWP17-06E (Sand and Gravel Drainage Blanket)
- LL-VWP13-01 (U/S Dam Fill)
- L-L TAILINGS POND

NOTES

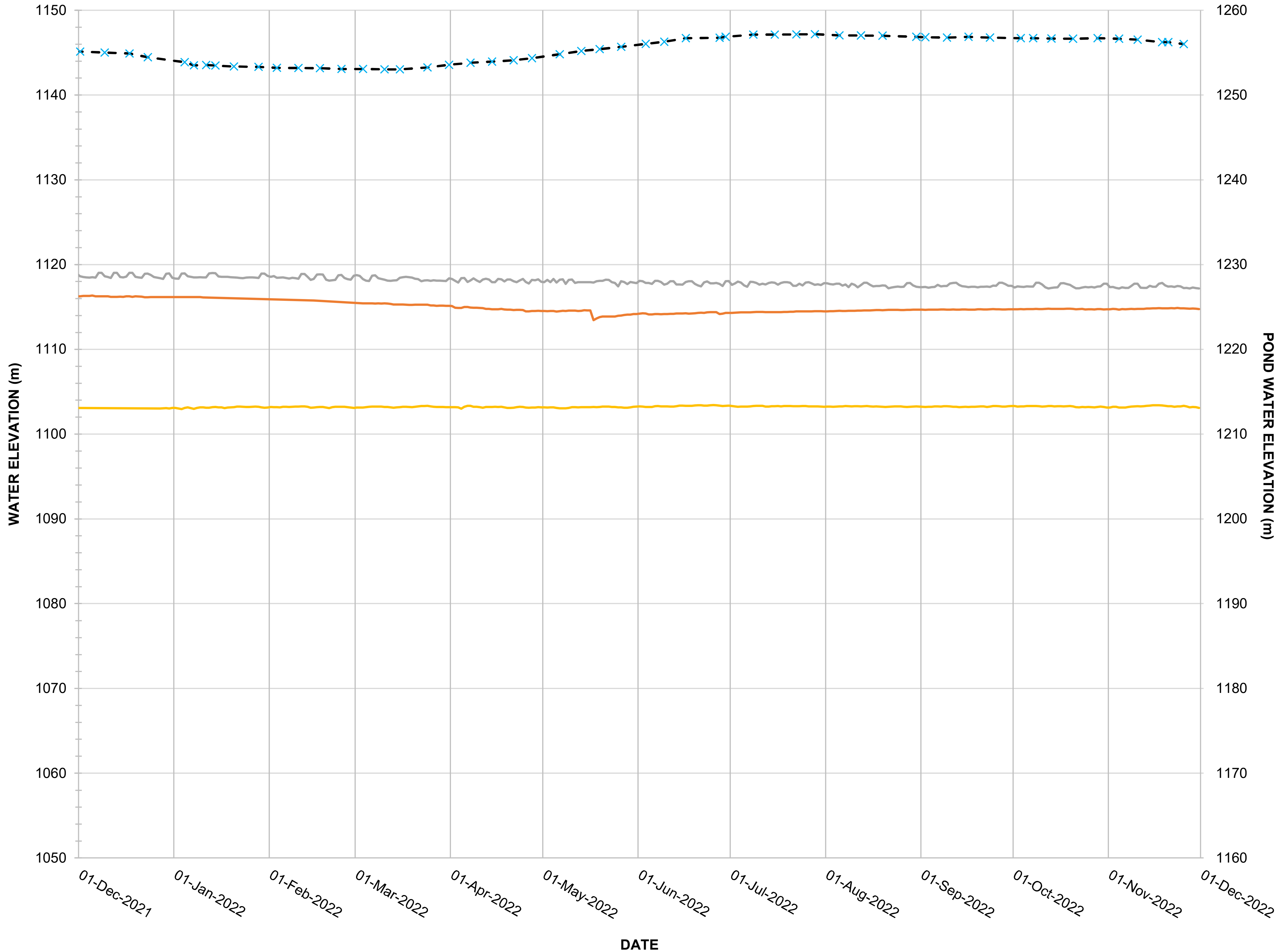
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM VALLEY BUTTRESS BERM DAM FILL DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-3

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-003-VBB-DAM FILL SINCE 2021.XLSX - 2023-03-28 10:13



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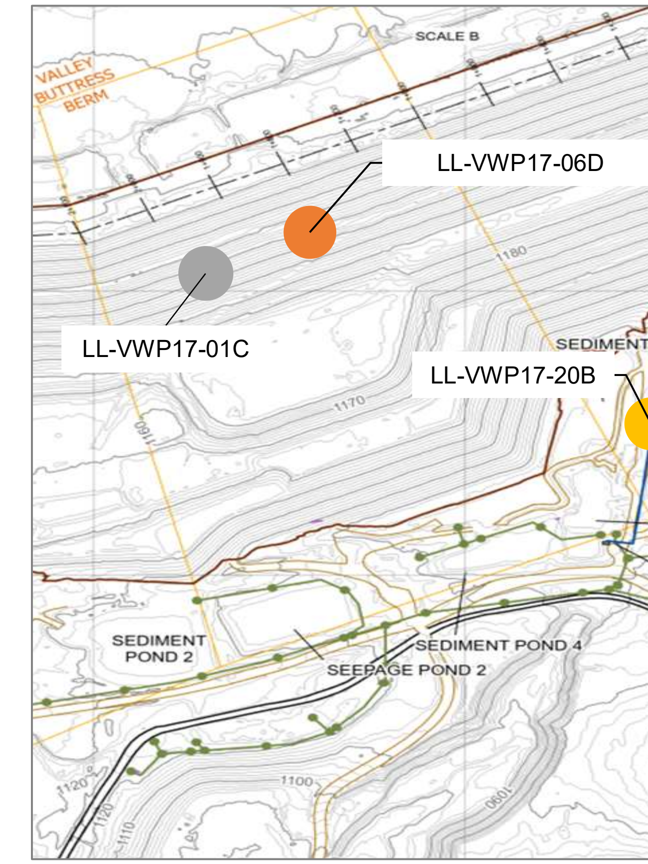


LEGEND

- LL-VWP17-01C (Lacustrine)
- LL-VWP17-06D (Lacustrine)
- LL-VWP17-20B (Lacustrine)
- L-L TAILINGS POND

NOTES

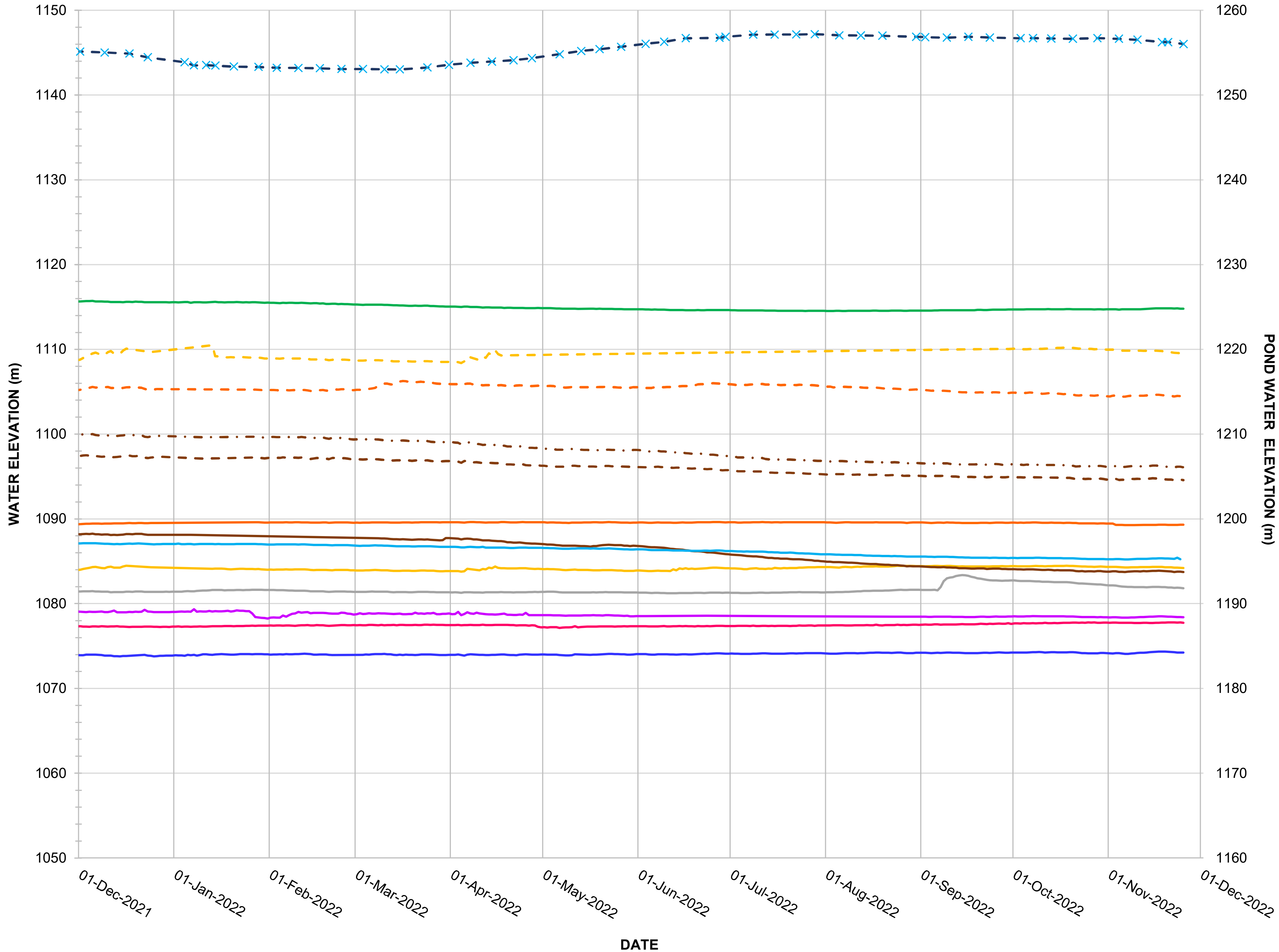
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM VALLEY BUTTRESS BERM LACUSTRINE DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-4

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-004-VBB-LACUSTRINE SINCE 2021.XLSX - 2023-03-28 10:16



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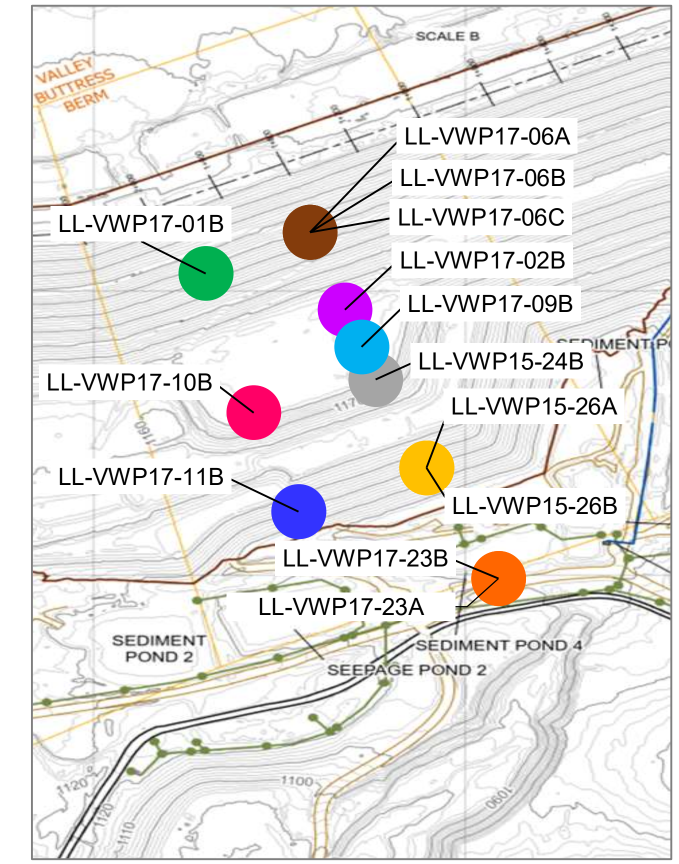


LEGEND

- LL-VWP15-24B (L-GLU)
- LL-VWP15-26A (L-GLU)
- LL-VWP15-26B (U-GLU)
- LL-VWP17-01B (L-GLU)
- LL-VWP17-02B (L-GLU)
- LL-VWP17-06A (LSG and L-GLU Contact)
- LL-VWP17-06B (L-GLU)
- LL-VWP17-06C (GT and L-GLU Contact)
- LL-VWP17-09B (L-GLU)
- LL-VWP17-10B (L-GLU)
- LL-VWP17-11B (L-GLU)
- LL-VWP17-23A (L-GLU)
- LL-VWP17-23B (U-GLU)
- L-L TAILINGS POND

NOTES

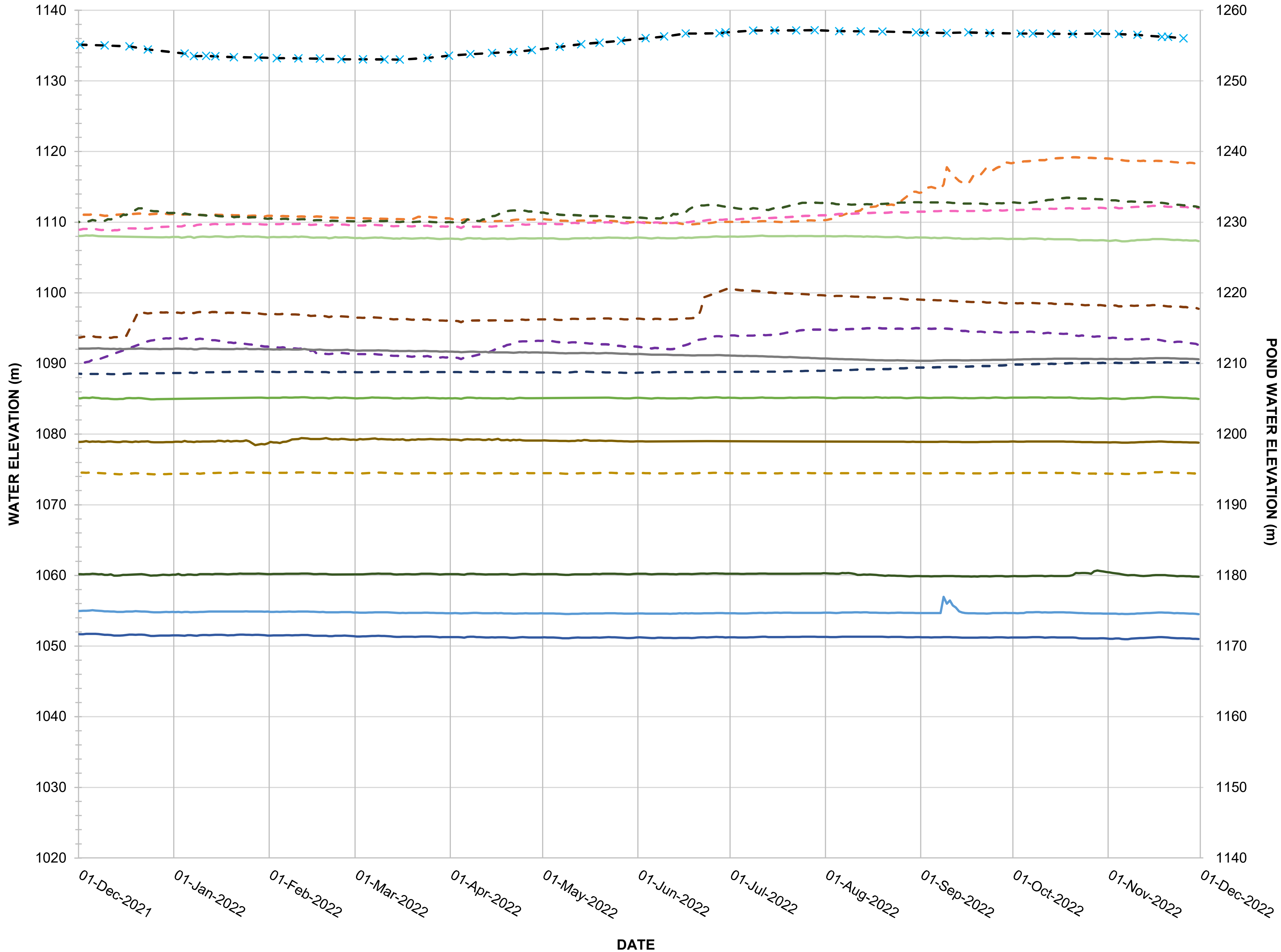
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM VALLEY BUTTRESS BERM GLACIOLACUSTRINE DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-5

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-005-VBB-GLACIOLACUSTRINE SINCE 2021.XLSX - 2023-03-28 10:17



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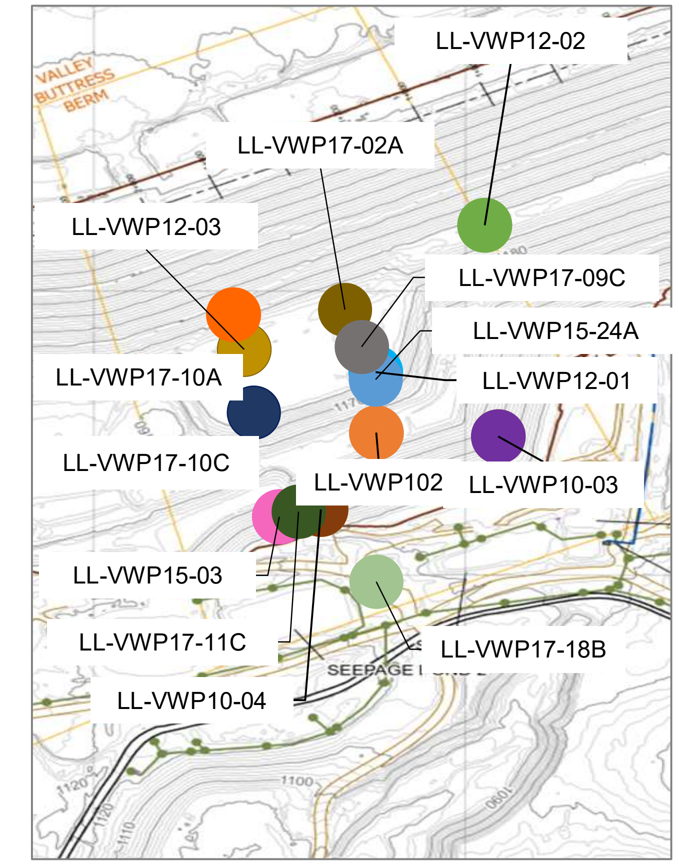


LEGEND

- LL-VWP10-03 (Glacial Till)
- LL-VWP10-04 (Glacial Till)
- LL-VWP102 (Glacial Till)
- LL-VWP12-02 (Glacial Till)
- LL-VWP12-03 (Glacial Till)
- LL-VWP15-03 (Glacial Till)
- LL-VWP15-24A (LSG)
- LL-VWP17-02A (LSG)
- LL-VWP17-09C (Glacial Till)
- LL-VWP17-10A (Glacial Till)
- LL-VWP17-10C (Glacial Till)
- LL-VWP17-11A (LSG)
- LL-VWP17-11C (Glacial Till)
- LL-VWP17-18B (Glacial Till)
- L-L TAILINGS POND

NOTES

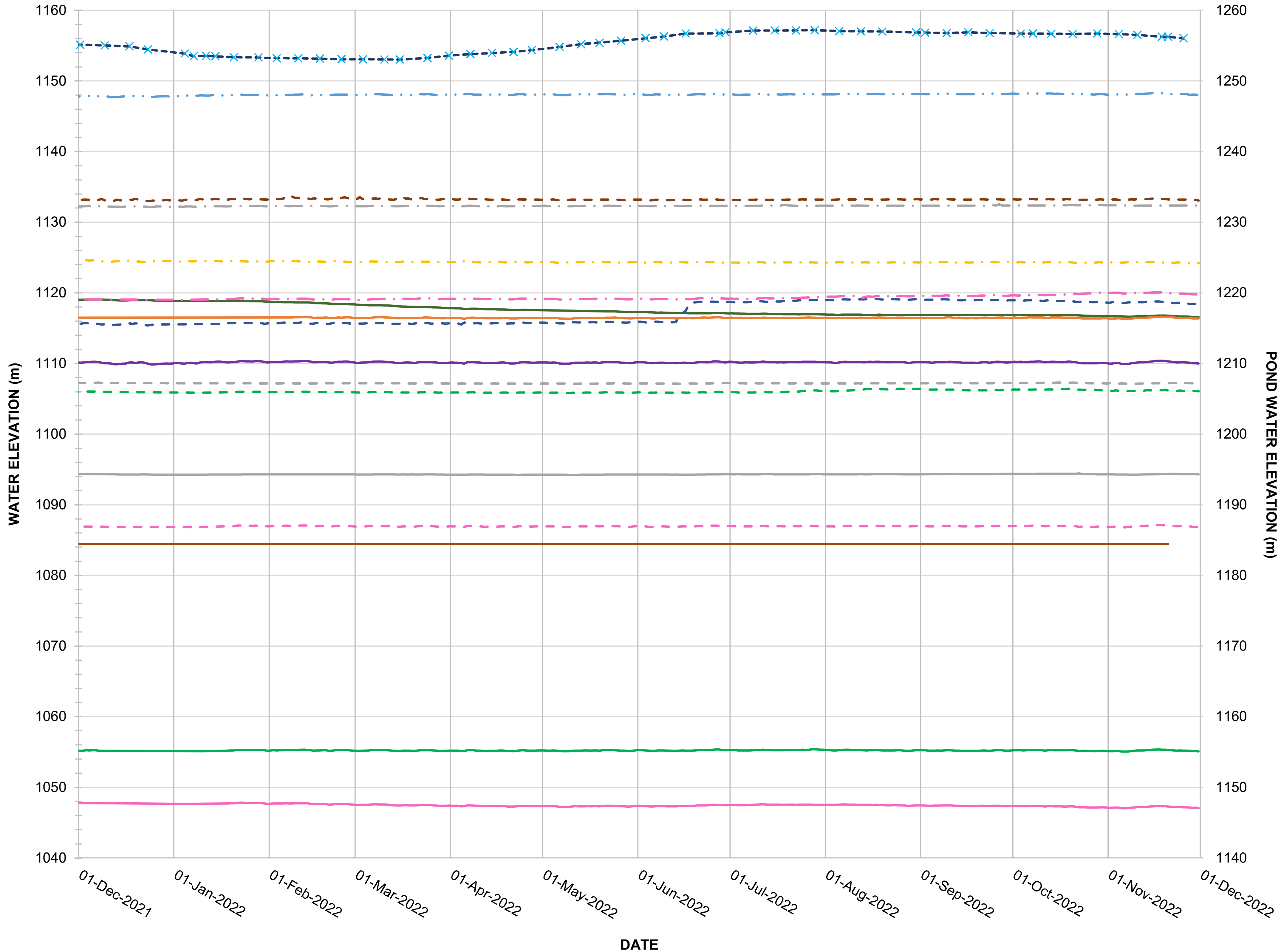
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM VALLEY BUTTRESS BERM GLACIAL TILL, SAND AND GRAVEL DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-6

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-006-VBB-GLACIAL TILL, SAND AND GRAVEL SINCE 2021.XLSX - 2023-03-28 10:17



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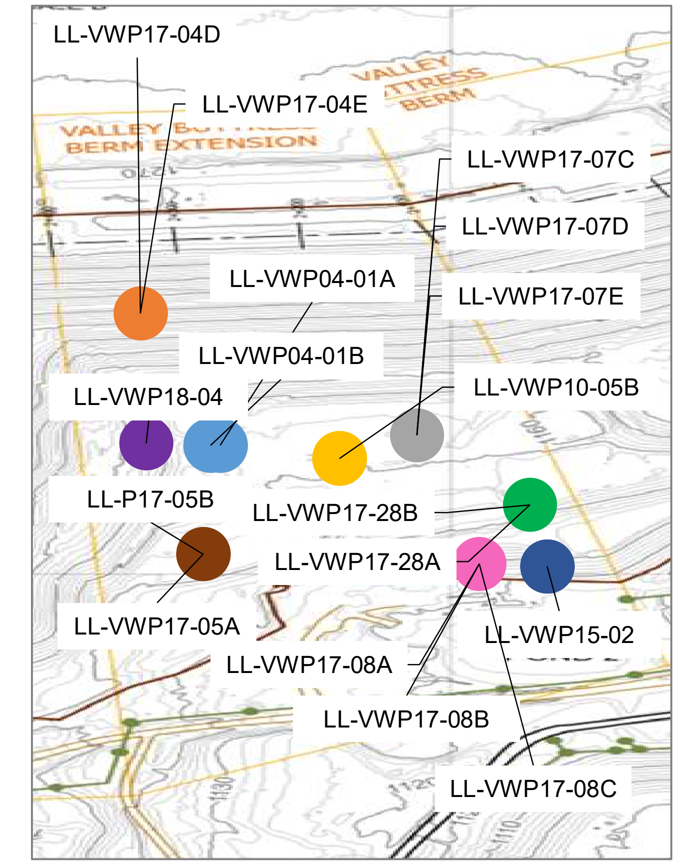


LEGEND

- LL-P17-05B (LSG)
- LL-VWP04-01A (Glacial Till)
- LL-VWP10-05B (LSG)
- LL-VWP12-05
- LL-VWP15-02 (Glacial Till)
- LL-VWP17-04D (LSG)
- LL-VWP17-05A (Glacial Till)
- LL-VWP17-07C (LSG)
- LL-VWP17-07D (Glacial Till)
- LL-VWP17-07E
- LL-VWP17-08A (Glacial Till)
- LL-VWP17-08B (LSG)
- LL-VWP17-08C (Glacial Till)
- LL-VWP17-28A (LSG)
- LL-VWP17-28B (Glacial Till)
- LL-VWP18-04 (Gravel)
- L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

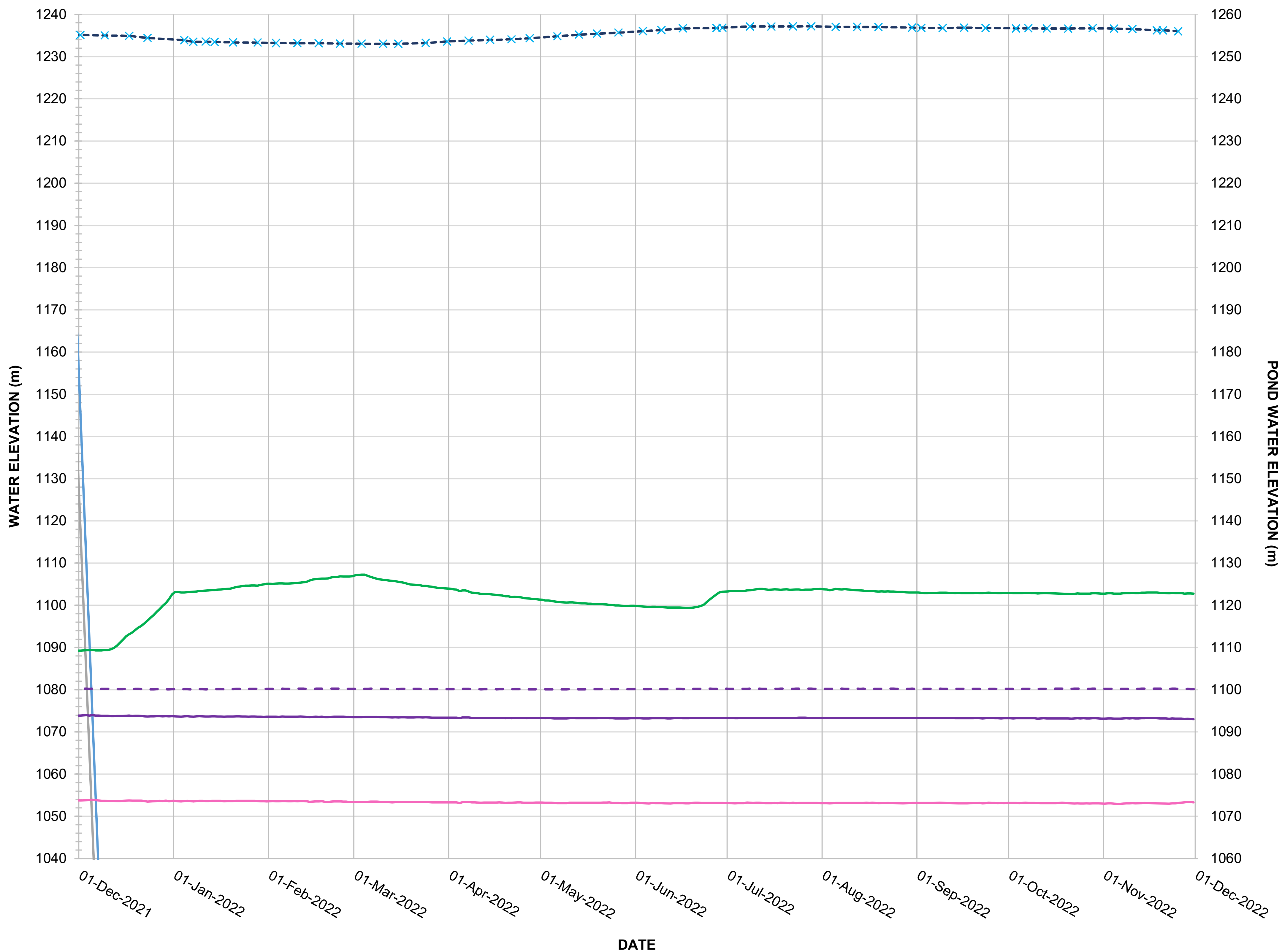
Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: L-L DAM
VALLEY BUTTRESS BERM EXTENSION
OVERBURDEN AND DAM FILL
DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-7

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-007-VBBE-OVERBURDEN AND DAM FILL SINCE 2021.XLSX - 2023-03-28 10:18



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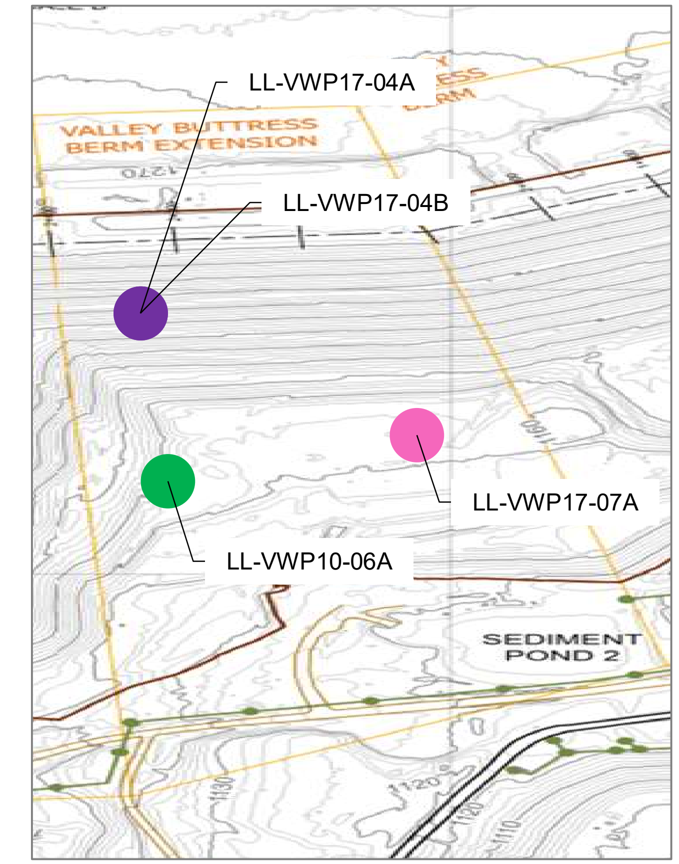


LEGEND

- LL-VWP10-06A (Sedimentary)
- LL-VWP17-04A (Conglomerate)
- LL-VWP17-04B (Conglomerate)
- LL-VWP17-07A (Granodiorite)
- L-L TAILINGS POND

NOTES

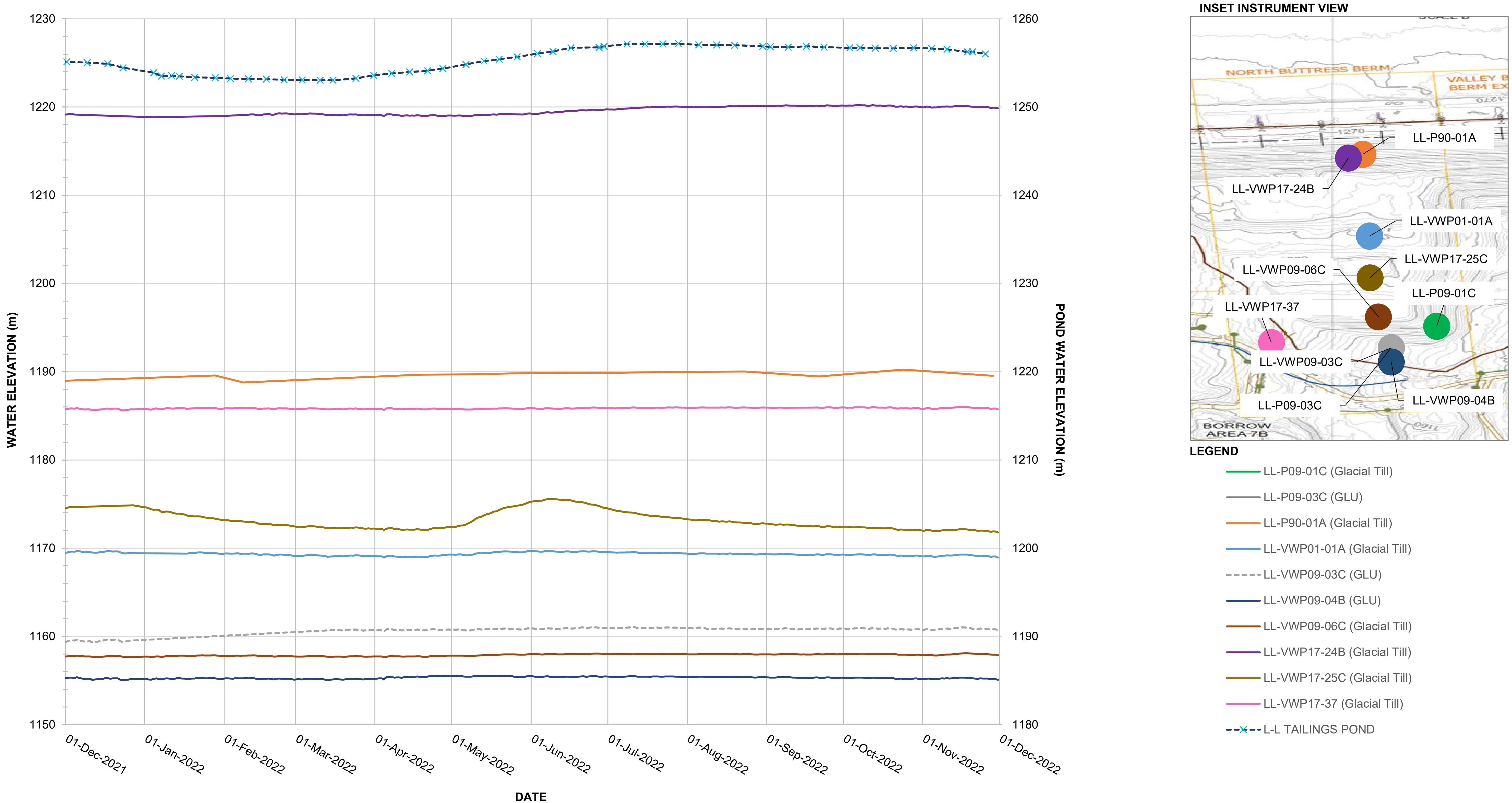
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM VALLEY BUTTRESS BERM EXTENSION FOUNDATION ROCK DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-8

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-008-VBBE-FOUNDATION ROCK SINCE 2021.XLSX - 2023-03-28 10:19



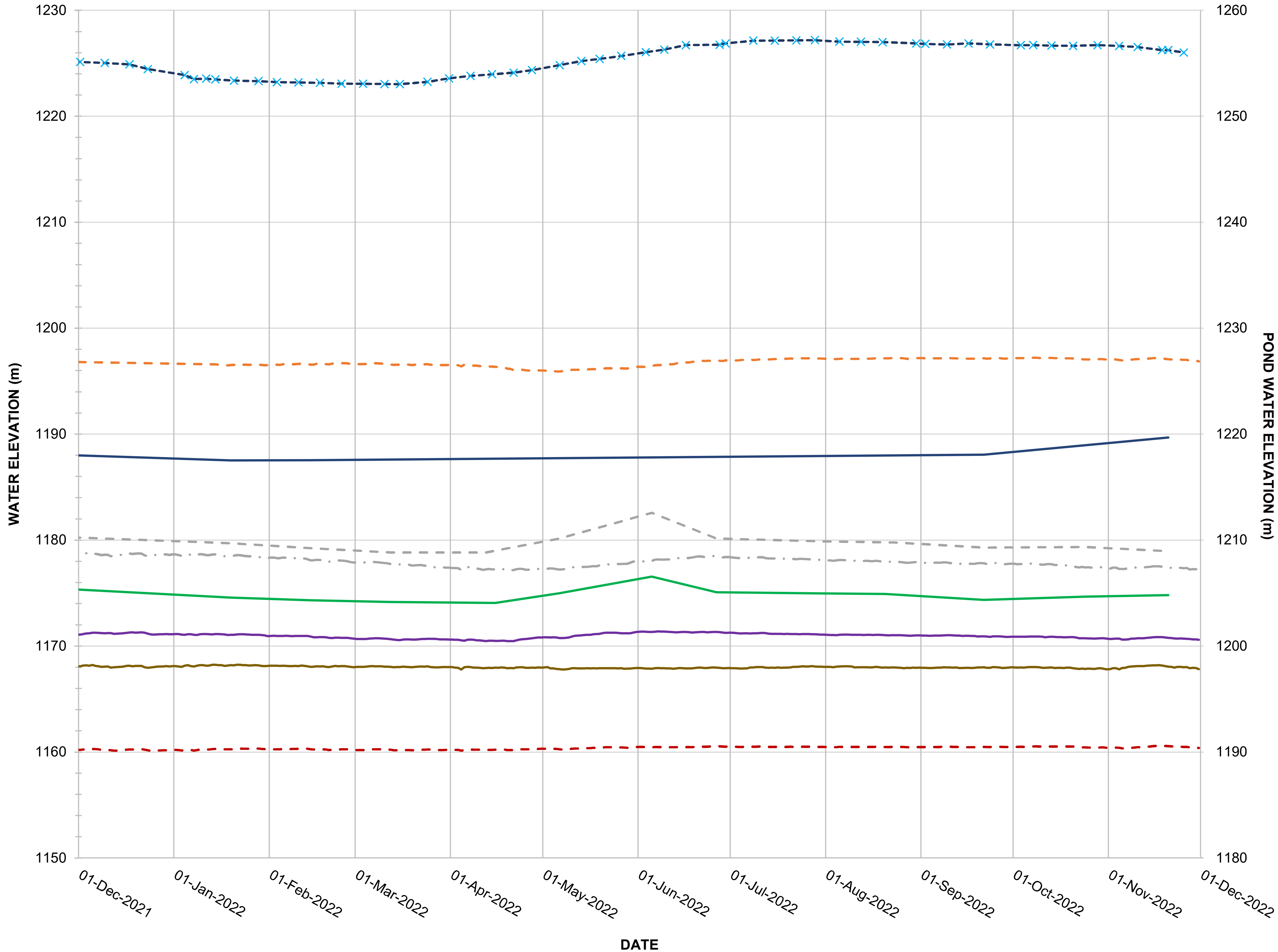
NOTES

NOT FOR CONSTRUCTION

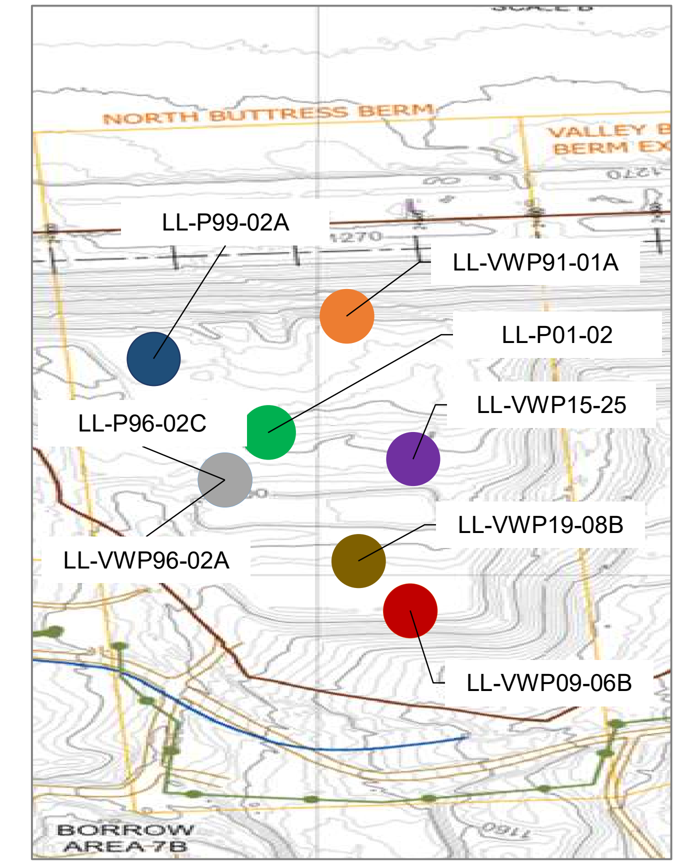
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH BUTTRESS BERM OVERBURDEN DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS
SCALE: AS SHOWN	PROJECT No.: M02341C42 — FIG. No.: II-A-9

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-009-NBB-OVERBURDEN SINCE 2021.XLSX - 2023-03-28 10:19



INSET INSTRUMENT VIEW



LEGEND

- LL-P01-02 (Volcanics)
- LL-P96-02C (Volcanics)
- LL-P99-02A (Volcanics)
- LL-VWP09-06B (Volcanics)
- LL-VWP15-25 (Volcanics)
- LL-VWP19-08B (Volcanics)
- LL-VWP91-01A (Volcanics)
- LL-VWP96-02A (Volcanics)
- L-L TAILINGS POND

NOTES

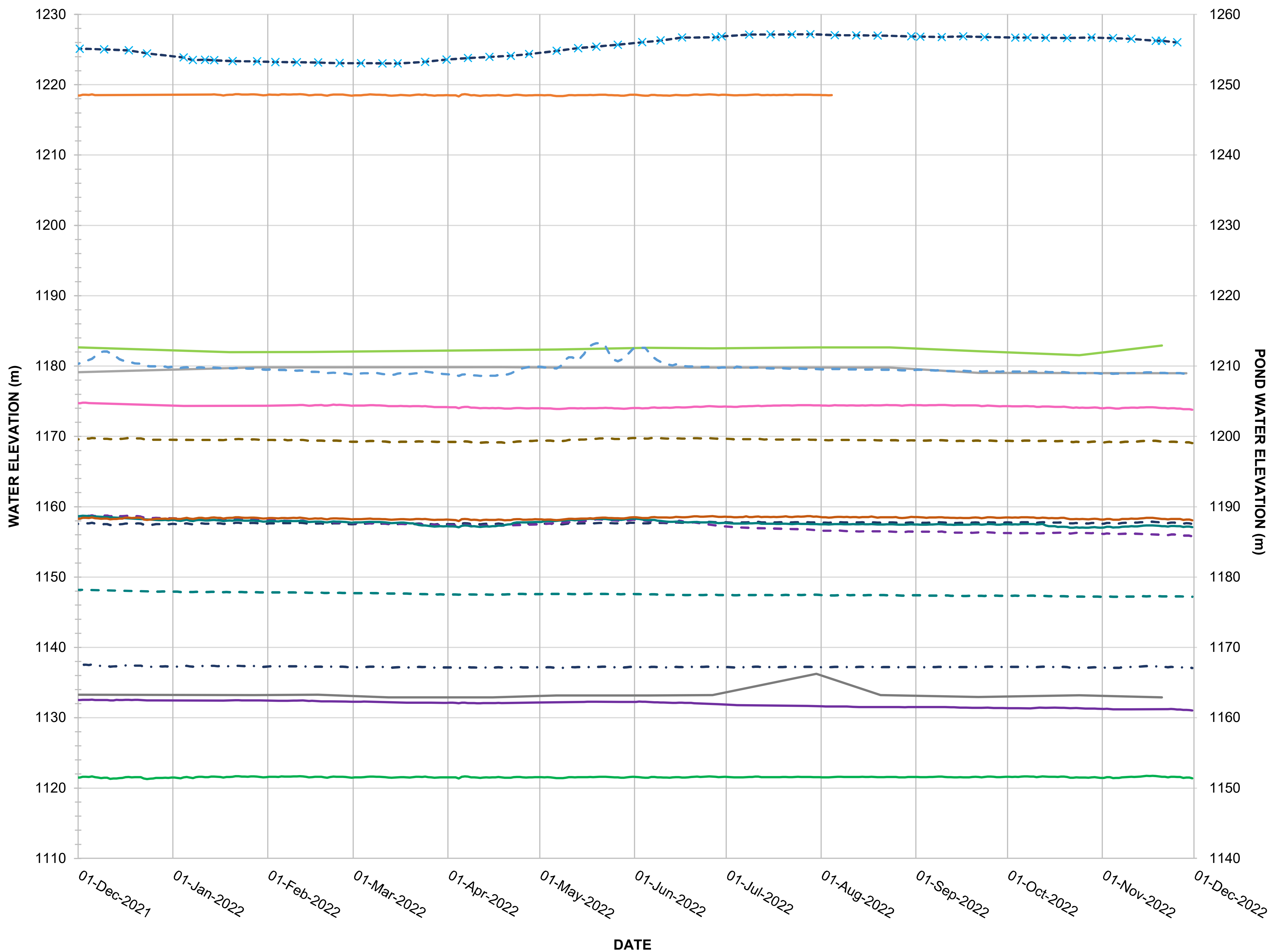
NOT FOR CONSTRUCTION

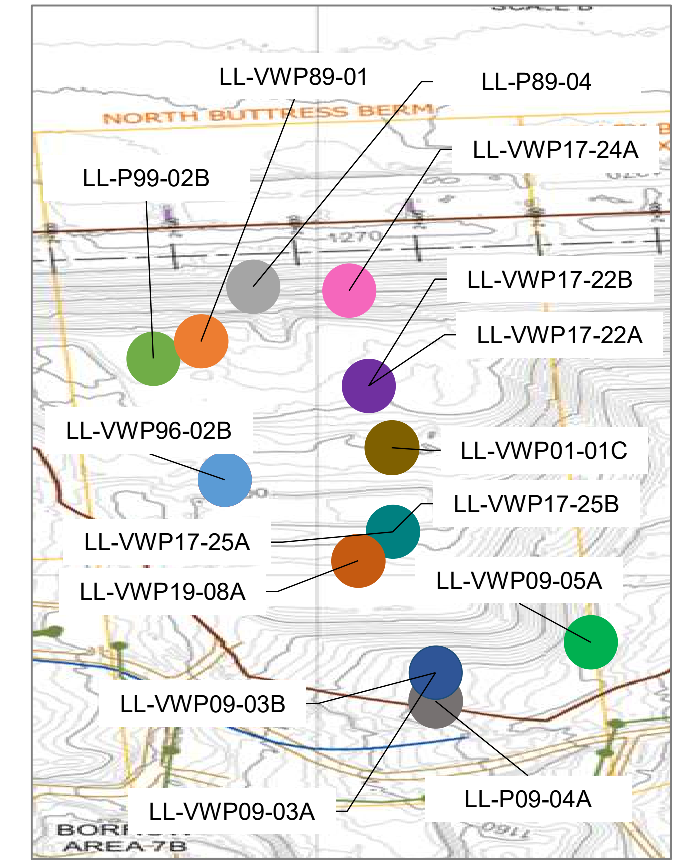
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH BUTTRESS BERM VOLCANICS DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-10

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-010-NBB-VOLCANICS SINCE 2021.XLSX - 2023-03-28 10:20





LEGEND

- LL-P09-04A (Sedimentary)
- LL-P89-04 (Sedimentary)
- LL-P99-02B (Lower Sedimentary)
- LL-VWP01-01C (Lower Sedimentary)
- LL-VWP09-03A (Sedimentary)
- LL-VWP09-03B (Sedimentary)
- LL-VWP09-05A (Sedimentary)
- LL-VWP17-22A (Sedimentary)
- LL-VWP17-22B (Mudstone Breccia)
- LL-VWP17-24A (Mudstone Breccia)
- LL-VWP17-25A (Mudstone)
- LL-VWP17-25B (Sandstone)
- LL-VWP19-08A (Mudstone)
- LL-VWP89-01 (Sedimentary)
- LL-VWP96-02B (Conglomerate)
- L-L TAILINGS POND

NOTES

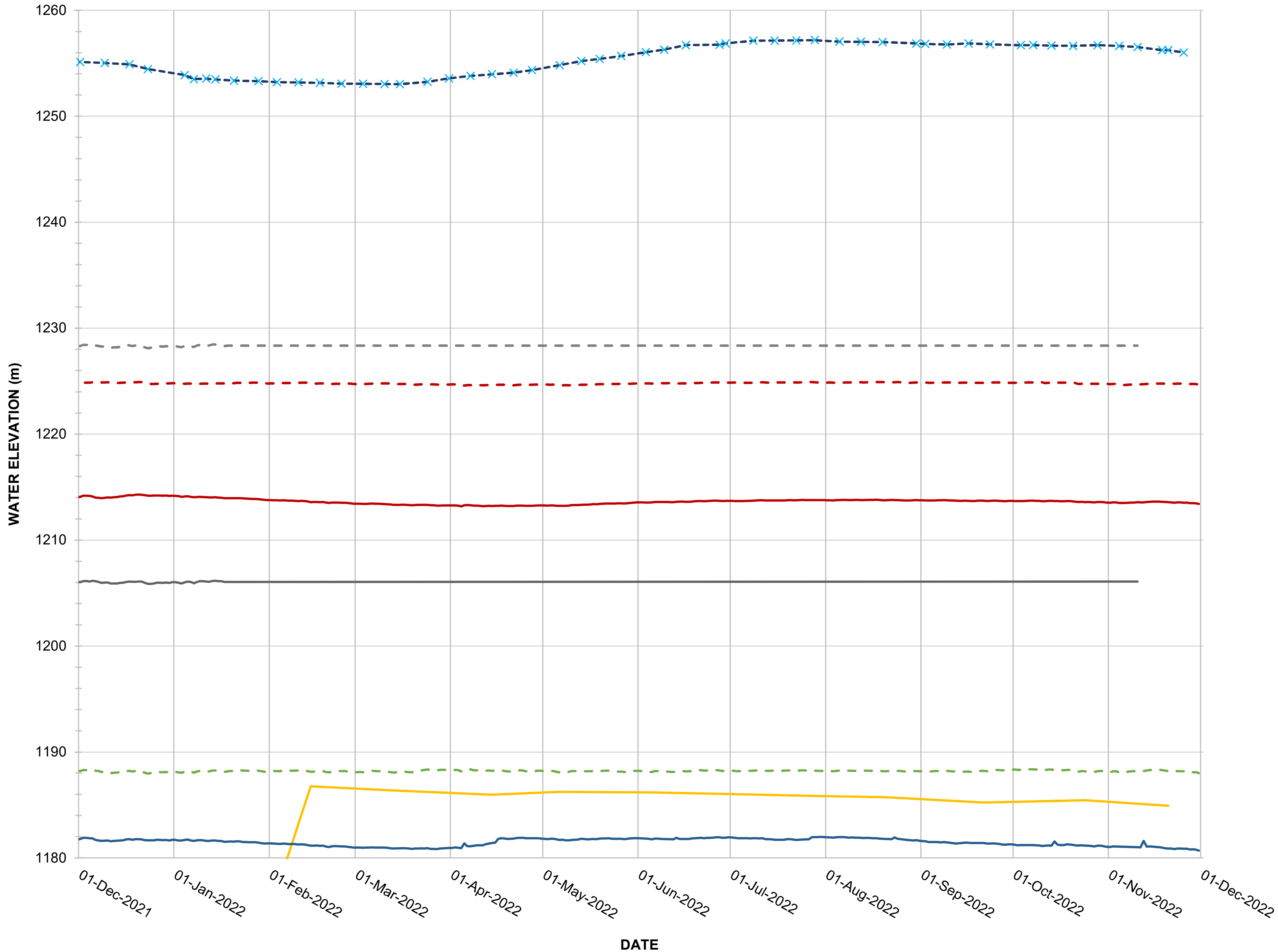
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

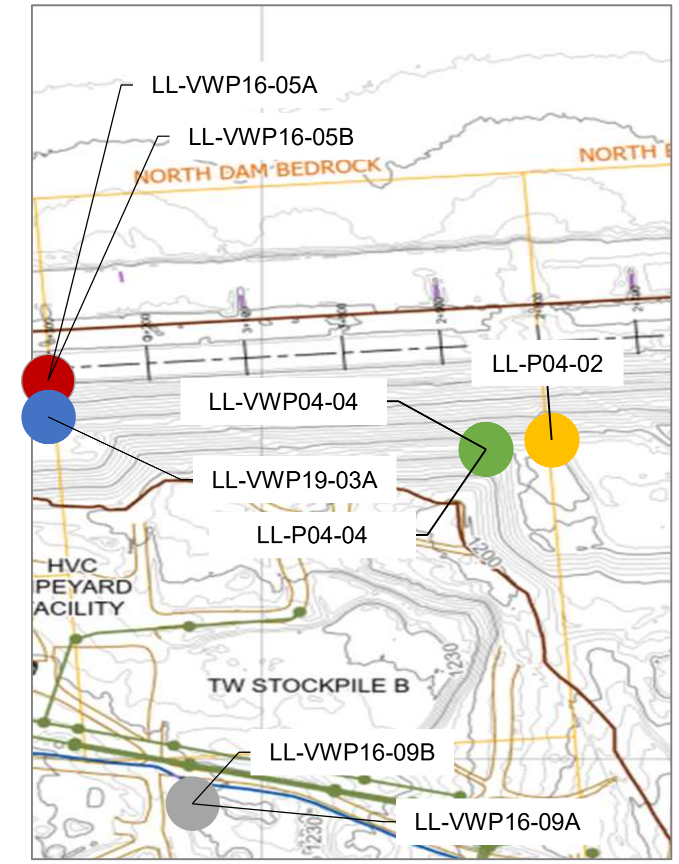
CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH BUTTRESS BERM SEDIMENTARY DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-11

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-011-NBB-SEDIMENTARY SINCE 2021.XLSX - 2023-03-28 10:21



INSET INSTRUMENT VIEW



LEGEND

- LL-P04-02 (Glacial Till)
- LL-VWP04-04 (Glacial Till)
- LL-VWP16-05A (Glacial Till)
- LL-VWP16-05B (U-GLU)
- LL-VWP16-09A (Glacial Till)
- LL-VWP16-09B (Glacial Till)
- LL-VWP19-03A (Stratified Till)
- L-L TAILINGS POND

NOTES

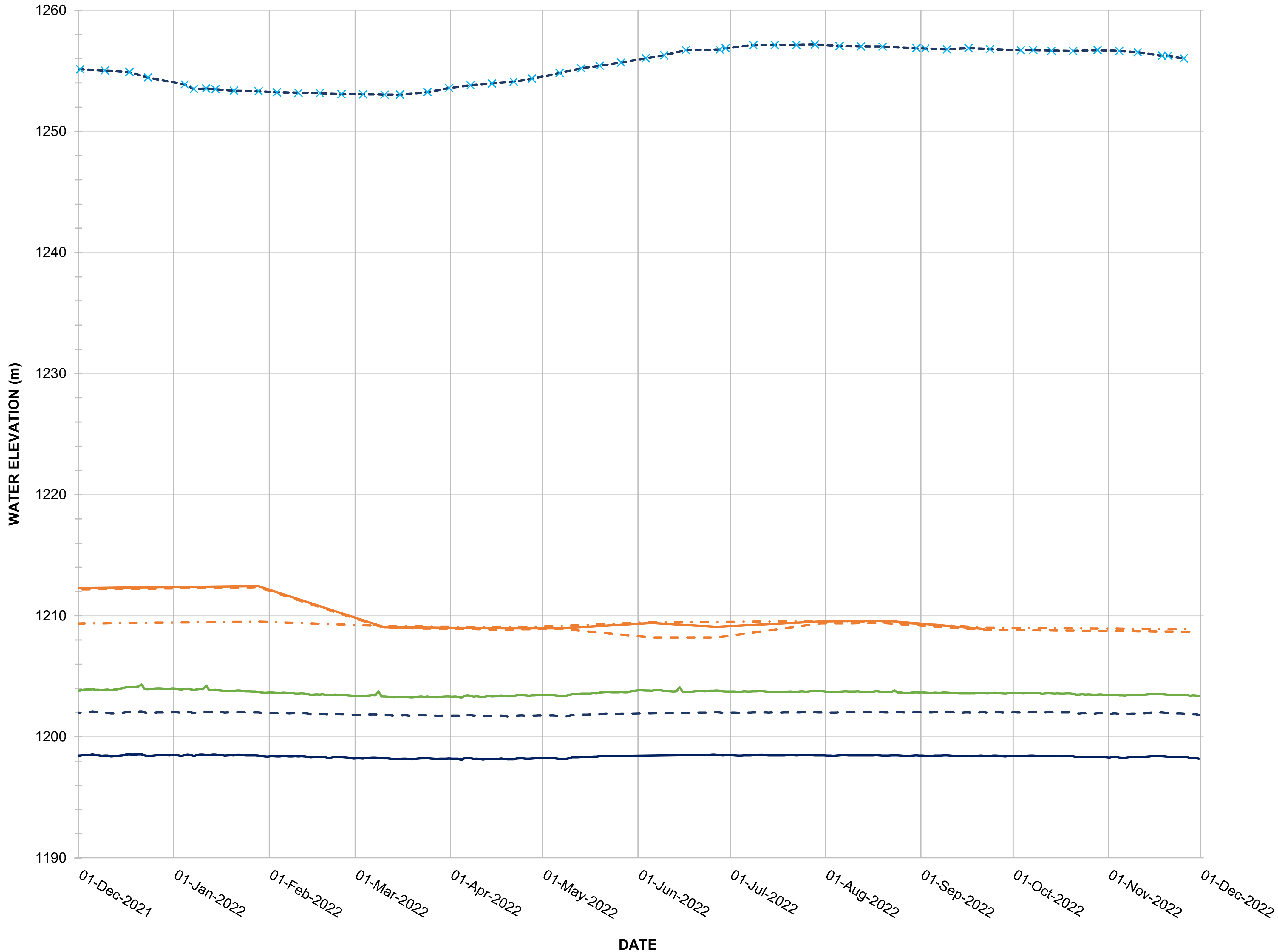
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM NORTH DAM BEDROCK GLACIAL TILL, SAND, AND UPPER GLU DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-12

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-012-NORTH DAM BEDROCK-GLACIAL TILL, SAND AND UPPER GLU SINCE 2021.XLSX - 2023-03-28 10:22



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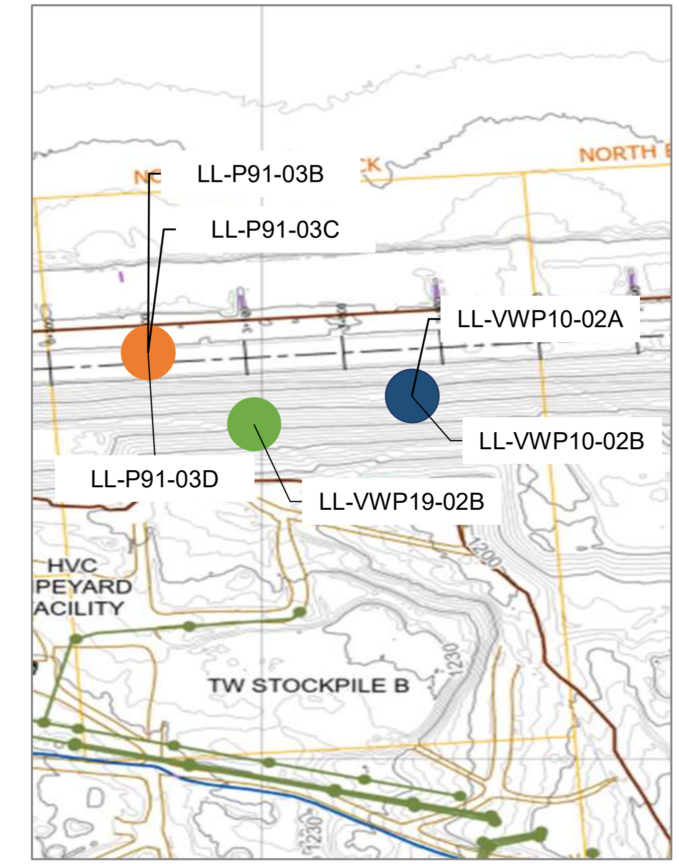


LEGEND

- LL-P91-03B (Volcanics)
- LL-P91-03C (Volcanics)
- LL-P91-03D (Volcanics)
- LL-VWP10-02A (Upper Volcanics)
- LL-VWP10-02B (Upper Volcanics)
- LL-VWP19-02B (Andesite/Basalt)
- L-L TAILINGS POND

NOTES

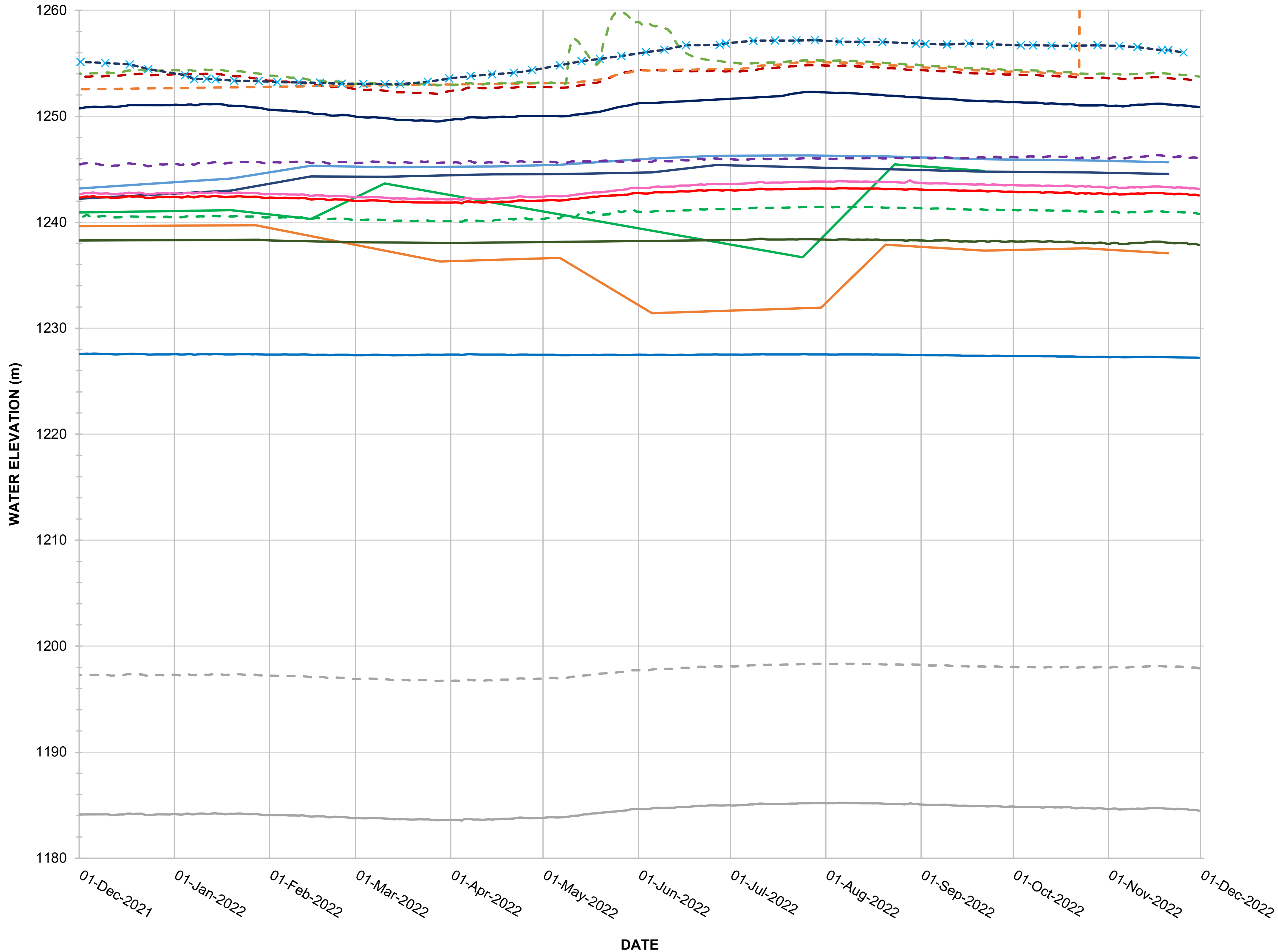
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH DAM BEDROCK VOLCANICS DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-13

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-013-NORTH DAM BEDROCK-VOLCANICS SINCE 2021.XLSX - 2023-03-28 10:22



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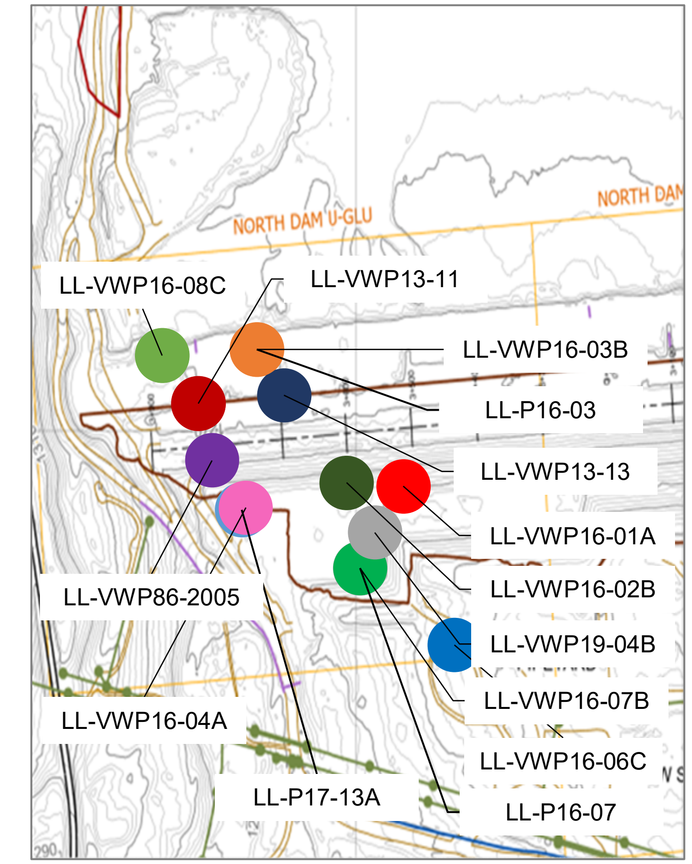


LEGEND

- LL-P16-03 (Glaciofuvial)
- LL-P16-07 (LSG)
- LL-P17-13A (USG)
- LL-VWP13-11 (U/S Sand and Gravel)
- LL-VWP13-13 (U/S Sand and Gravel)
- LL-VWP16-01A (LSG)
- LL-VWP16-02B (USG)
- LL-VWP16-03B (U/S Sand and Gravel)
- LL-VWP16-04A (LSG)
- LL-VWP16-06C (USG)
- LL-VWP16-07B (LSG)
- LL-VWP16-08C (USG)
- LL-VWP19-04A (Sand and Gravel)
- LL-VWP19-04B (Sand and Gravel)
- LL-VWP86-2005 (USG)
- L-L TAILINGS POND

NOTES

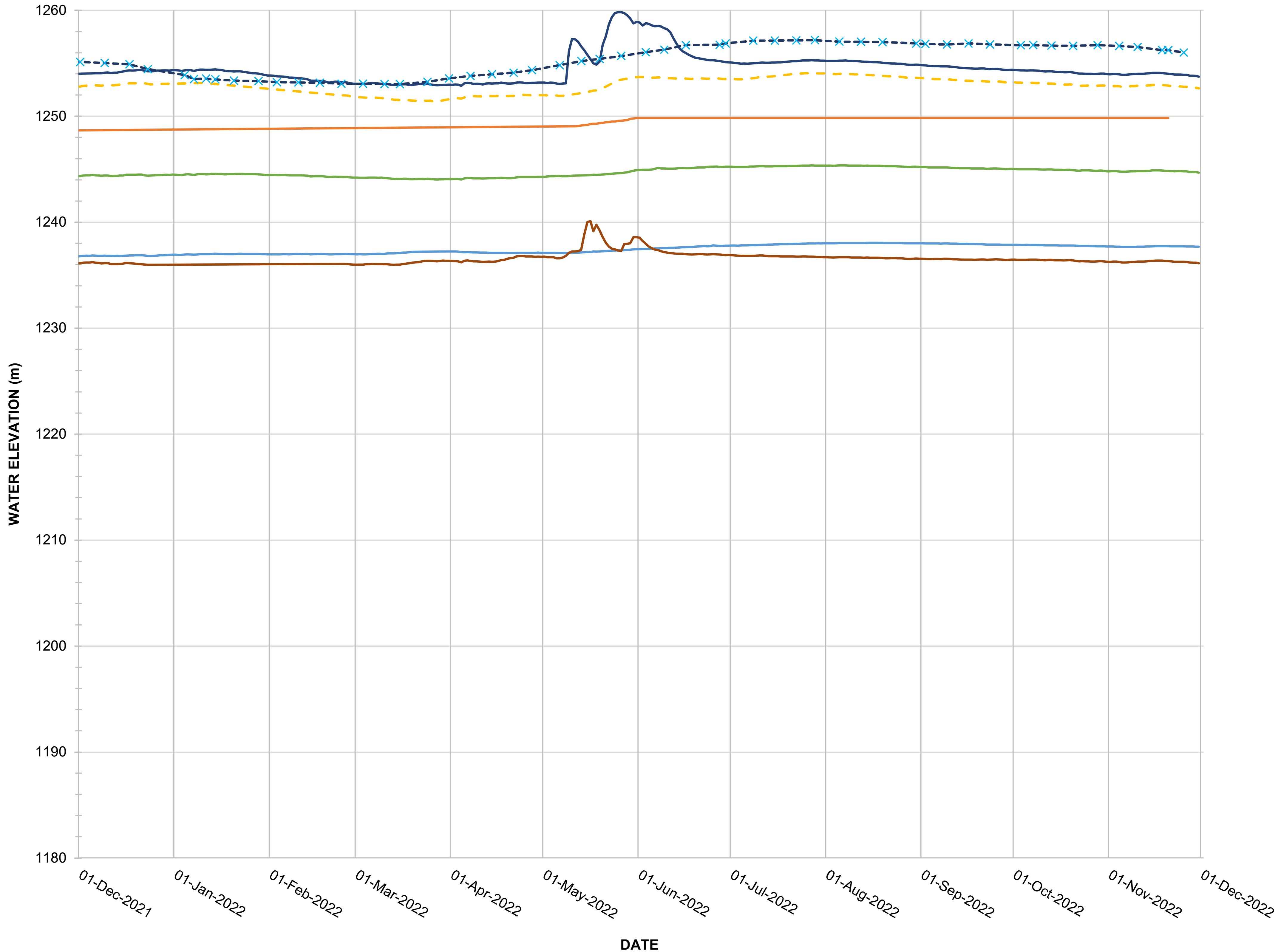
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH DAM UPPER GLACIOLACUSTRINE SAND AND GRAVEL DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-14

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 APPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-014-NORTH DAM UPPER GLU- SAND AND GRAVEL SINCE 2021.XLSX - 2023-03-28 10:23



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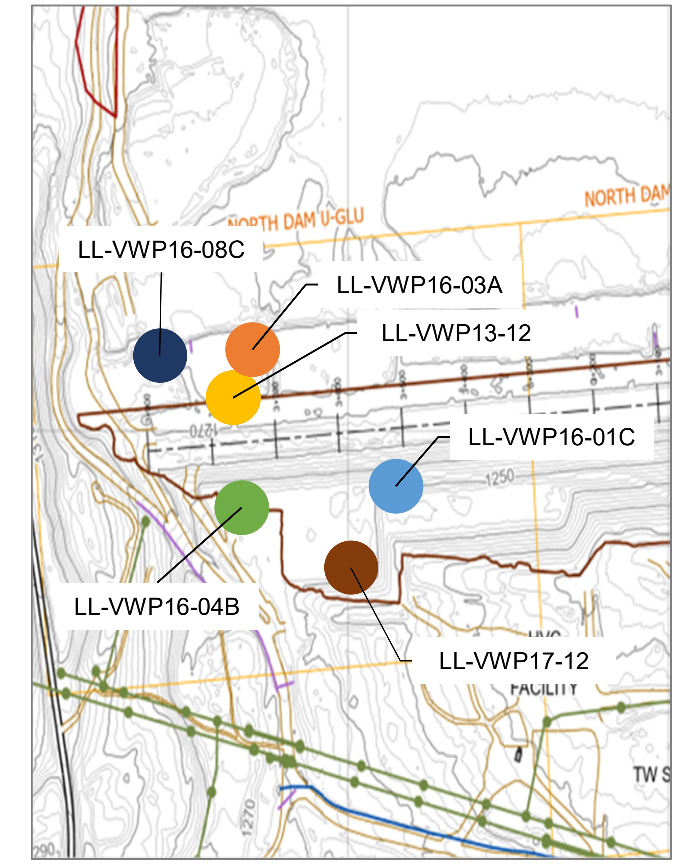


LEGEND

- LL-VWP13-12 (U-GLU)
- LL-VWP16-01C (U-GLU)
- LL-VWP16-03A (U-GLU)
- LL-VWP16-04B (U-GLU)
- LL-VWP16-08C (U-GLU)
- LL-VWP17-12 (U-GLU)
- L-L TAILINGS POND

NOTES

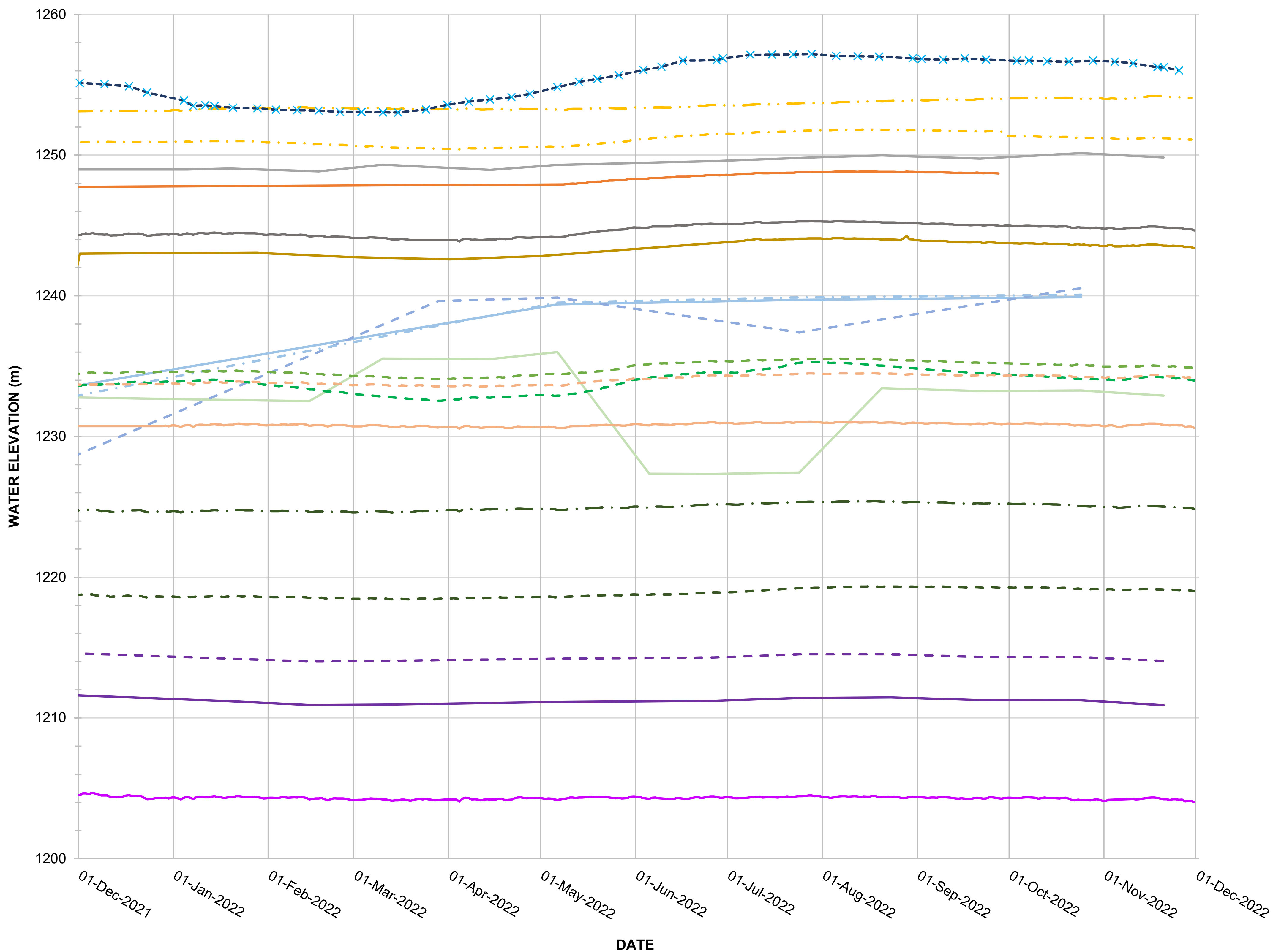
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

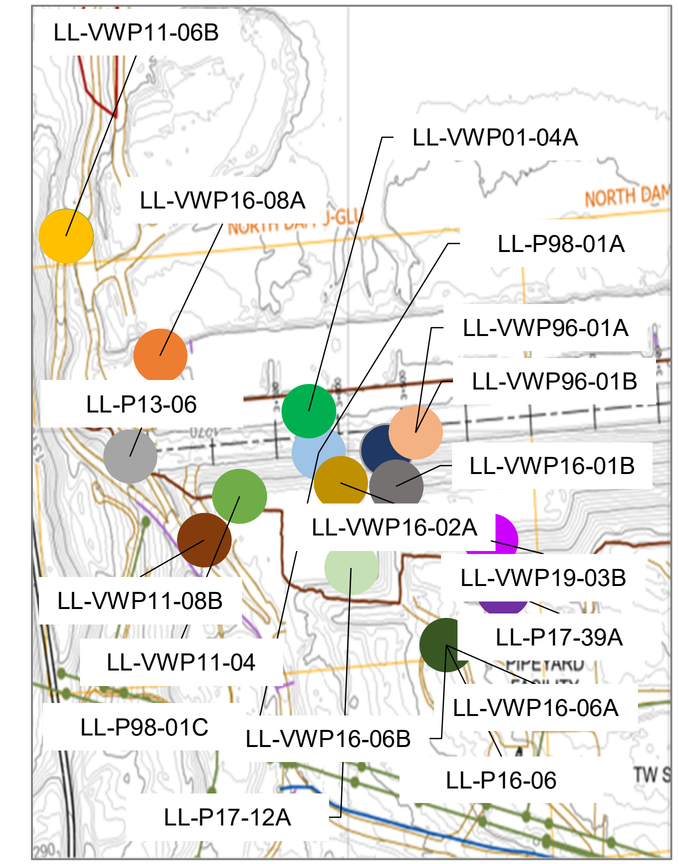
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH DAM UPPER GLACIOLACUSTRINE GLACIOLACUSTRINE DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-15

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-015-NORTH DAM UPPER GLU- GLACIOLACUSTRINE SINCE 2021.XLSX - 2023-03-28 10:23



INSET INSTRUMENT VIEW



LEGEND

- LL-P13-06 (Glacial Till)
- LL-P17-12A (Glacial Till)
- LL-P17-39A (Glacial Till)
- LL-P17-39B (Glacial Till)
- LL-P98-01A (Glacial Till)
- LL-P98-01B (Glacial Till)
- LL-P98-01C (Glacial Till)
- LL-VWP01-04A (U/S Glacial Till)
- LL-VWP11-04 (Glacial Till)
- LL-VWP11-06A (Glacial Till)
- LL-VWP11-06B (Glacial Till)
- LL-VWP16-01B (Glacial Till)
- LL-VWP16-02A (Glacial Till)
- LL-VWP16-06A (Glacial Till)
- LL-VWP16-06B (Glacial Till)
- LL-VWP16-08A (Glacial Till)
- LL-VWP19-03B (Stratified Till)
- LL-VWP96-01A (Glacial Till)
- LL-VWP96-01B (Glacial Till)
- L-L TAILINGS POND

NOTES

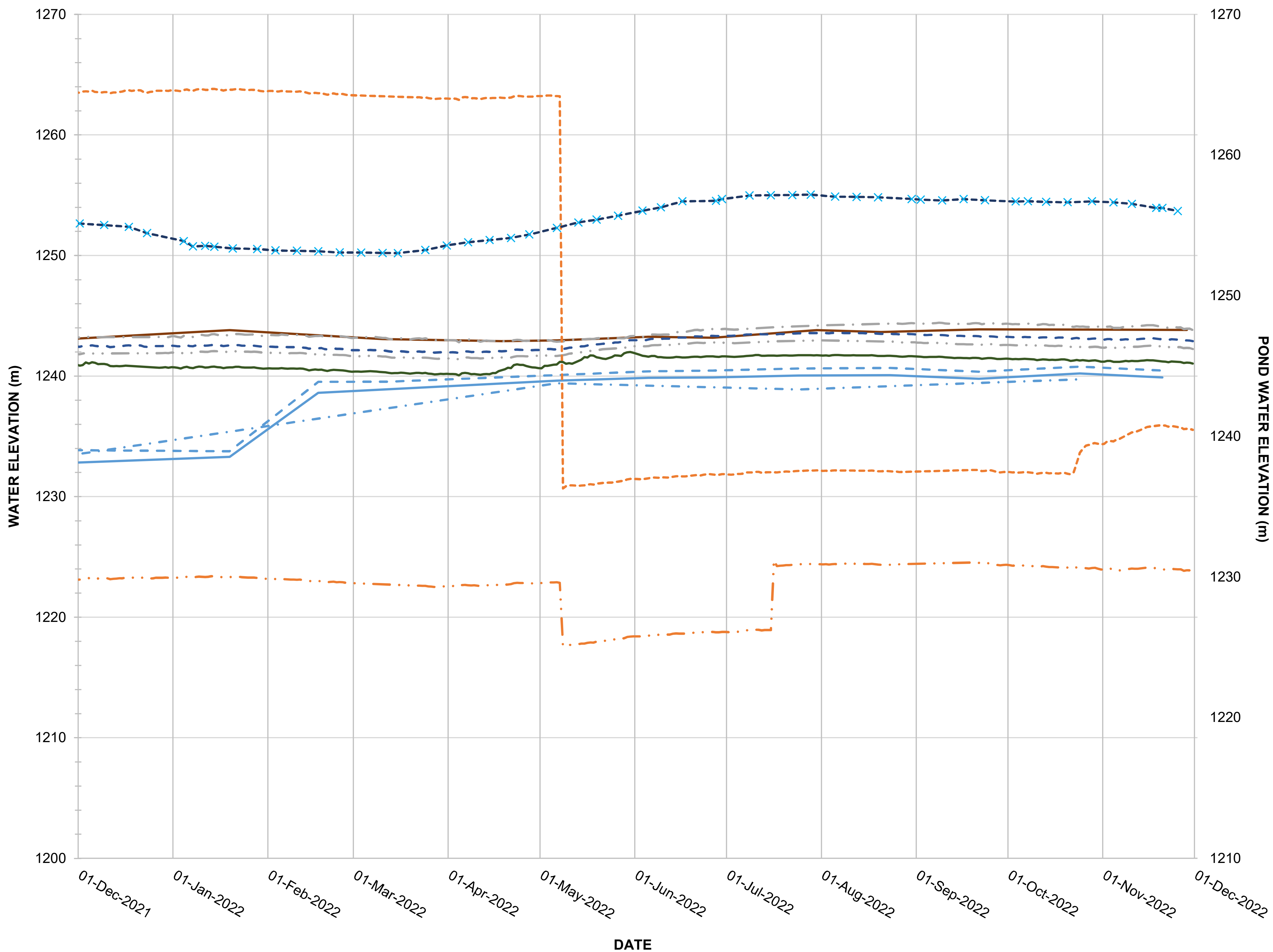
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

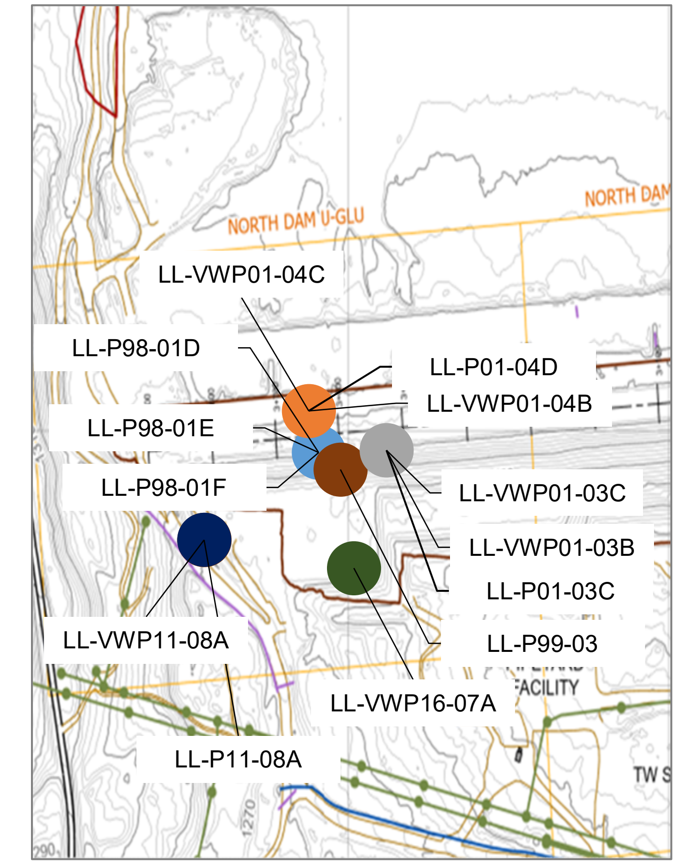
CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM NORTH DAM UPPER GLACIOLACUSTRINE GLACIAL TILL DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-16

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-016-NORTH DAM UPPER GLU- GLACIAL TILL SINCE 2021.XLSX - 2023-03-28 10:24



INSET INSTRUMENT VIEW



LEGEND

- LL-P01-03C (Sedimentary)
- LL-P01-04D (U/S Sedimentary)
- LL-P11-08A (Volcanics)
- LL-P98-01D (Volcanics)
- LL-P98-01E (Sedimentary)
- LL-P98-01F (Sedimentary)
- LL-P99-03 (Volcanics)
- LL-VWP01-03B (Sedimentary)
- LL-VWP01-03C (Sedimentary)
- LL-VWP01-04B (Sedimentary)
- LL-VWP01-04C (Sedimentary)
- LL-VWP11-08A (Volcanics)
- LL-VWP16-07A (Sedimentary)
- L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

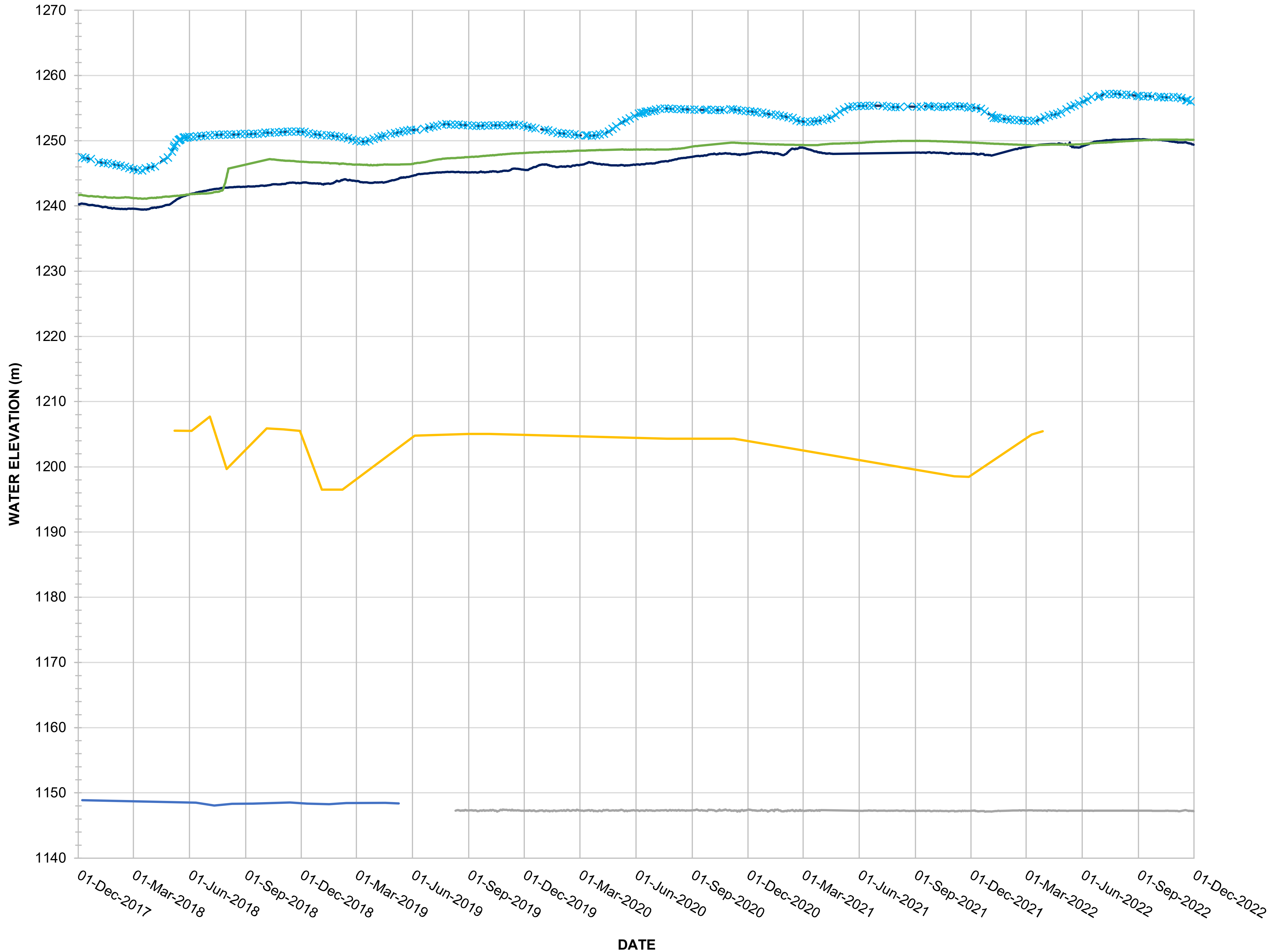
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: L-L DAM
NORTH DAM UPPER GLACIOLACUSTRINE
FOUNDATION ROCK
DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

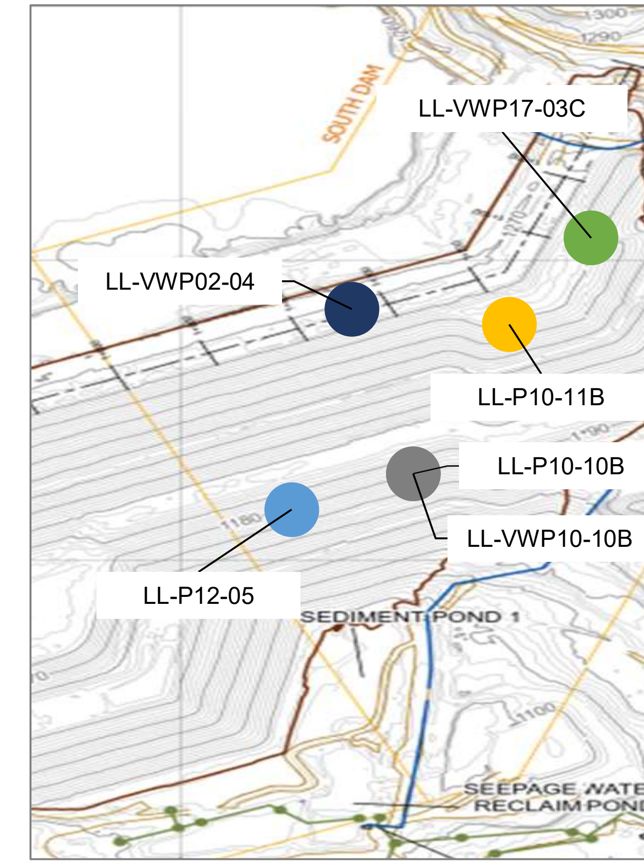
SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-17

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 APPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-017-NORTH DAM UPPER GLU- FOUNDATION ROCK SINCE2021.XLSX - 2023-03-28 10:25

L-L DAM PIEZOMETER PLOTS:
December 1, 2017 to November 30, 2022



INSET INSTRUMENT VIEW



LEGEND

- LL-P10-10B (Sand and Gravel Drain)
- LL-P10-11B (Sand Fill)
- LL-VWP02-04 (Sand Fill)
- LL-VWP10-10B (Sand and Gravel Drain)
- LL-VWP17-03C (Glacial Till)
- L-L TAILINGS POND

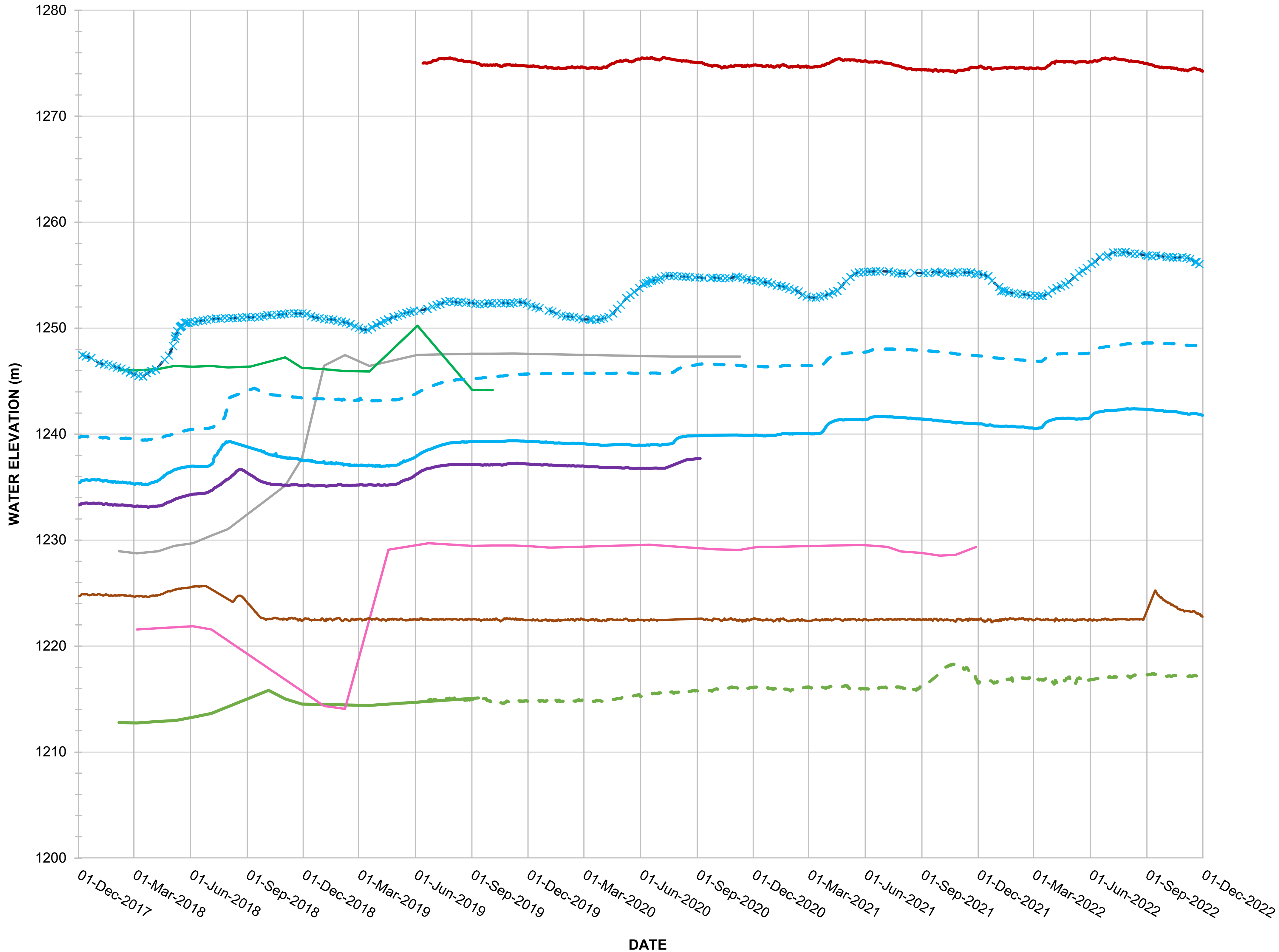
NOTES

NOT FOR CONSTRUCTION

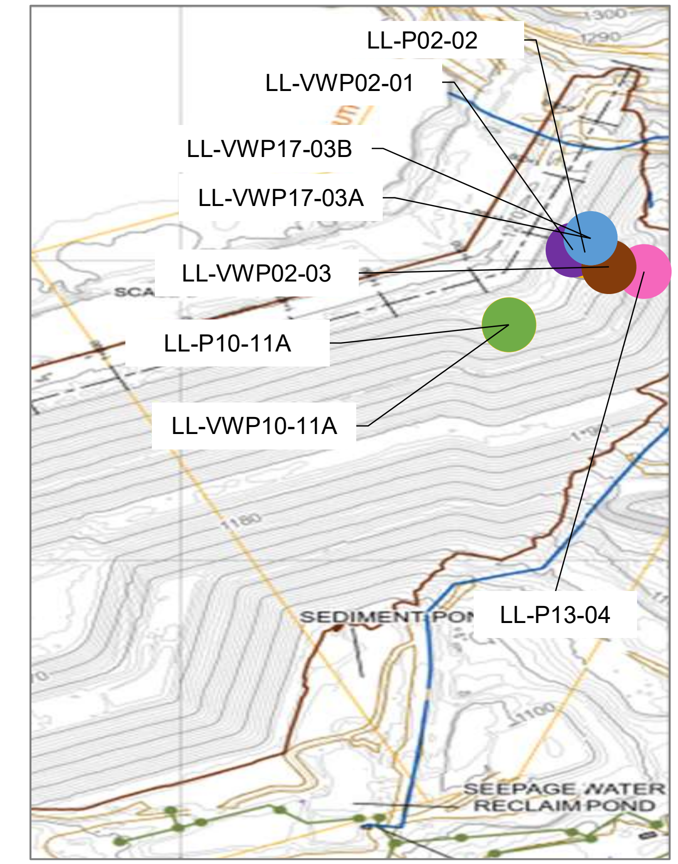
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT		
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT		
Klohn Crippen Berger	TITLE L-L DAM SOUTH DAM DAM FILL DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS		
	SCALE AS SHOWN	PROJECT No. M02341C42	FIG. No. II-A-101

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-101-SOUTH DAM-DAM FILL SINCE 2018.XLSX - 2023-03-28 10:25



INSET INSTRUMENT VIEW



LEGEND

- LL-P02-02 (Glacial Till Fill)
- LL-P10-11A (Granodiorite)
- LL-P13-04 (Granodiorite)
- LL-P86-2001 (Granodiorite)
- LL-VWP02-01 (Glacial Till Fill)
- LL-VWP02-03 (Glacial Till Fill)
- LL-VWP10-11A (Granodiorite)
- LL-VWP13-05 (Granodiorite)
- LL-VWP17-03A (Granodiorite)
- LL-VWP17-03B (Glacial Till)
- L-L TAILINGS POND

NOTES

1. LL-VWP13-05 AND LL-P86-2001 ARE LOCATED TO THE RIGHT OF THE DEPICTED INSET FIGURE.

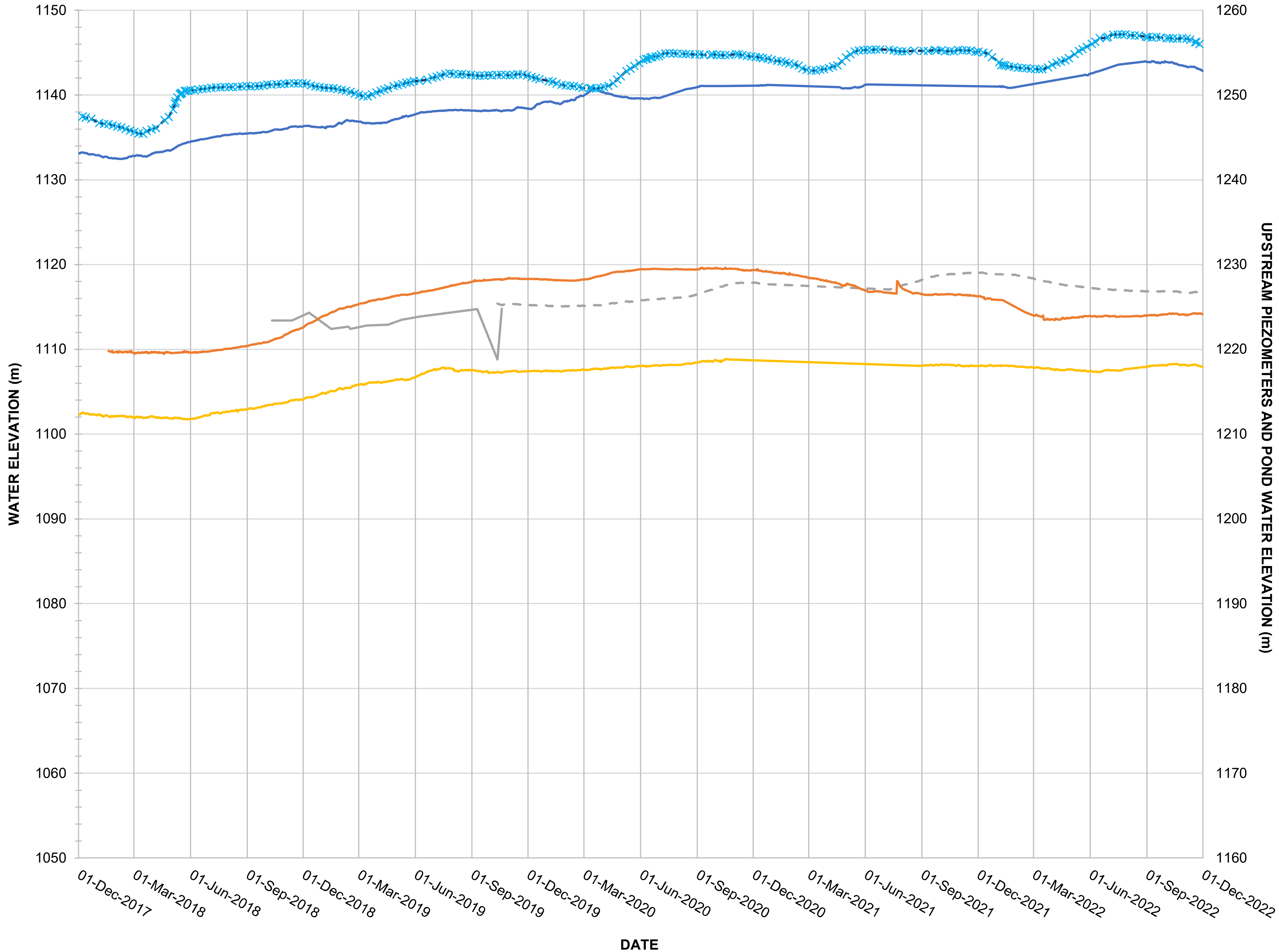
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

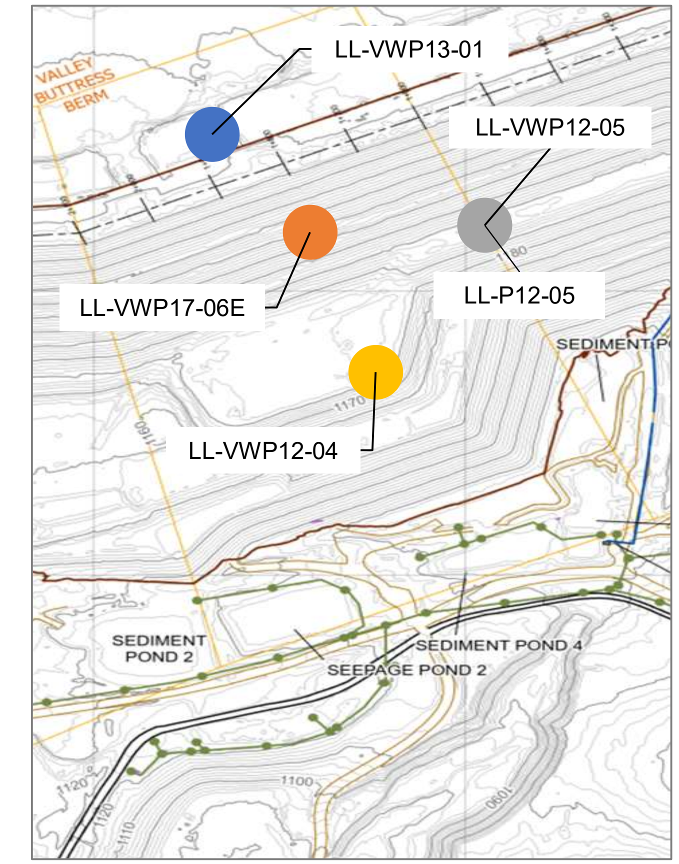
CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM SOUTH DAM GRANODIORITE, FOUNDATION ROCK, AND GLACIAL TILL DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-102

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-102-SOUTH DAM-GRANODIORITE, FOUNDATION ROCK AND GLACIAL TILL SINCE 2018.XLSX - 2023-03-28 11:38



INSET INSTRUMENT VIEW



LEGEND

- LL-P12-05 (Sand Fill)
- LL-VWP12-04 (Sand Fill)
- LL-VWP12-05 (Sand Fill)
- LL-VWP17-06E (Sand and Gravel Drainage Blanket)
- LL-VWP13-01 (U/S Dam Fill)
- L-L TAILINGS POND

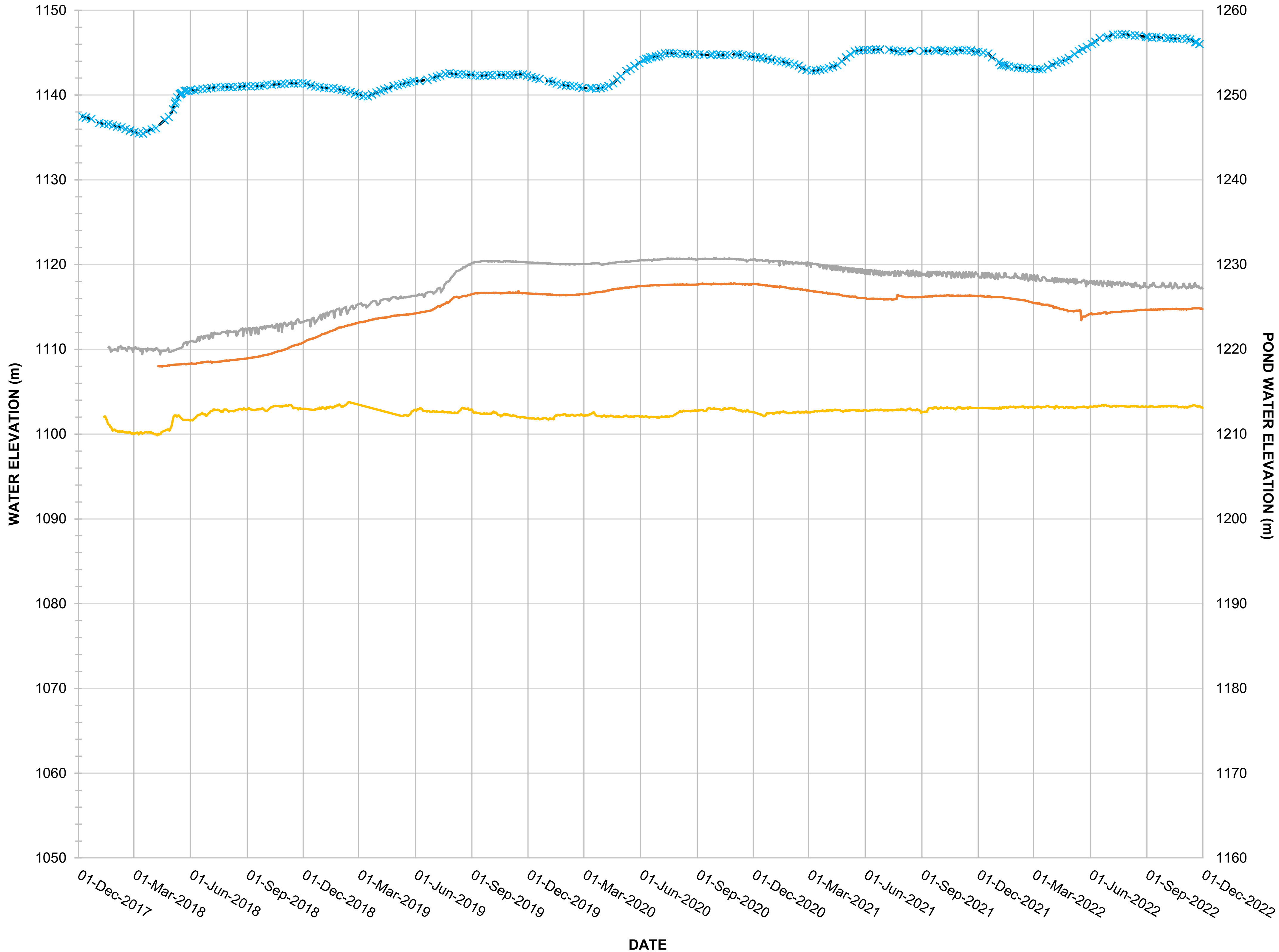
NOTES

NOT FOR CONSTRUCTION

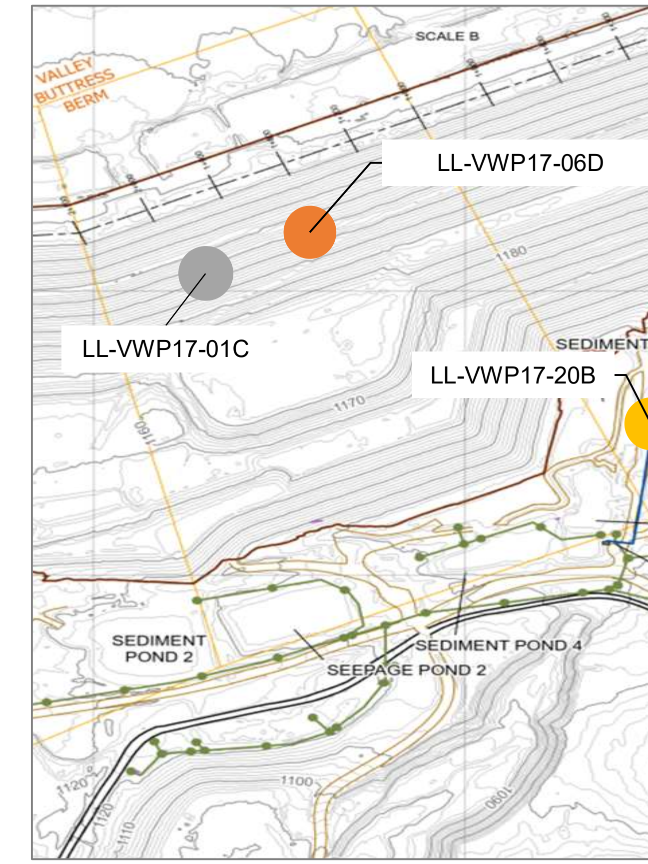
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM VALLEY BUTTRESS BERM DAM FILL DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS
SCALE: AS SHOWN	PROJECT No. M02341C42
FIG. No. II-A-103	

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-103-VBB-DAM FILL SINCE 2018.XLSX - 2023-03-28 10:27



INSET INSTRUMENT VIEW



LEGEND

- LL-VWP17-01C (Lacustrine)
- LL-VWP17-06D (Lacustrine)
- LL-VWP17-20B (Lacustrine)
- L-L TAILINGS POND

NOTES

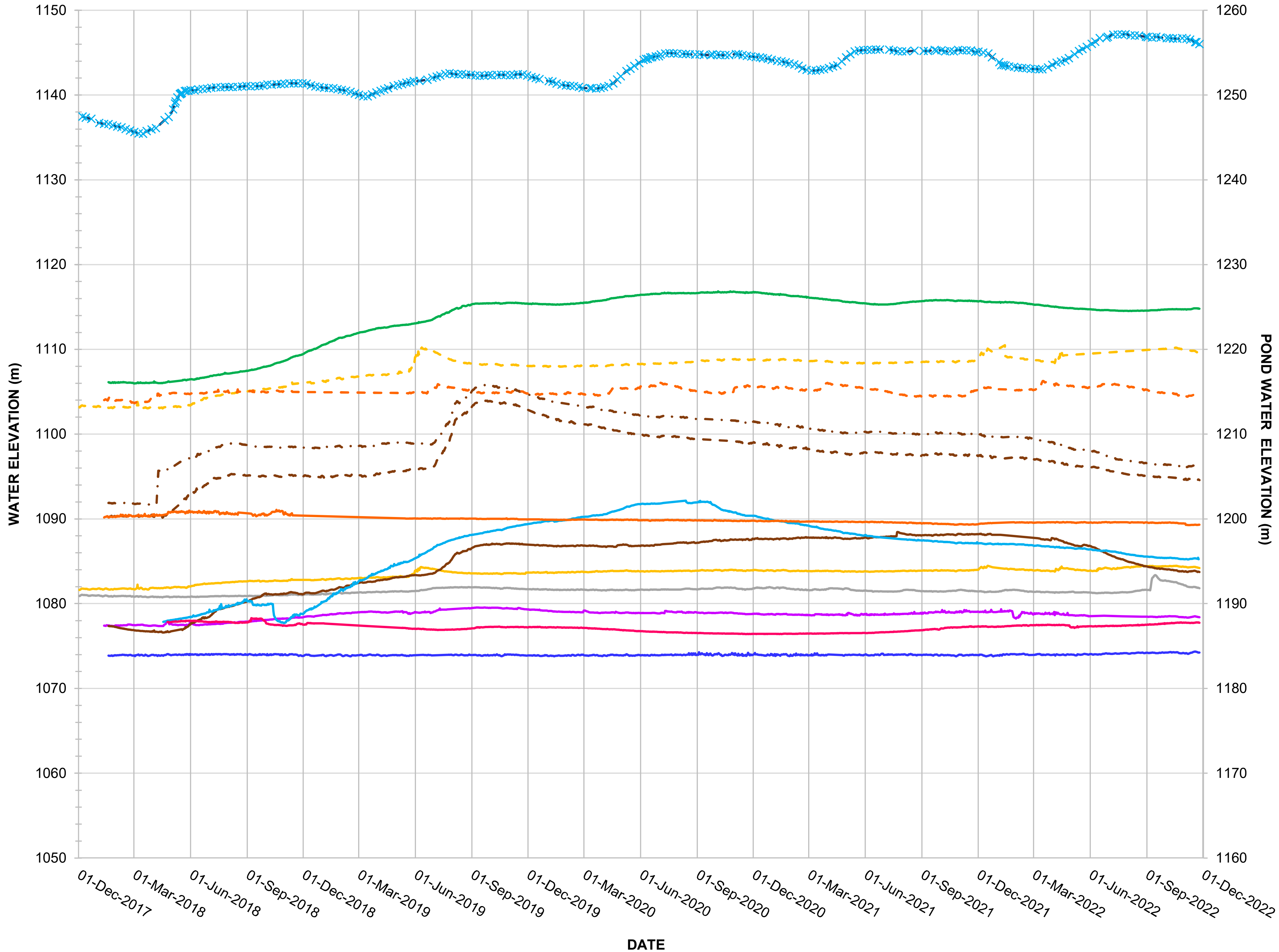
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

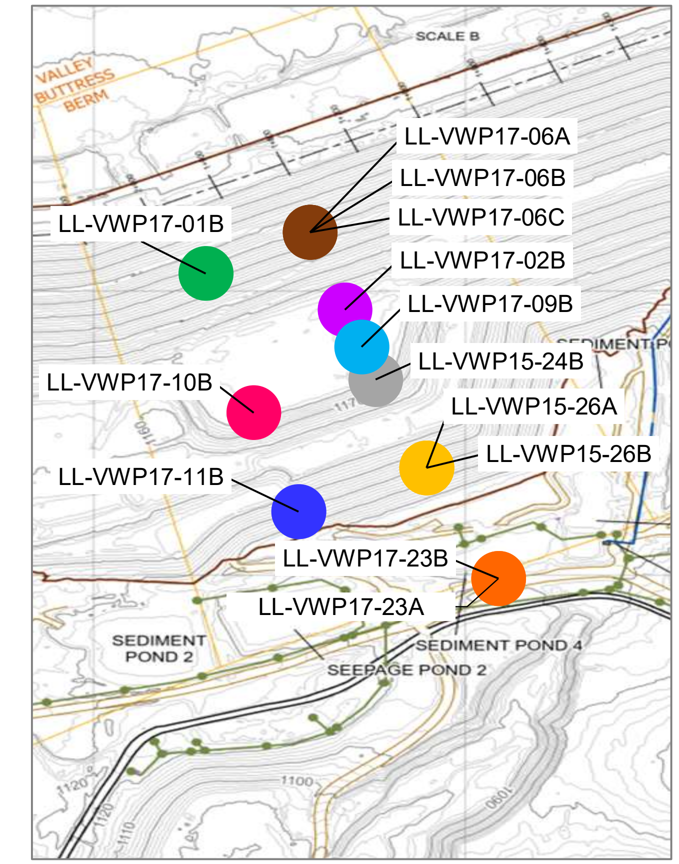
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM VALLEY BUTTRESS BERM LACUSTRINE DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-104

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-104-VBB-LACUSTRINE SINCE 2018.XLSX - 2023-03-28 10:27



INSET INSTRUMENT VIEW



LEGEND

- LL-VWP15-24B (L-GLU)
- LL-VWP15-26A (L-GLU)
- LL-VWP15-26B (U-GLU)
- LL-VWP17-01B (L-GLU)
- LL-VWP17-02B (L-GLU)
- LL-VWP17-06A (LSG and L-GLU Contact)
- LL-VWP17-06B (L-GLU)
- LL-VWP17-06C (GT and L-GLU Contact)
- LL-VWP17-09B (L-GLU)
- LL-VWP17-10B (L-GLU)
- LL-VWP17-11B (L-GLU)
- LL-VWP17-23A (L-GLU)
- LL-VWP17-23B (U-GLU)
- L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

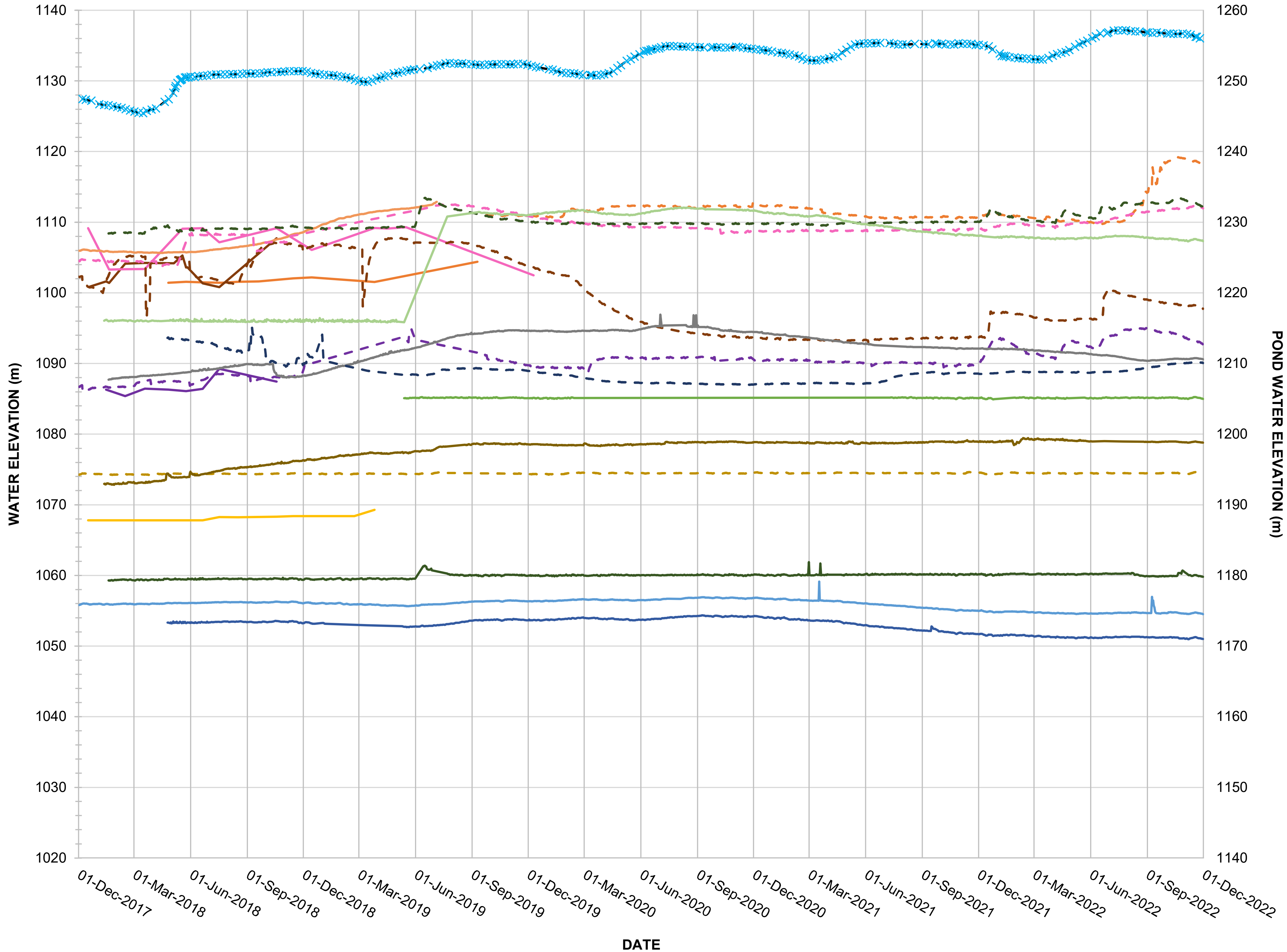
CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

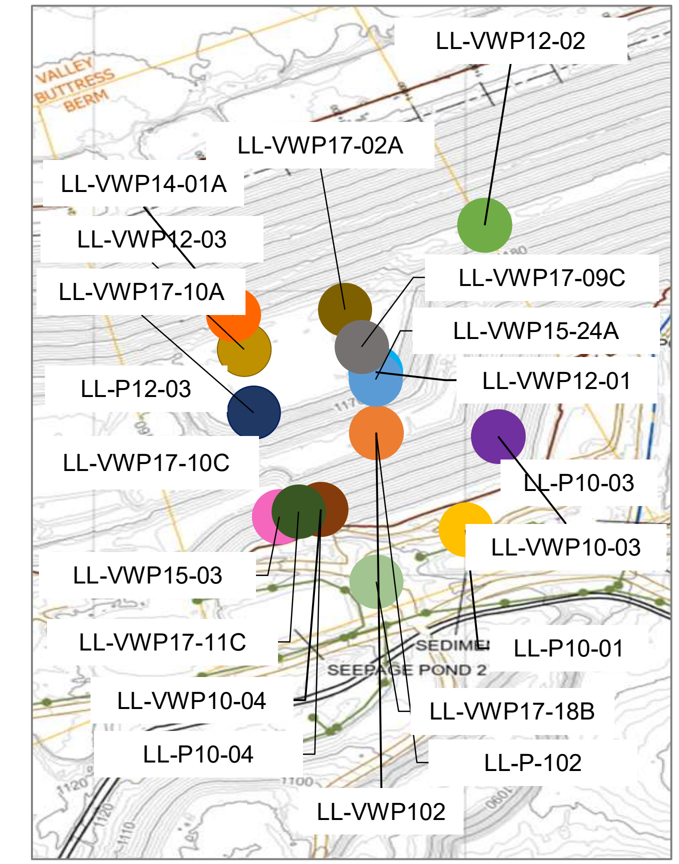
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: L-L DAM
VALLEY BUTTRESS BERM
GLACIOLACUSTRINE
DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-105



INSET INSTRUMENT VIEW



LEGEND

LL-P-102 (Glacial Till)	LL-P10-01 (LSG)
LL-P10-03 (Glacial Till)	LL-P10-04 (Glacial Till)
LL-P12-03 (Glacial Till)	LL-P15-03 (Glacial Till)
LL-VWP10-03 (Glacial Till)	LL-VWP10-04 (Glacial Till)
LL-VWP102 (Glacial Till)	LL-VWP12-02 (Glacial Till)
LL-VWP12-03 (Glacial Till)	LL-VWP14-01A
LL-VWP15-03 (Glacial Till)	LL-VWP15-24A (LSG)
LL-VWP17-02A (LSG)	LL-VWP17-09C (Glacial Till)
LL-VWP17-10A (Glacial Till)	LL-VWP17-10C (Glacial Till)
LL-VWP17-11A (LSG)	LL-VWP17-11C (Glacial Till)
LL-VWP17-18B (Glacial Till)	L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

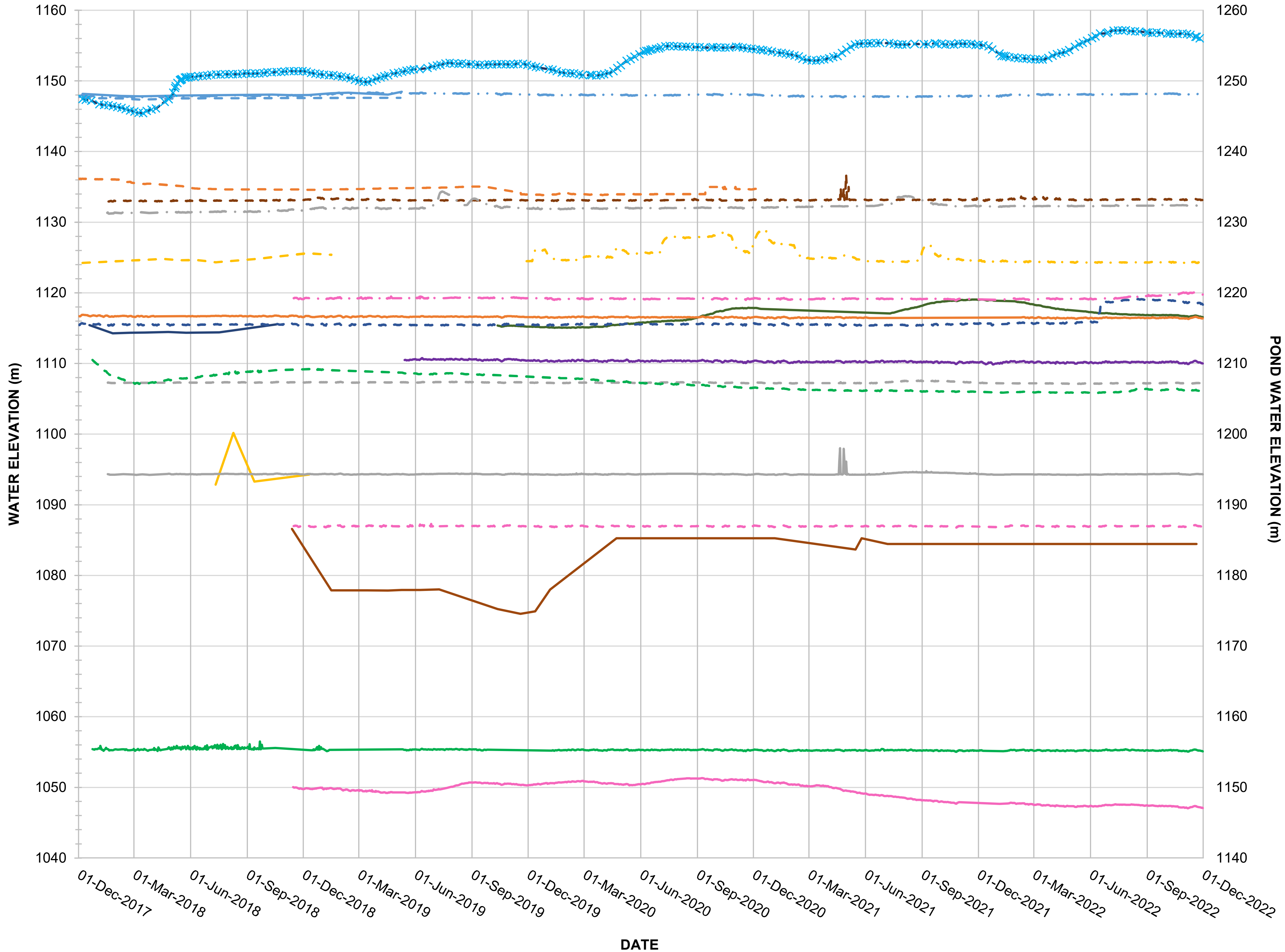
Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

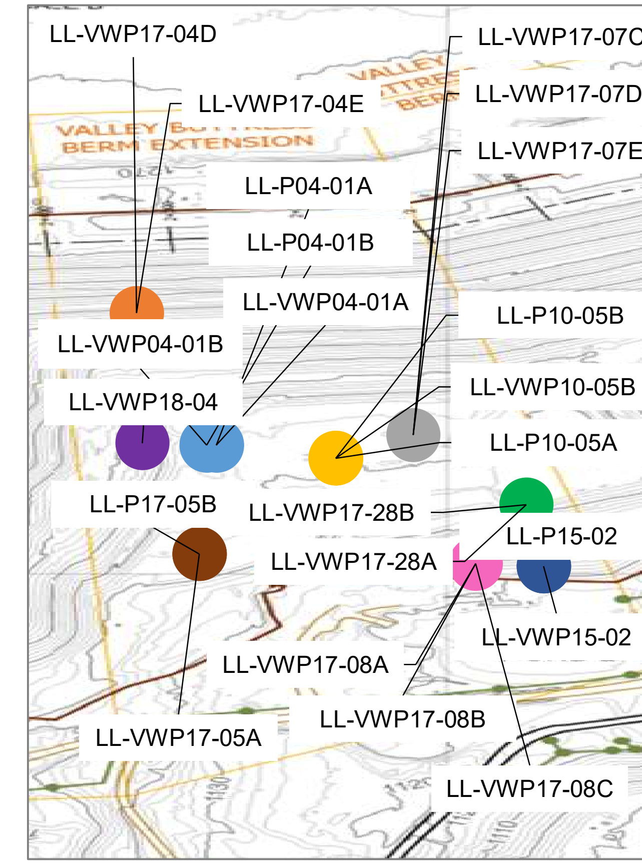
TITLE: L-L DAM
VALLEY BUTTRESS BERM
GLACIAL TILL, SAND AND GRAVEL
DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-106

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-106-VBB-GLACIAL TILL, SAND AND GRAVEL SINCE 2018 .XLSX - 2023-03-28 10:29



INSET INSTRUMENT VIEW



LEGEND

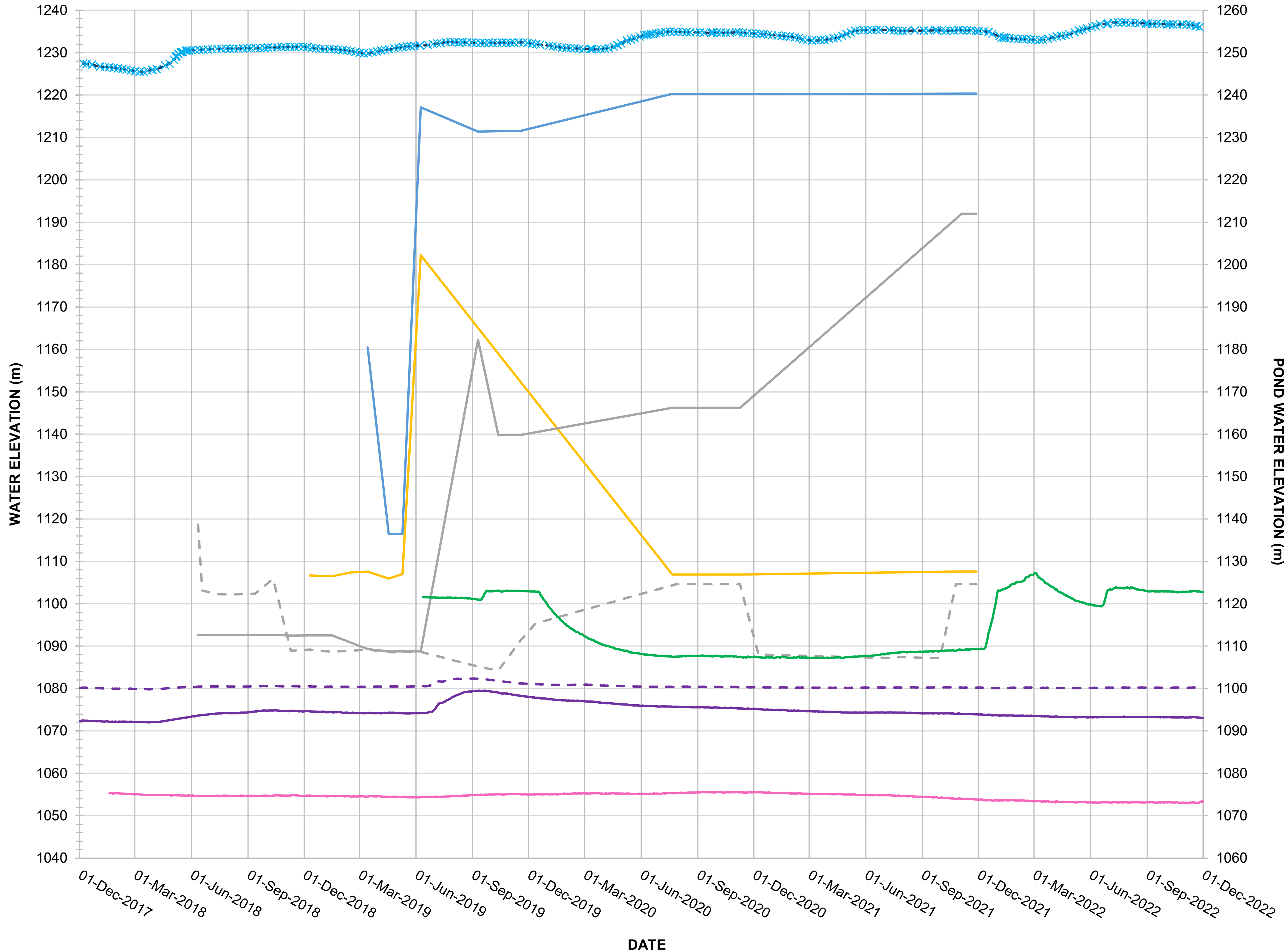
- LL-P04-01A
- LL-P04-01B
- LL-P10-05A (LSG)
- LL-P10-05B (LSG)
- LL-P15-02 (Glacial Till)
- LL-P17-05B (LSG)
- LL-VWP04-01A (Glacial Till)
- LL-VWP04-01B (Sand and Gravel)
- LL-VWP10-05B (LSG)
- LL-VWP12-05
- LL-VWP15-02 (Glacial Till)
- LL-VWP17-04D (LSG)
- LL-VWP17-04E
- LL-VWP17-05A (Glacial Till)
- LL-VWP17-07C (LSG)
- LL-VWP17-07D (Glacial Till)
- LL-VWP17-07E
- LL-VWP17-08A (Glacial Till)
- LL-VWP17-08B (LSG)
- LL-VWP17-08C (Glacial Till)
- LL-VWP17-28A (LSG)
- LL-VWP17-28B (Glacial Till)
- LL-VWP18-04 (Gravel)
- L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT		
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT		
Klohn Crippen Berger	TITLE L-L DAM VALLEY BUTTRESS BERM EXTENSION OVERBURDEN AND DAM FILL DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS		
	SCALE AS SHOWN	PROJECT No. M02341C42	FIG. No. II-A-107



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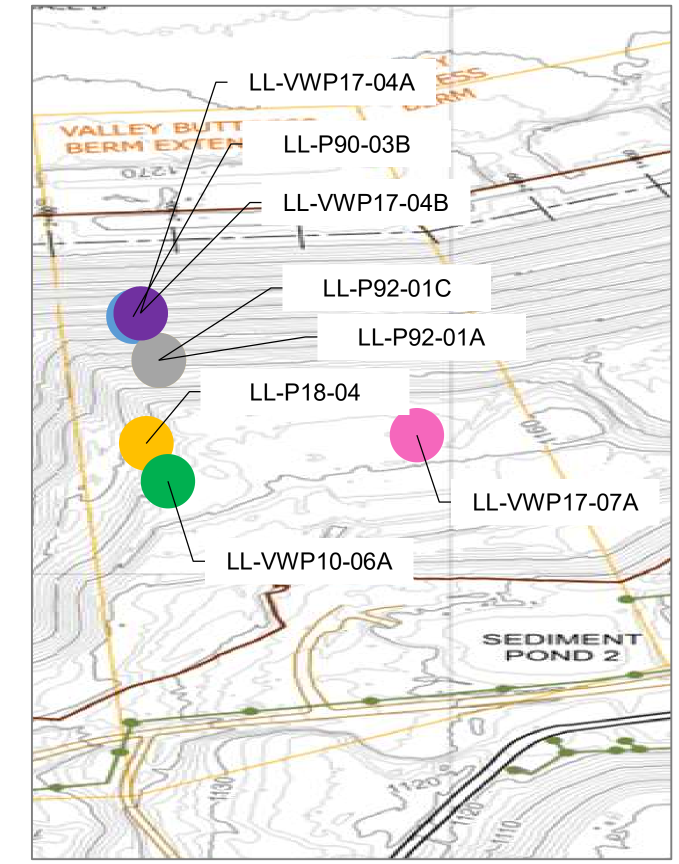


LEGEND

- LL-P18-04 (Gravel)
- LL-P90-03B (Weathered Volcanics)
- LL-P92-01A (Sedimentary)
- LL-P92-01C (Sedimentary)
- LL-VWP10-06A (Sedimentary)
- LL-VWP17-04A (Conglomerate)
- LL-VWP17-04B (Conglomerate)
- LL-VWP17-07A (Granodiorite)
- L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

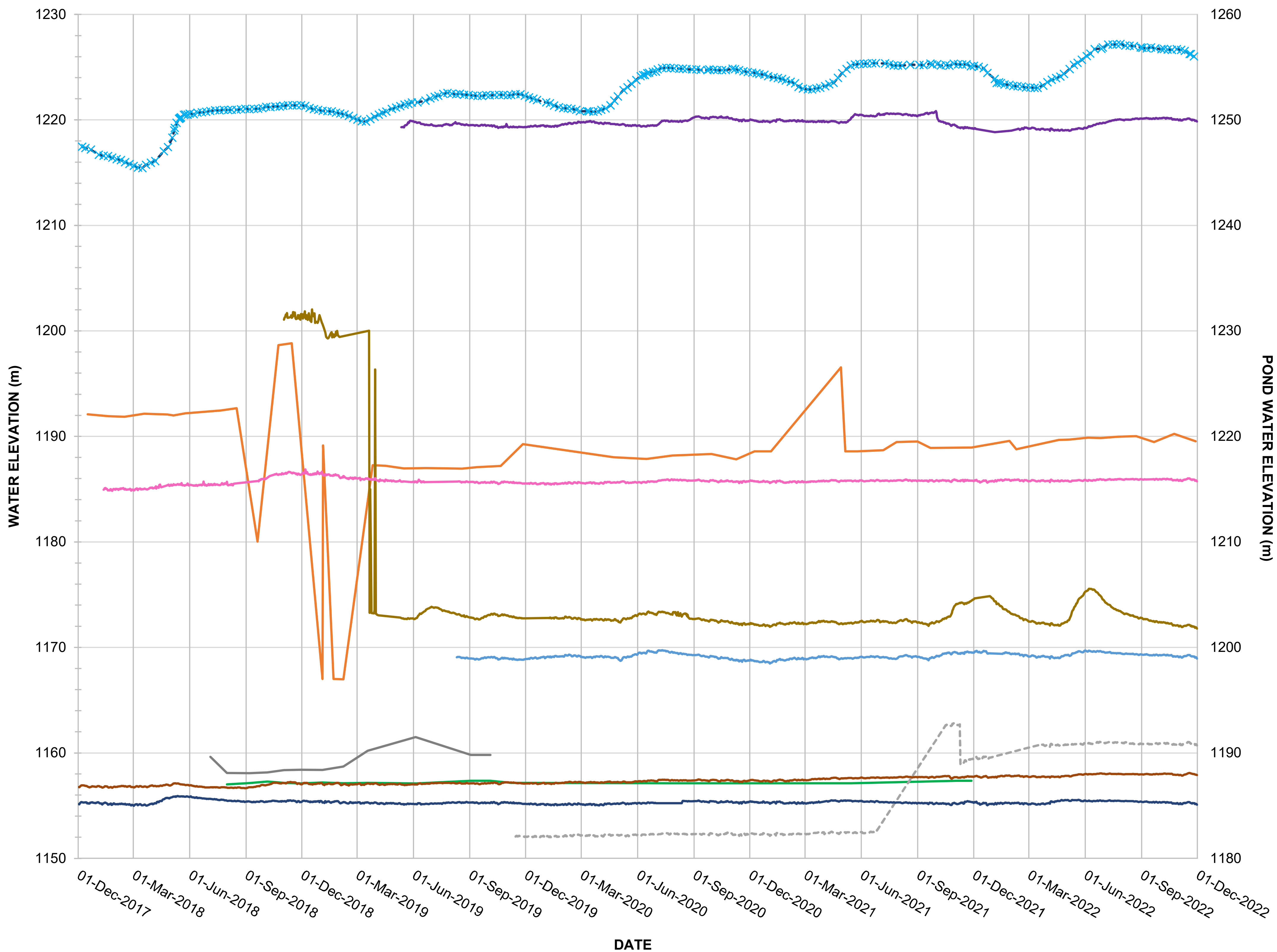
Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

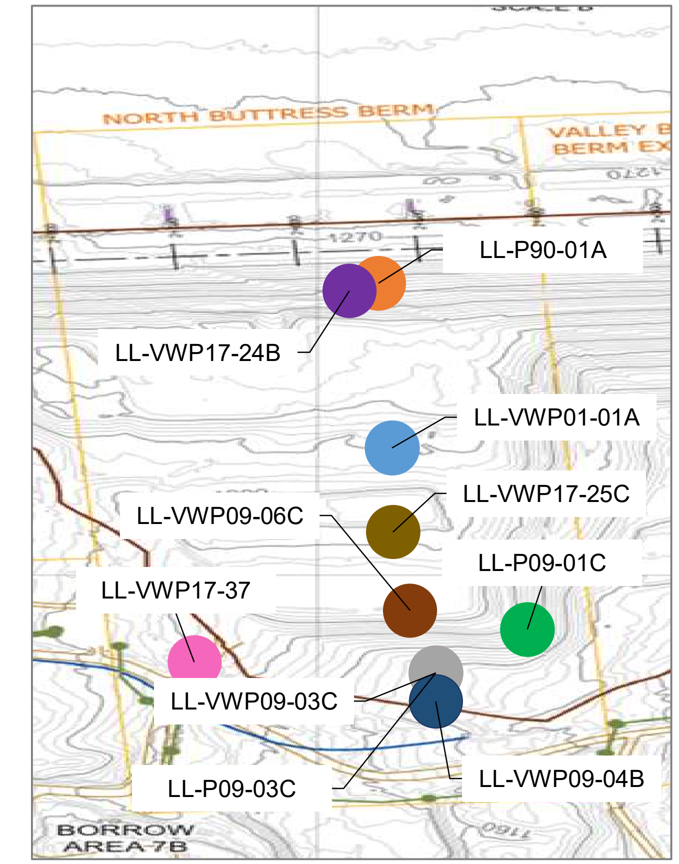
TITLE: L-L DAM
VALLEY BUTTRESS BERM EXTENSION
FOUNDATION ROCK
DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-108

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-108-VBBE-FOUNDATION ROCK SINCE 2018.XLSX - 2023-03-28 10:30



INSET INSTRUMENT VIEW



LEGEND

- LL-P09-01C (Glacial Till)
- LL-P09-03C (GLU)
- LL-P90-01A (Glacial Till)
- LL-VWP01-01A (Glacial Till)
- LL-VWP09-03C (GLU)
- LL-VWP09-04B (GLU)
- LL-VWP09-06C (Glacial Till)
- LL-VWP17-24B (Glacial Till)
- LL-VWP17-25C (Glacial Till)
- LL-VWP17-37 (Glacial Till)
- L-L TAILINGS POND

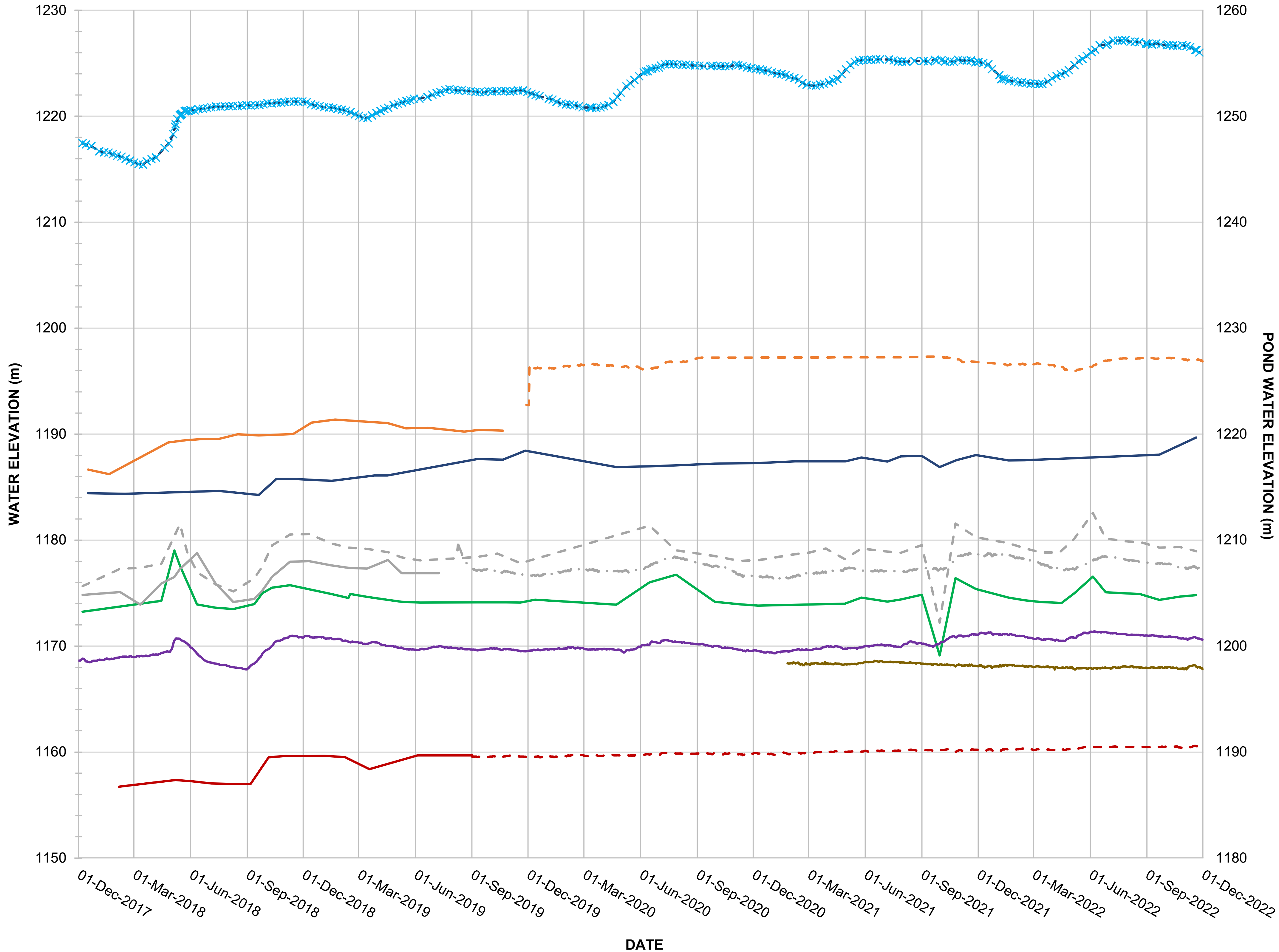
NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM NORTH BUTTRESS BERM OVERBURDEN DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-109



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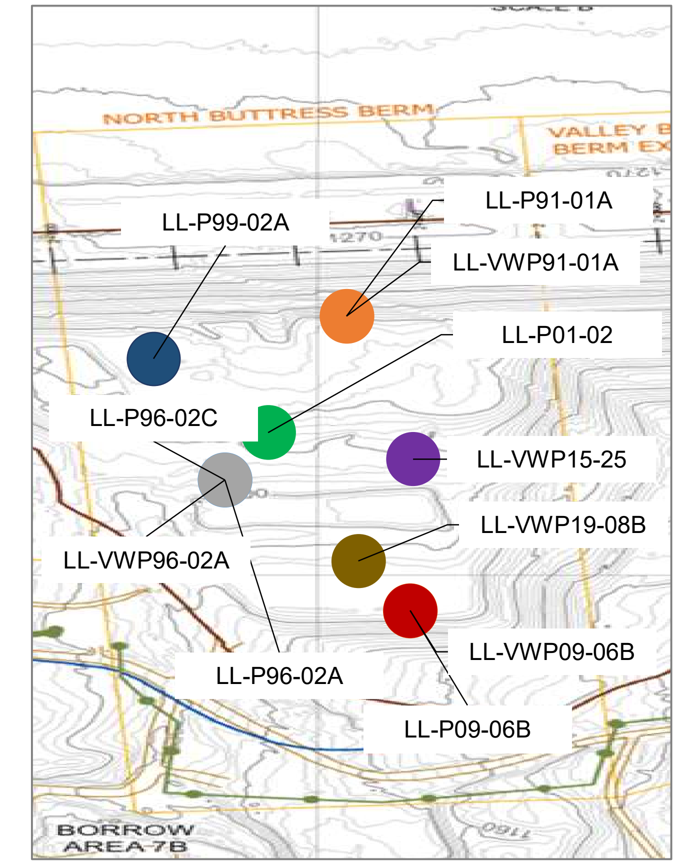


LEGEND

- LL-P01-02
- LL-P09-06B
- LL-P91-01A
- LL-P96-02A
- LL-P96-02C
- LL-P99-02A
- LL-VWP09-06B
- LL-VWP15-25
- LL-VWP19-08B
- LL-VWP91-01A
- LL-VWP96-02A
- L-L TAILINGS POND

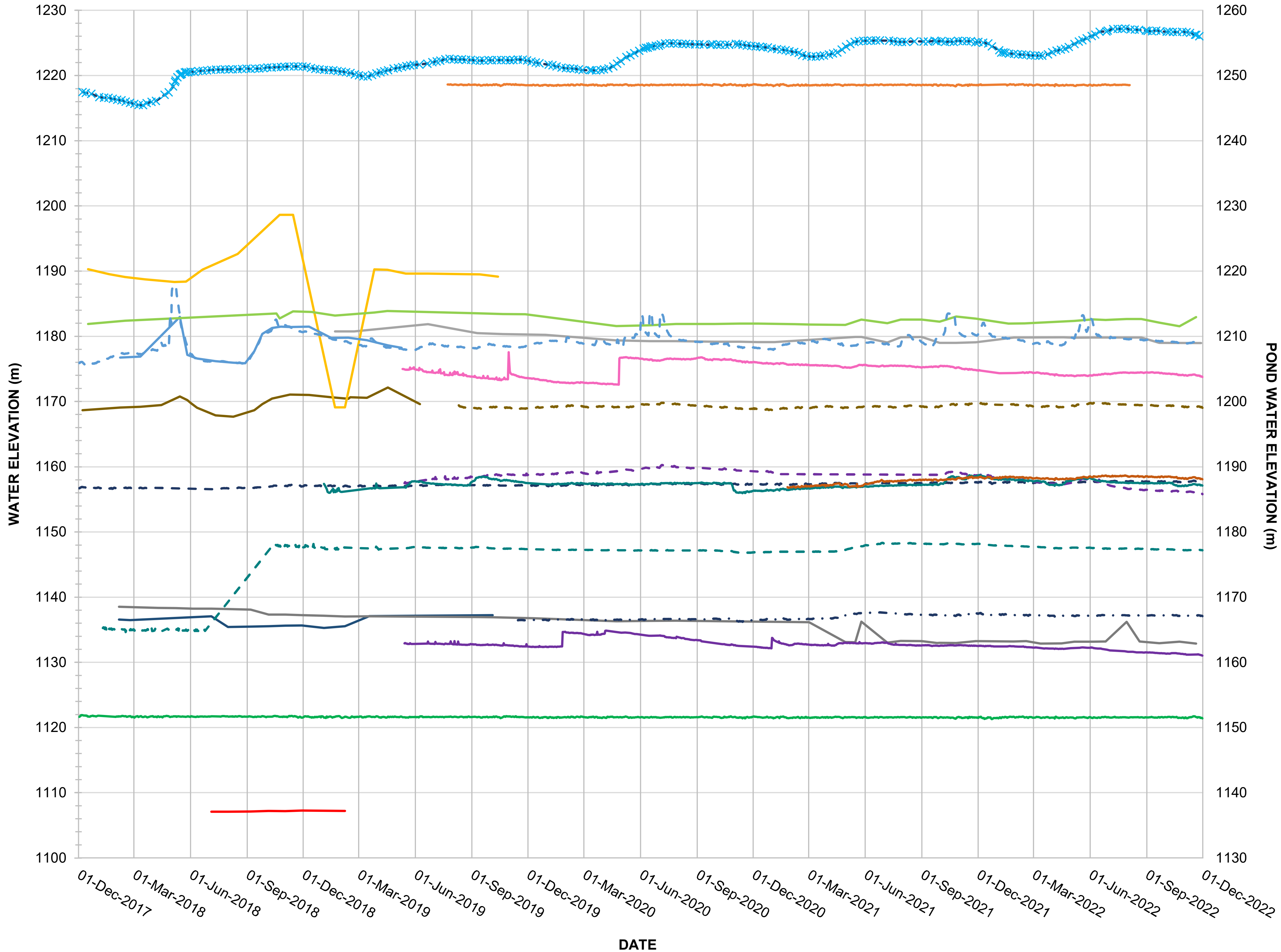
NOTES

NOT FOR CONSTRUCTION

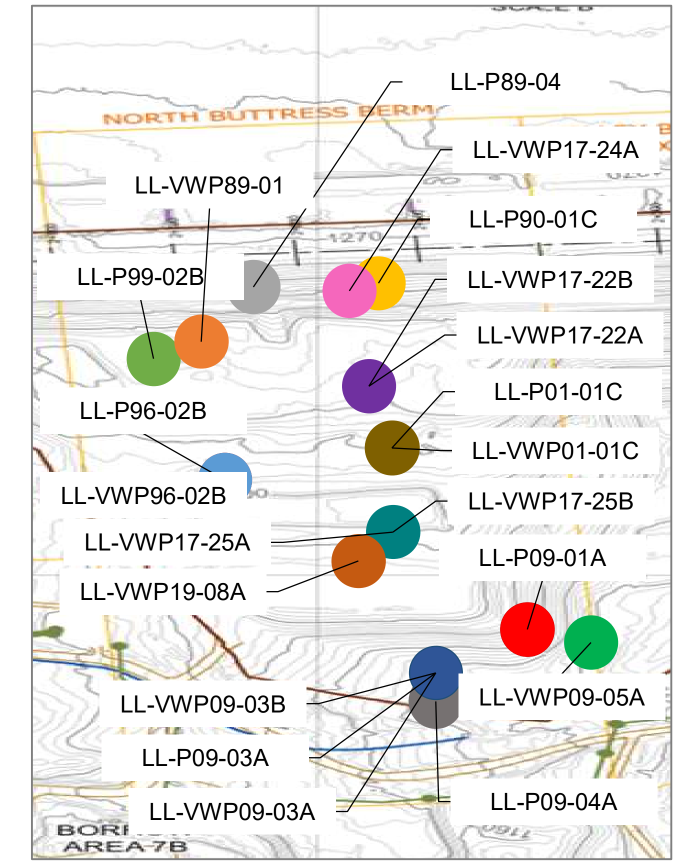
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH BUTTRESS BERM VOLCANICS DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-110



INSET INSTRUMENT VIEW



LEGEND

- LL-P01-01C (Lower Sedimentary)
- LL-P09-01A (Sedimentary)
- LL-P09-03A (Sedimentary)
- LL-P09-04A (Sedimentary)
- LL-P89-04 (Sedimentary)
- LL-P90-01C (Sedimentary)
- LL-P96-02B (Conglomerate)
- LL-P99-02B (Lower Sedimentary)
- LL-VWP01-01C (Lower Sedimentary)
- LL-VWP09-03A (Sedimentary)
- LL-VWP09-03B (Sedimentary)
- LL-VWP09-05A (Sedimentary)
- LL-VWP17-22A (Sedimentary)
- LL-VWP17-22B (Mudstone Breccia)
- LL-VWP17-24A (Mudstone Breccia)
- LL-VWP17-25A (Mudstone)
- LL-VWP17-25B (Sandstone)
- LL-VWP19-08A (Mudstone)
- LL-VWP89-01 (Sedimentary)
- LL-VWP96-02B (Conglomerate)
- L-L TAILINGS POND

NOTES

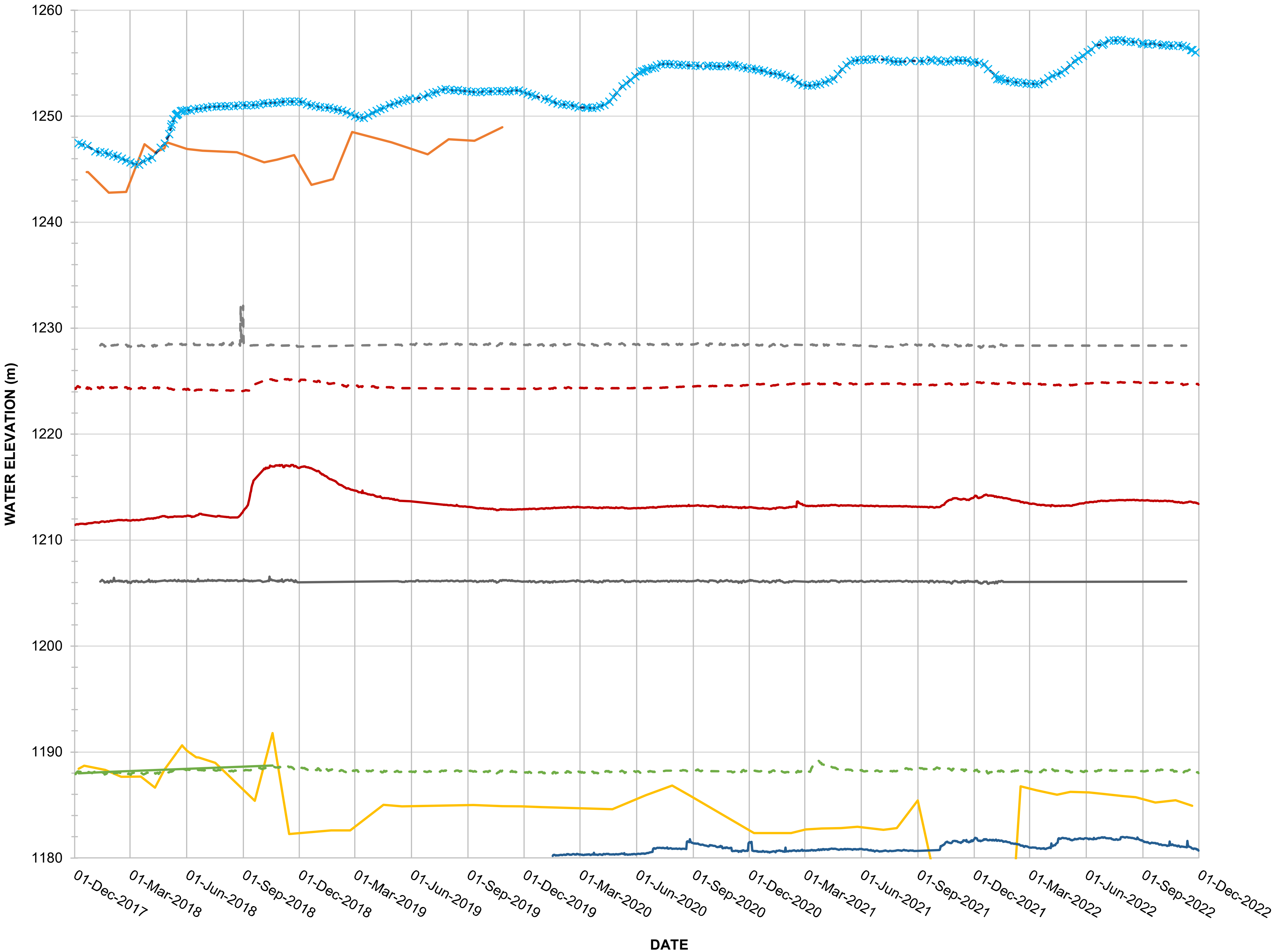
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

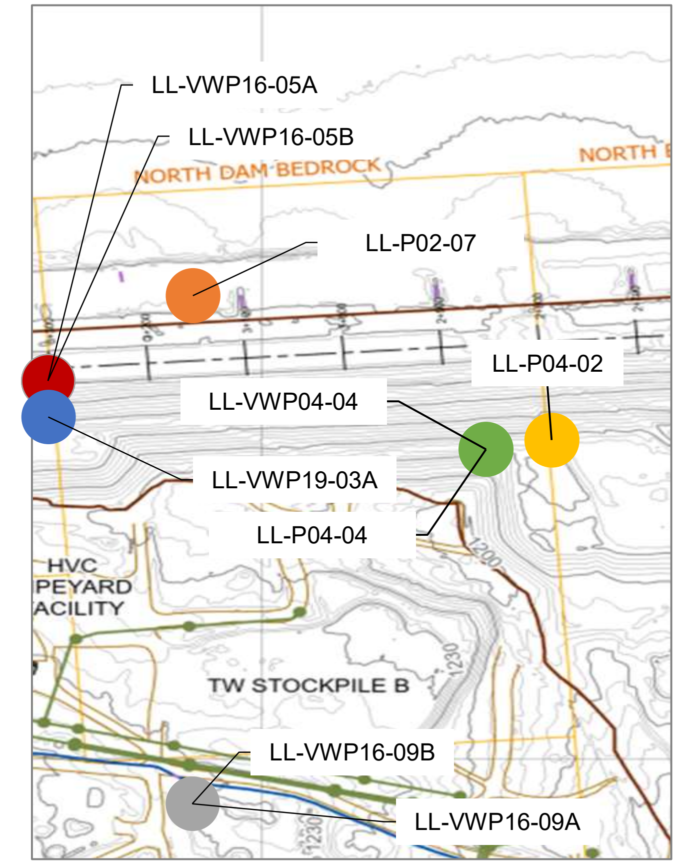
CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH BUTTRESS BERM SEDIMENTARY DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-111

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-111-NBB-SEDIMENTARY SINCE 2018.XLSX - 2023-03-28 10:33



INSET INSTRUMENT VIEW



LEGEND

- LL-P02-07 (U/S Sand Fill)
- LL-P04-02 (Glacial Till)
- LL-P04-04 (Glacial Till)
- LL-VWP04-04 (Glacial Till)
- LL-VWP16-05A (Glacial Till)
- LL-VWP16-05B (U-GLU)
- LL-VWP16-09A (Glacial Till)
- LL-VWP16-09B (Glacial Till)
- LL-VWP19-03A (Stratified Till)
- L-L TAILINGS POND

NOTES

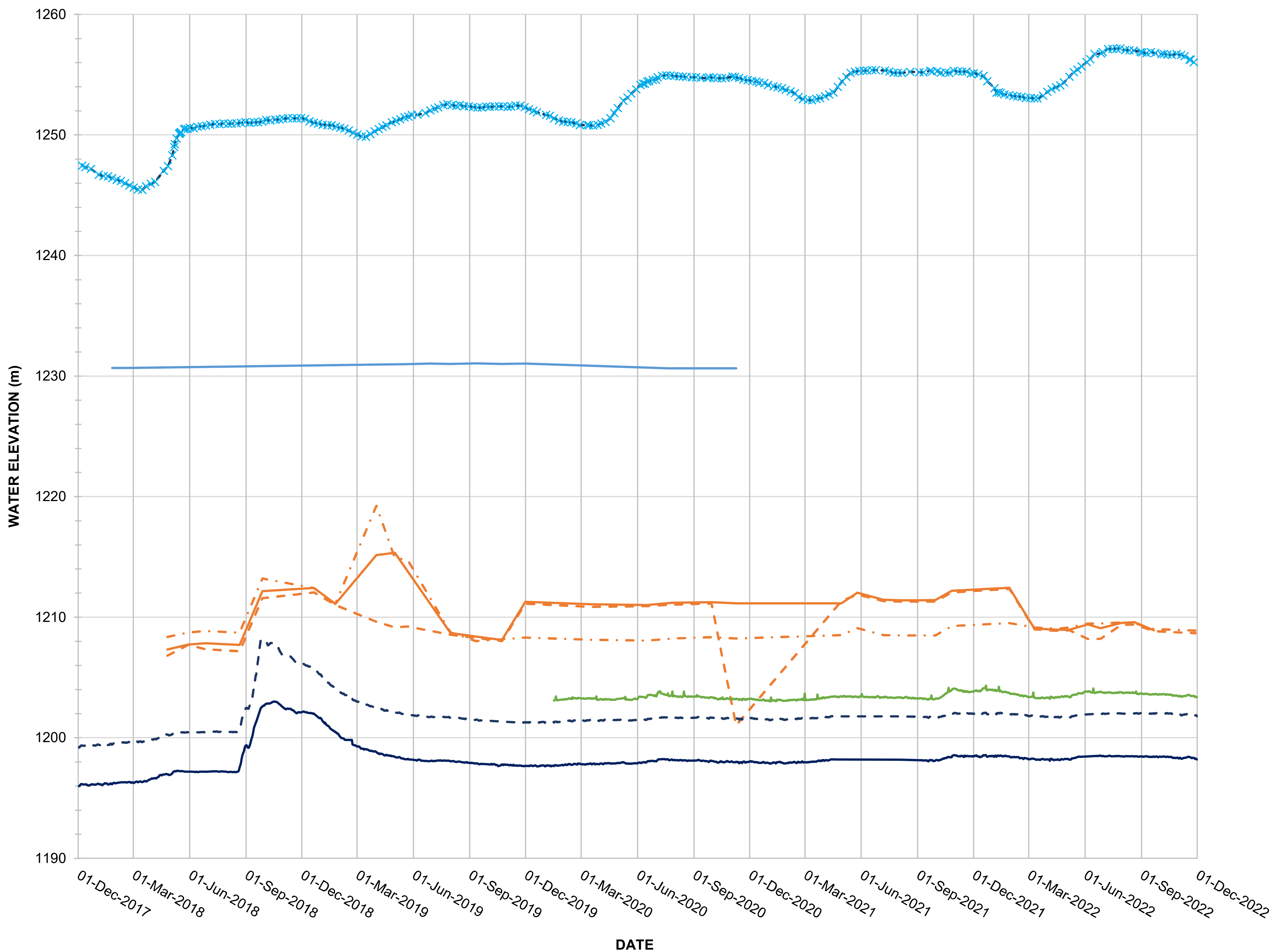
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

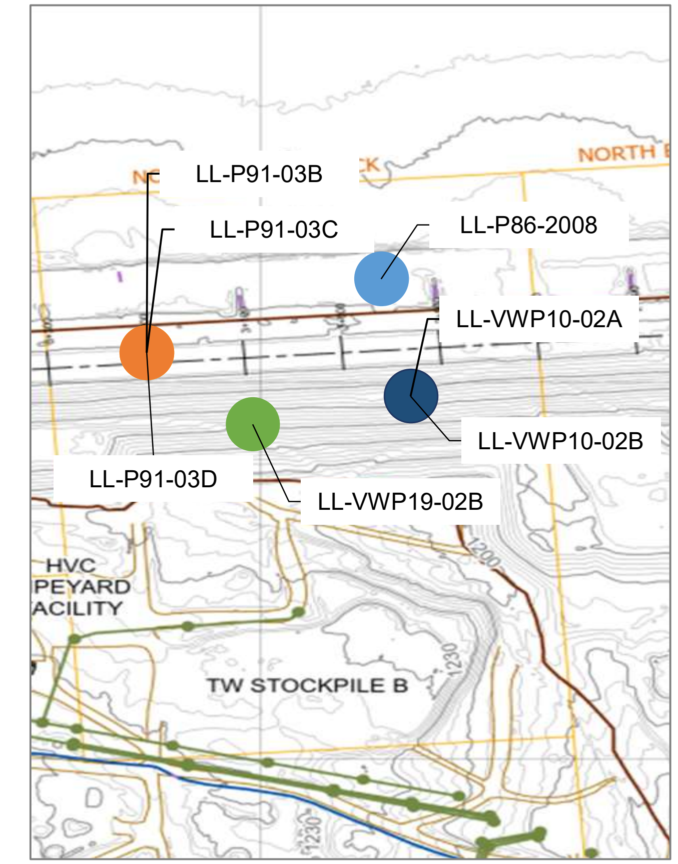
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH DAM BEDROCK GLACIAL TILL, SAND, AND UPPER GLU DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-112

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-112-NORTH DAM BEDROCK-GLACIAL TILL, SAND AND UPPER GLU SINCE 2018.XLSX - 2023-03-28 10:34



INSET INSTRUMENT VIEW



LEGEND

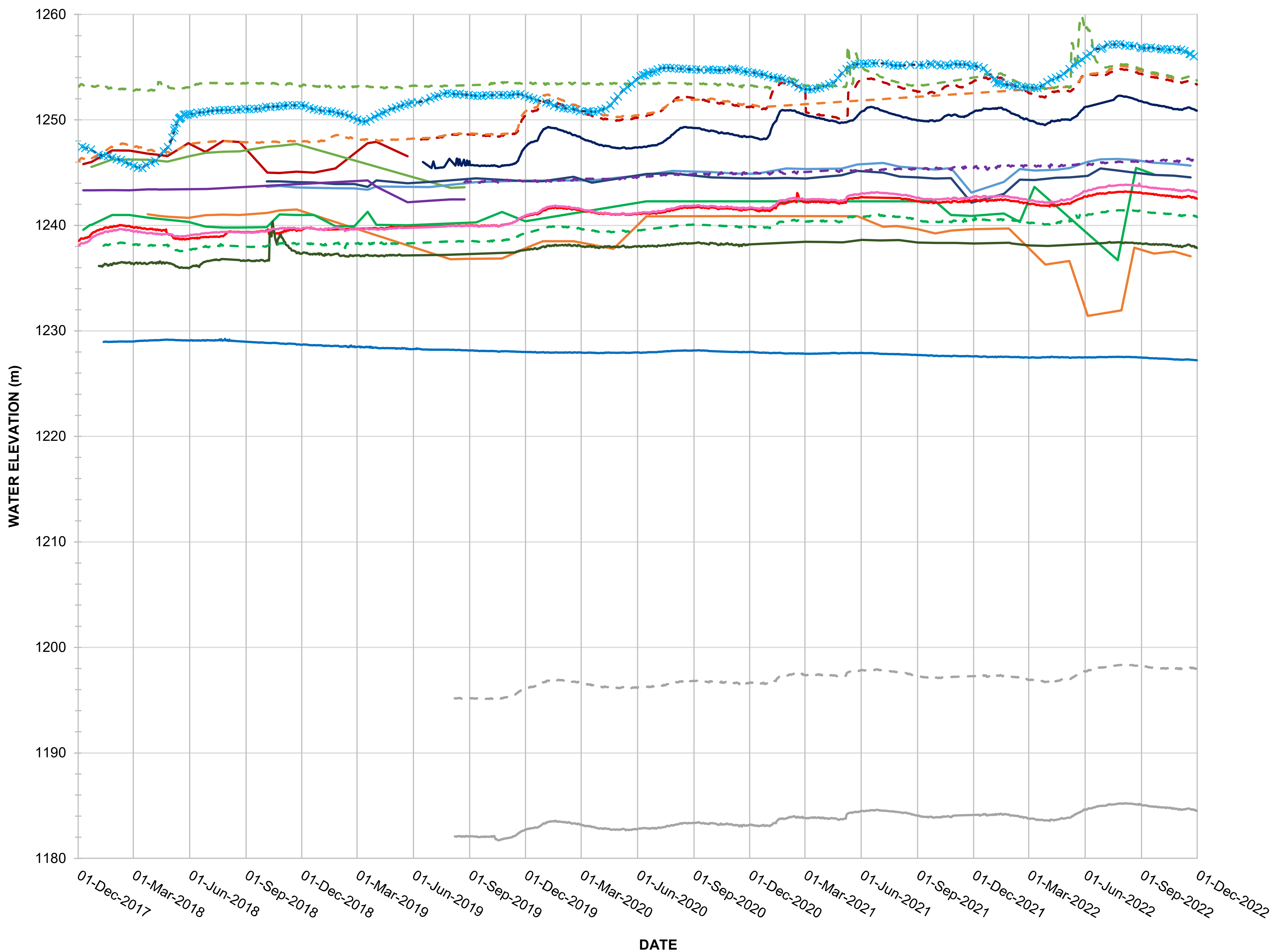
- LL-P86-2008 (Volcanics)
- LL-P91-03B (Volcanics)
- LL-P91-03C (Volcanics)
- LL-P91-03D (Volcanics)
- LL-VWP10-02A (Upper Volcanics)
- LL-VWP10-02B (Upper Volcanics)
- LL-VWP19-02B (Andesite/Basalt)
- L-L TAILINGS POND

NOTES

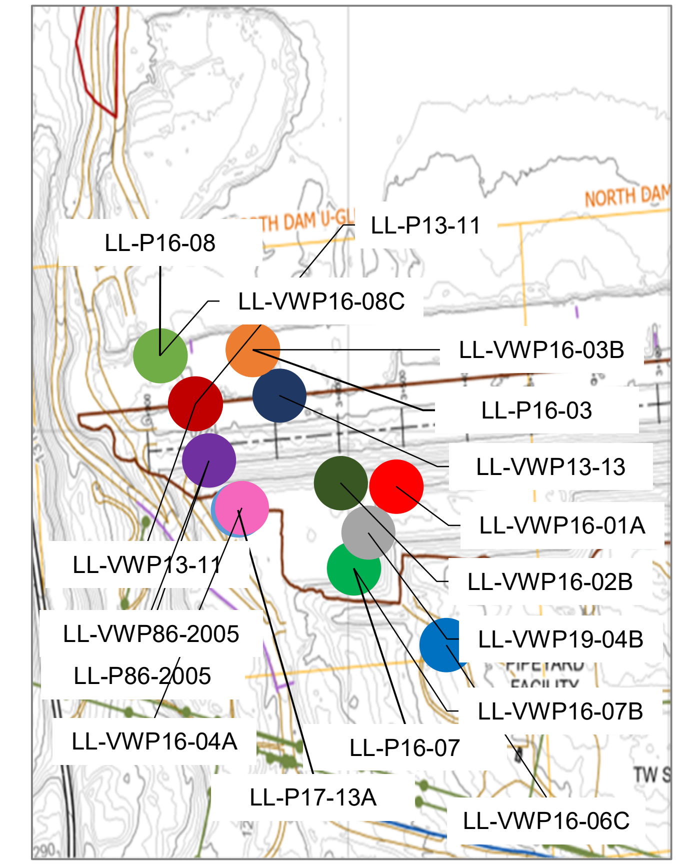
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH DAM BEDROCK VOLCANICS DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS
SCALE: AS SHOWN	PROJECT No. M02341C42 / FIG. No. II-A-113



INSET INSTRUMENT VIEW



LEGEND

- LL-P13-11 (U/S Sand and Gravel)
- LL-P16-03 (Glaciofuvial)
- LL-P16-07 (LSG)
- LL-P16-08 (LSG)
- LL-P17-13A (USG)
- LL-P86-2005 (USG)
- LL-VWP13-11 (U/S Sand and Gravel)
- LL-VWP13-13 (U/S Sand and Gravel)
- LL-VWP16-01A (LSG)
- LL-VWP16-02B (USG)
- LL-VWP16-03B (U/S Sand and Gravel)
- LL-VWP16-04A (LSG)
- LL-VWP16-06C (USG)
- LL-VWP16-07B (LSG)
- LL-VWP16-08C (USG)
- LL-VWP19-04A (Sand and Gravel)
- LL-VWP19-04B (Sand and Gravel)
- LL-VWP86-2005 (USG)
- L-L TAILINGS POND

NOTES

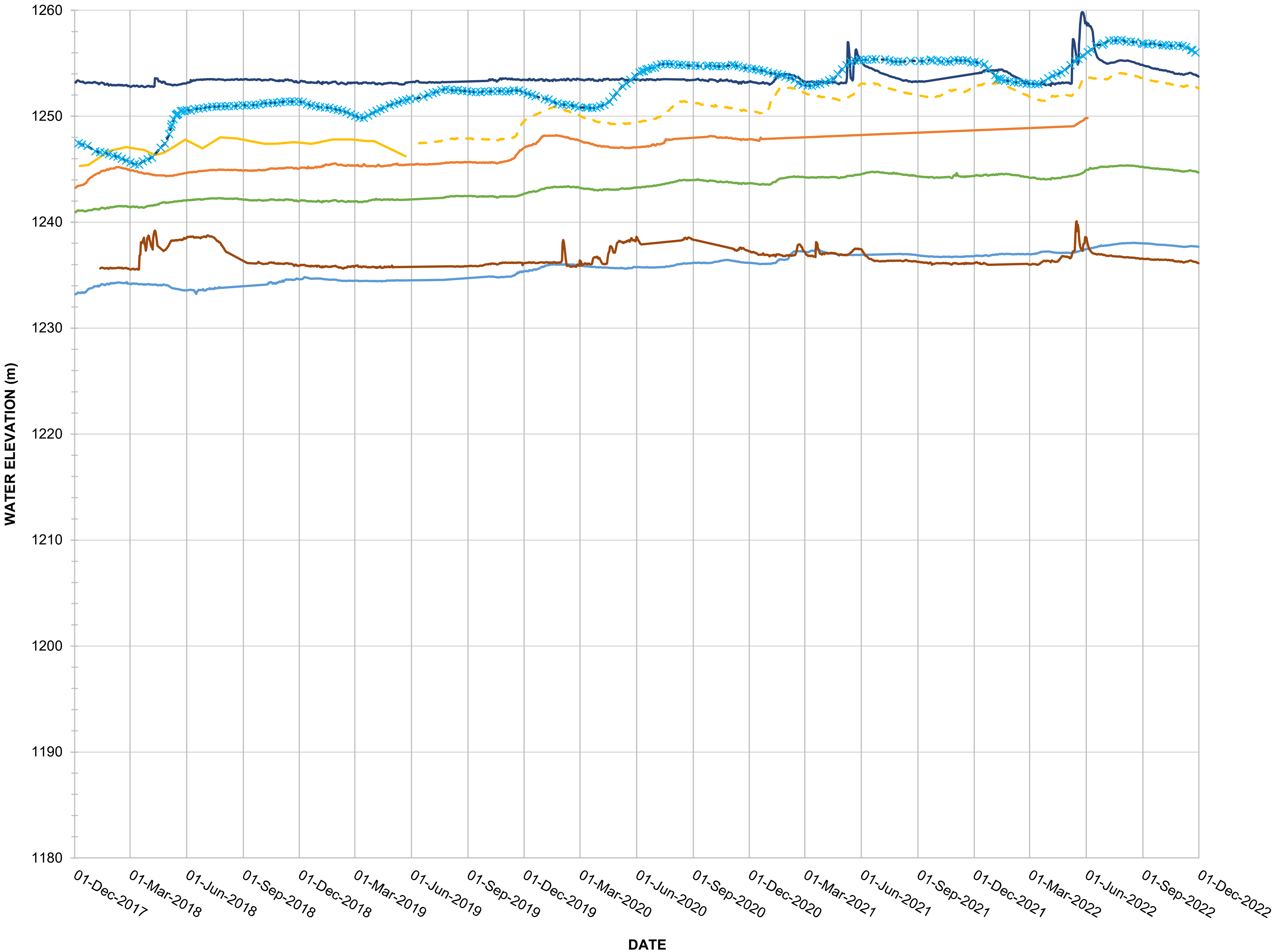
NOT FOR CONSTRUCTION

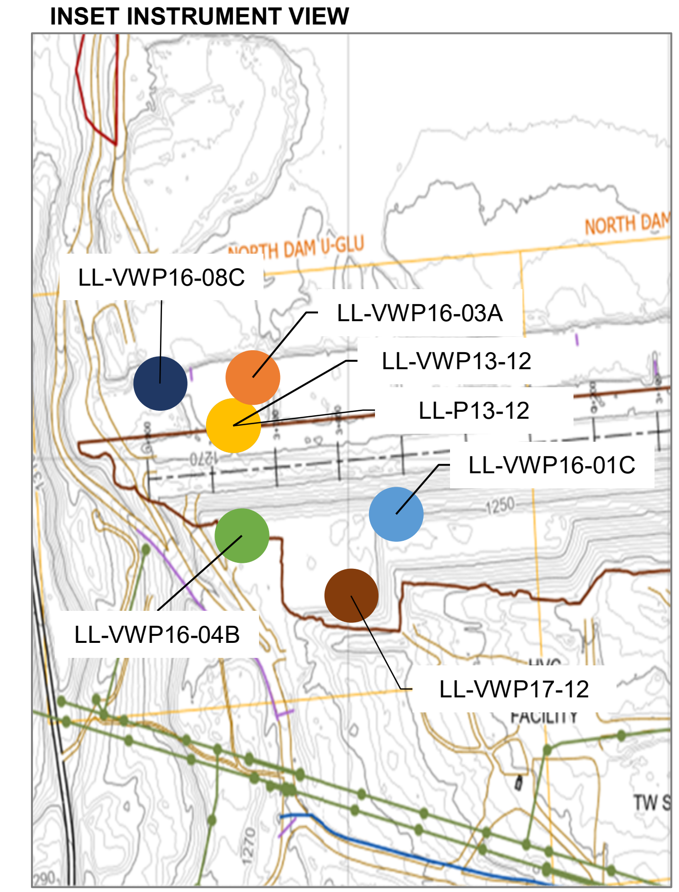
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH DAM UPPER GLACIOLACUSTRINE SAND AND GRAVEL DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-114

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\II-114-NORTH DAM UPPER GLU- SAND AND GRAVEL SINCE 2018.XLSX - 2023-03-28 10:35





LEGEND

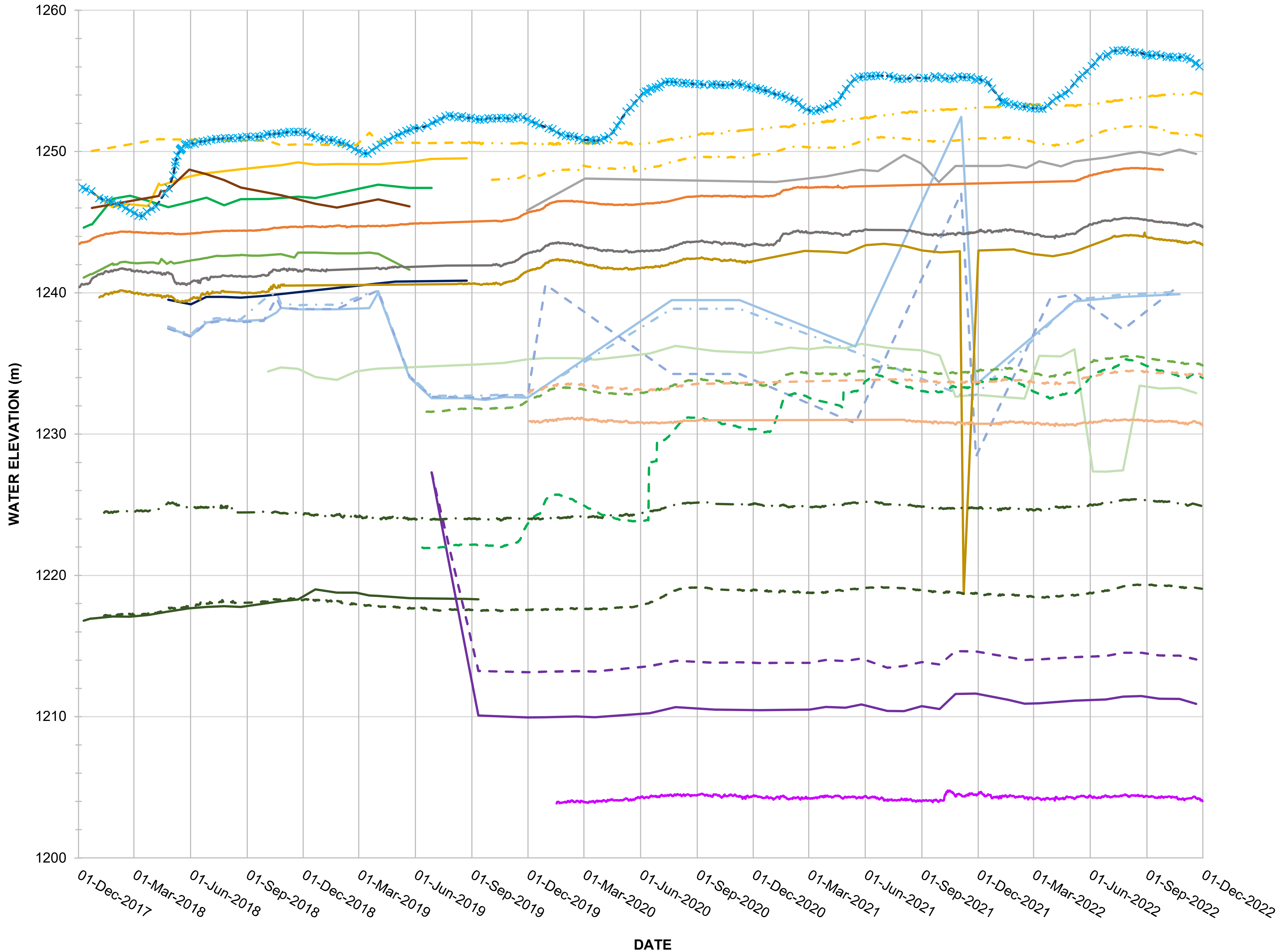
- LL-P13-12 (U-GLU)
- LL-VWP13-12 (U-GLU)
- LL-VWP16-01C (U-GLU)
- LL-VWP16-03A (U-GLU)
- LL-VWP16-04B (U-GLU)
- LL-VWP16-08C (U-GLU)
- LL-VWP17-12 (U-GLU)
- L-L TAILINGS POND

NOTES

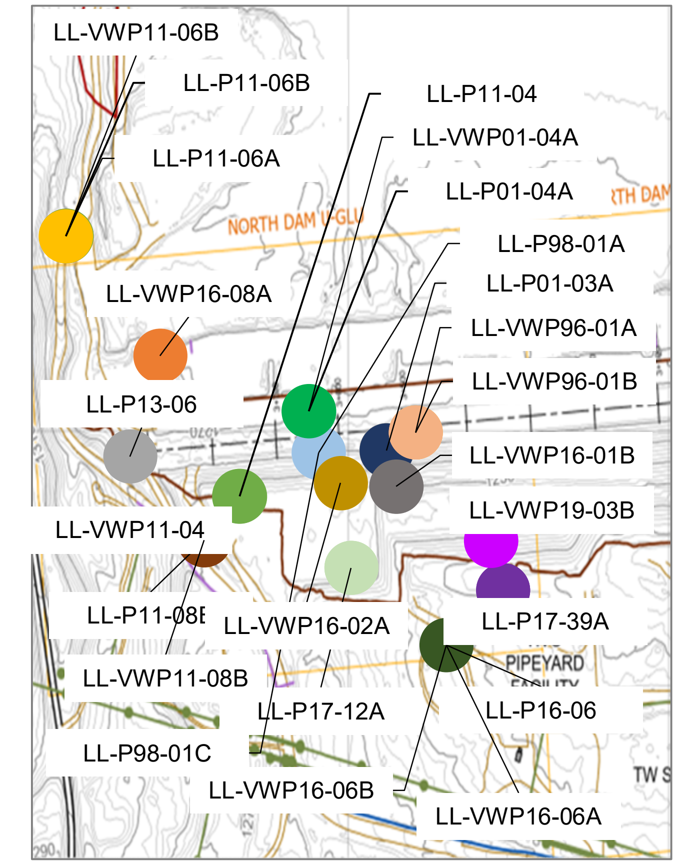
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH DAM UPPER GLACIOLACUSTRINE GLACIOLACUSTRINE DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS
SCALE: AS SHOWN	PROJECT No.: M02341C42 — FIG. No.: II-A-115



INSET INSTRUMENT VIEW



LEGEND

- LL-P01-03A (Glacial Till)
- LL-P01-04A (U/S Glacial Till)
- LL-P11-04 (Glacial Till)
- LL-P11-06A (U/S Glacial Till)
- LL-P11-06B (U/S Glacial Till)
- LL-P11-08B (Glacial Till)
- LL-P13-06 (Glacial Till)
- LL-P16-06 (Glacial Till)
- LL-P17-12A (Glacial Till)
- LL-P17-39A (Glacial Till)
- LL-P17-39B (Glacial Till)
- LL-P98-01A (Glacial Till)
- LL-P98-01B (Glacial Till)
- LL-P98-01C (Glacial Till)
- LL-VWP01-04A (U/S Glacial Till)
- LL-VWP11-04 (Glacial Till)
- LL-VWP11-06A (Glacial Till)
- LL-VWP11-06B (Glacial Till)
- LL-VWP16-01B (Glacial Till)
- LL-VWP16-02A (Glacial Till)
- LL-VWP16-06A (Glacial Till)
- LL-VWP16-06B (Glacial Till)
- LL-VWP16-08A (Glacial Till)
- LL-VWP19-03B (Stratified Till)
- LL-VWP96-01A (Glacial Till)
- LL-VWP96-01B (Glacial Till)
- L-L TAILINGS POND

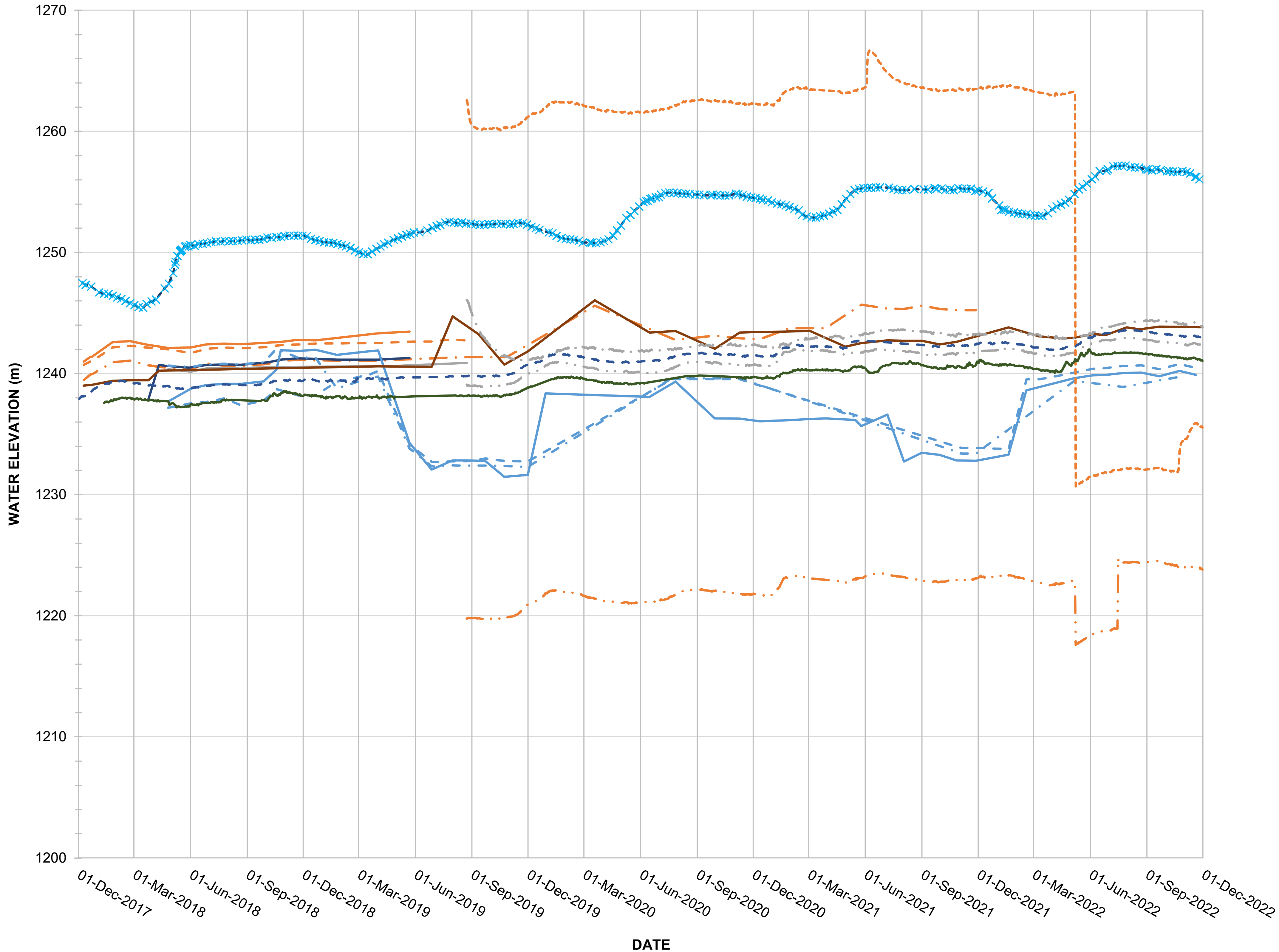
NOTES

NOT FOR CONSTRUCTION

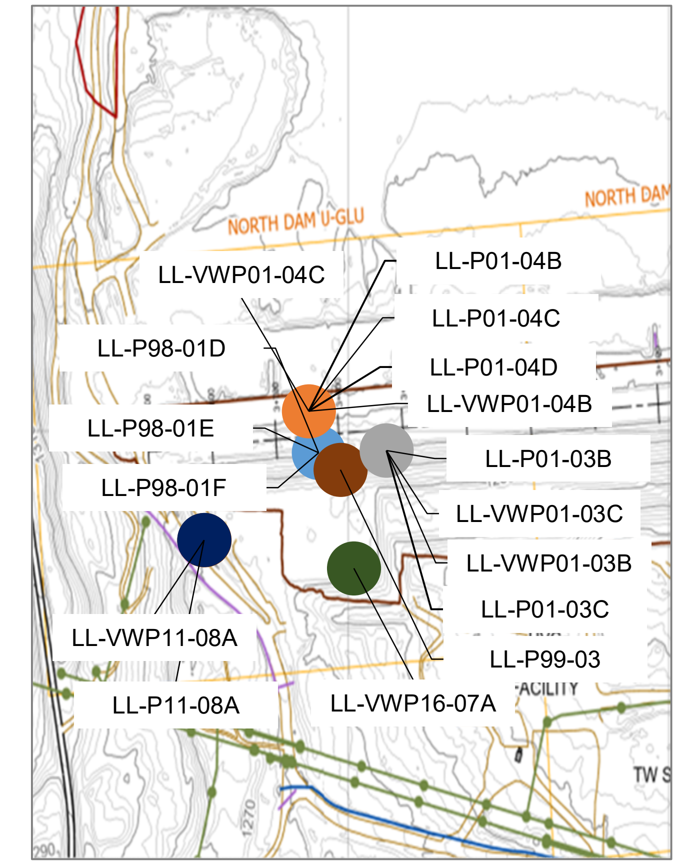
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE L-L DAM NORTH DAM UPPER GLACIOLACUSTRINE GLACIAL TILL DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-116



INSET INSTRUMENT VIEW



LEGEND

- LL-P01-03B (Sedimentary)
- LL-P01-03C (Sedimentary)
- LL-P01-04B (U/S Sedimentary)
- LL-P01-04C (U/S Sedimentary)
- LL-P01-04D (U/S Sedimentary)
- LL-P11-08A (Volcanics)
- LL-P98-01D (Volcanics)
- LL-P98-01E (Sedimentary)
- LL-P98-01F (Sedimentary)
- LL-P99-03 (Volcanics)
- LL-VWP01-03B (Sedimentary)
- LL-VWP01-03C (Sedimentary)
- LL-VWP01-04B (Sedimentary)
- LL-VWP01-04C (Sedimentary)
- LL-VWP11-08A (Volcanics)
- LL-VWP16-07A (Sedimentary)
- L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

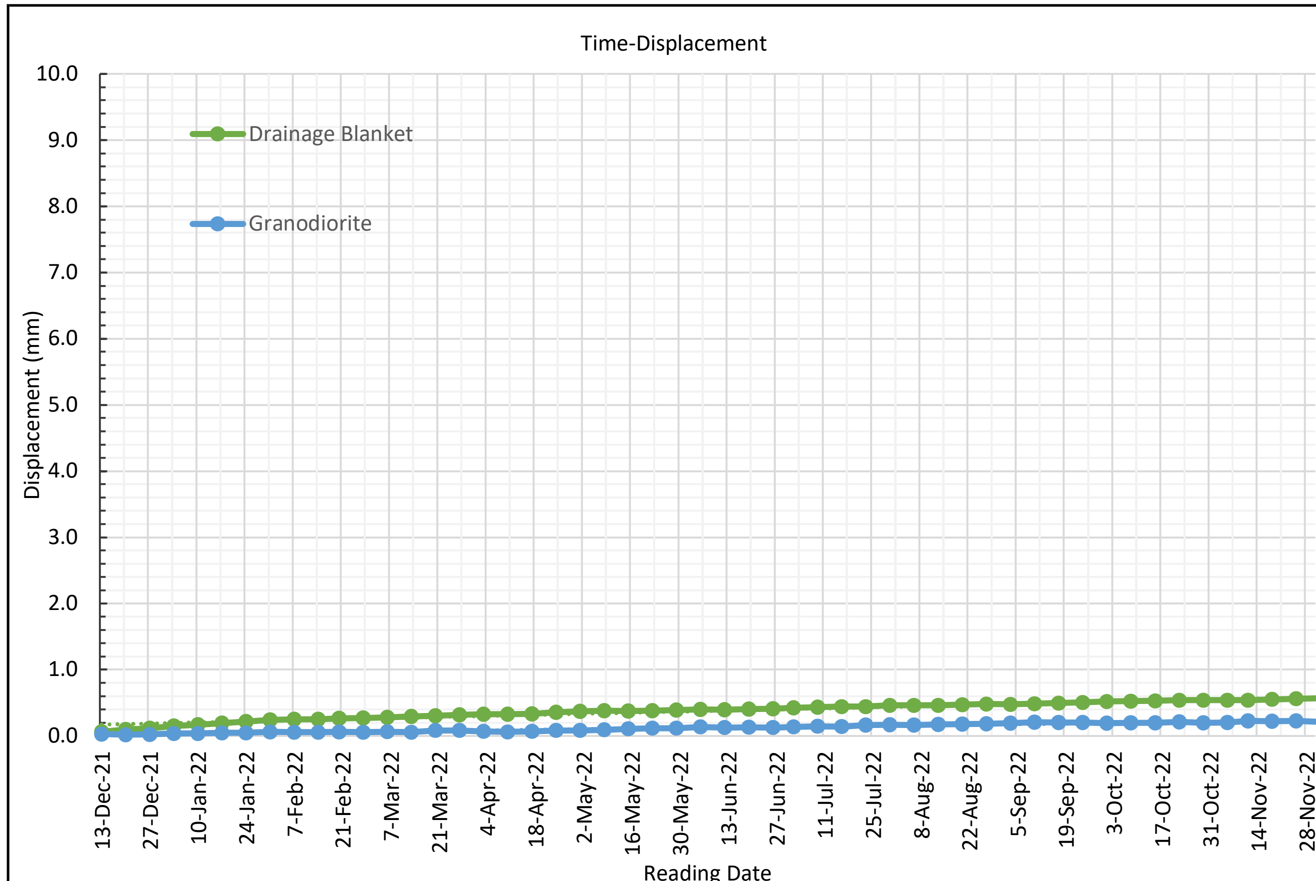
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: L-L DAM NORTH DAM UPPER GLACIOLACUSTRINE FOUNDATION ROCK DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

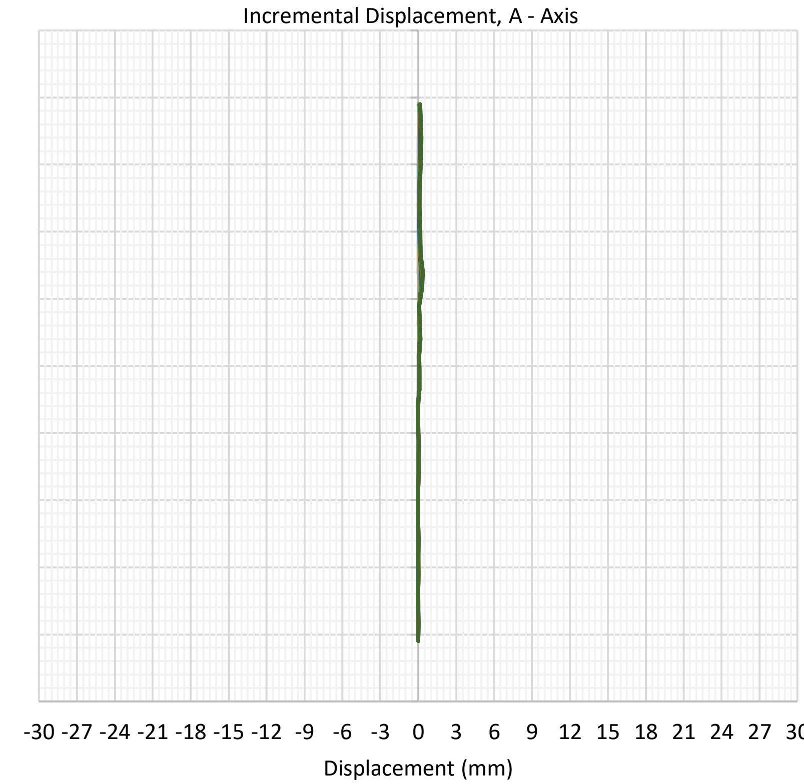
SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	II-A-117

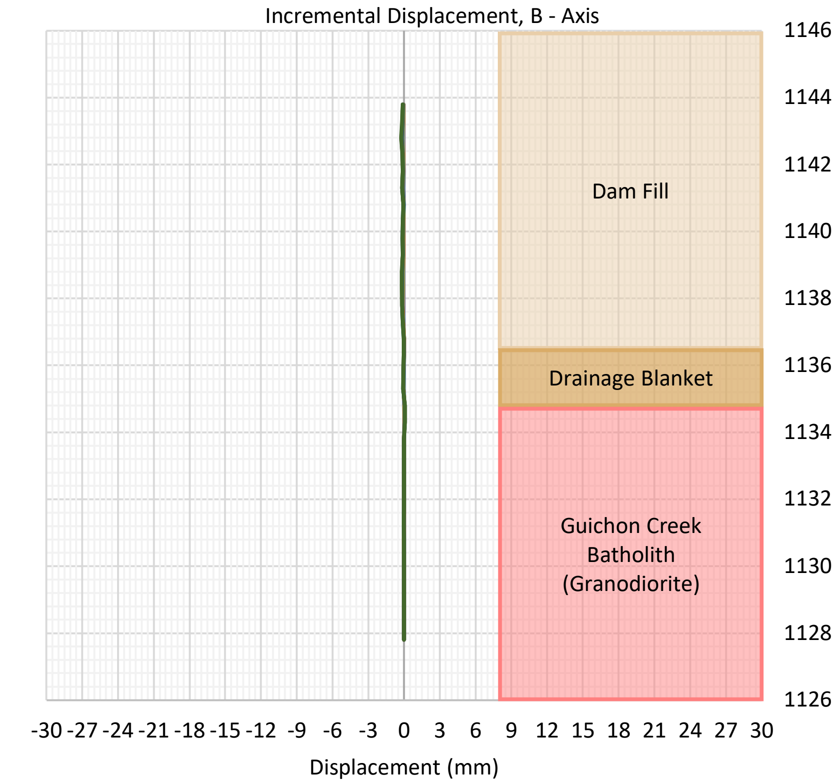
APPENDIX II-B

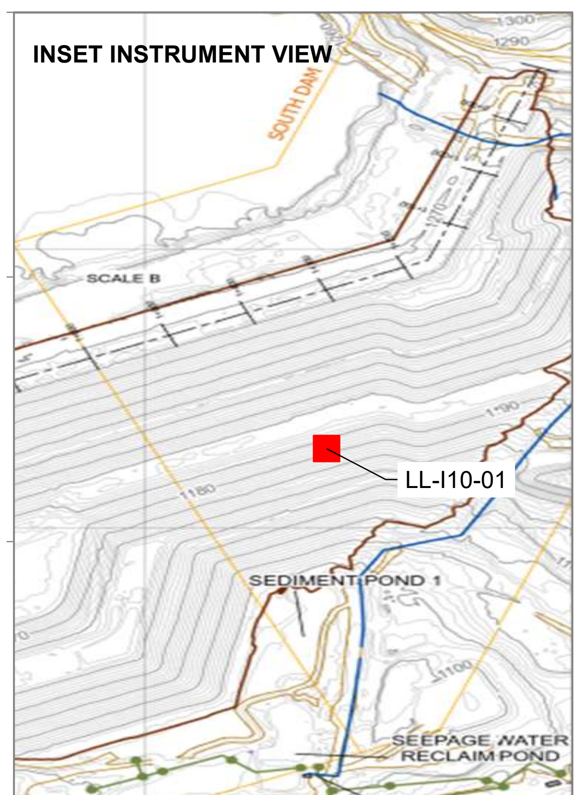
L-L Dam Inclinometer Plots

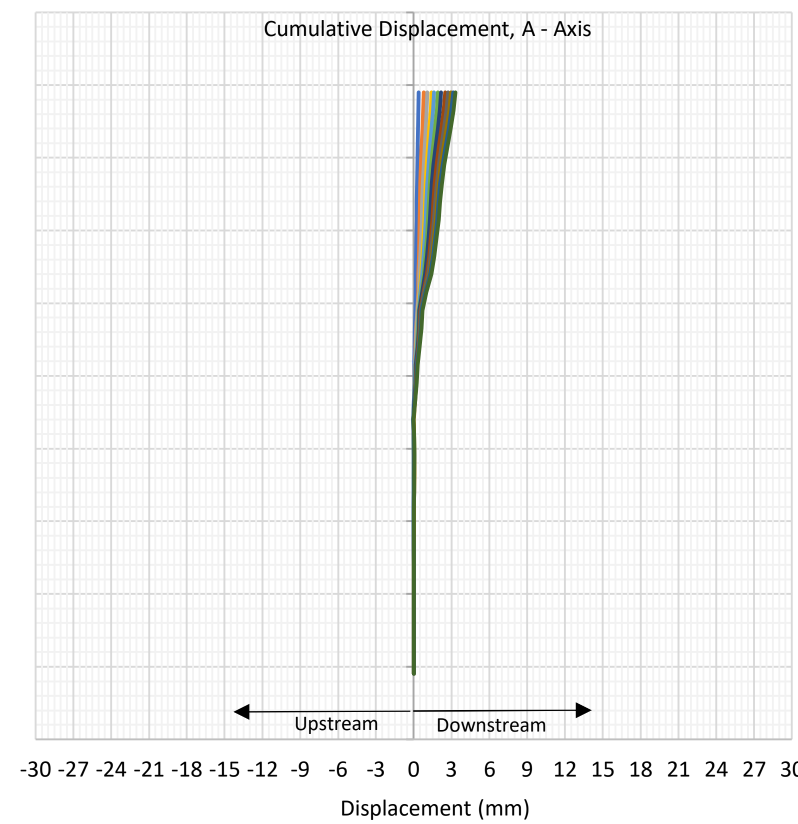
South Dam

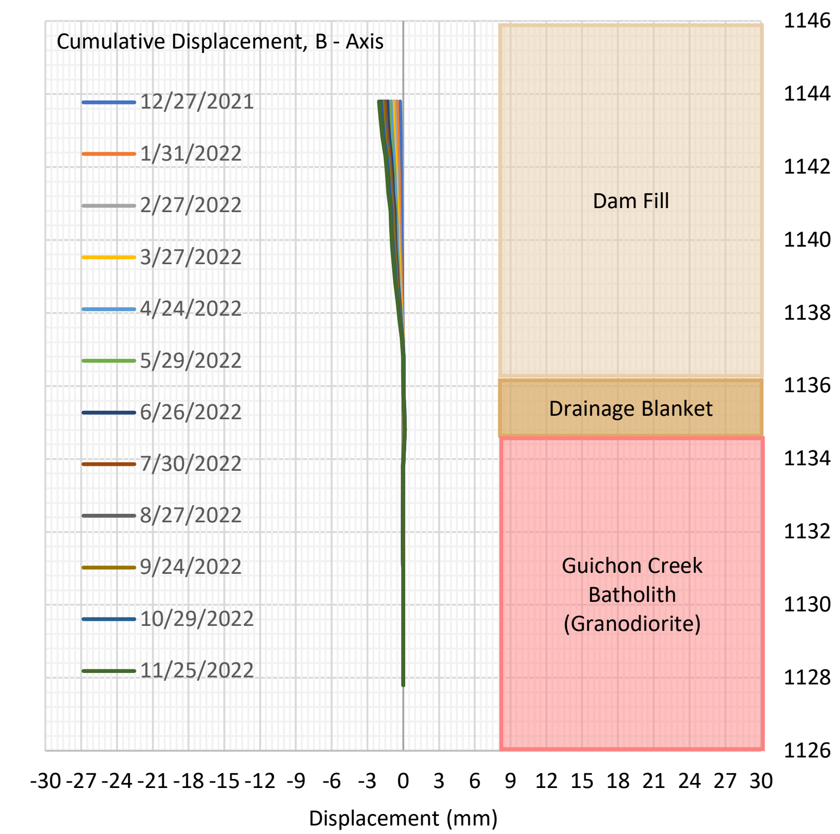












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Drainage Blanket	1137.8-1135.8	5.0	N/A	N/A
Granodiorite	1135.8-1127.8	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
1+480	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

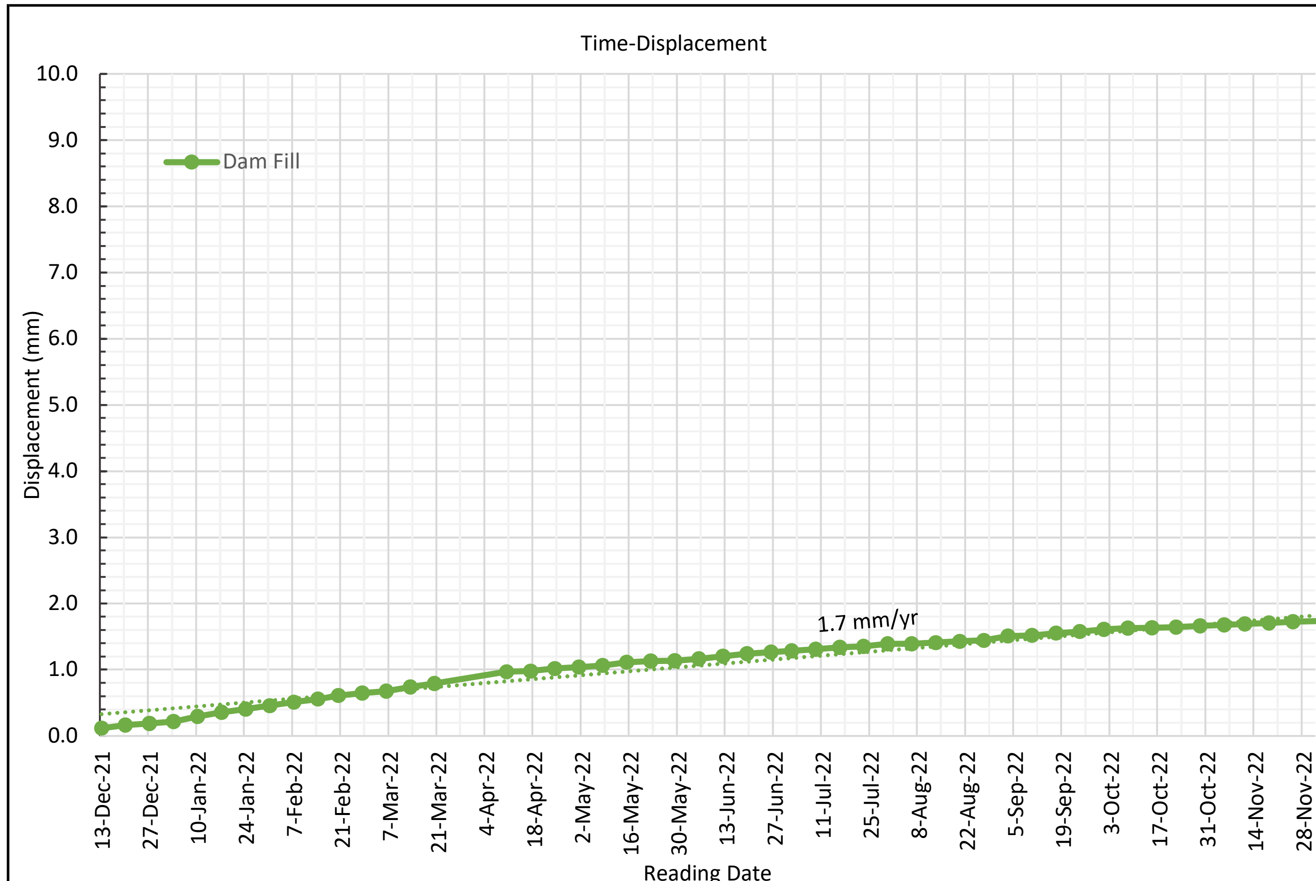
CLIENT: Highland Valley Copper / Teck

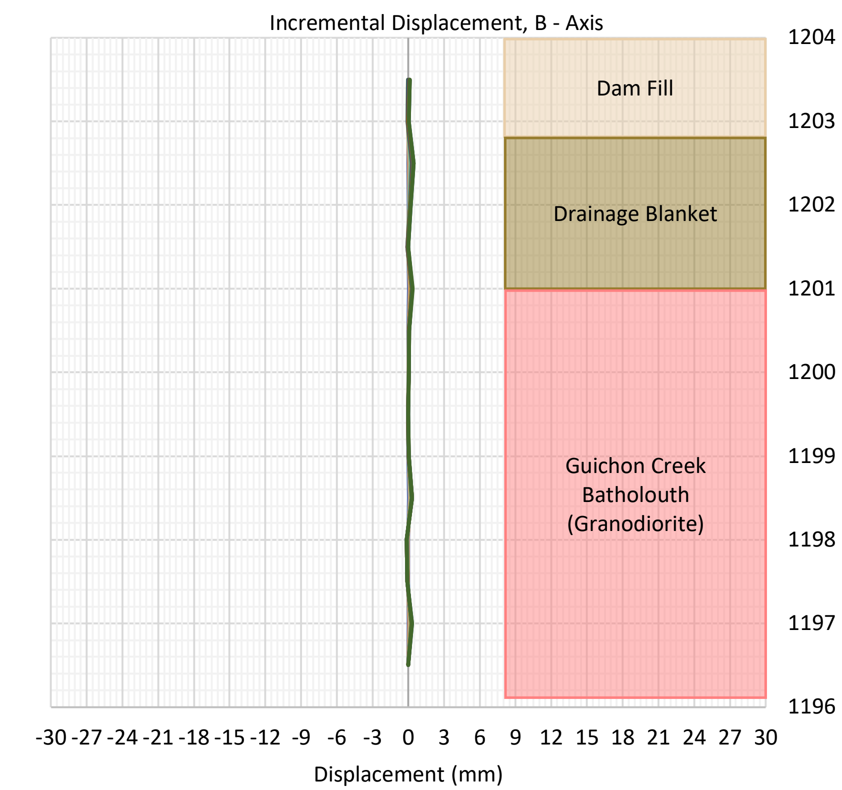
Klohn Crippen Berger

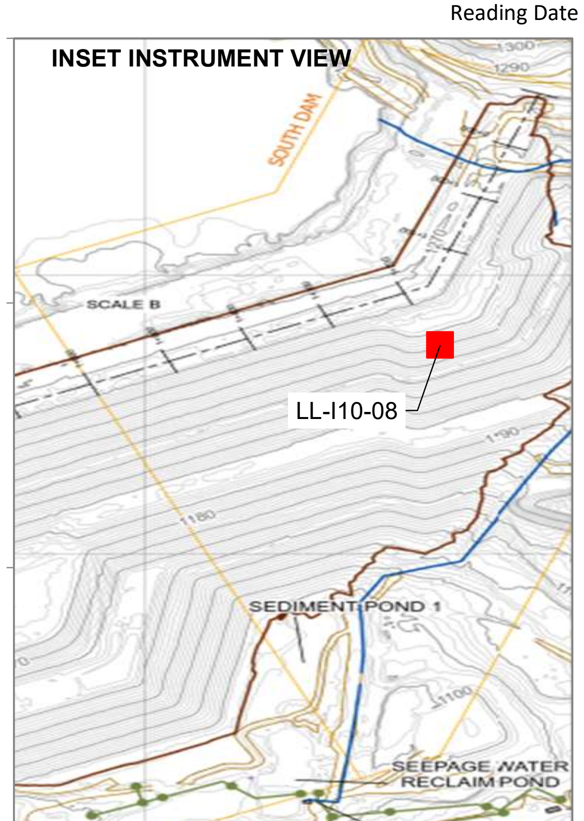
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

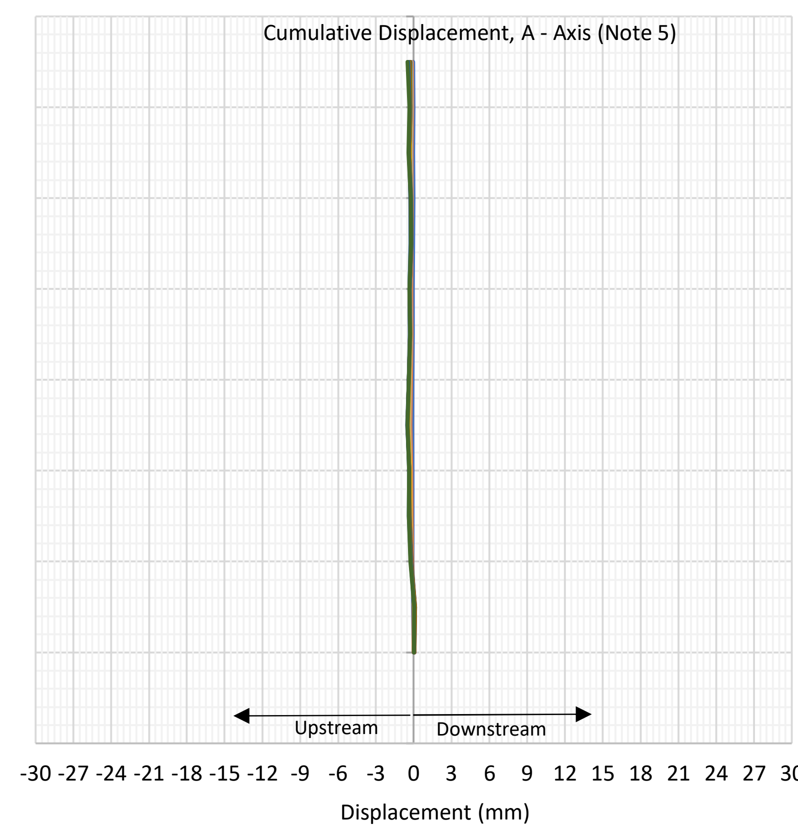
TITLE: LL DAM INCLINOMETER PLOTS LL-I10-01(SOUTH DAM) DEC. 2021 TO NOV. 2022

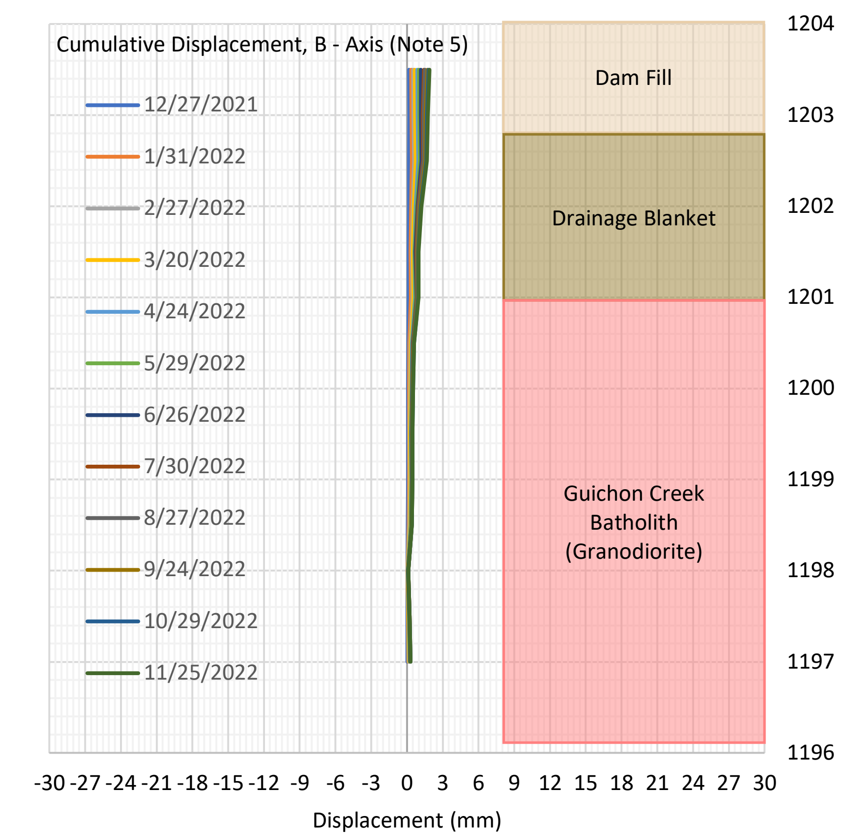
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-1











NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. AZIMUTH CORRECTIONS HAS NOT BEEN APPLIED TO THIS INSTRUMENT

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Dam Fill	1202.5-1196.5	5.0	N/A	N/A

Station	Baseline Reading	Instrument Type
1+200	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

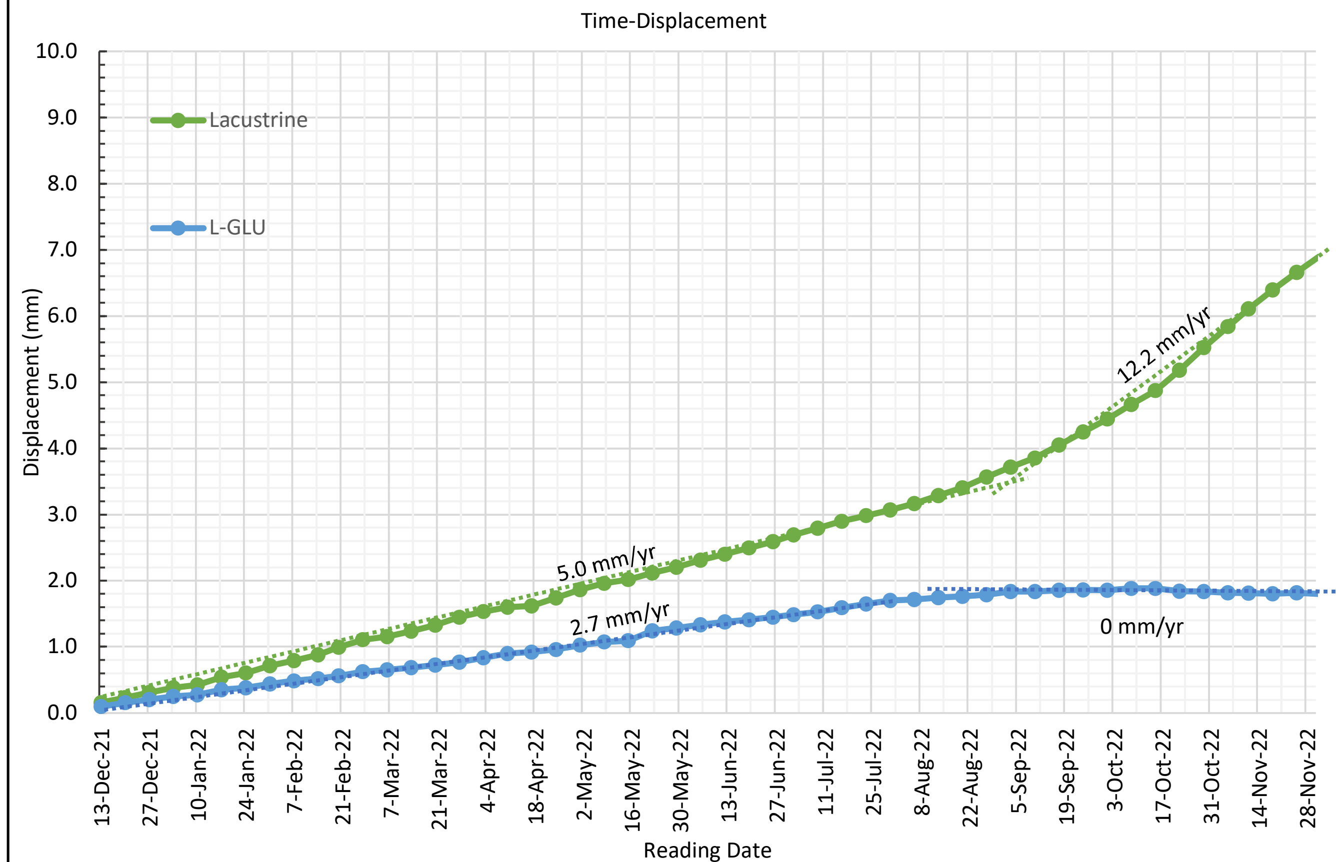
Klohn Crippen Berger

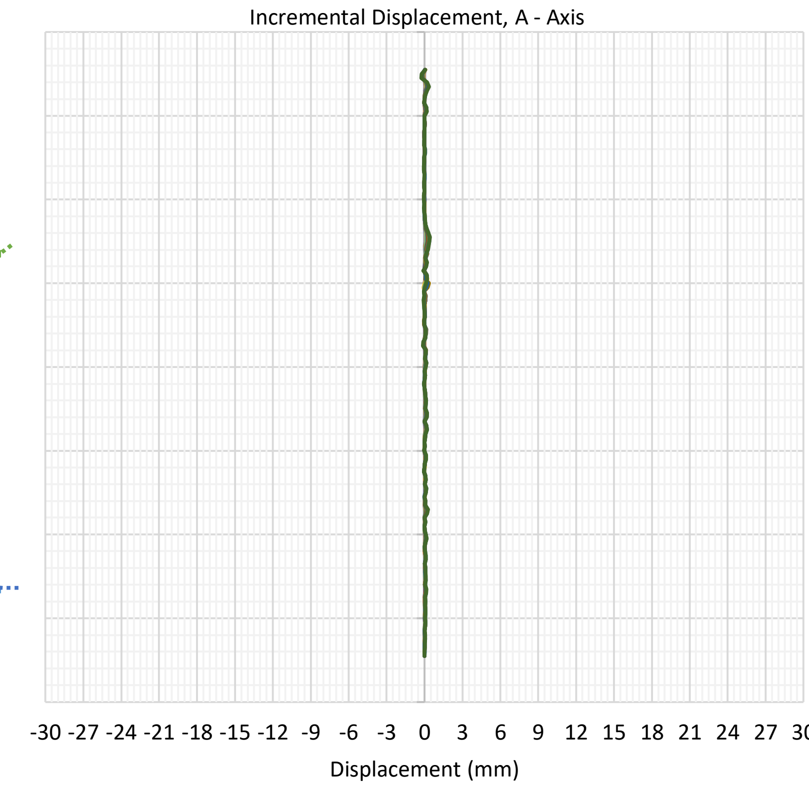
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

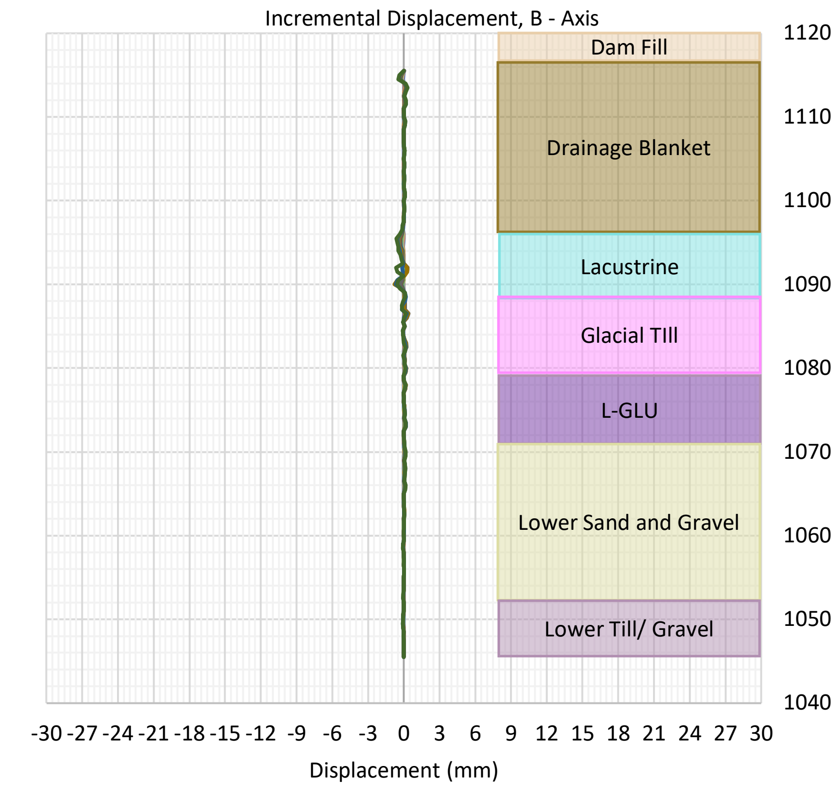
TITLE: LL DAM INCLINOMETER PLOTS LL-I10-08 (SOUTH DAM) DEC. 2021 TO NOV. 2022

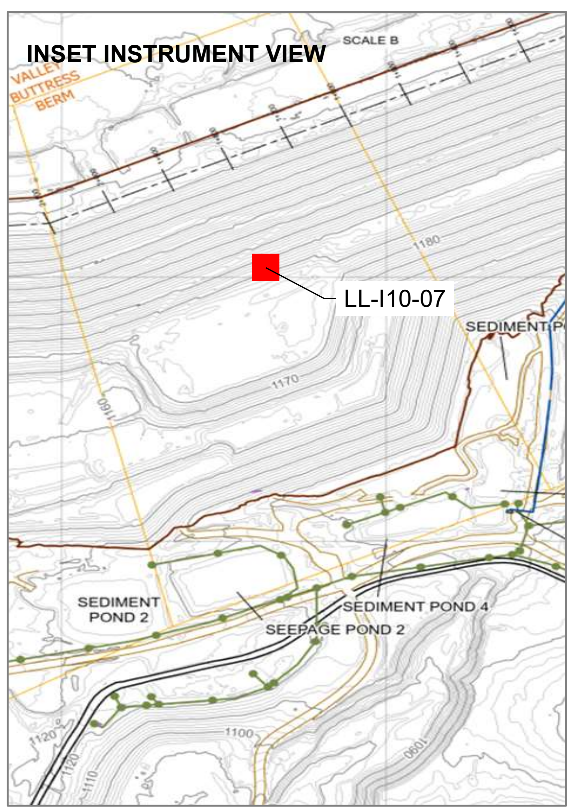
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-2

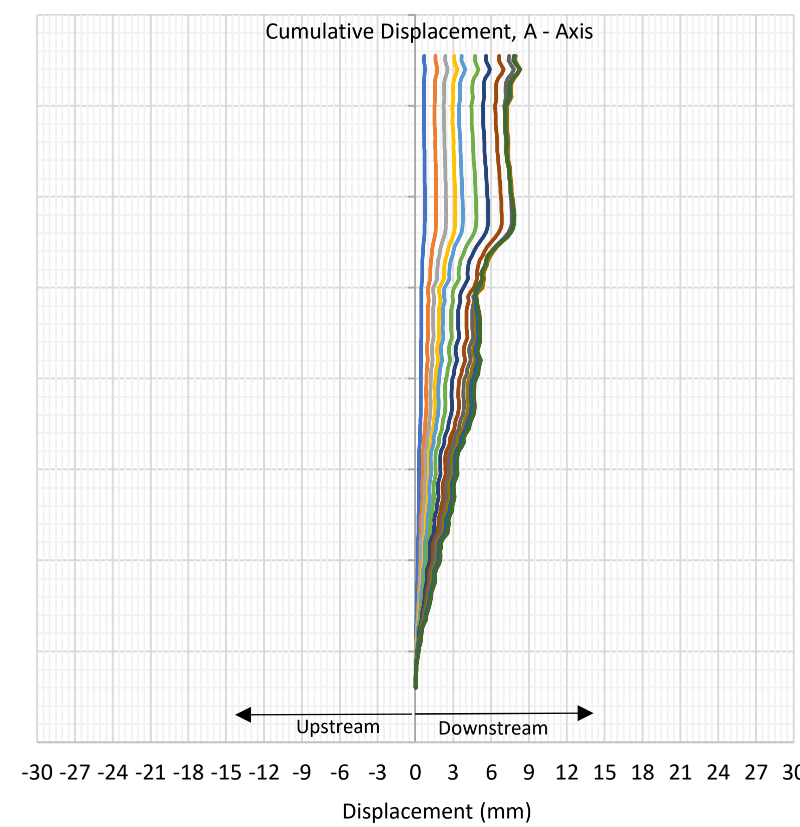
Valley Buttress Berm

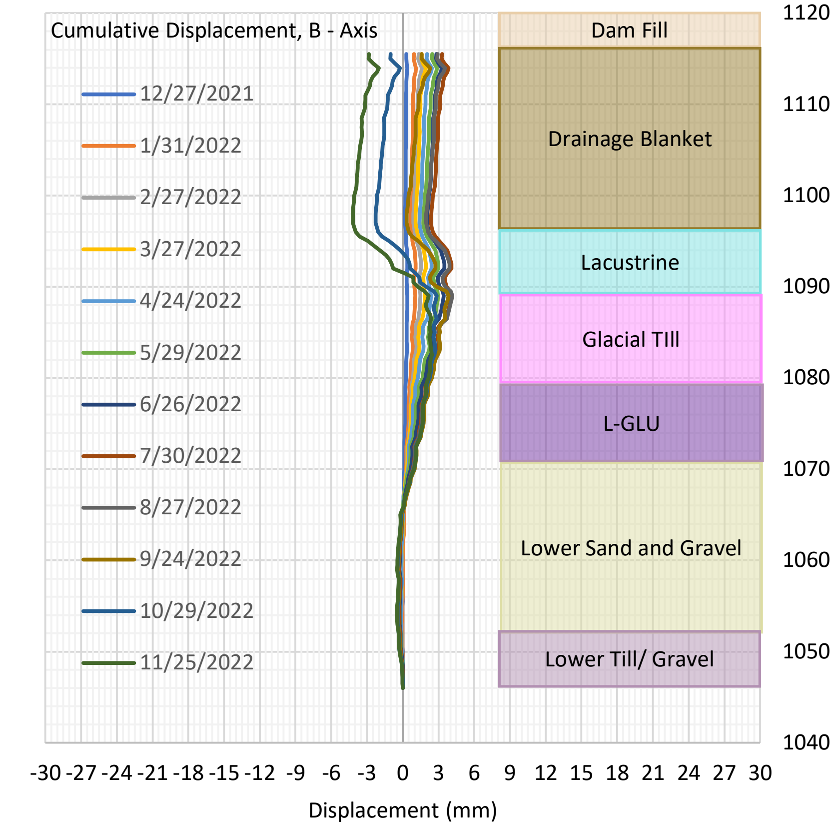












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Lacustrine	1100-1088	5.0	N/A	N/A
L-GLU	1079.5-1069.5	1.0	1.4	N/A

Station	Baseline Reading	Instrument Type
1+850	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

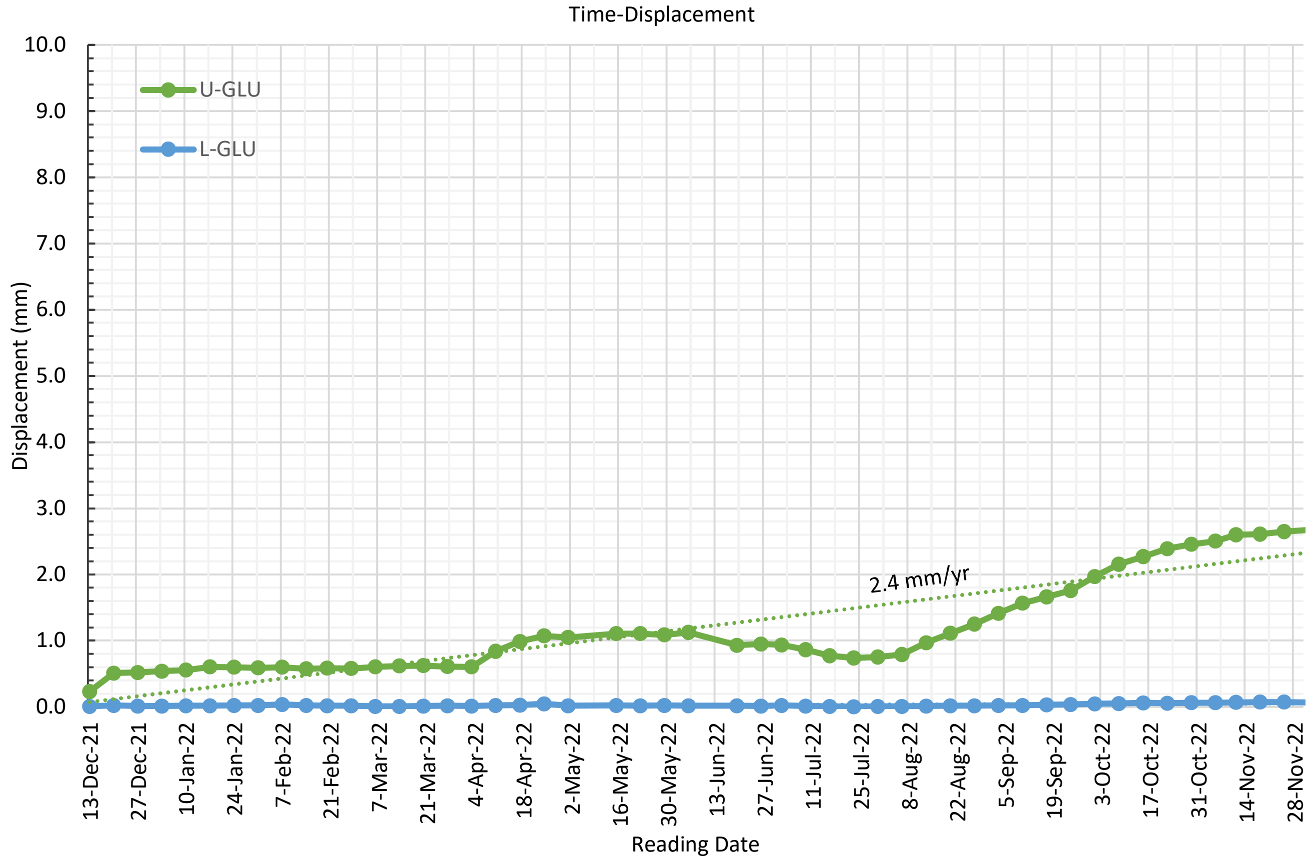
CLIENT: Highland Valley Copper / Teck

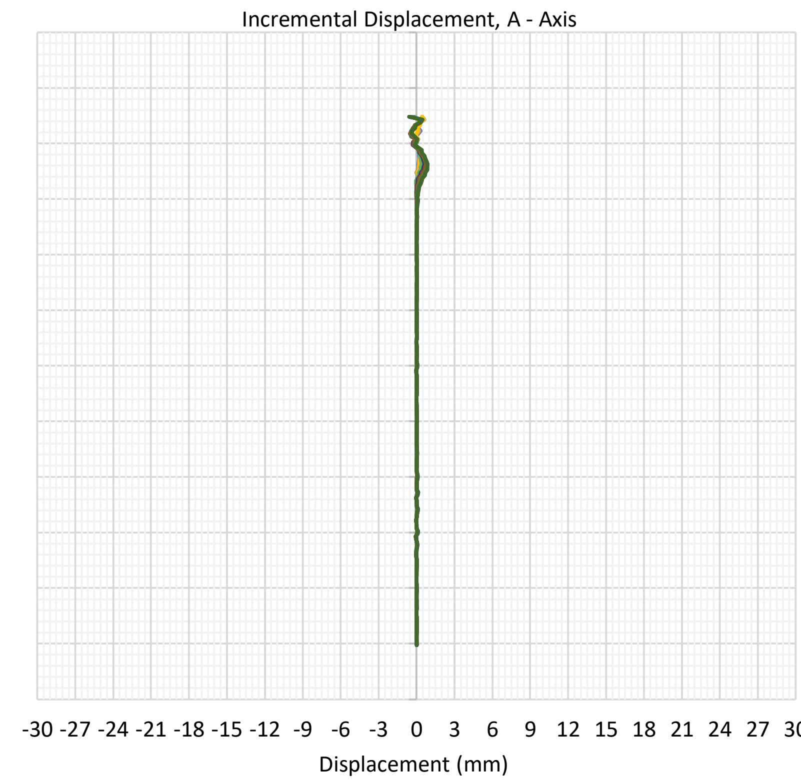
Klohn Crippen Berger

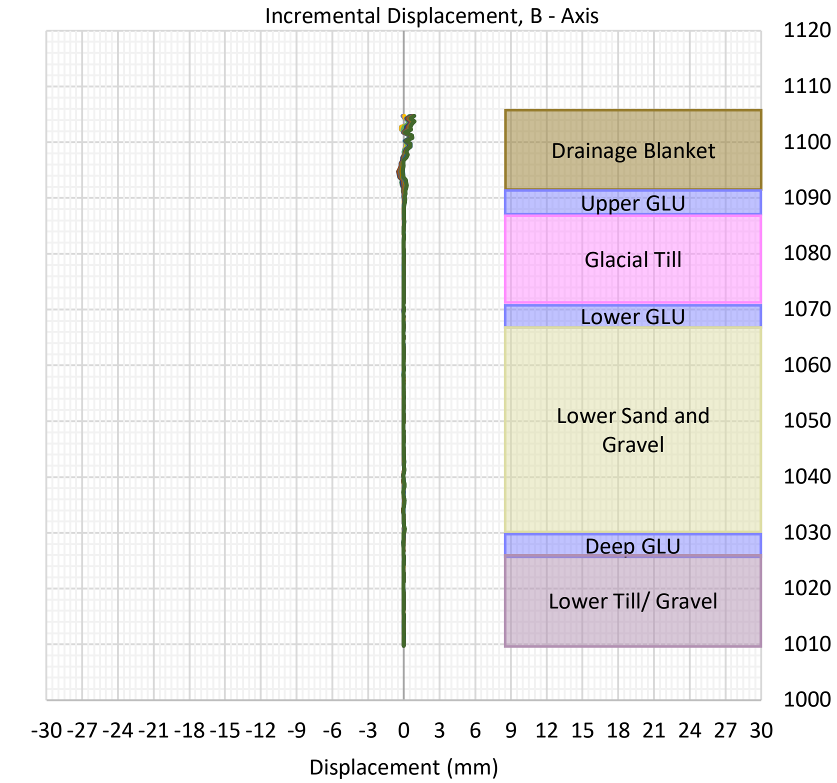
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

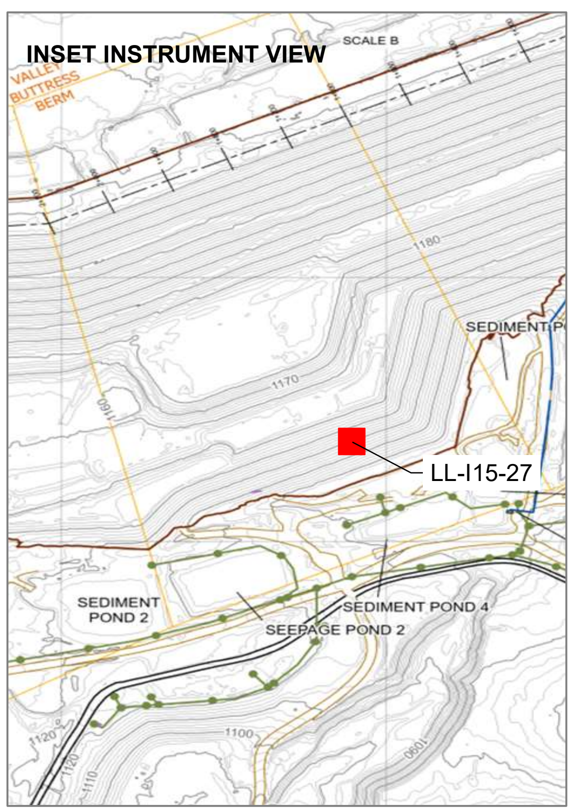
TITLE: LL DAM INCLINOMETER PLOTS
LL-I10-07 (VBB)
DEC. 2021 TO NOV. 2022

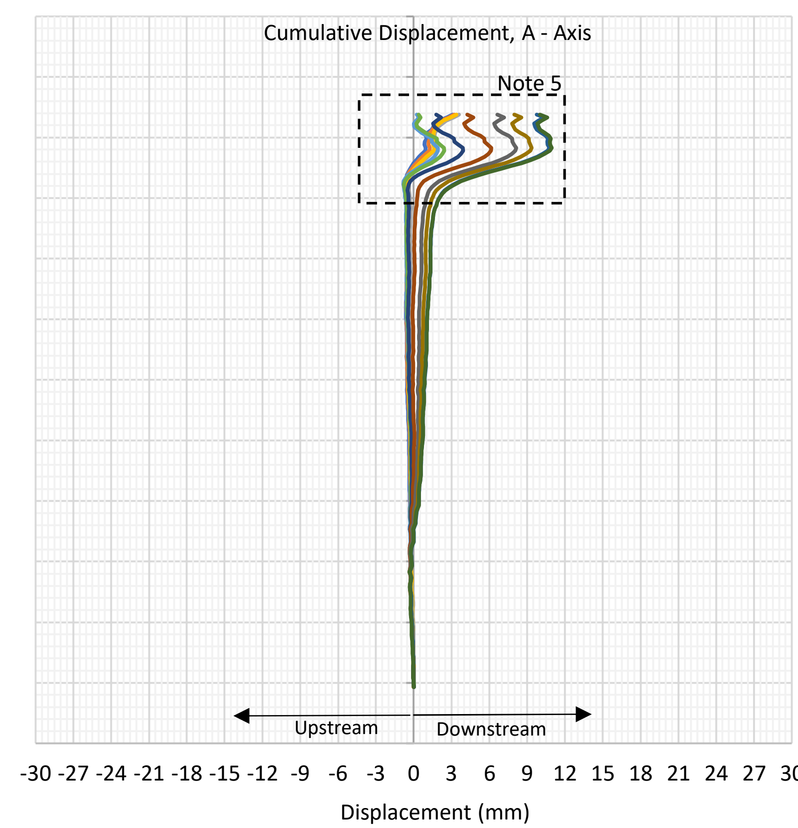
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-3

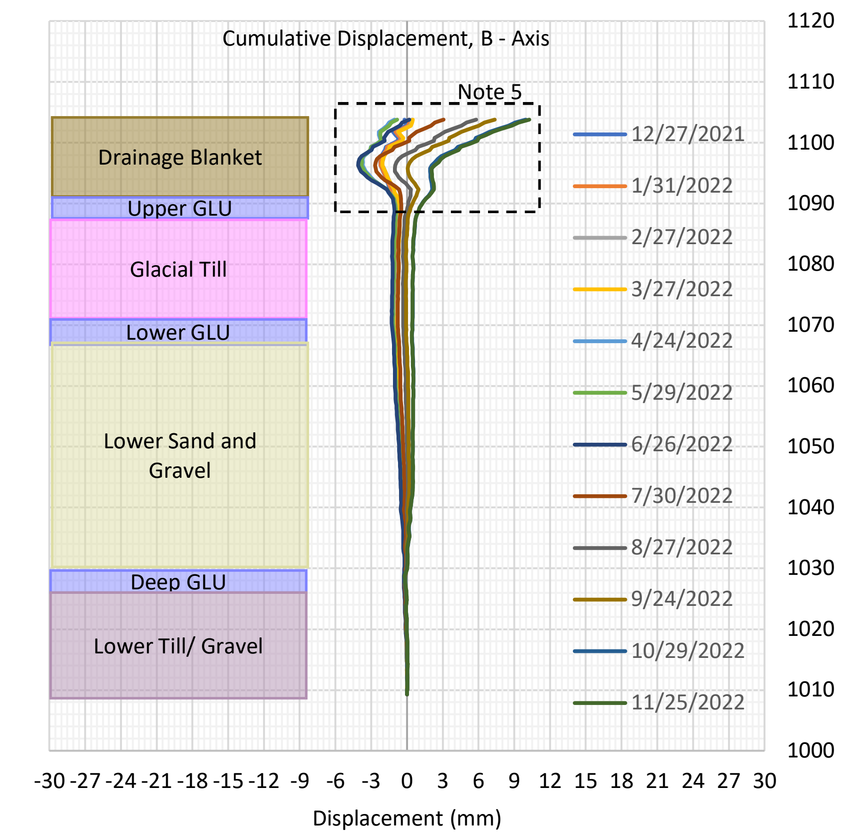












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. MOVEMENT IN THE COMPACTED DRIANAGE BLANKET WAS A LOCALISED RESPONSE AT THE END OF DRILLING AS THE CASING WAS LEFT IN THE GROUND DURING INSTALLATION. REFER TO SECTION 5.2.3.4 OF MAIN TEXT.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
U-GLU	1093.3-1088.3	0.5	N/A	1.0
L-GLU	1071.8-1069.8	0.5	N/A	1.0

Station	Baseline Reading	Instrument Type
1+900	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

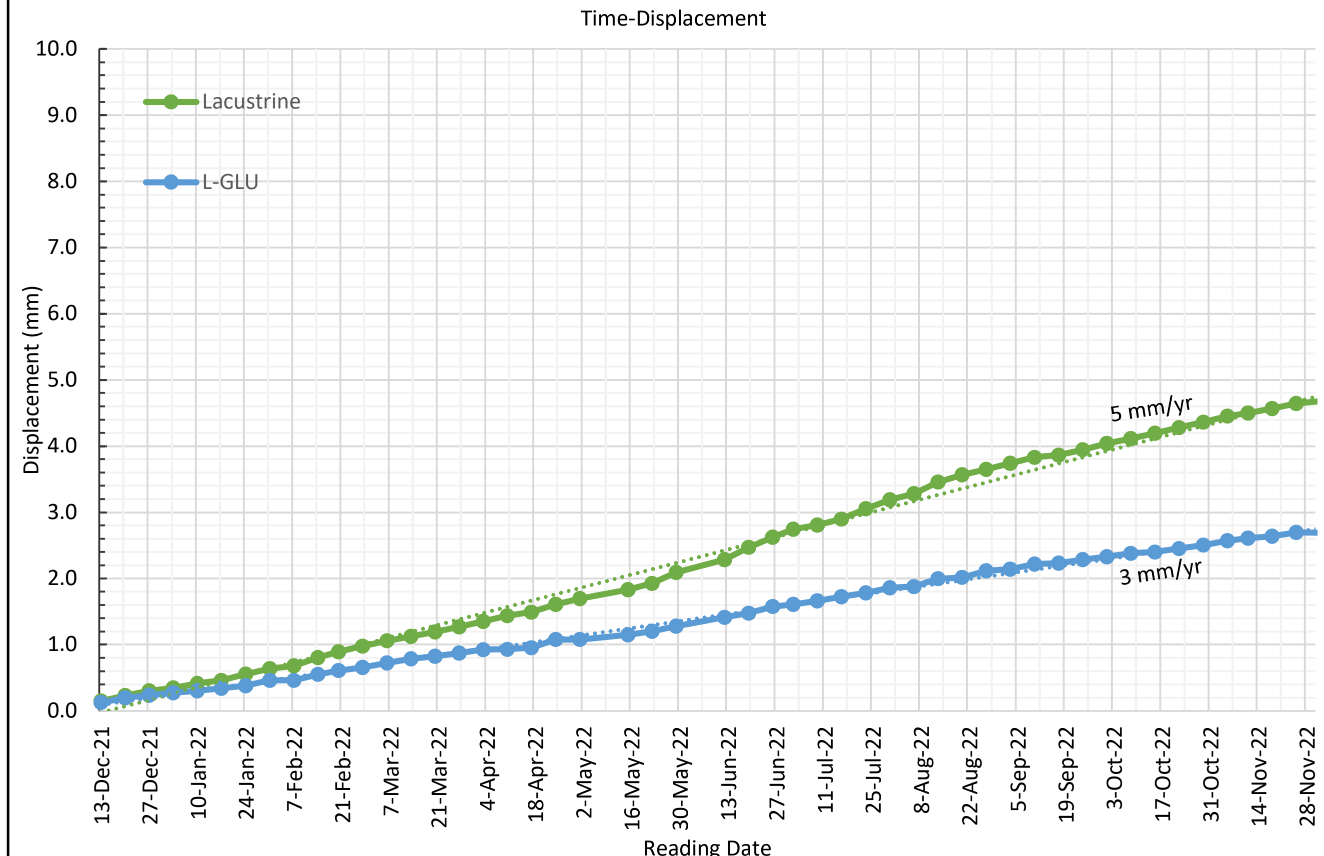
CLIENT: Highland Valley Copper / Teck

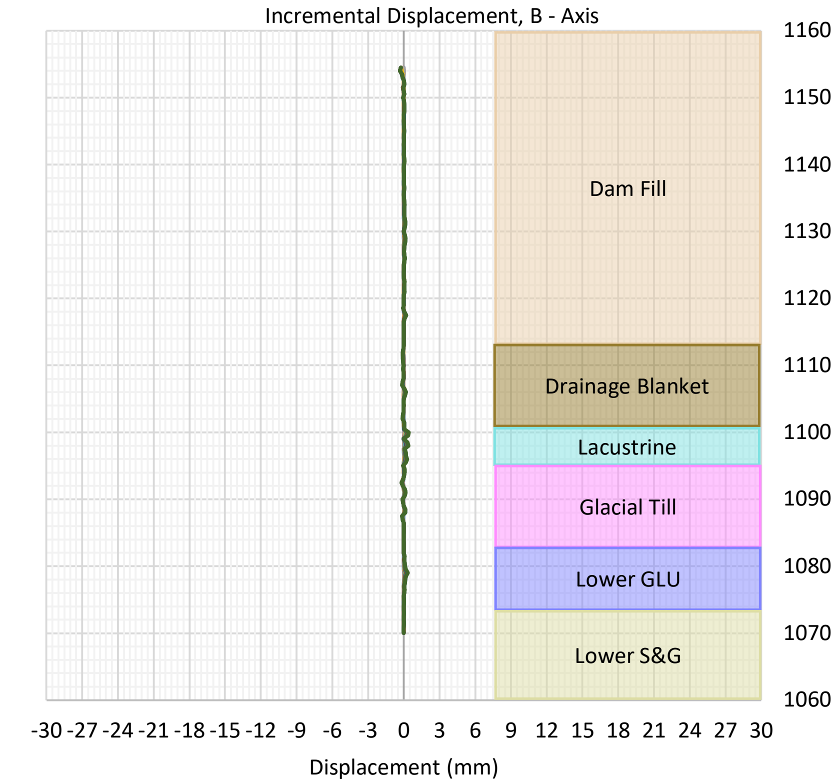
Klohn Crippen Berger

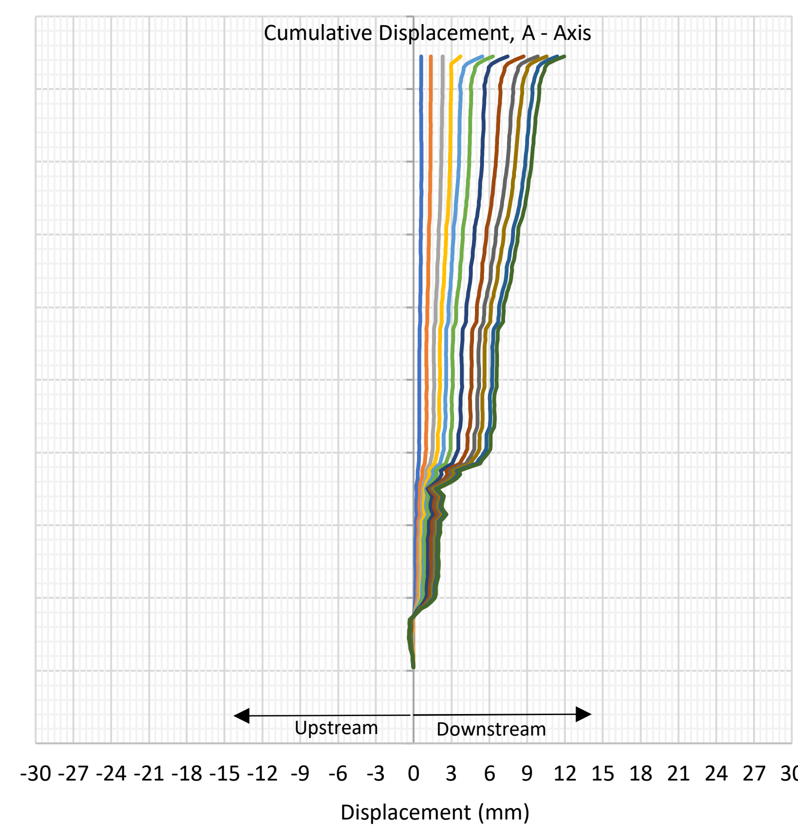
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

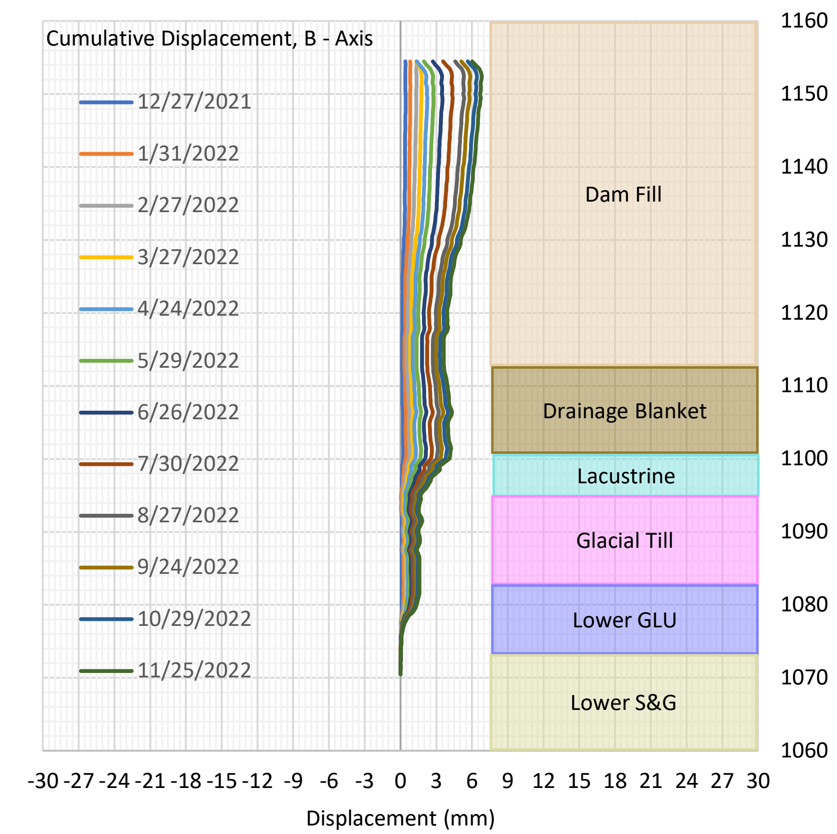
TITLE: LL DAM INCLINOMETER PLOTS LL-I15-27 (VBB) DEC. 2021 TO NOV. 2022

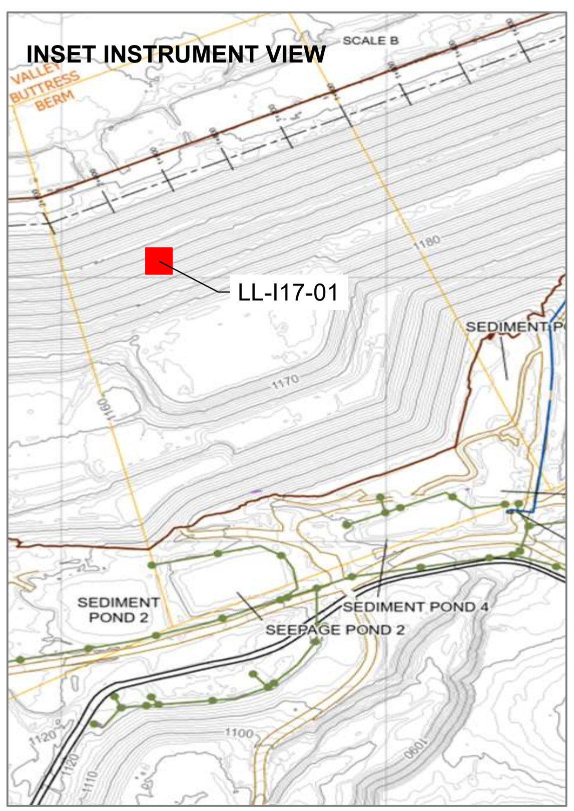
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-4











NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Lacustrine	1100.5-1094.5	1.0	N/A	N/A
L-GLU	1082.5-1073.5	1.0	1.4	N/A

Station	Baseline Reading	Instrument Type
2+000	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

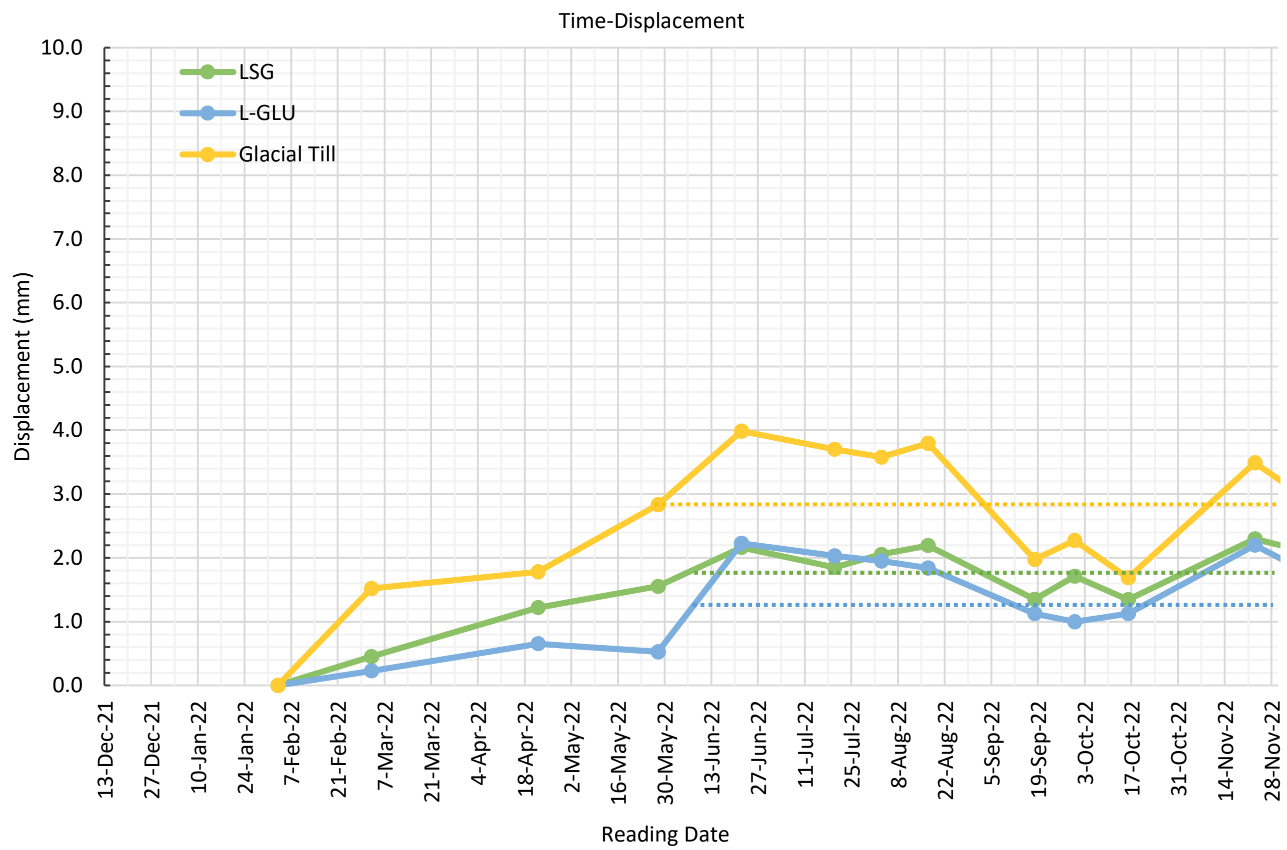
CLIENT: Highland Valley Copper / Teck

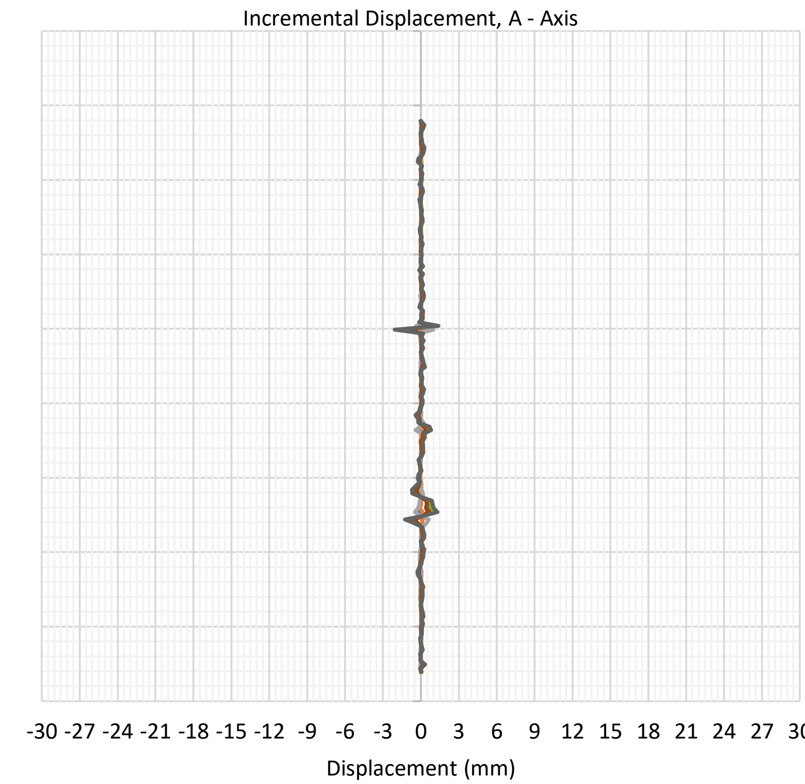
Klohn Crippen Berger

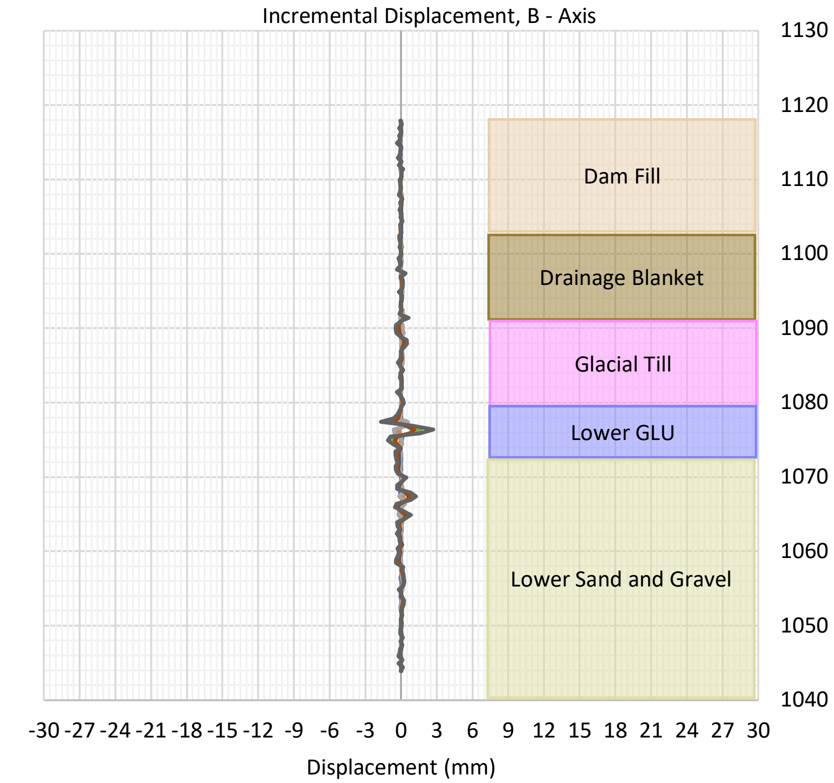
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

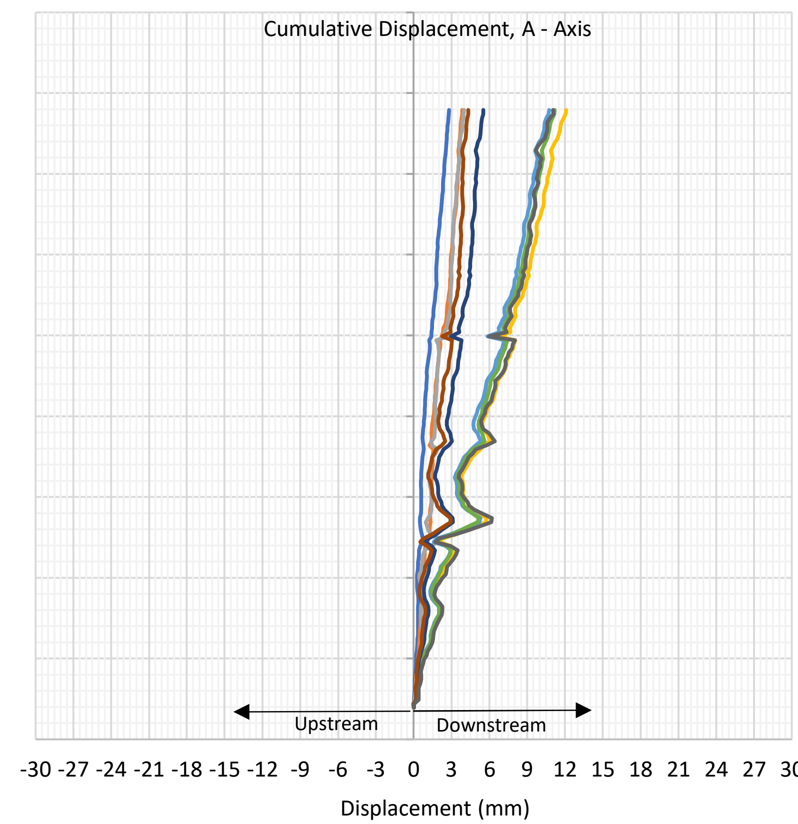
TITLE: LL DAM INCLINOMETER PLOTS
LL-I17-01 (VBB)
DEC. 2021 TO NOV. 2022

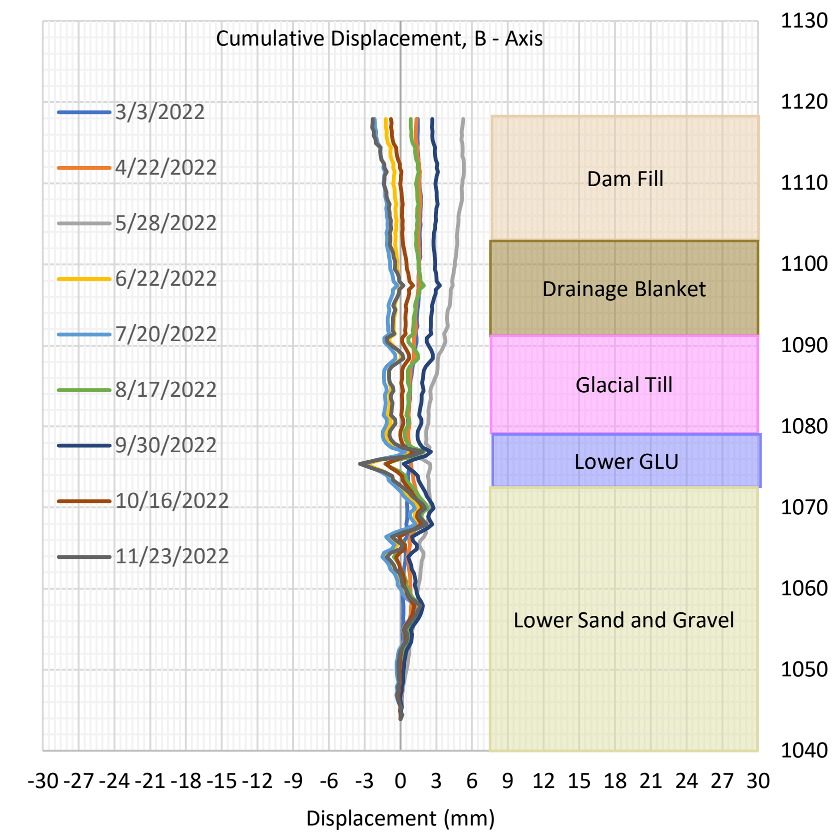
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-5

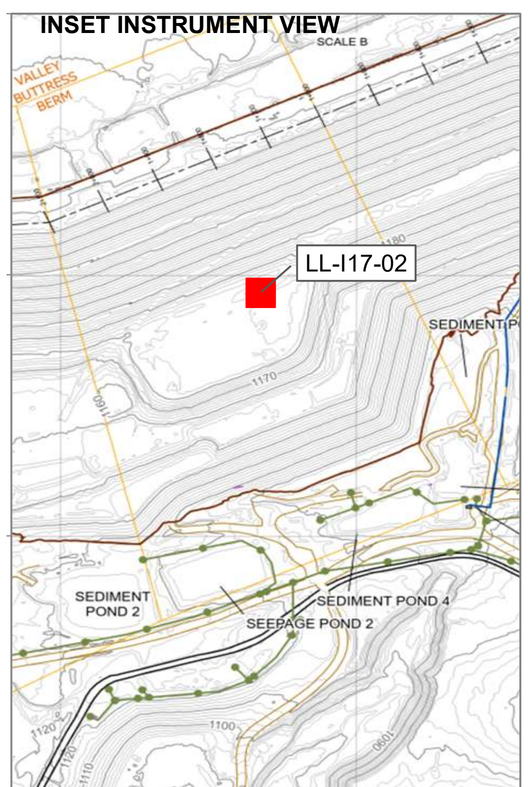












NOTES

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4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Glacial Till	1104.4-1081.4	1.0	N/A	N/A
L-GLU	1079.4-1071.8	1.0	1.5	N/A
LSG	1069.4-1055.4	1.0	N/A	N/A

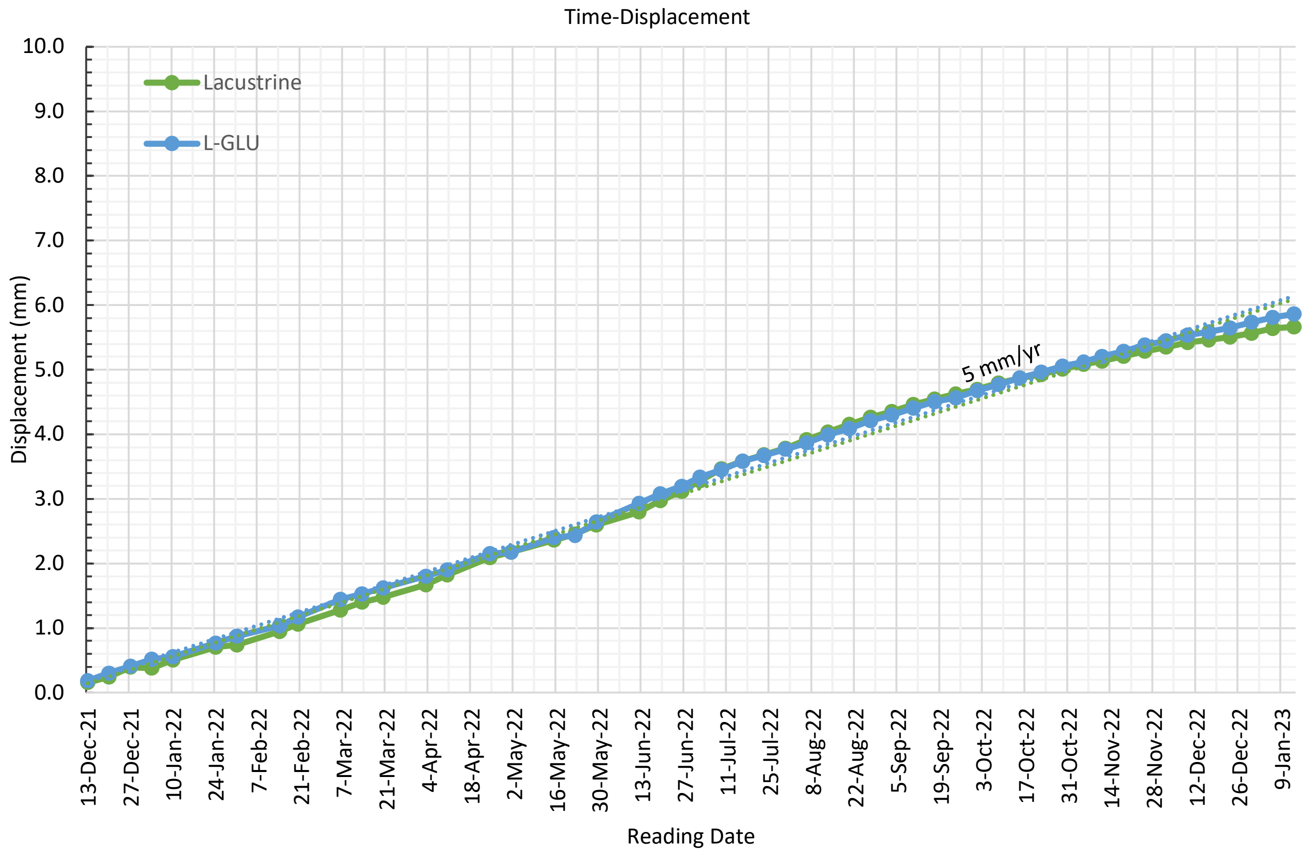
Station	Baseline Reading	Instrument Type
1+850	2022-03-03	SI

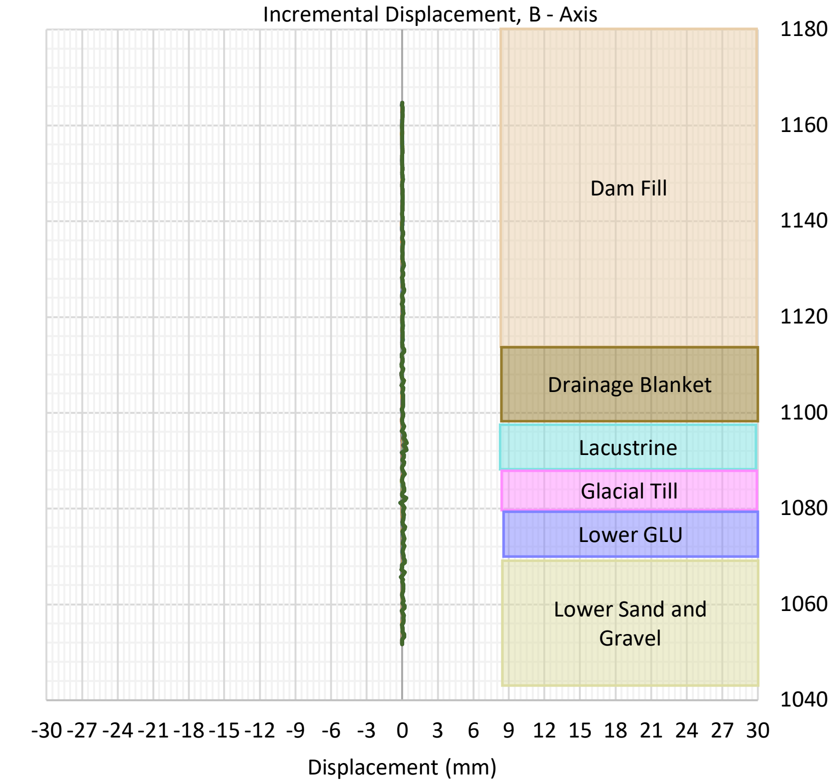
NOT FOR CONSTRUCTION

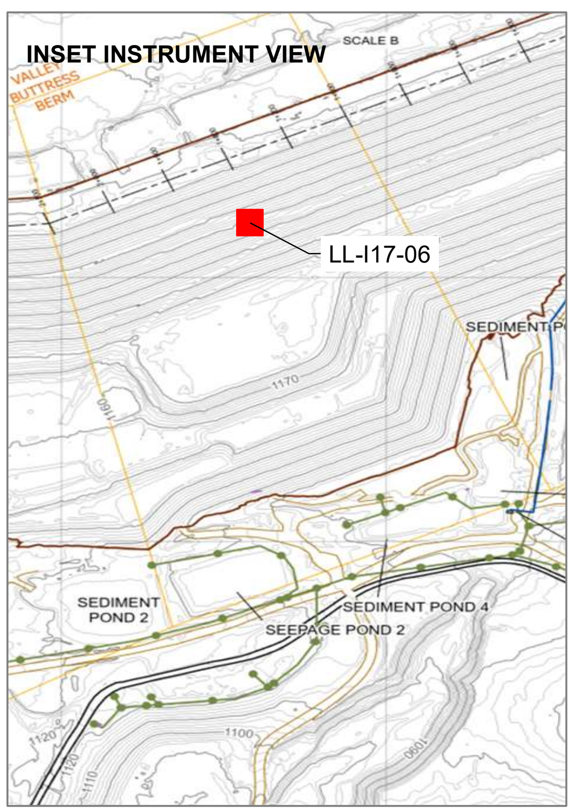
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

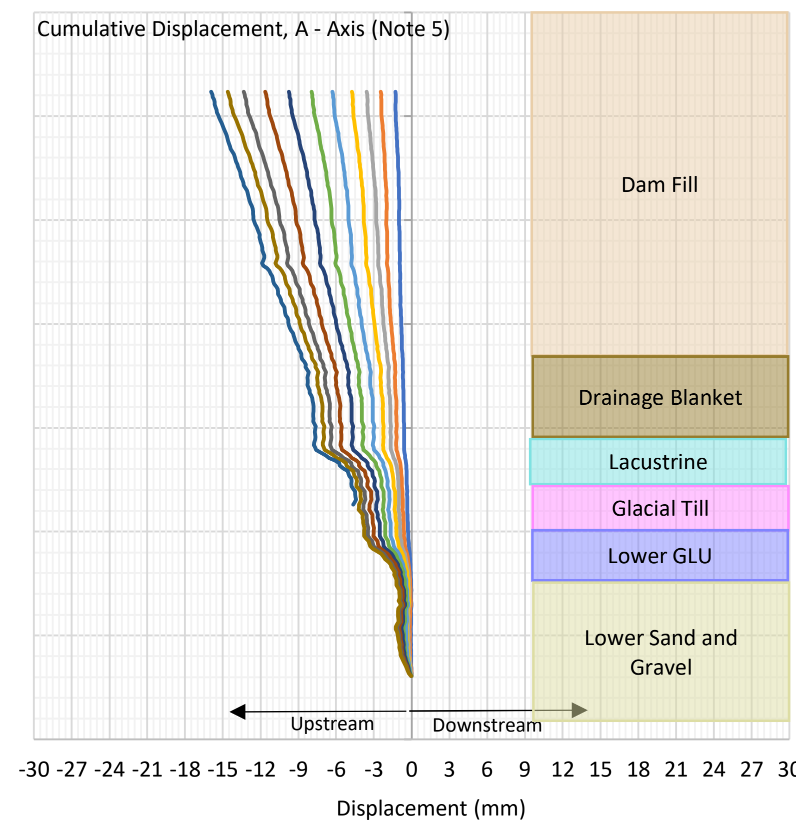
CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE LL DAM INCLINOMETER PLOTS LL-I17-02 (VBB) DEC. 2021 TO NOV. 2022

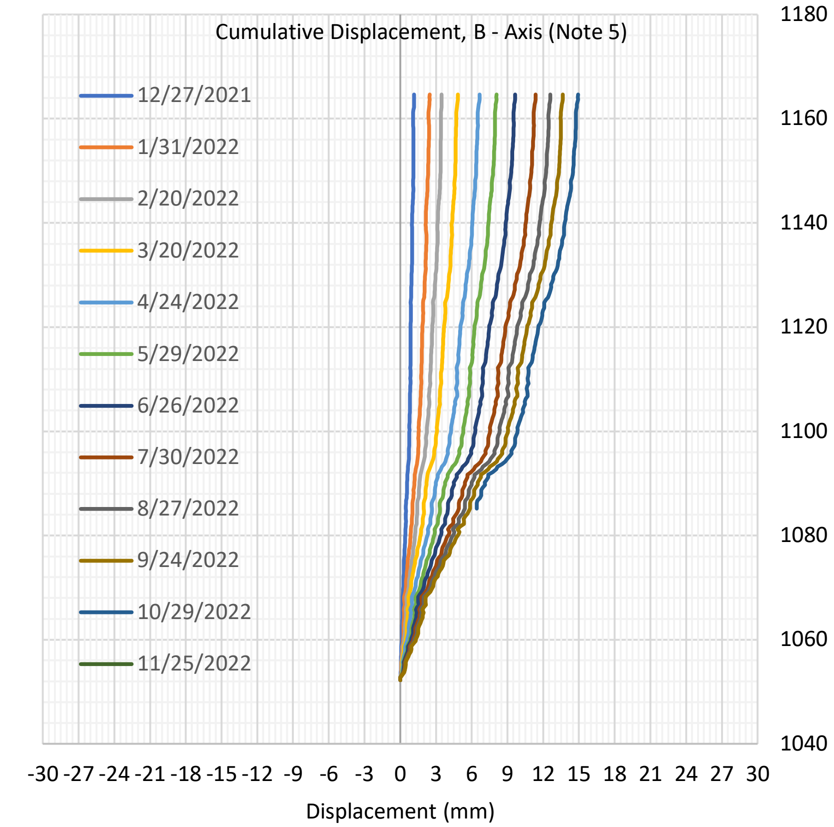
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-6











NOTES

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5. AZIMUTH CORRECTION HAS NOT BEEN APPLIED TO THIS INSTRUMENT

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Lacustrine	1101.2-1084.2	1.0	N/A	N/A
L-GLU	1084.2-1068.2	1.0	1.6	N/A

Station	Baseline Reading	Instrument Type
1+840	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

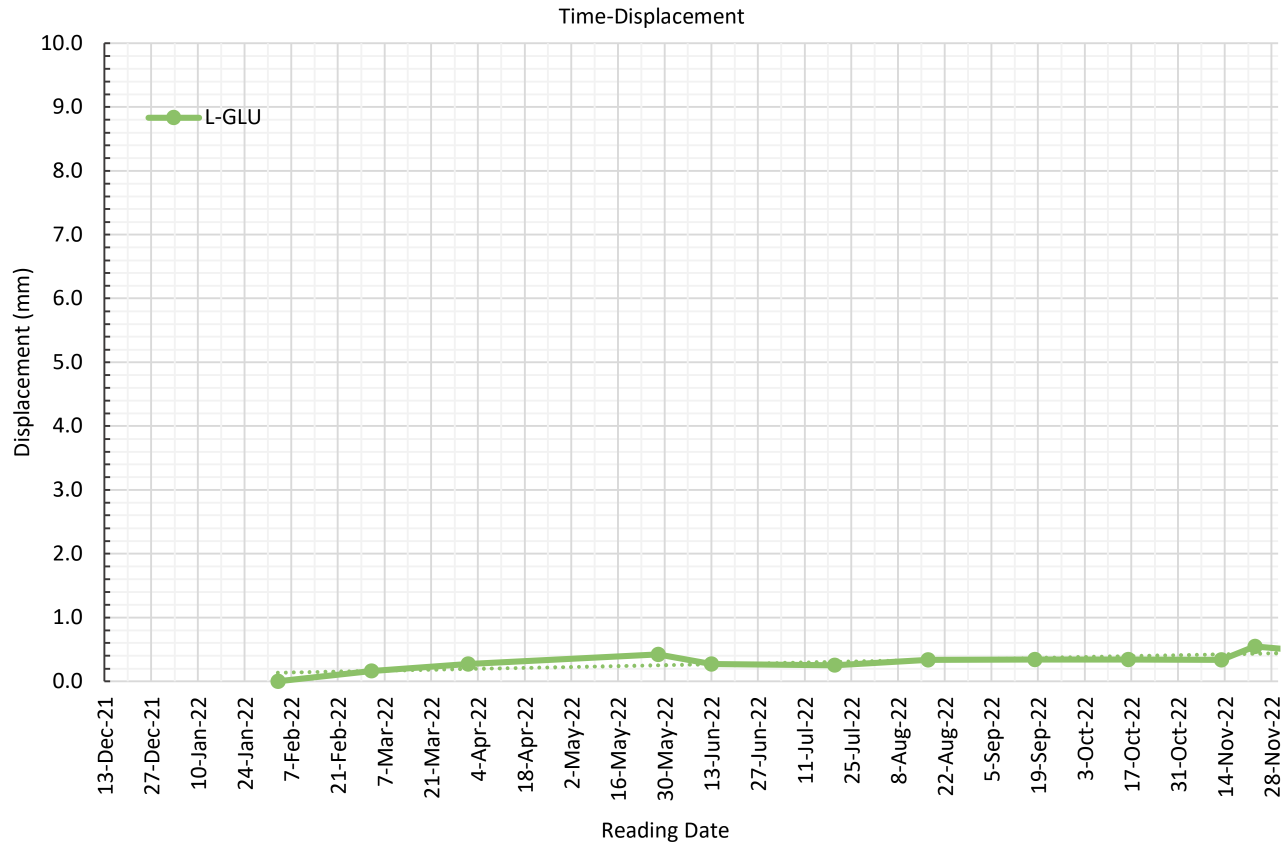
CLIENT
Highland Valley Copper / Teck

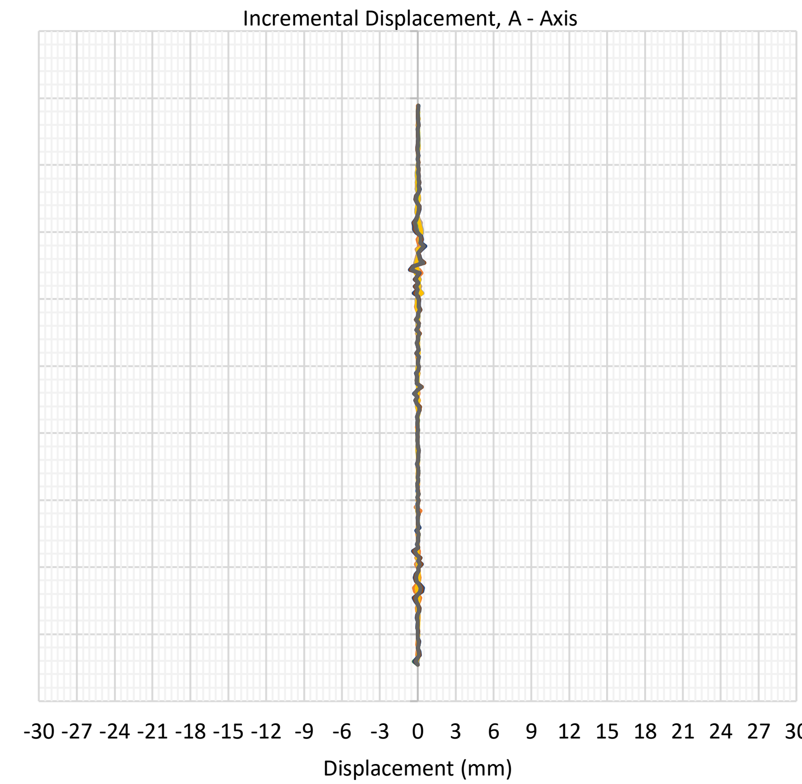
Klohn Crippen Berger

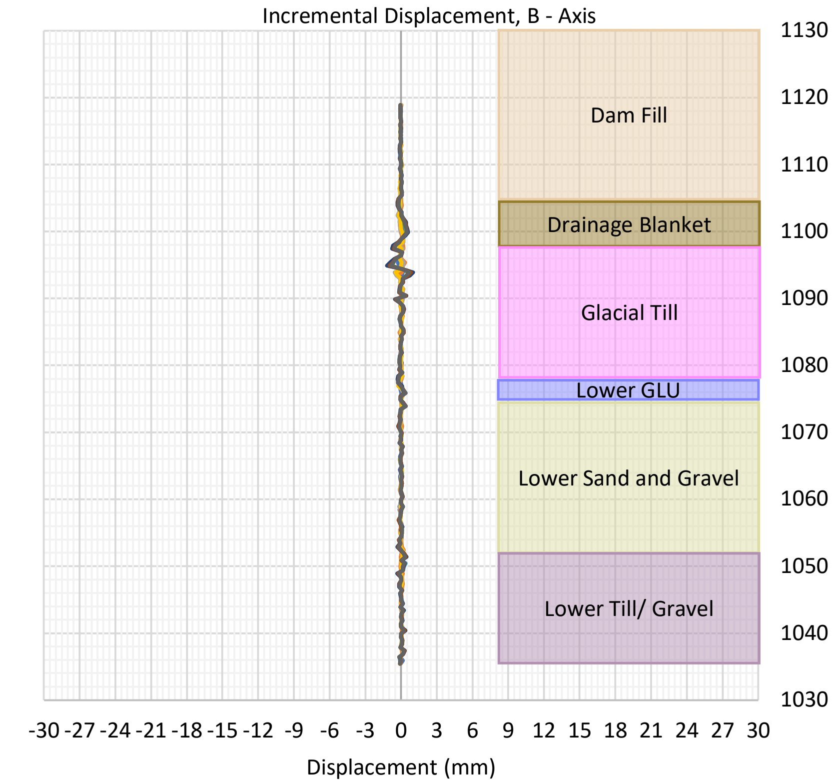
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

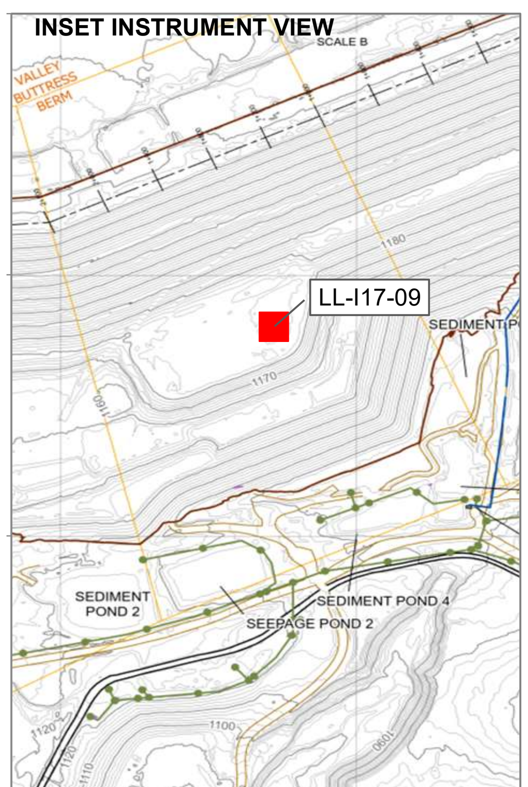
TITLE
LL DAM INCLINOMETER PLOTS
LL-I17-06 (VBB)
DEC. 2021 TO NOV. 2022

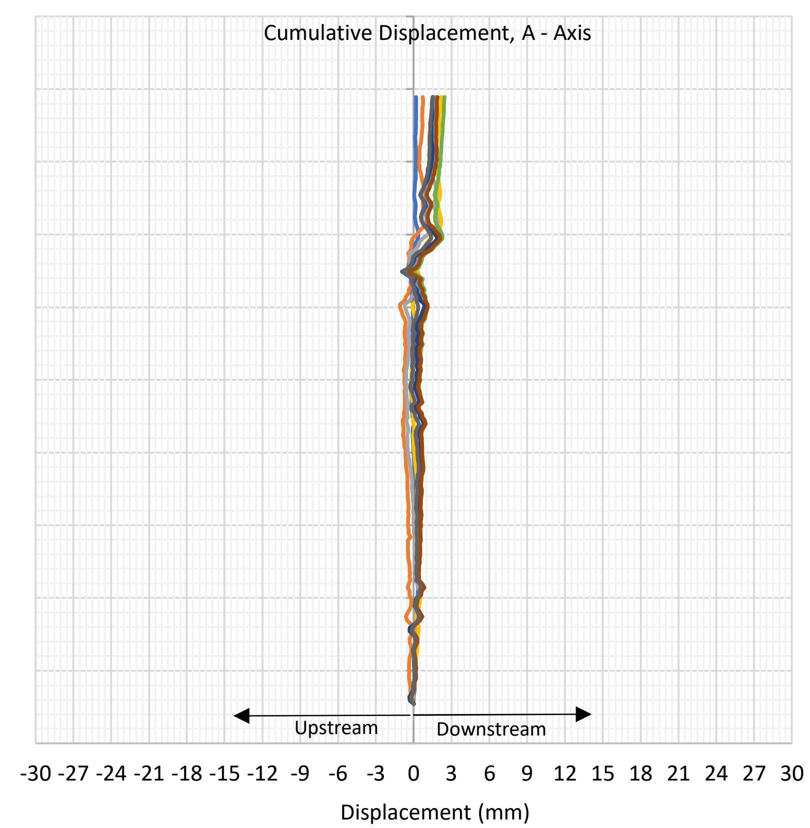
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-7

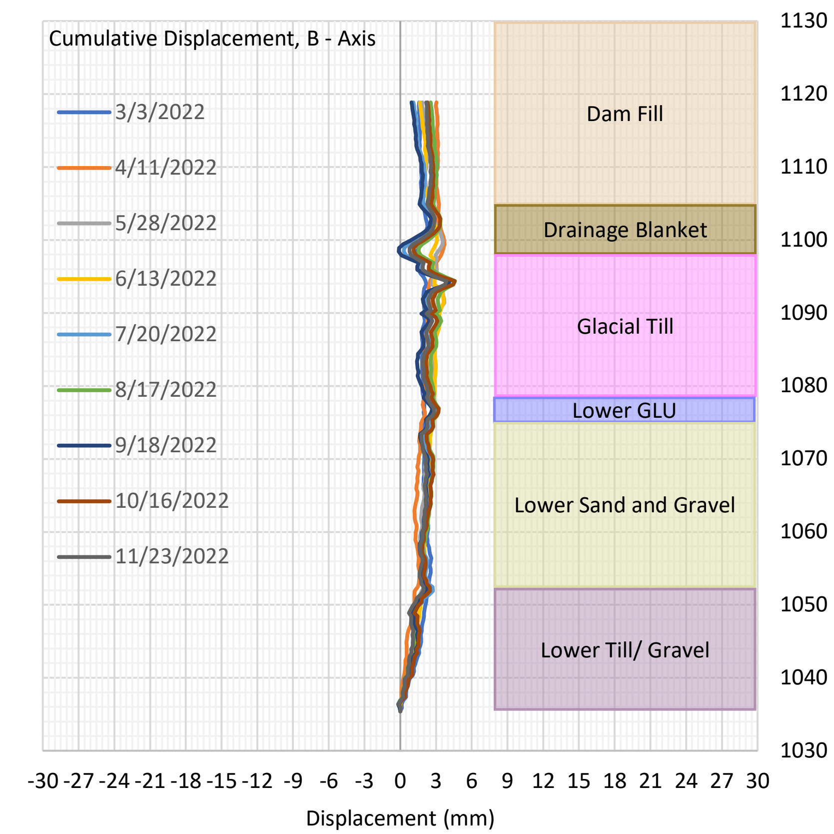












NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
L-GLU	1077.9-1070.9	1.0	N/A	12.2

Station	Baseline Reading	Instrument Type
1+850	2022-03-03	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

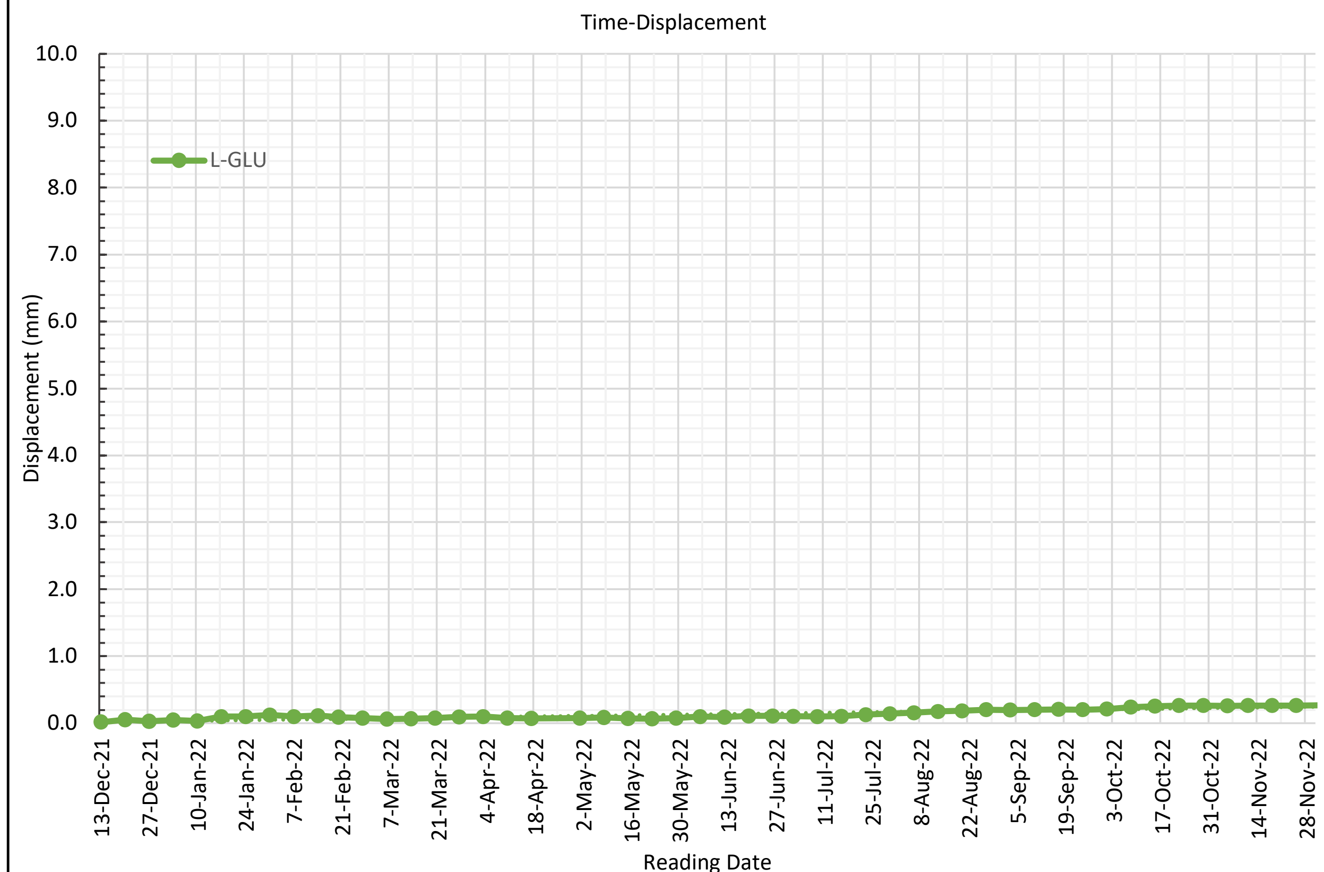
CLIENT: Highland Valley Copper / Teck

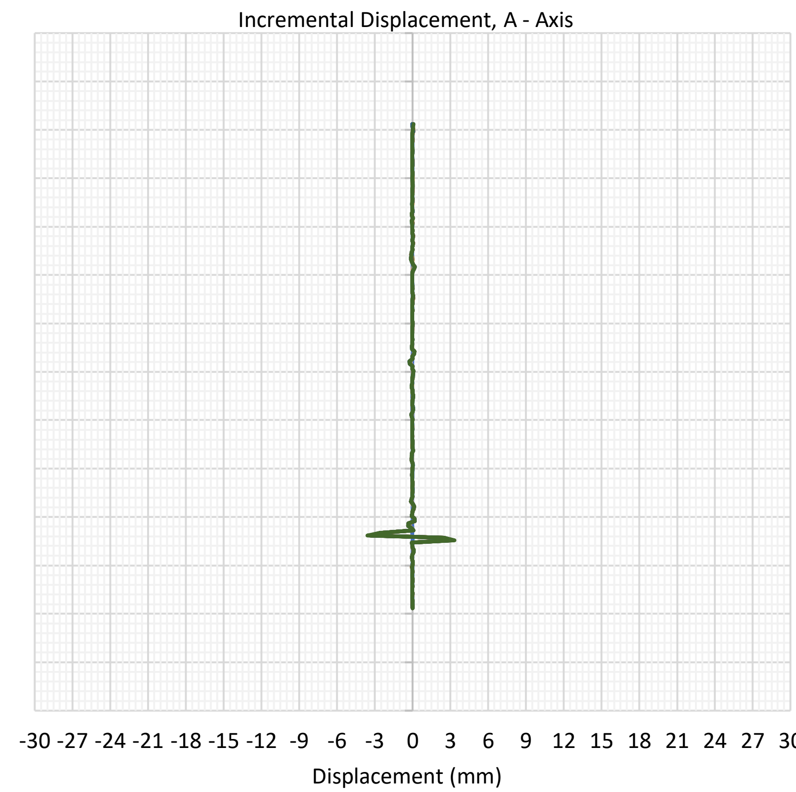
Klohn Crippen Berger

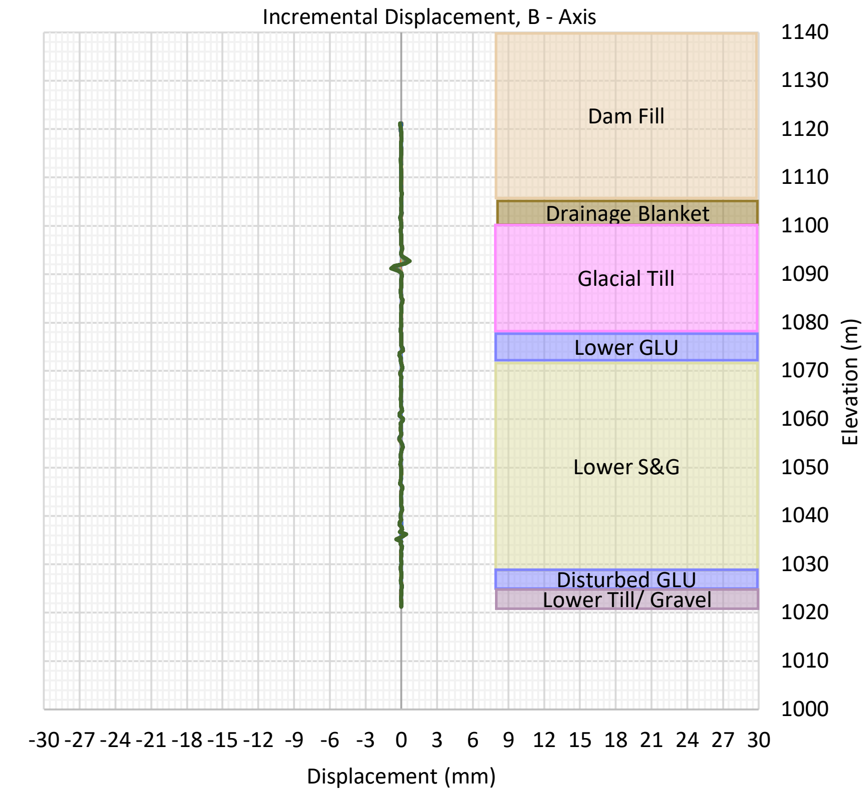
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

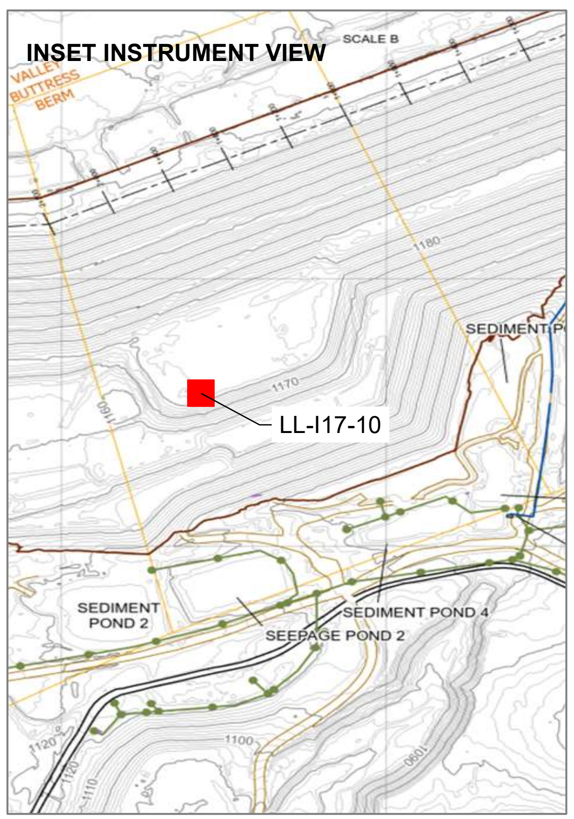
TITLE: LL DAM INCLINOMETER PLOTS
LL-I17-09 (VBB)
DEC. 2021 TO NOV. 2022

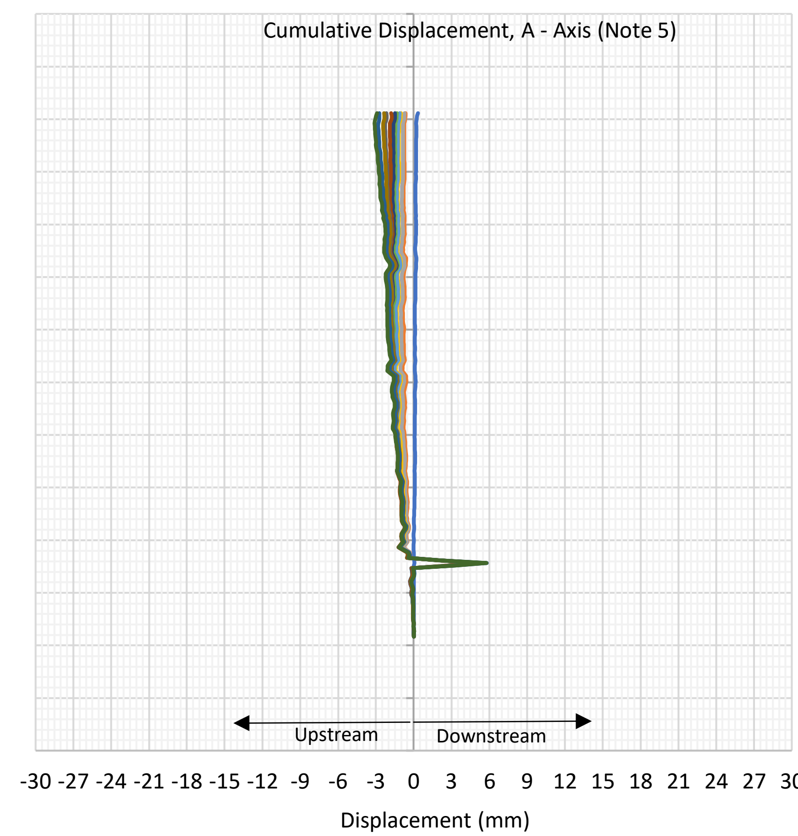
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-8

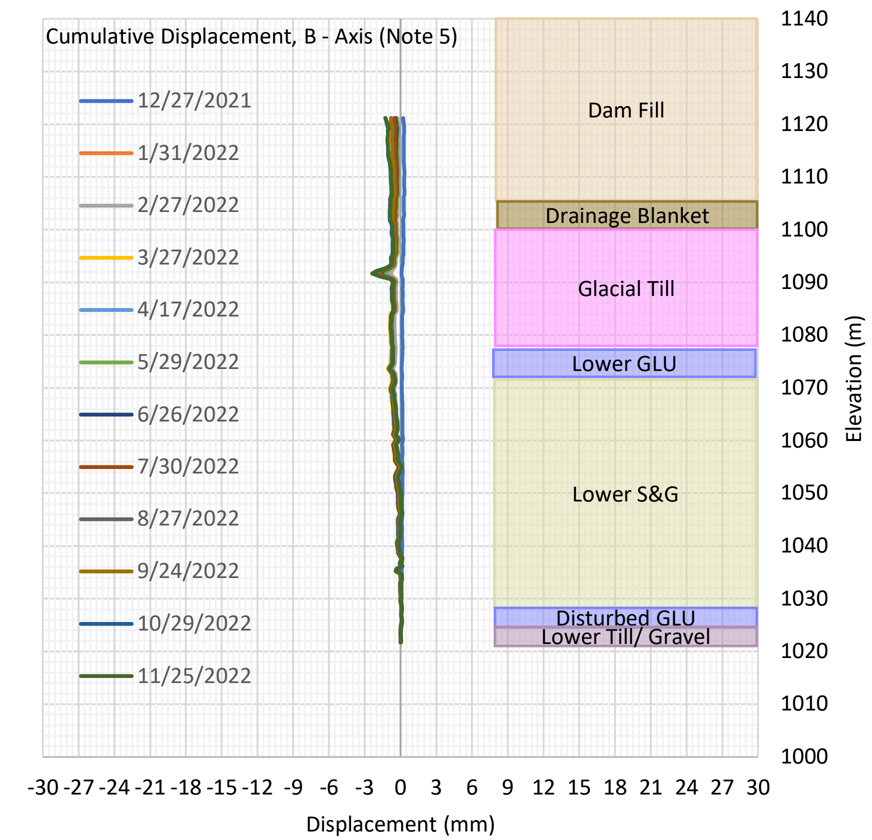












NOTES

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5. AZIMUTH CORREACTION HAS NOT BEEN APPLIED TO THIS INSTRUMENT.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
L-GLU	1075.2-1067.2	0.7	N/A	2.0

Station	Baseline Reading	Instrument Type
2+040	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

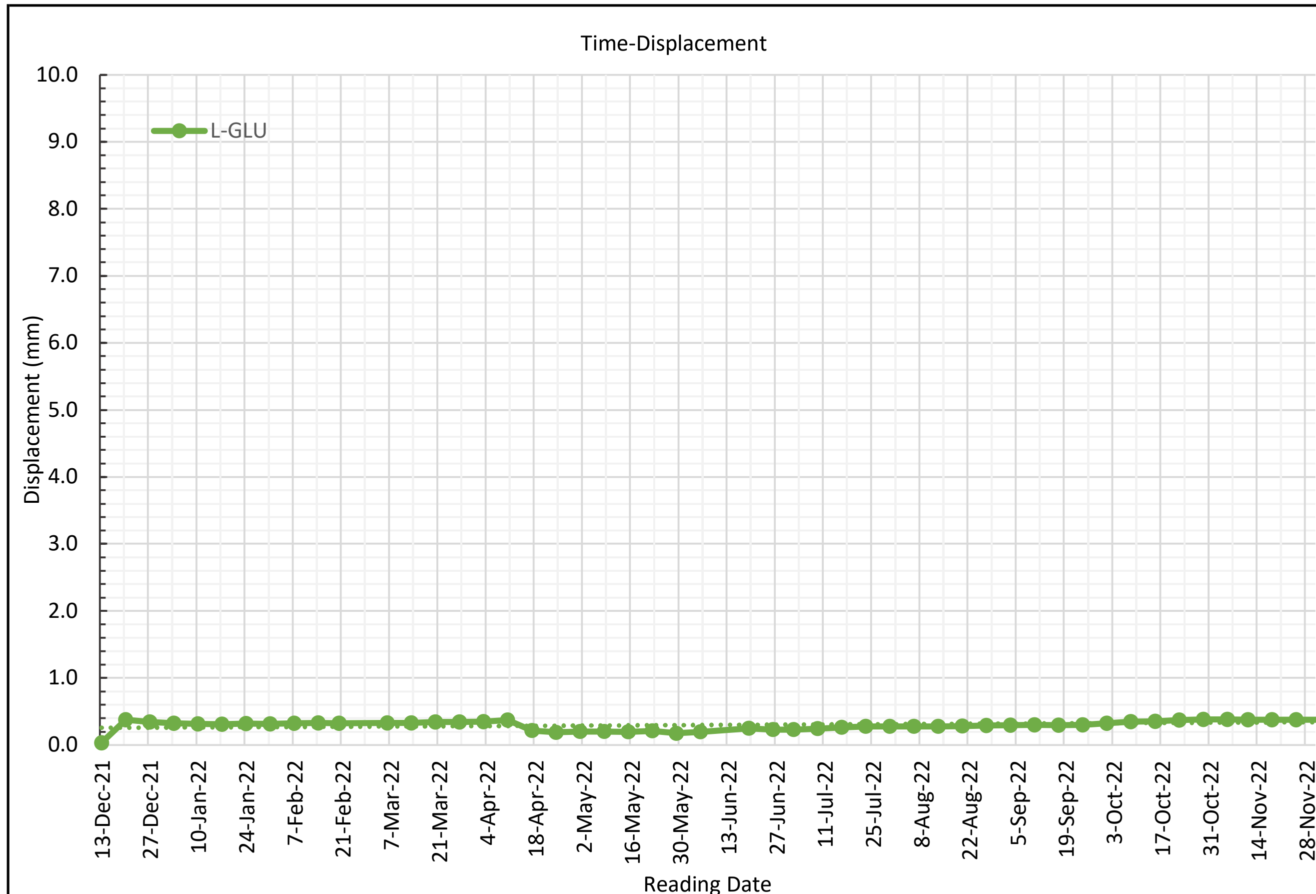
CLIENT: Highland Valley Copper / Teck

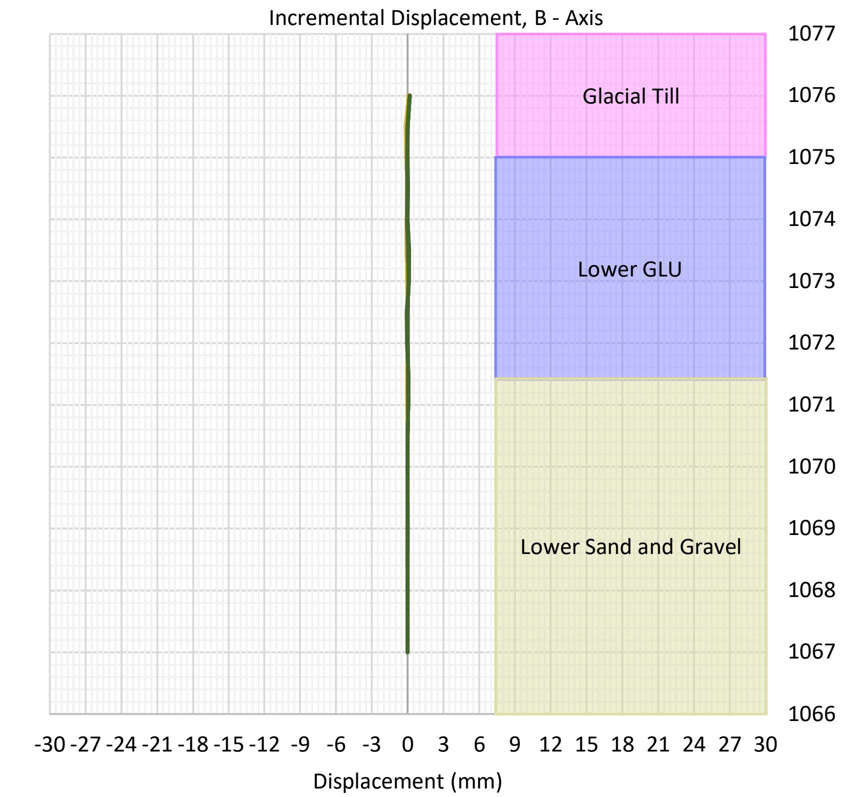
Klohn Crippen Berger

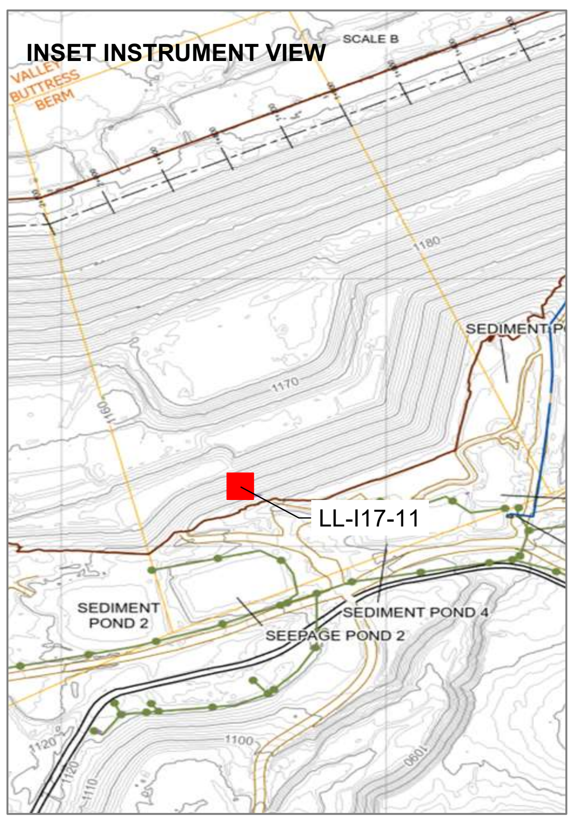
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

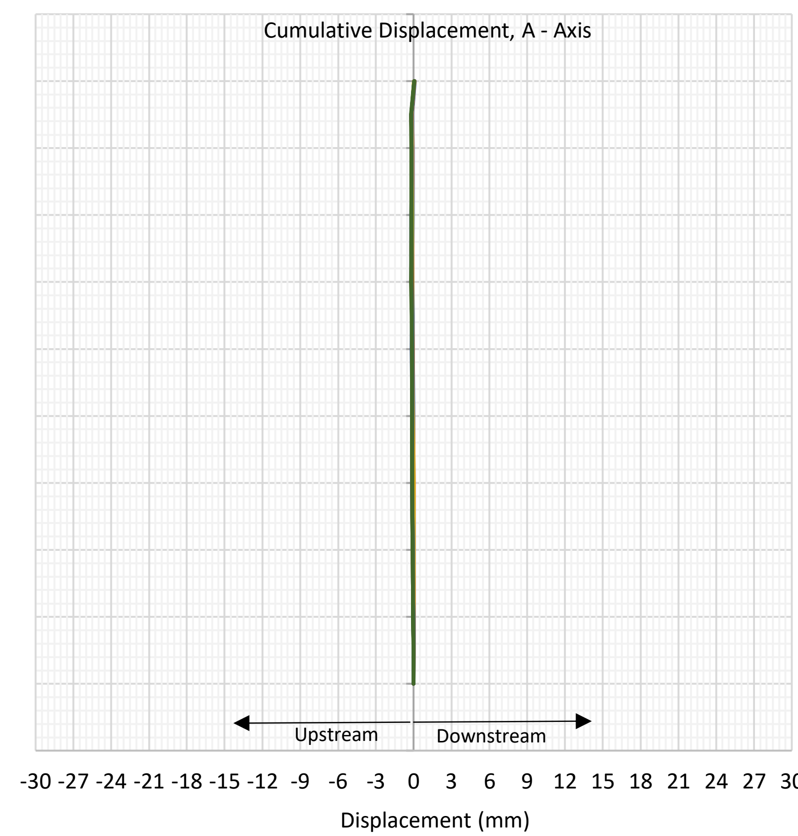
TITLE: LL DAM INCLINOMETER PLOTS LL-I17-10 (VBB) DEC. 2021 TO NOV. 2022

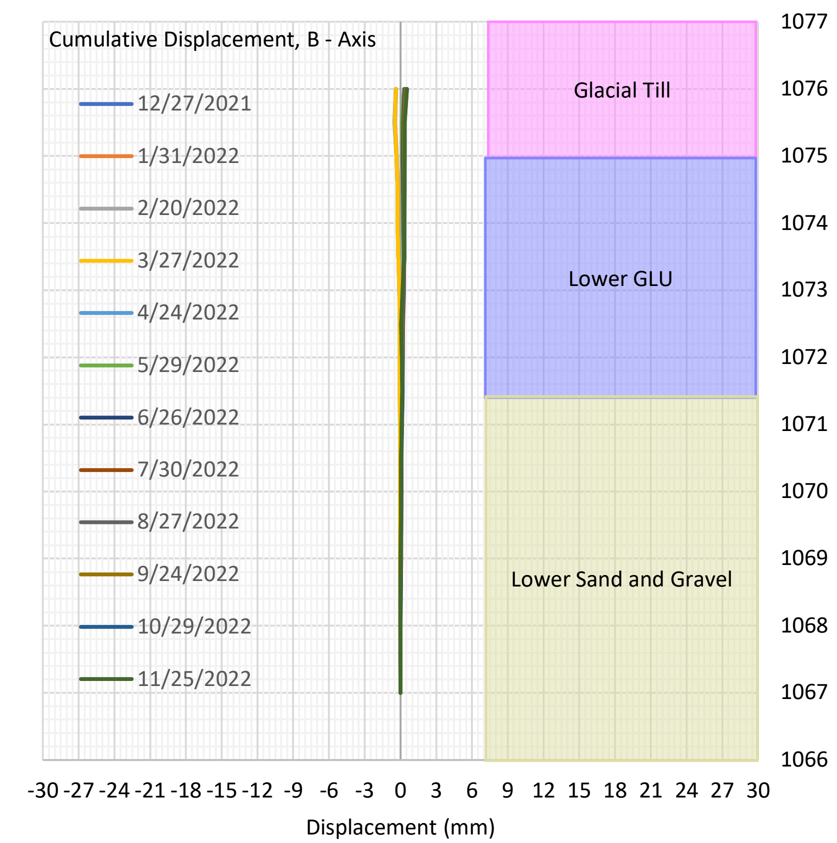
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-9











NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
L-GLU	1075.2-1067.2	0.5	N/A	1.0

Station	Baseline Reading	Instrument Type
2+060	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

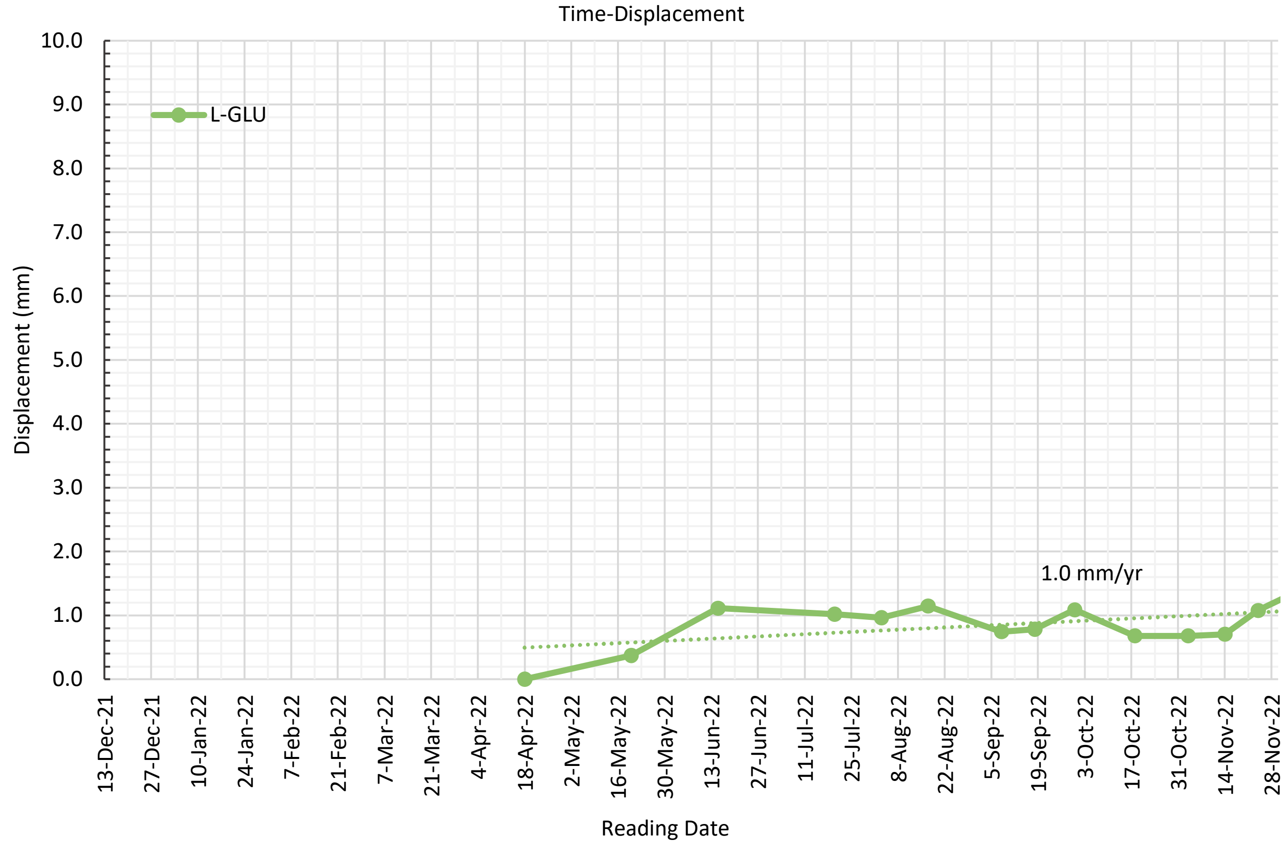
CLIENT: Highland Valley Copper / Teck

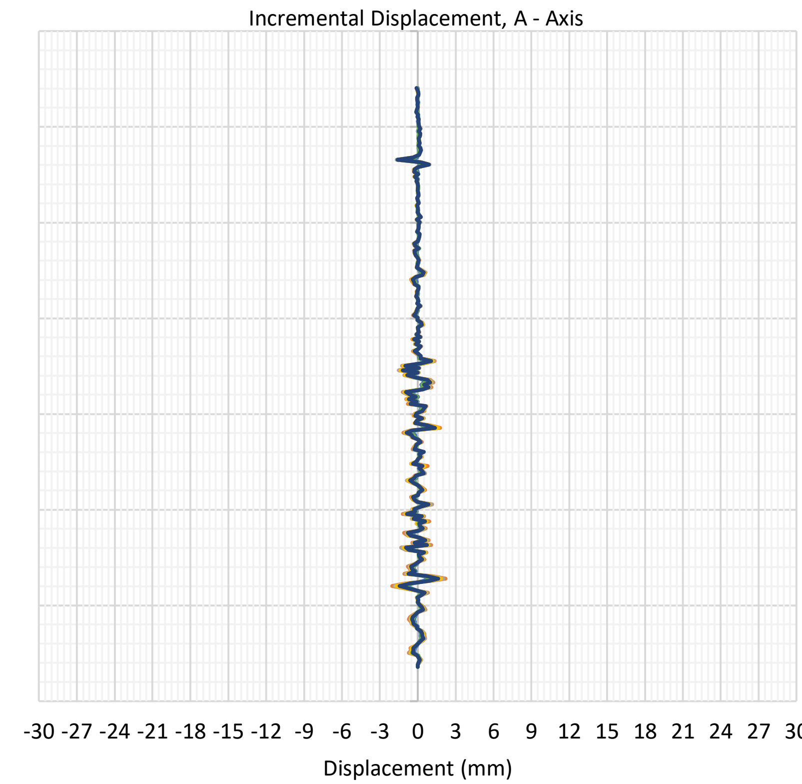
Klohn Crippen Berger

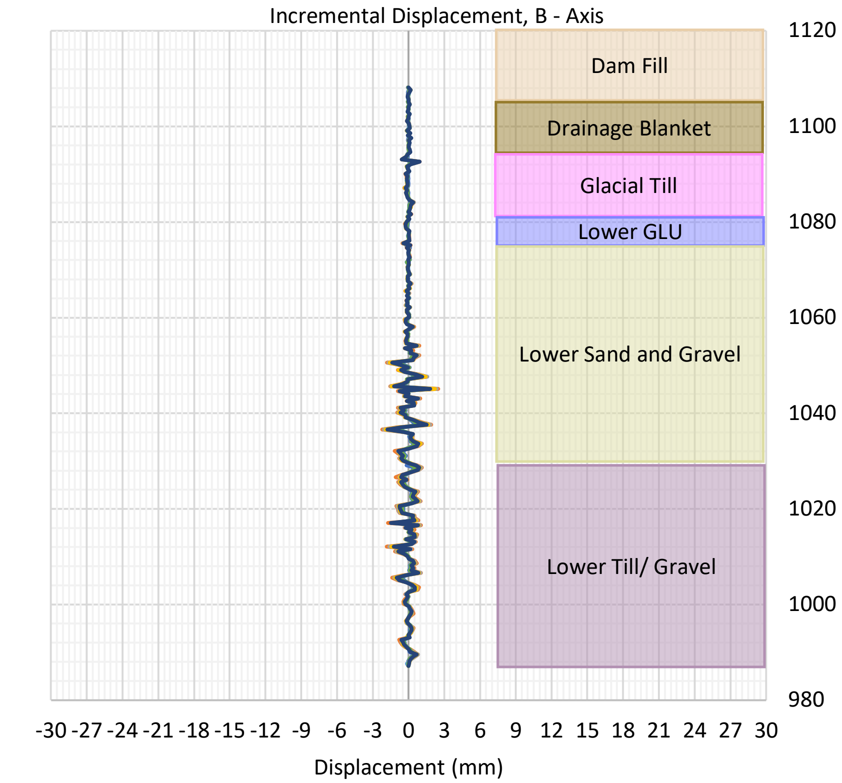
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

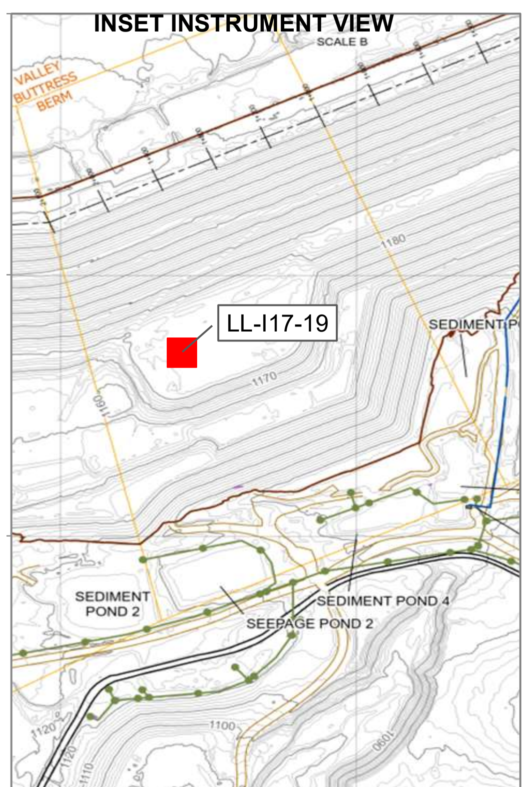
TITLE: LL DAM INCLINOMETER PLOTS
LL-I17-11 (VBB)
DEC. 2021 TO NOV. 2022

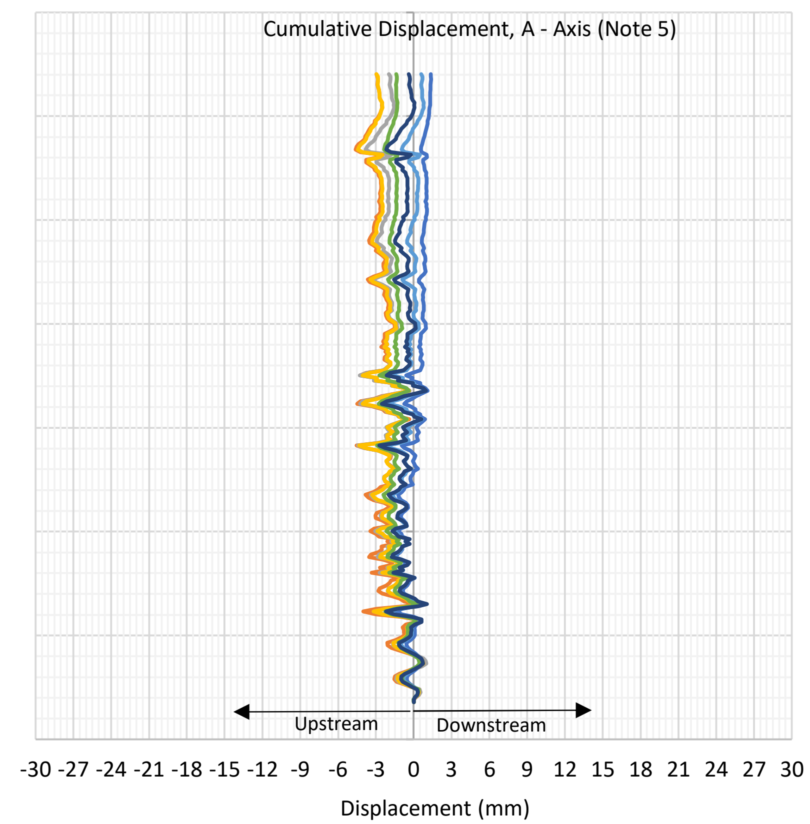
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-10

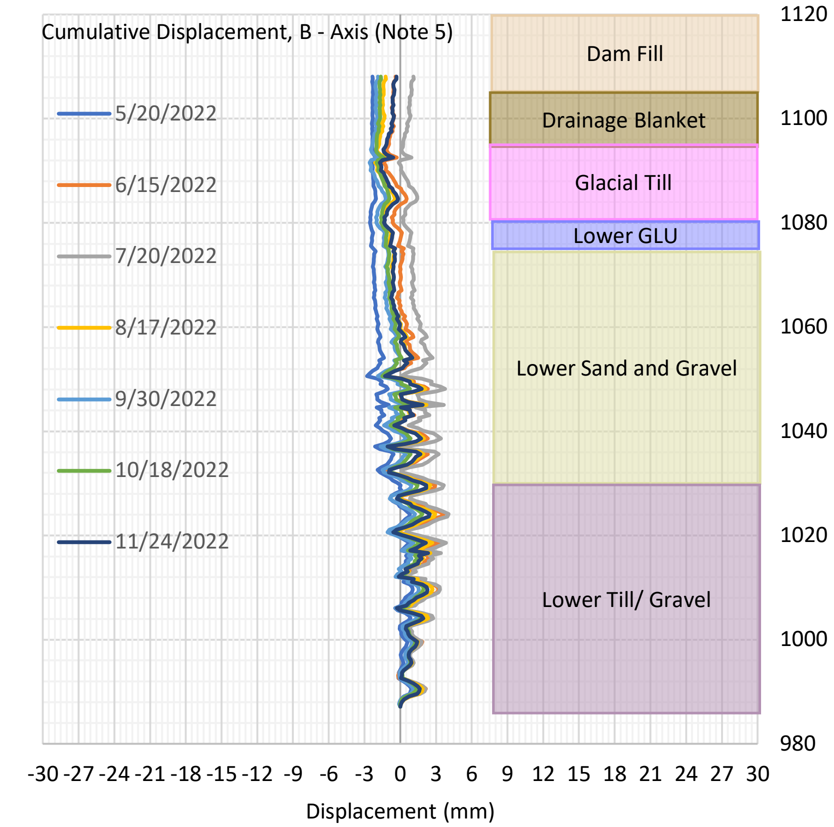












NOTES

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5. AZIMUTH CORRECTION HAS NOT BEEN APPLIED TO THIS INSTRUMENT.
6. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
L-GLU	1081.0-1075.0	1.0	N/A	13.2

Station	Baseline Reading	Instrument Type
2+000	2022-05-20	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

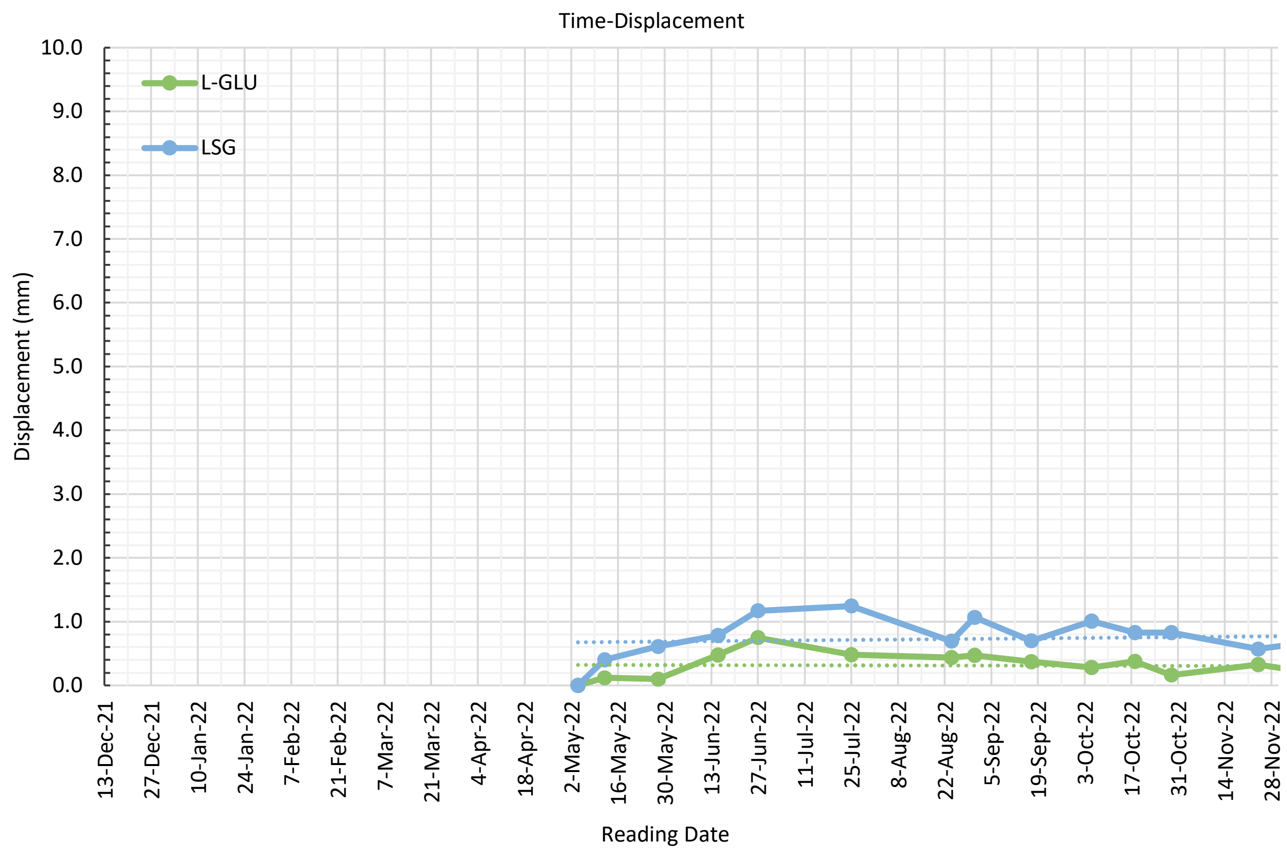
CLIENT: Highland Valley Copper / Teck

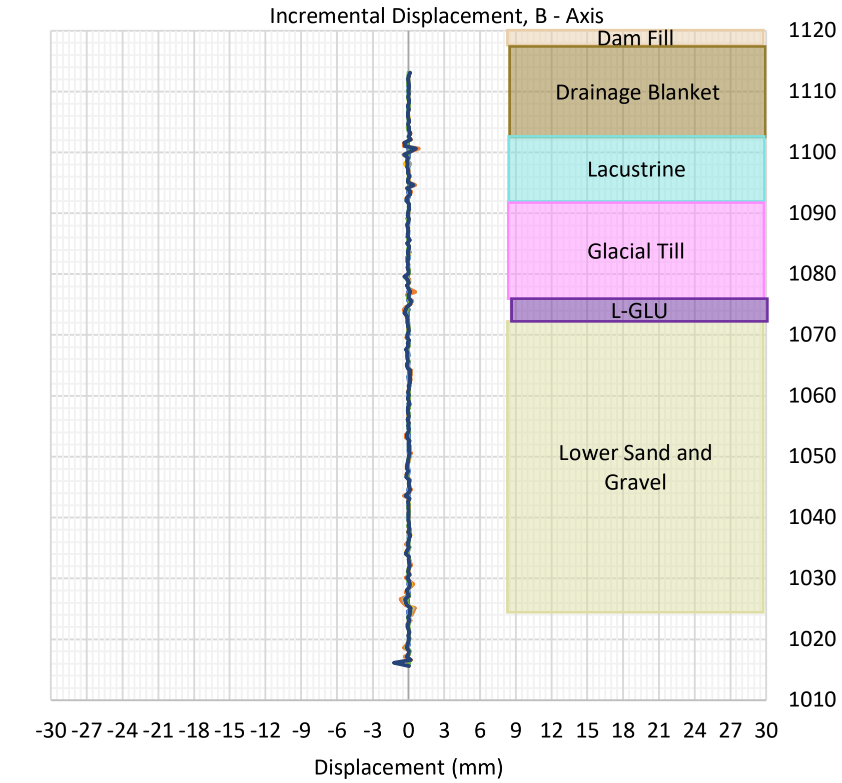
Klohn Crippen Berger

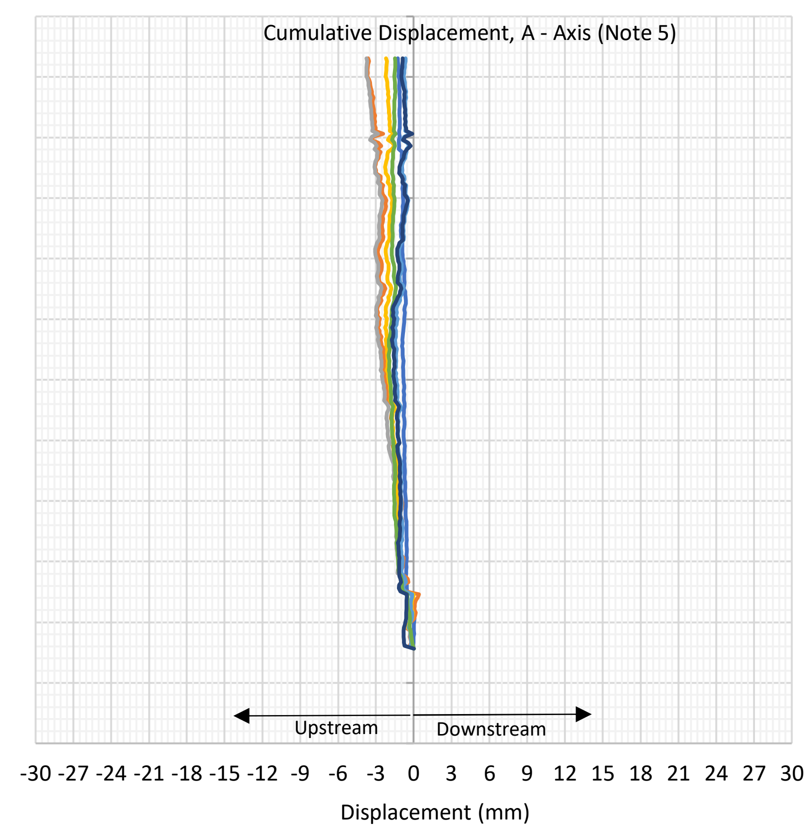
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

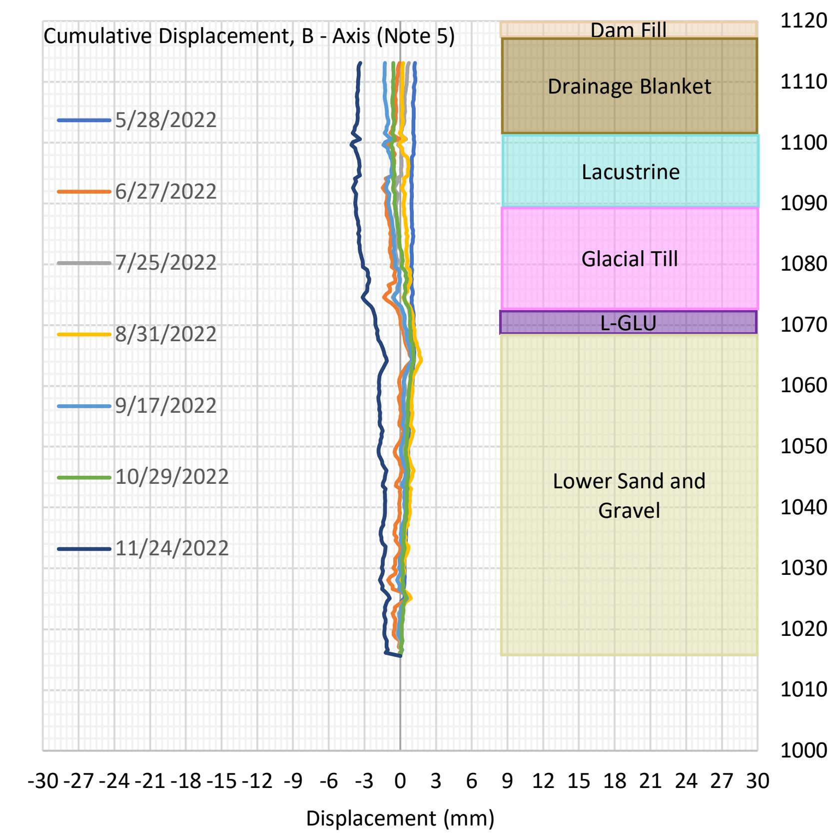
TITLE: LL DAM INCLINOMETER PLOTS
LL-I17-19 (VBB)
DEC. 2021 TO NOV. 2022

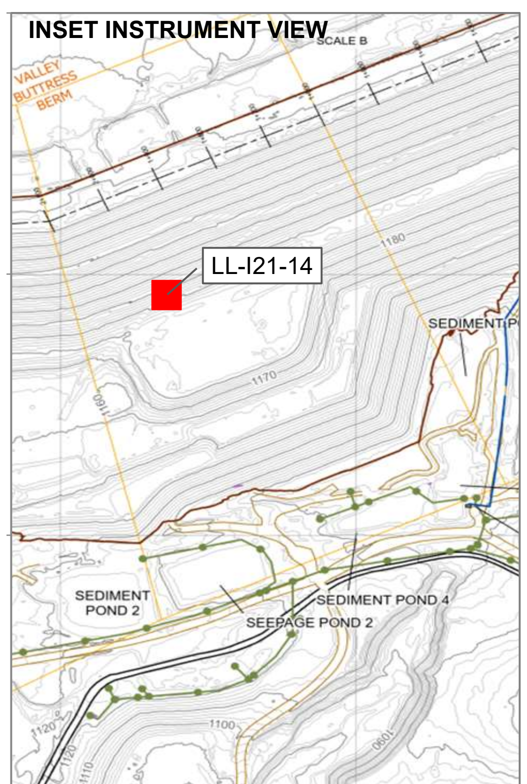
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-11











NOTES

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6. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.
7. GEOLOGY PRESENTED WAS LOGGED FOR LL-I10-06.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
L-GLU	1078.6-1075.0	1.0	N/A	N/A
LSG	1034.0-1023.0	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
2+000	2022-05-12	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

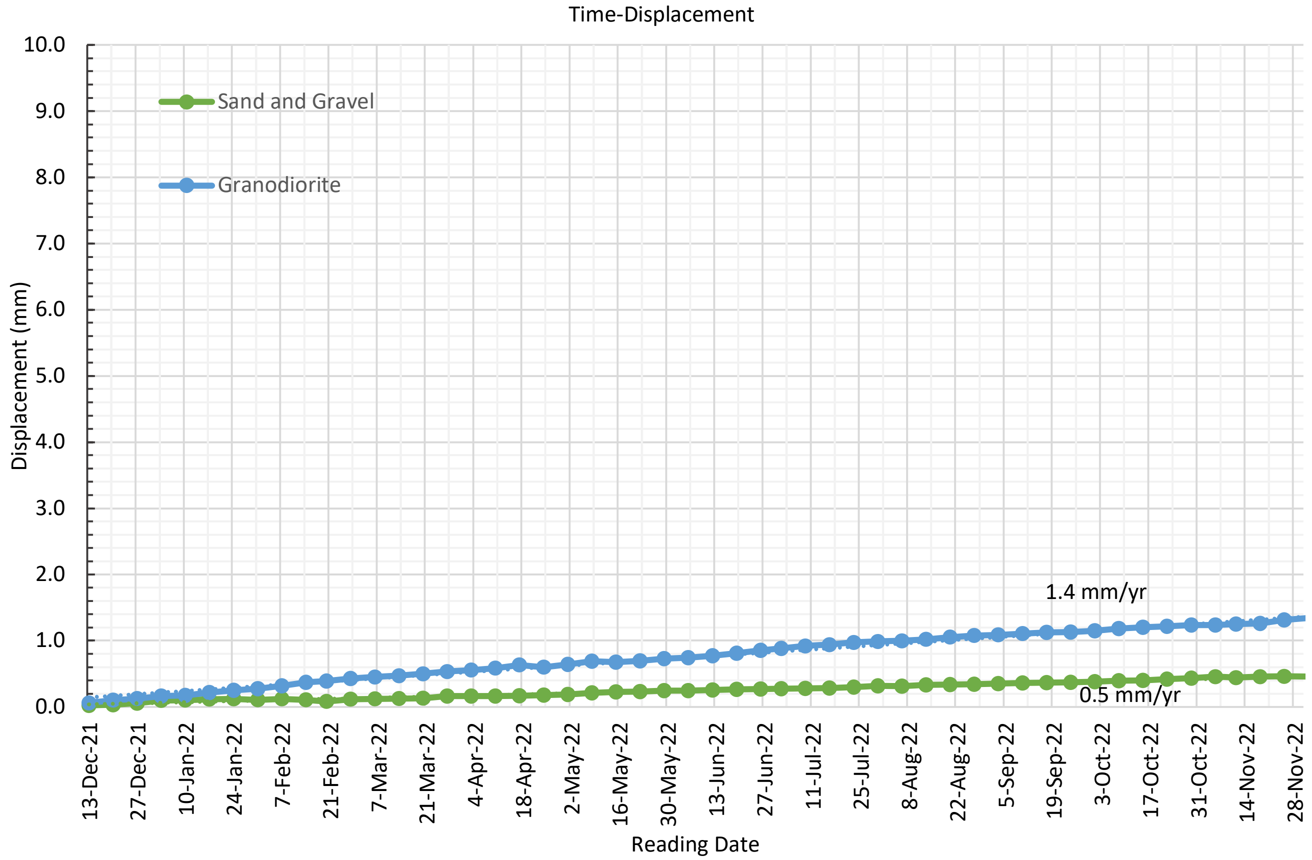
Klohn Crippen Berger

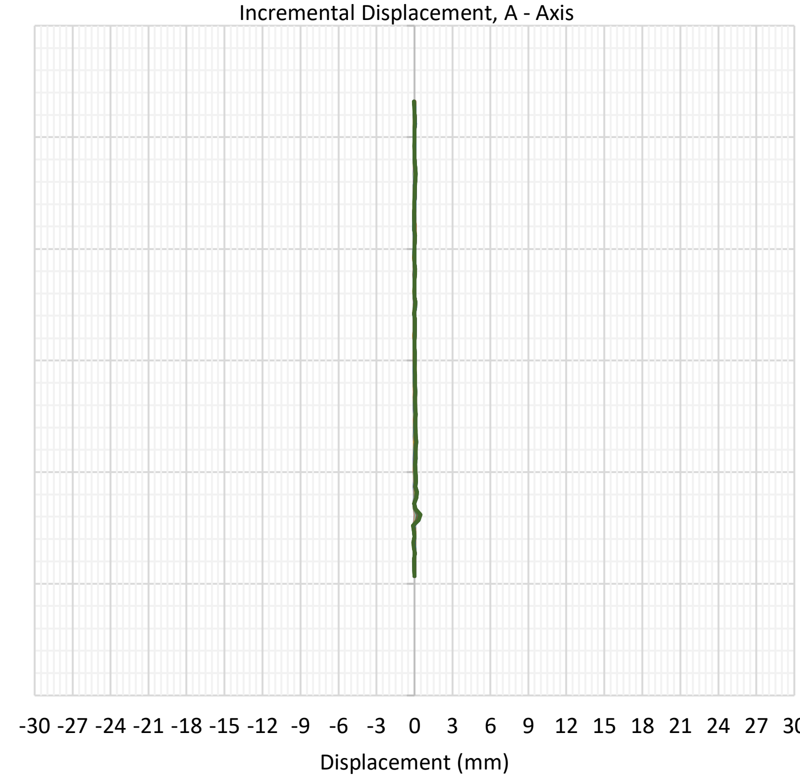
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

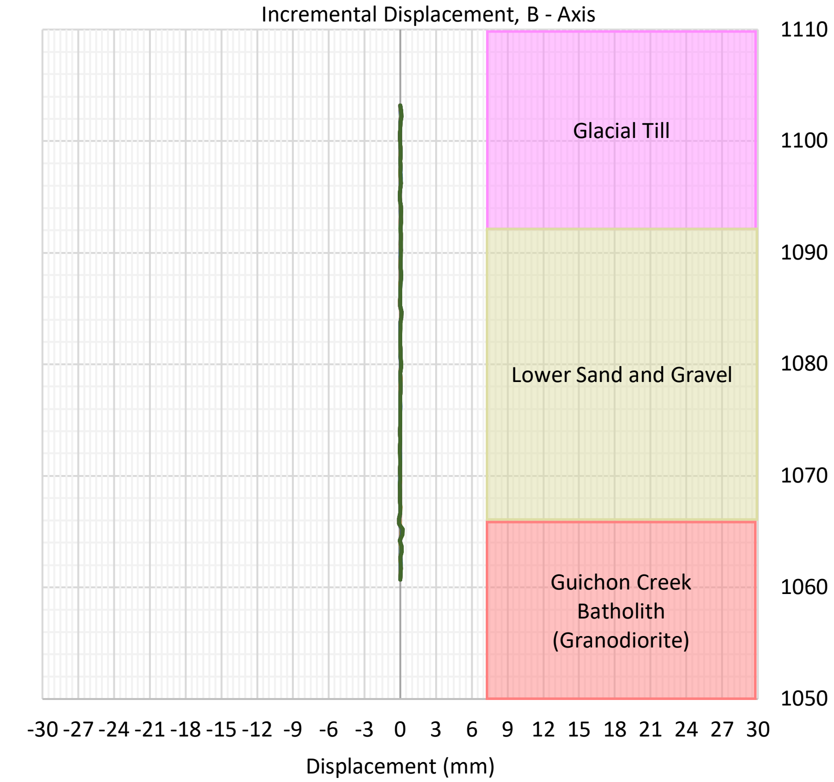
TITLE: LL DAM INCLINOMETER PLOTS
LL-I21-14 (VBB)
DEC. 2021 TO NOV. 2022

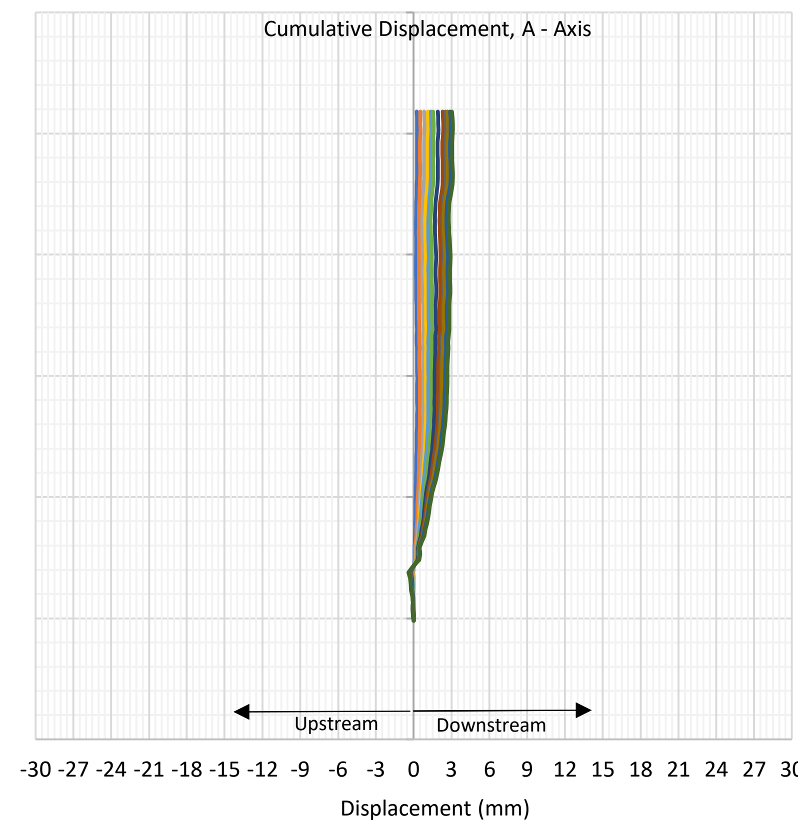
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-12

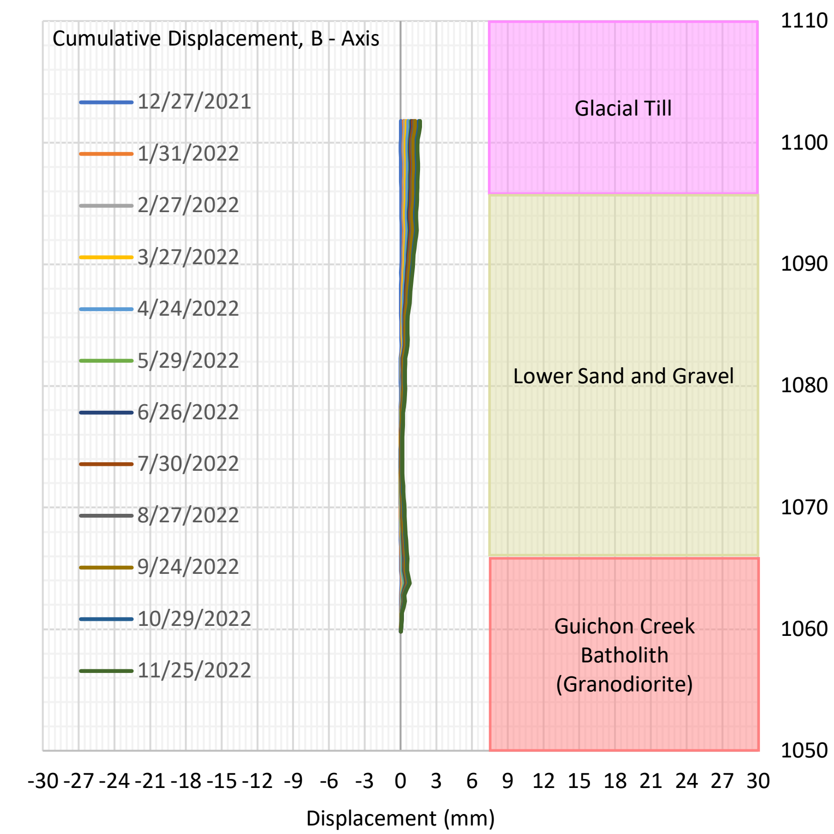
Valley Buttress Berm Extension

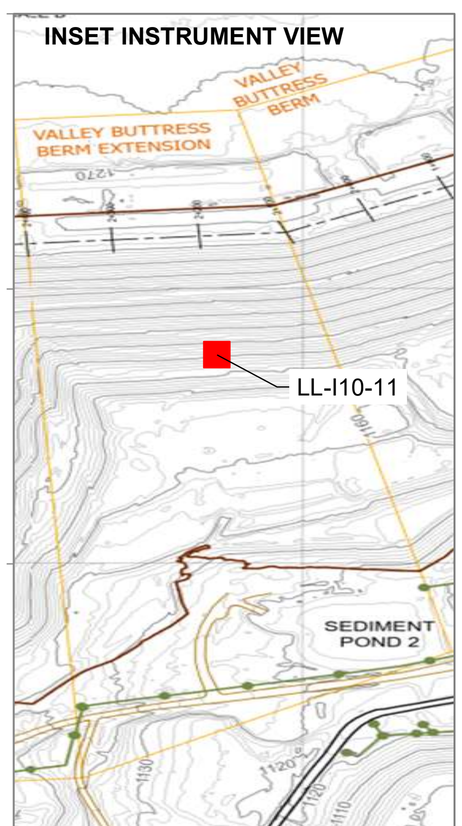












Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Sand and Gravel	1087.8-1081.8	1.0	N/A	N/A
Granodiorite	1068.8-1059.8	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
2+200	2021-12-13	SAAV

NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

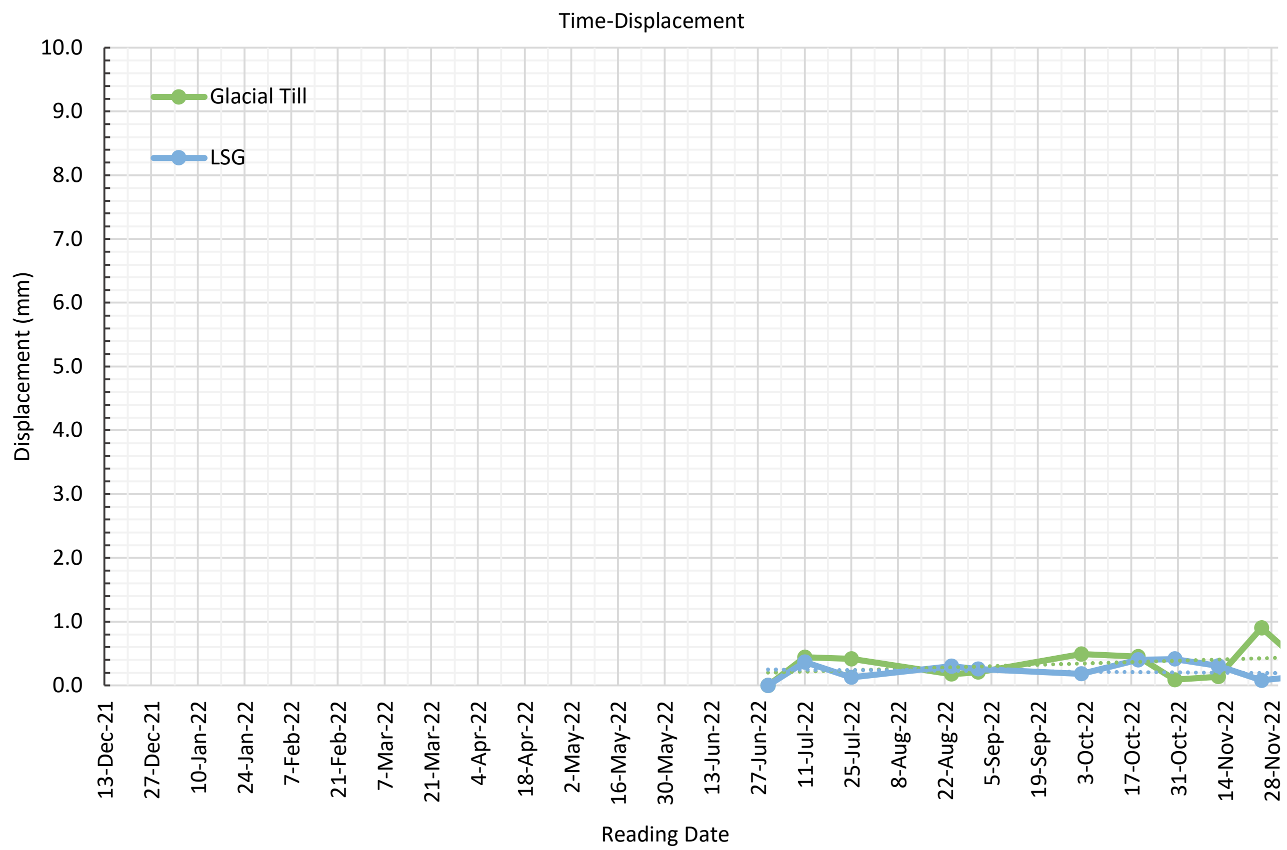
CLIENT: Highland Valley Copper / Teck

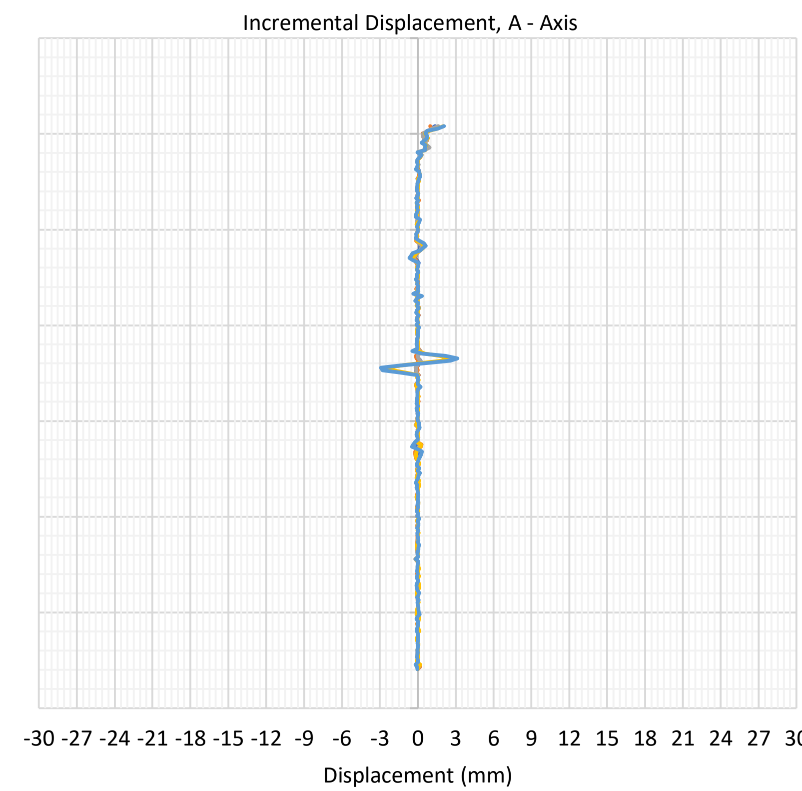
Klohn Crippen Berger

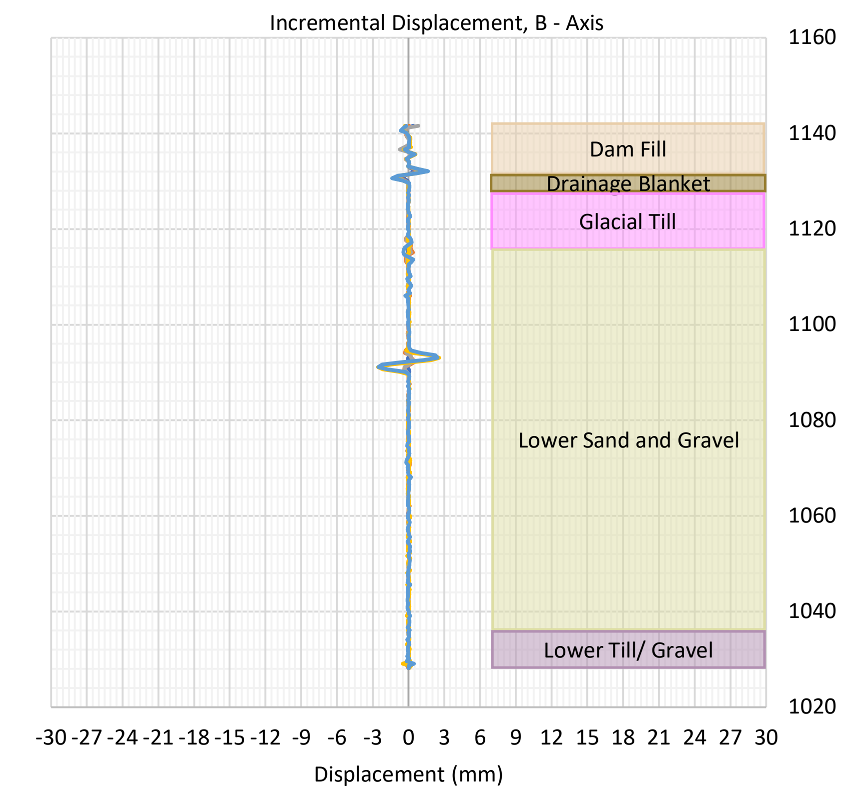
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

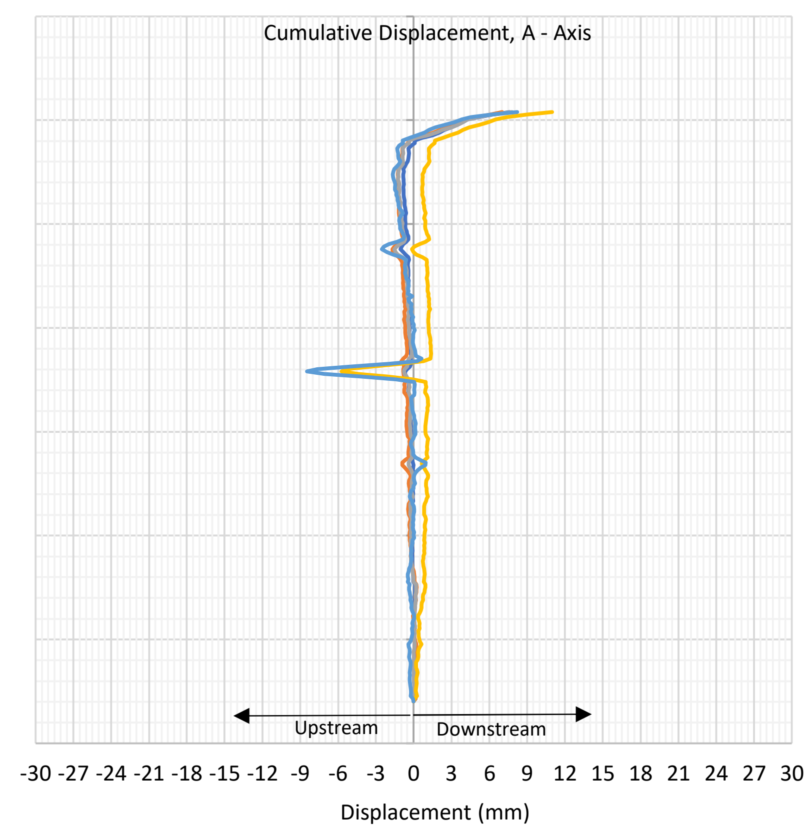
TITLE: LL DAM INCLINOMETER PLOTS LL-I10-11 (VBBE) DEC. 2021 TO NOV. 2022

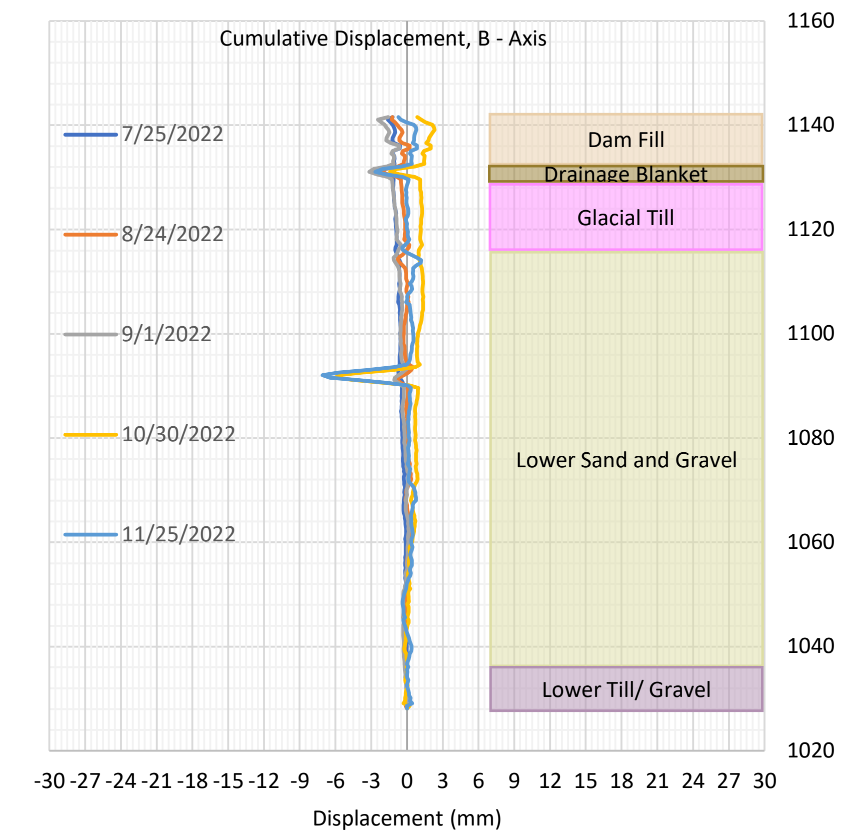
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-13

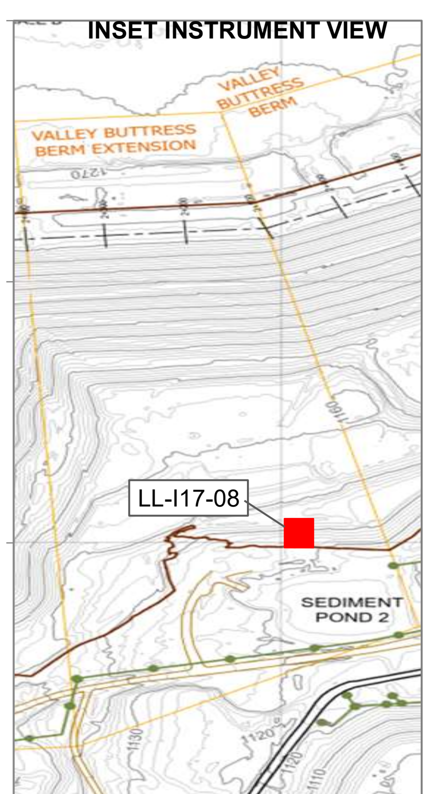












NOTES

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4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Glacial Till	1120.0-1113.0	1.0	N/A	N/A
LSG	1096.6-1089.6	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
2+150	2022-07-11	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

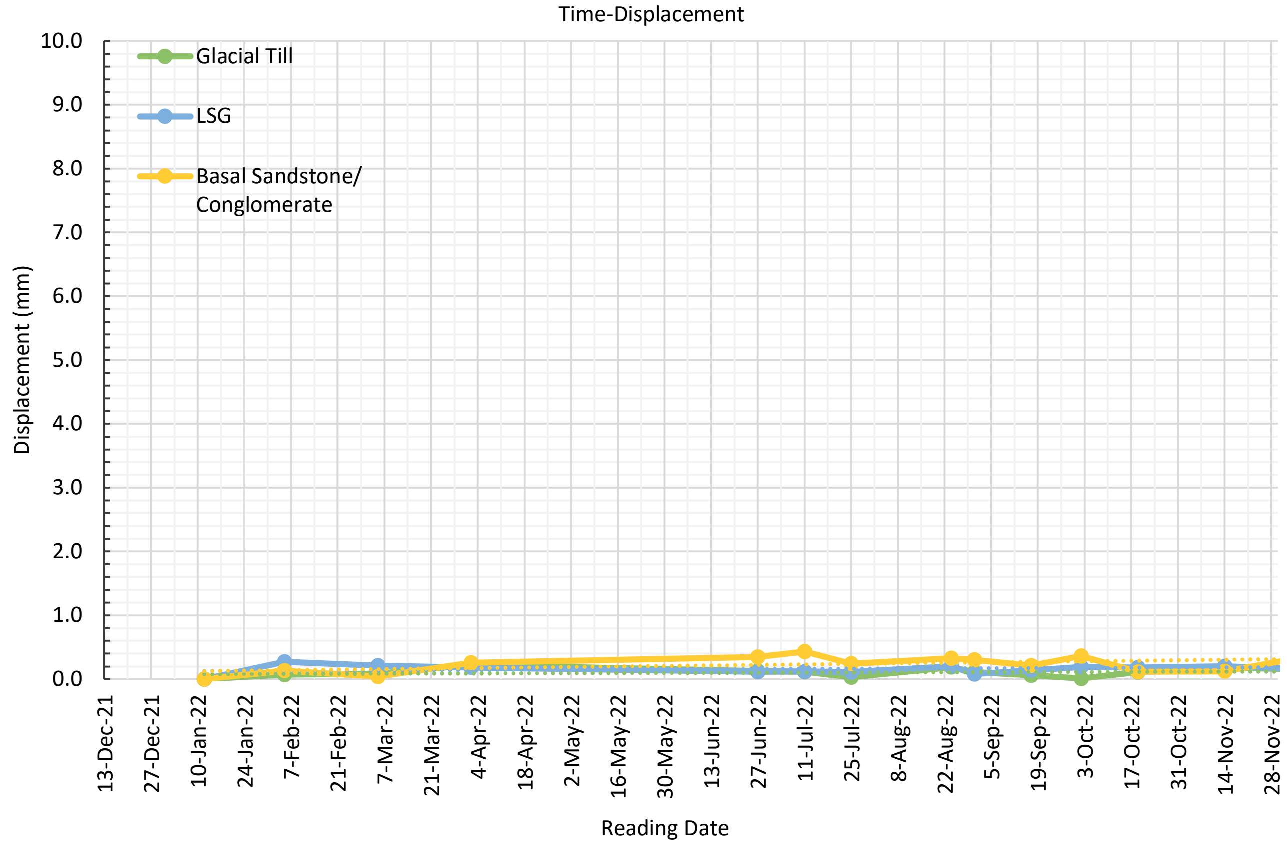
CLIENT
Highland Valley Copper / Teck

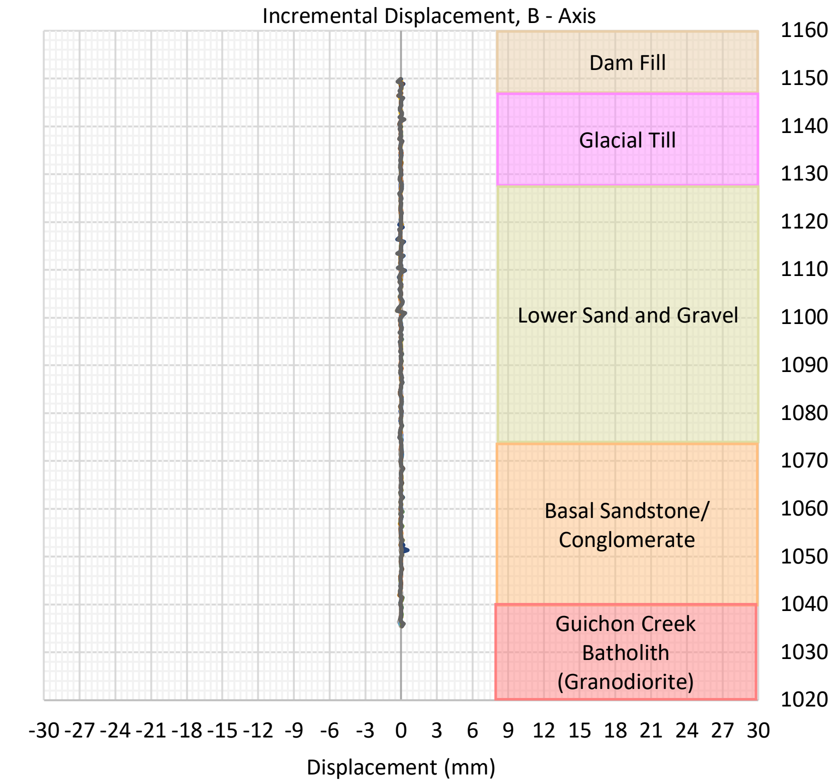
Klohn Crippen Berger

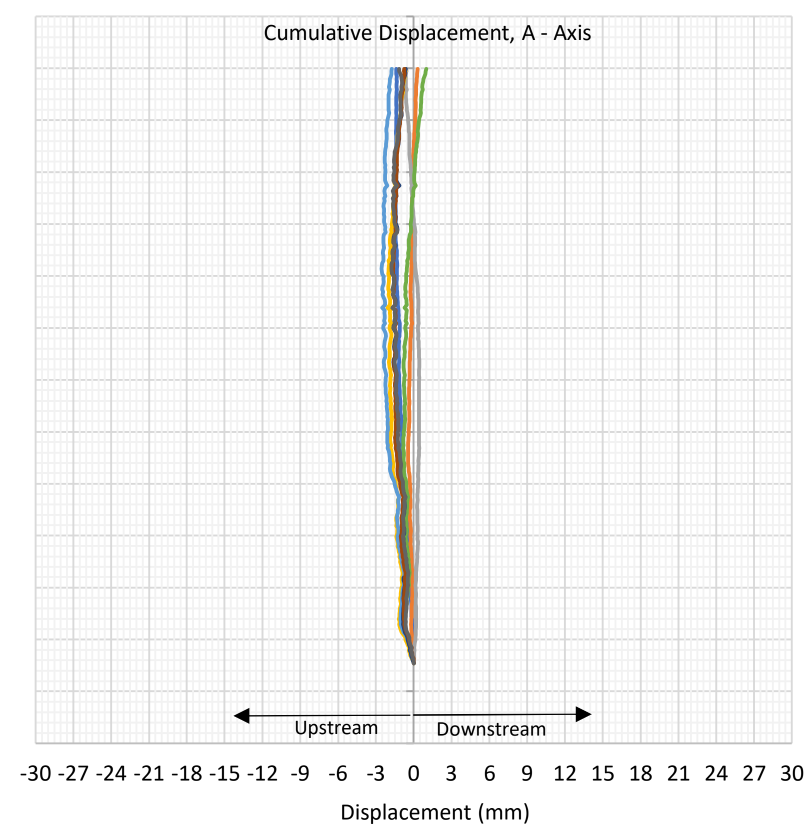
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

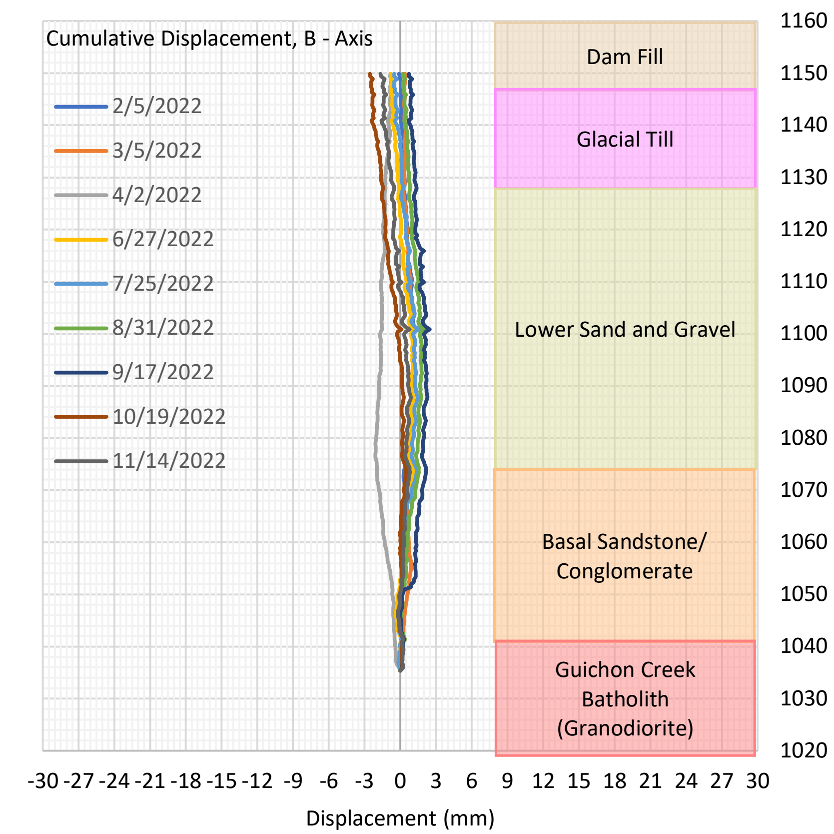
TITLE
LL DAM INCLINOMETER PLOTS
LL-I17-08 (VBBE)
DEC. 2021 TO NOV. 2022

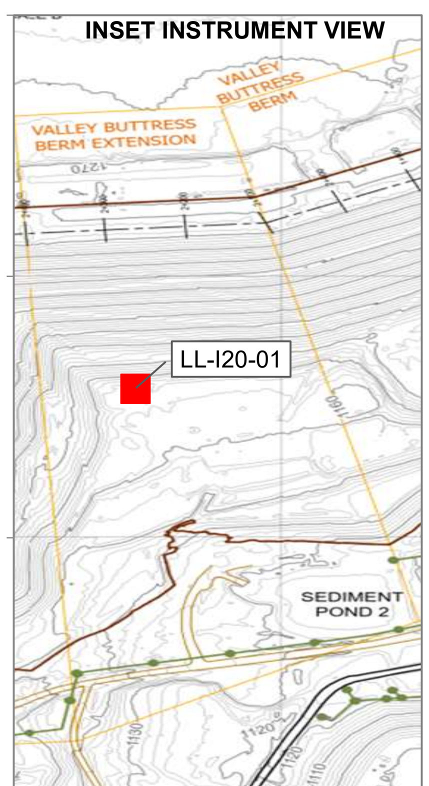
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-14











NOTES

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3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

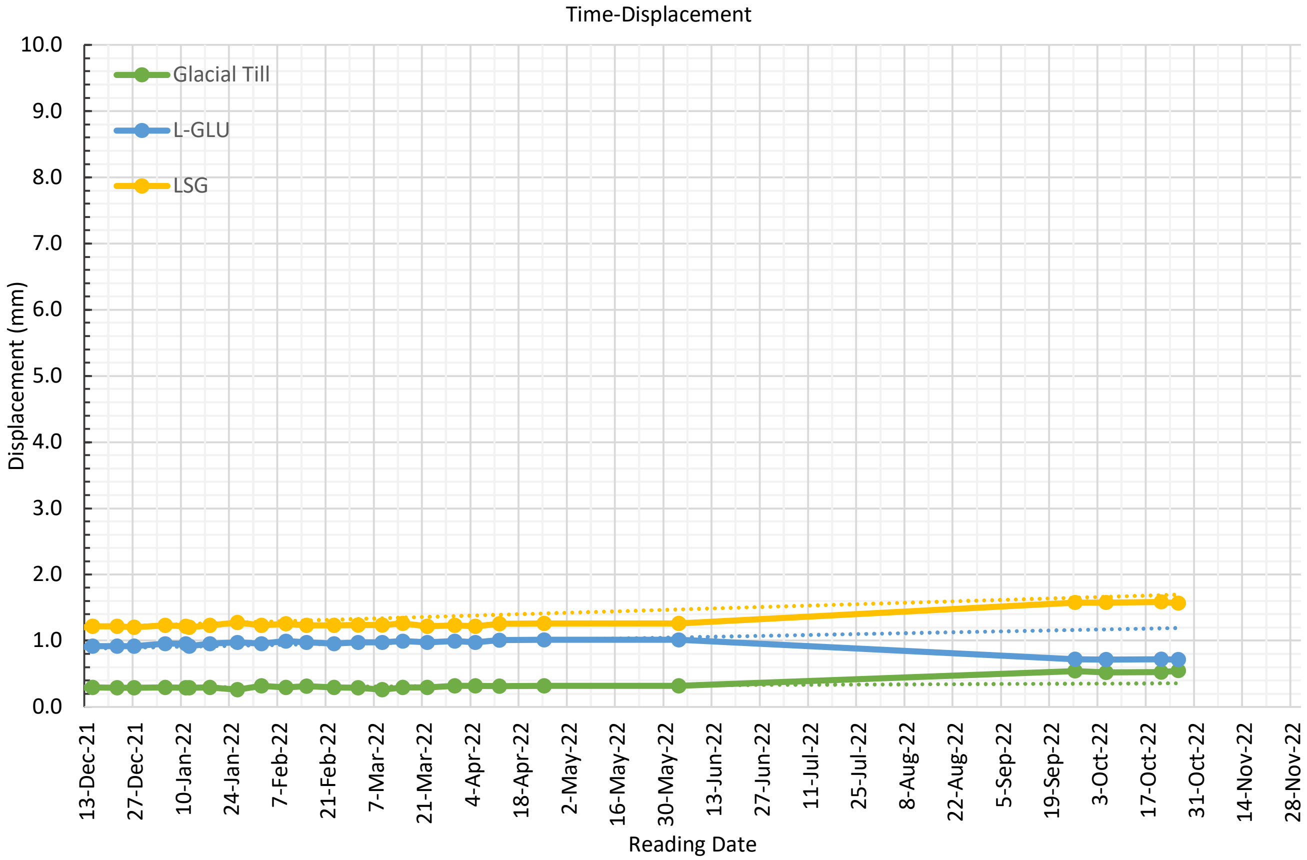
Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Glacial Till	1134.0-1130.0	1.0	N/A	N/A
LSG	1096.0-1090.0	1.0	N/A	N/A
Basal Sandstone	1068.0-1063.0	1.0	N/A	N/A

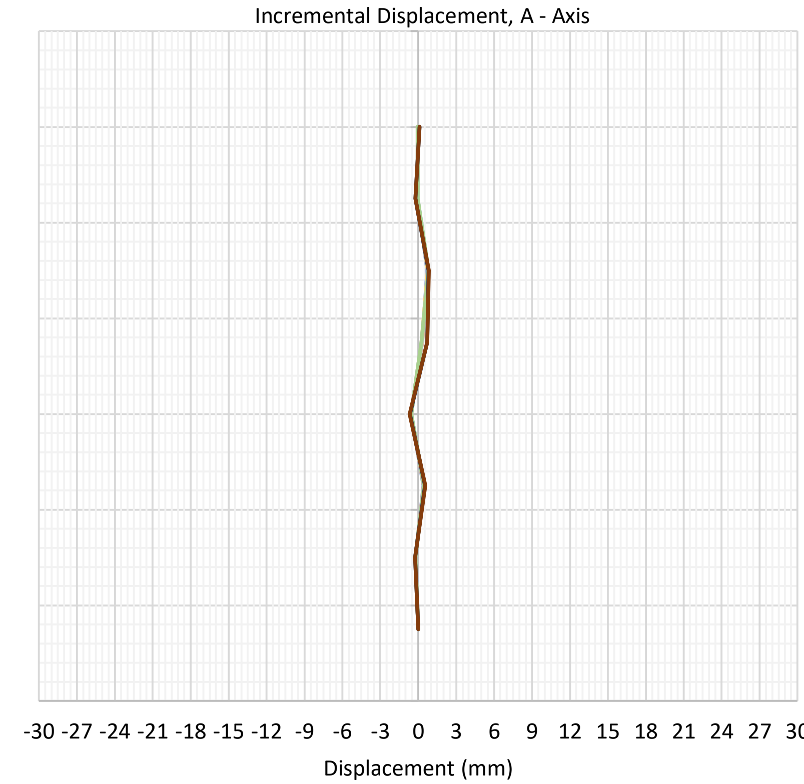
Station	Baseline Reading	Instrument Type
2+350	2022-02-05	SI

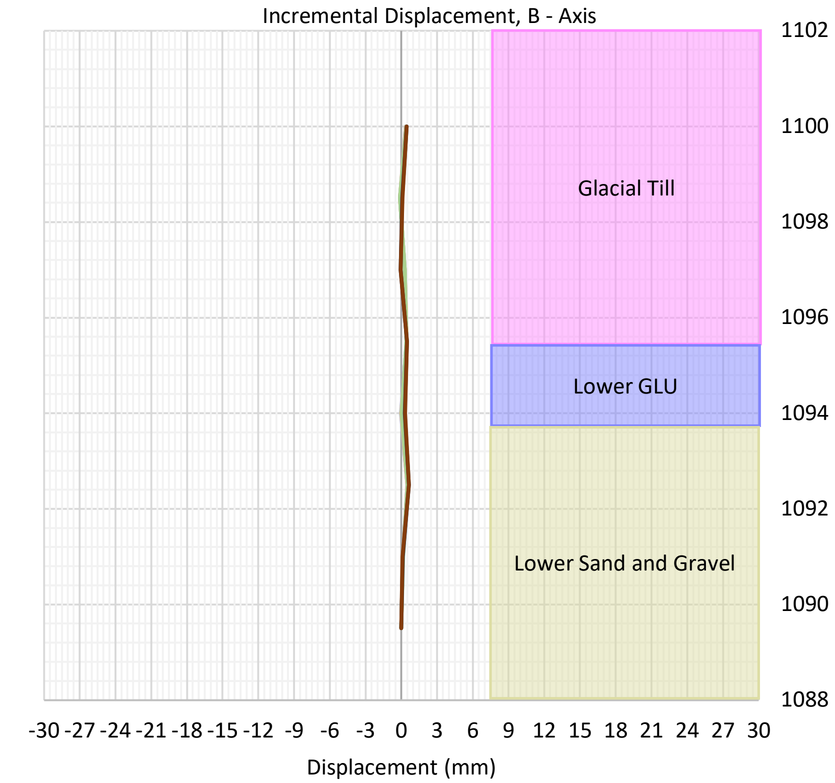
NOT FOR CONSTRUCTION

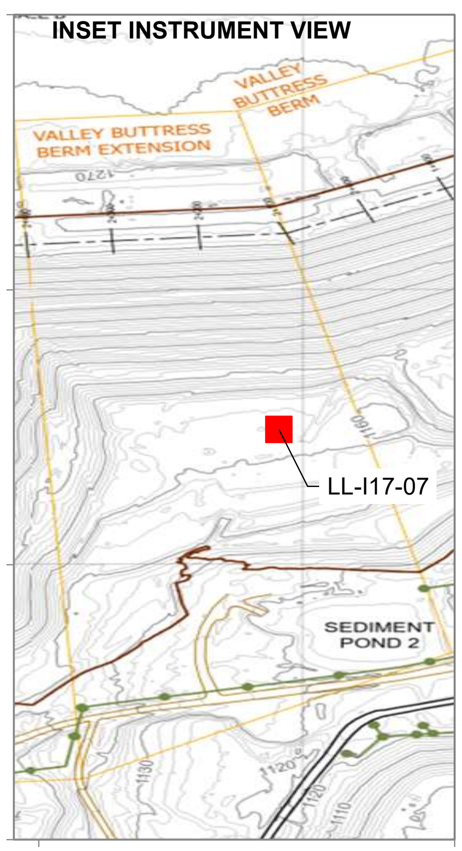
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

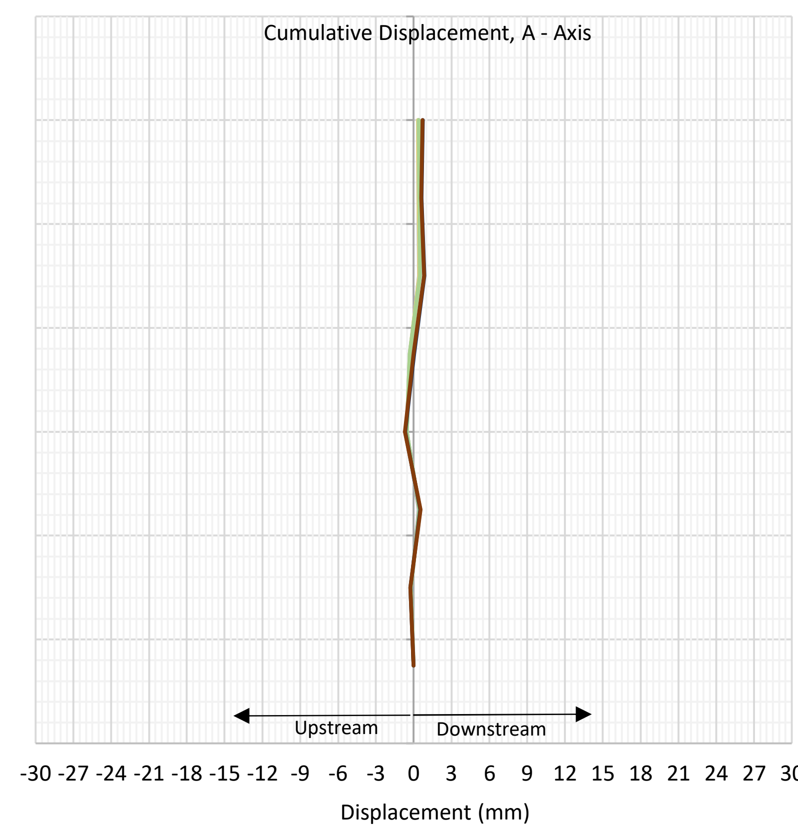
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: LL DAM INCLINOMETER PLOTS LL-I20-01 (VBBE) DEC. 2021 TO NOV. 2022
SCALE: NTS	PROJECT No.: M02341C42 — FIG. No.: II-B-15

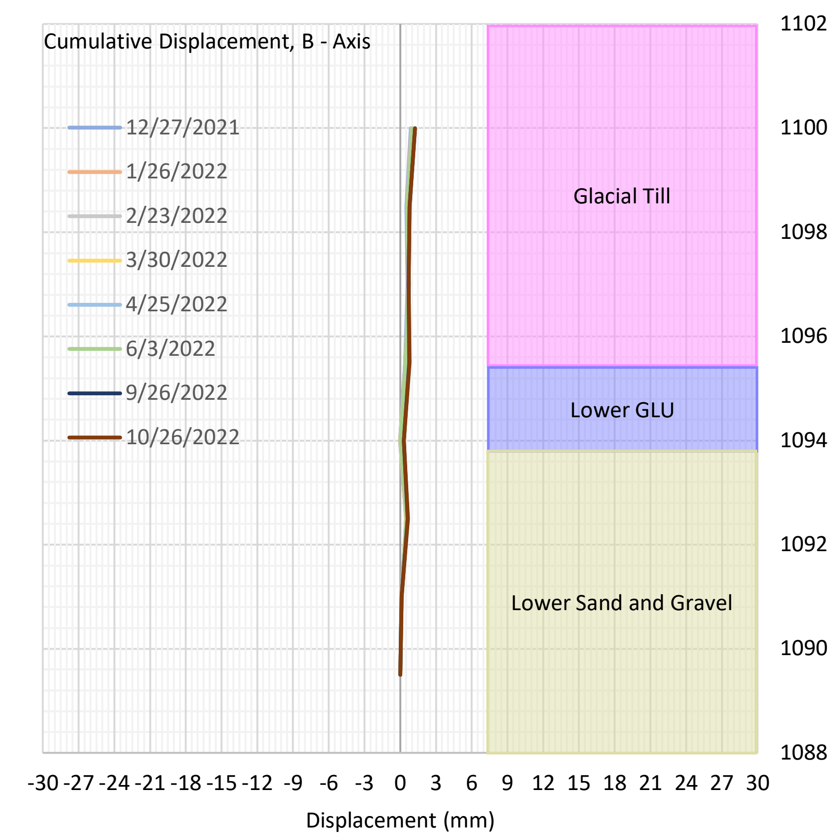












Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Glacial Till	1100.2-1096.7	1.0	N/A	N/A
L-GLU	1097.2-1095.7	1.0	N/A	N/A
LSG	1096.2-1089.2	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
2+175	2019-11-21	IPI

NOTES

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4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. INSTRUMENT WAS CONVERETED TO SAAV AT THE END OF THE REPORTING PERIOD

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

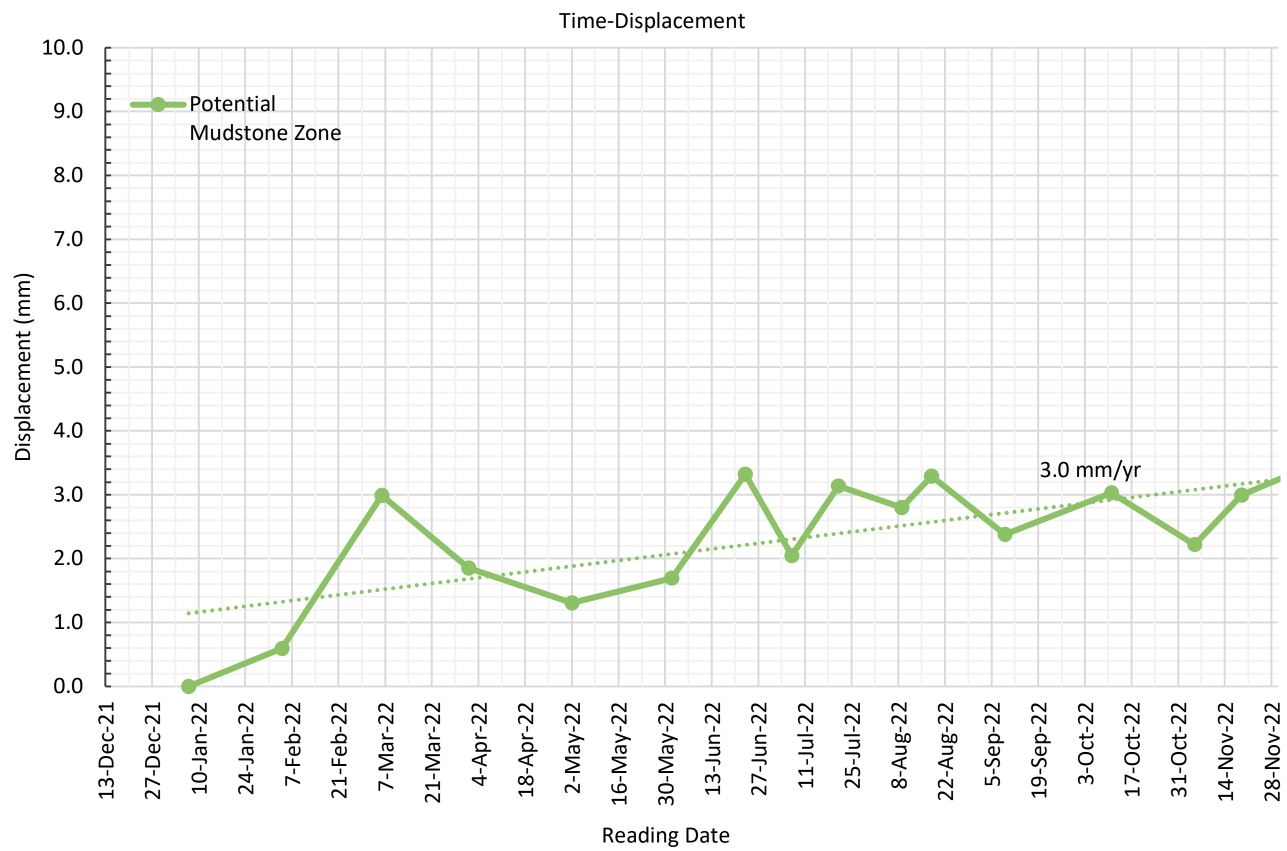
Klohn Crippen Berger

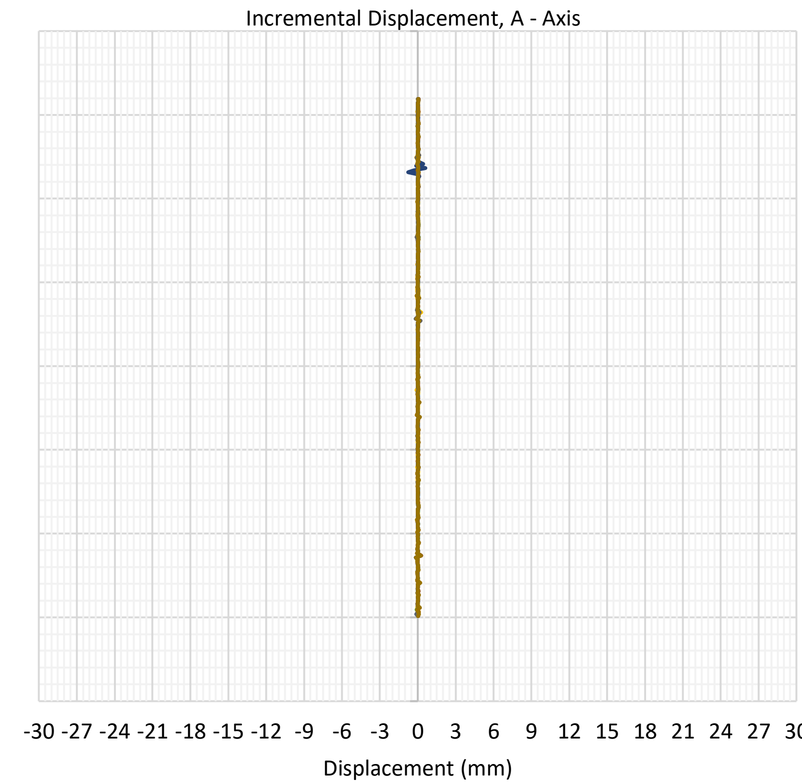
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

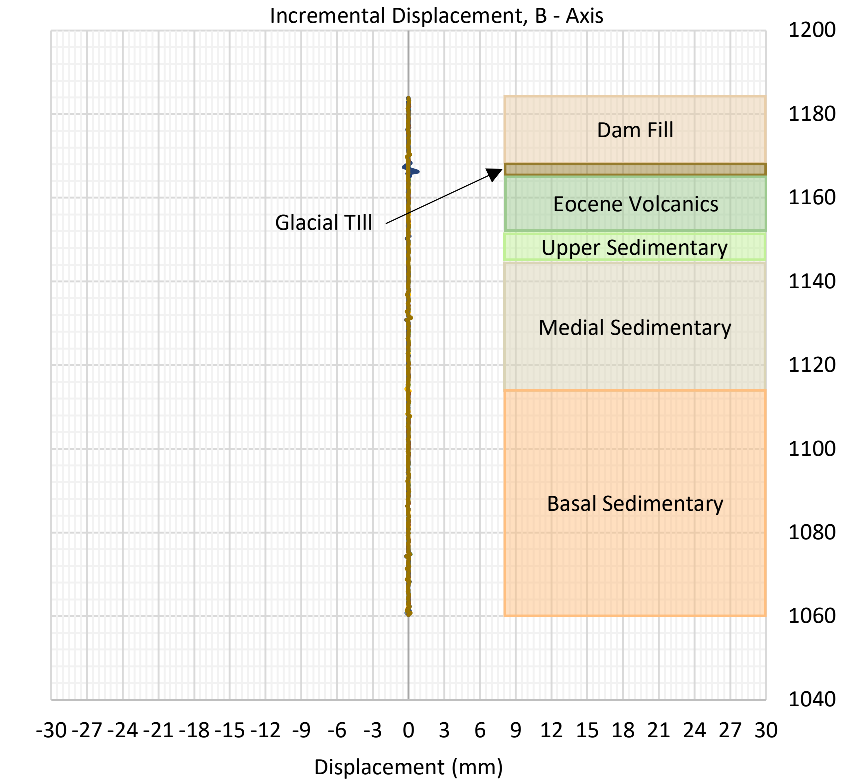
TITLE: LL DAM INCLINOMETER PLOTS LL-I17-07 (VBBE) DEC. 2021 to NOV. 2022

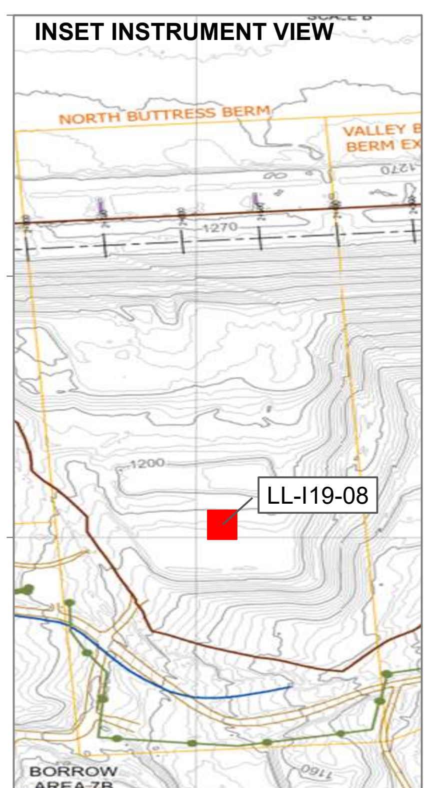
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-16

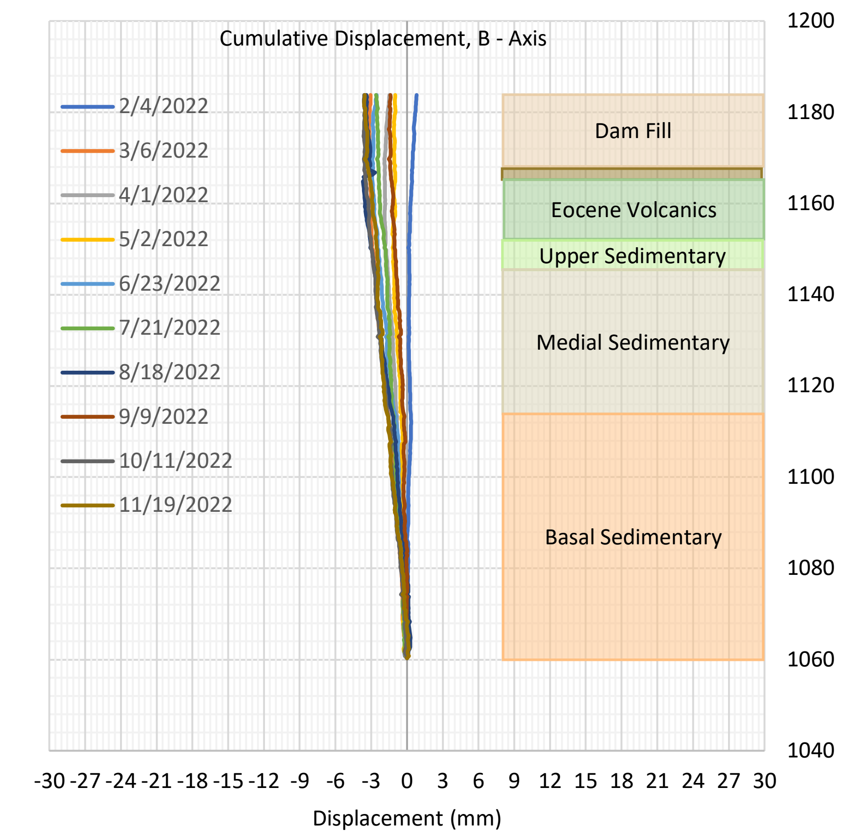
North Buttress Berm











NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Pot. Mudstone	1151.8-1060-4	0.5	N/A	1.0

Station	Baseline Reading	Instrument Type
2+570	2022-02-04	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

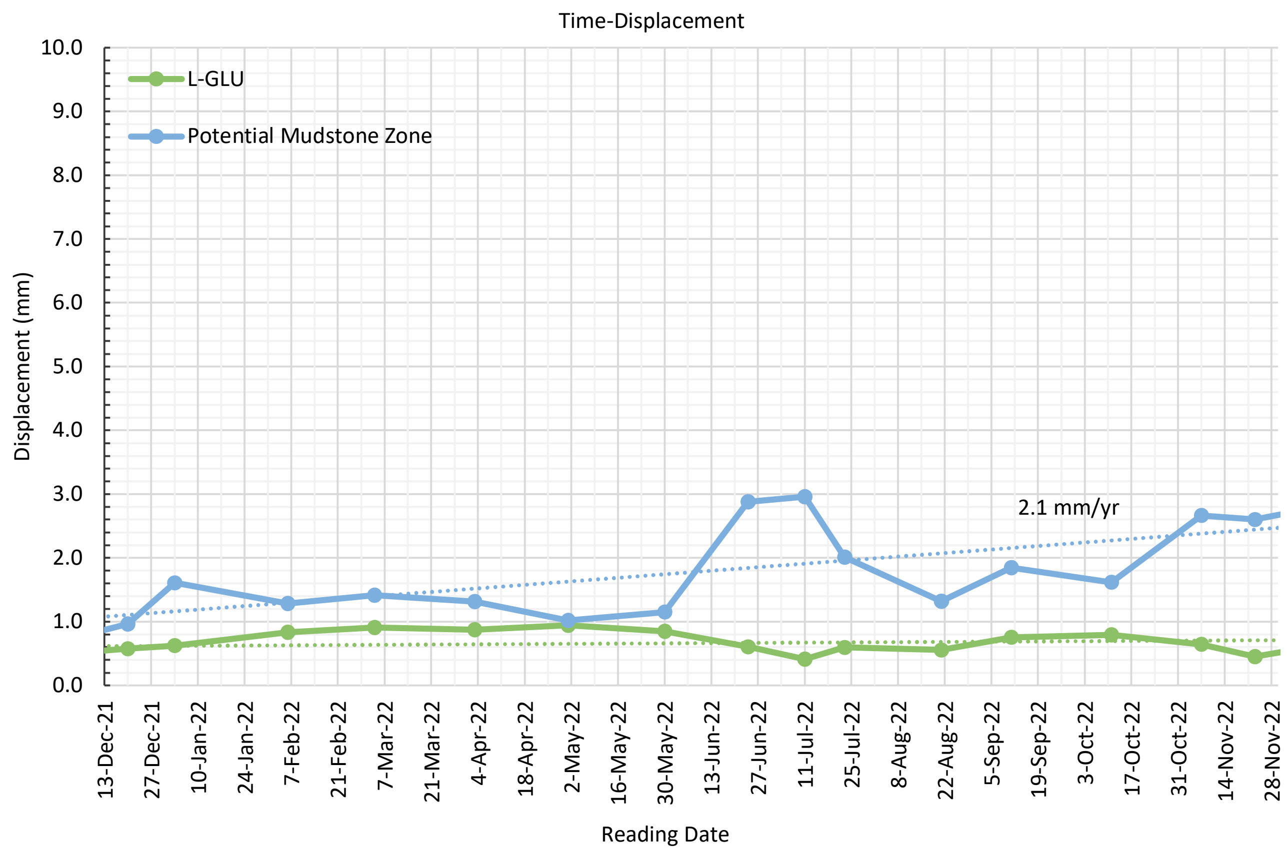
CLIENT: Highland Valley Copper / Teck

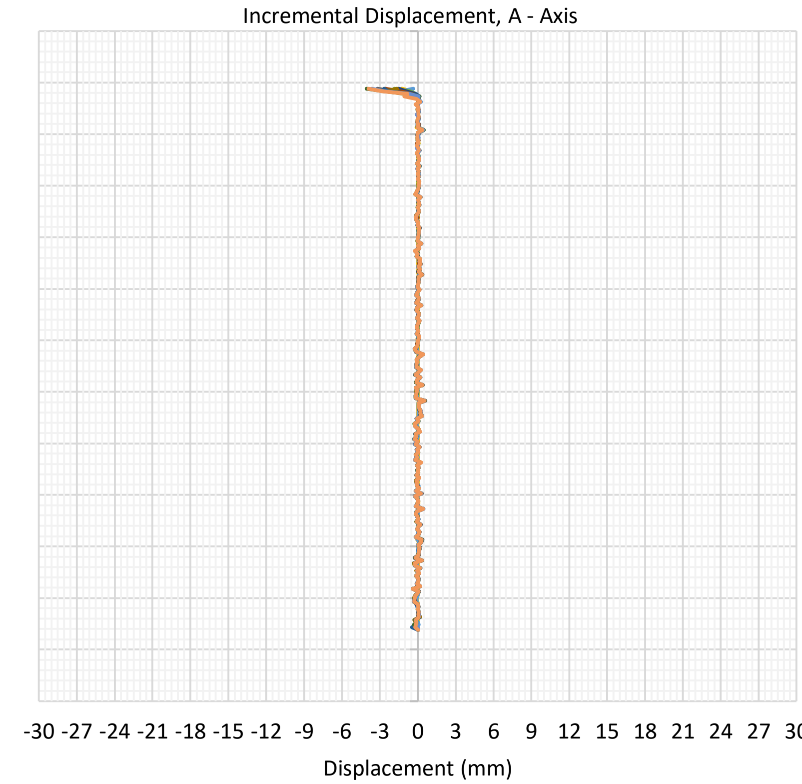
Klohn Crippen Berger

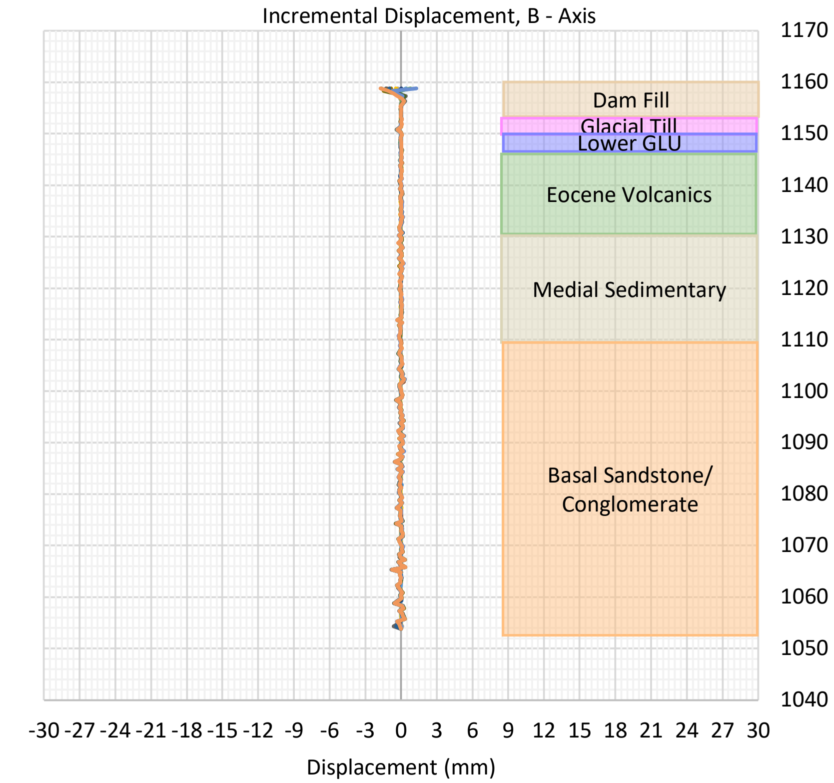
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

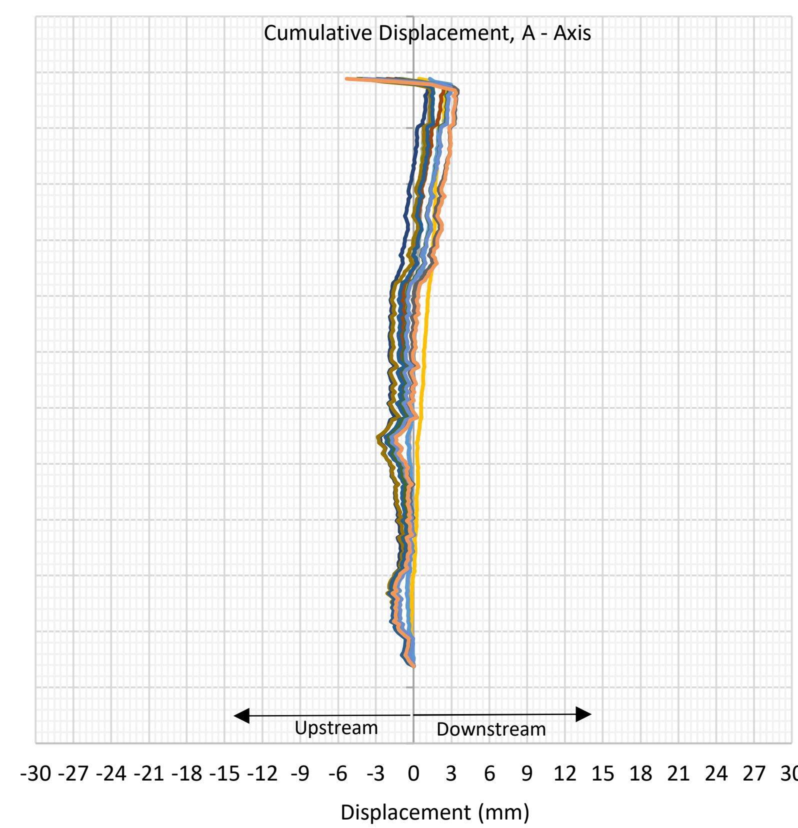
TITLE: LL DAM INCLINOMETER PLOTS LL-I19-08 (NBB) DEC. 2021 TO NOV. 2022

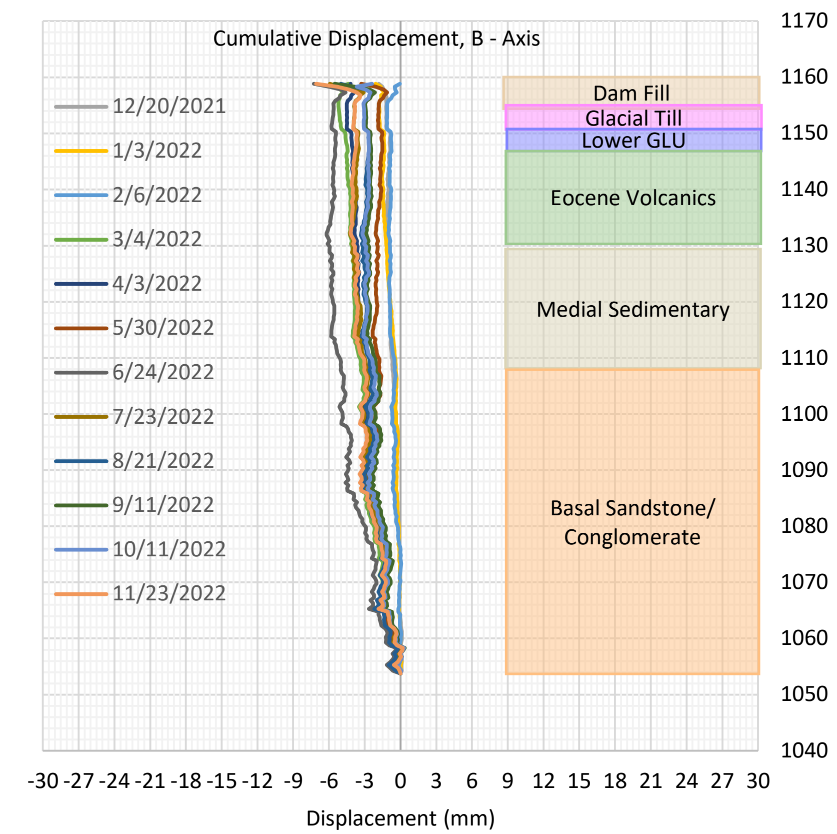
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-17

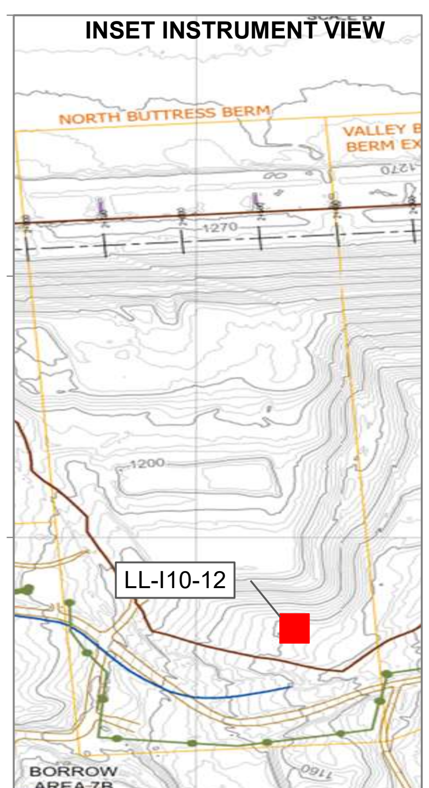












NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
L-GLU	1151.8-1144.8	0.5	1.0	N/A
Pot. Mudstone	1129.8-1083.8	1.0	2.0	N/A

Station	Baseline Reading	Instrument Type
2+500	2021-10-18	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

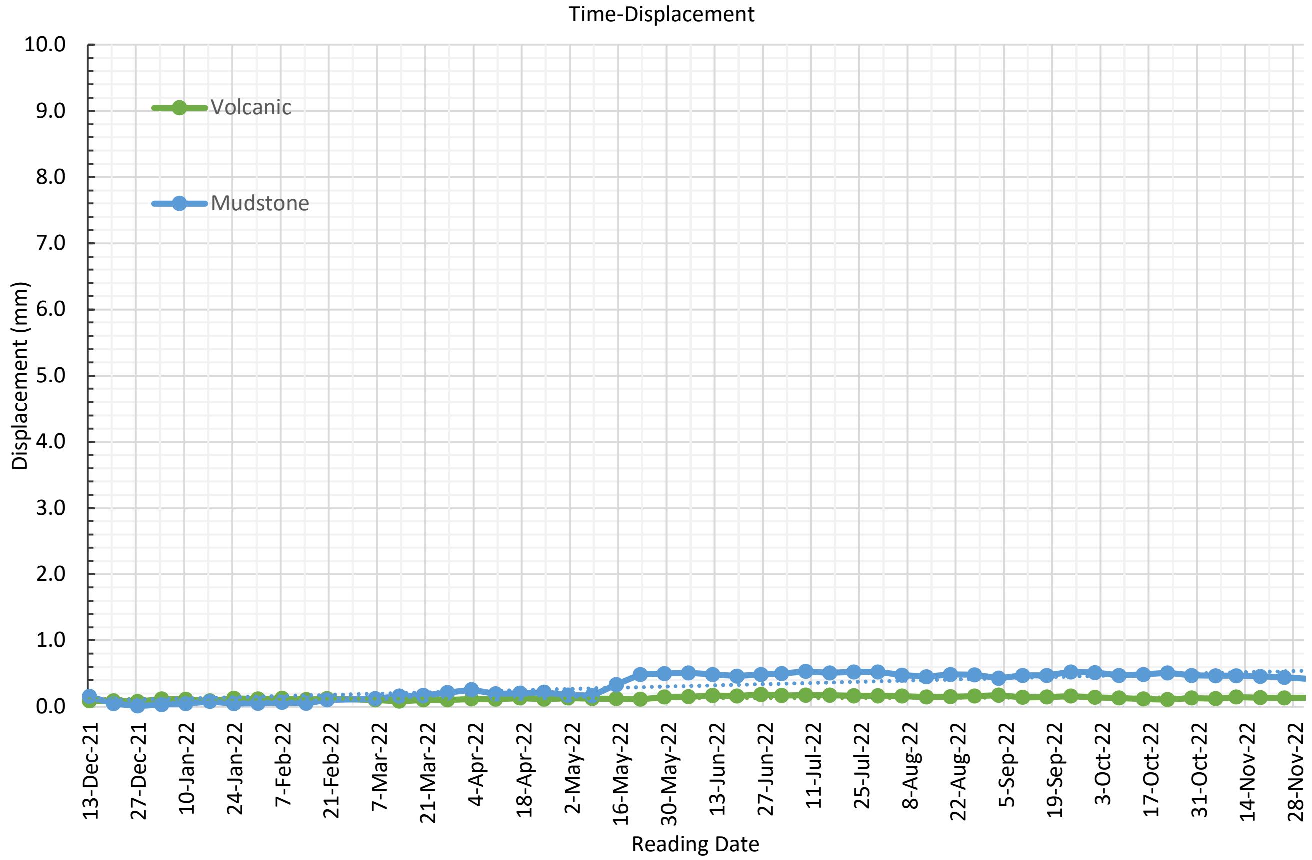
CLIENT: Highland Valley Copper / Teck

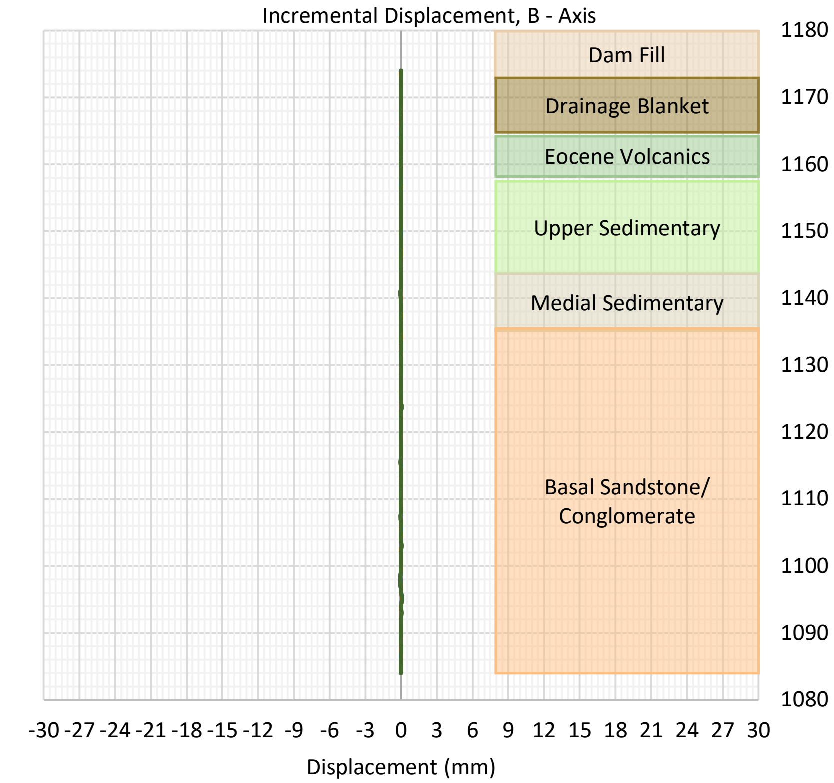
Klohn Crippen Berger

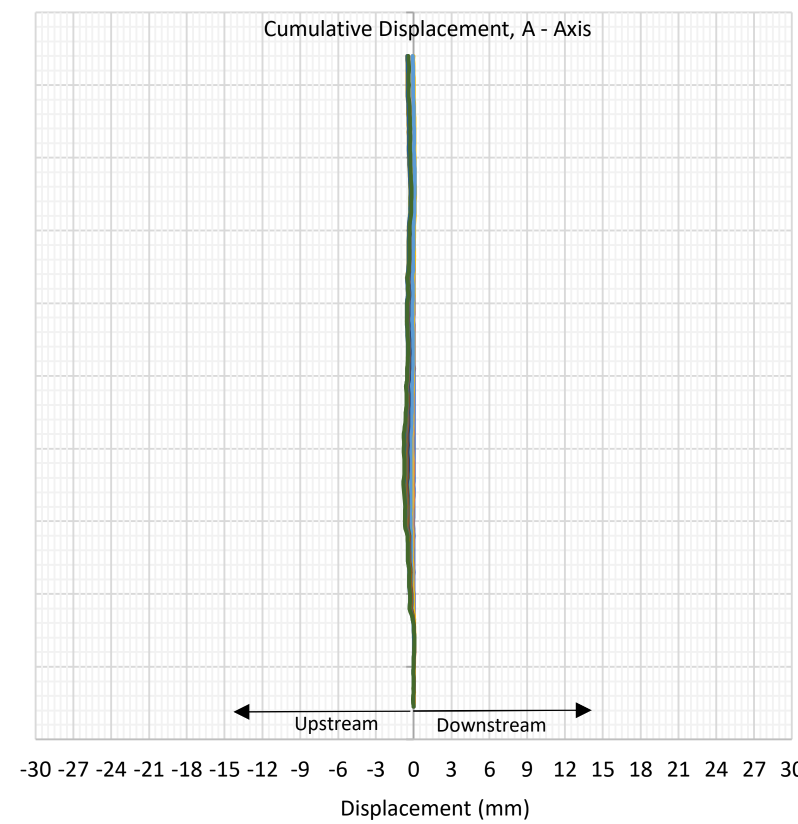
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

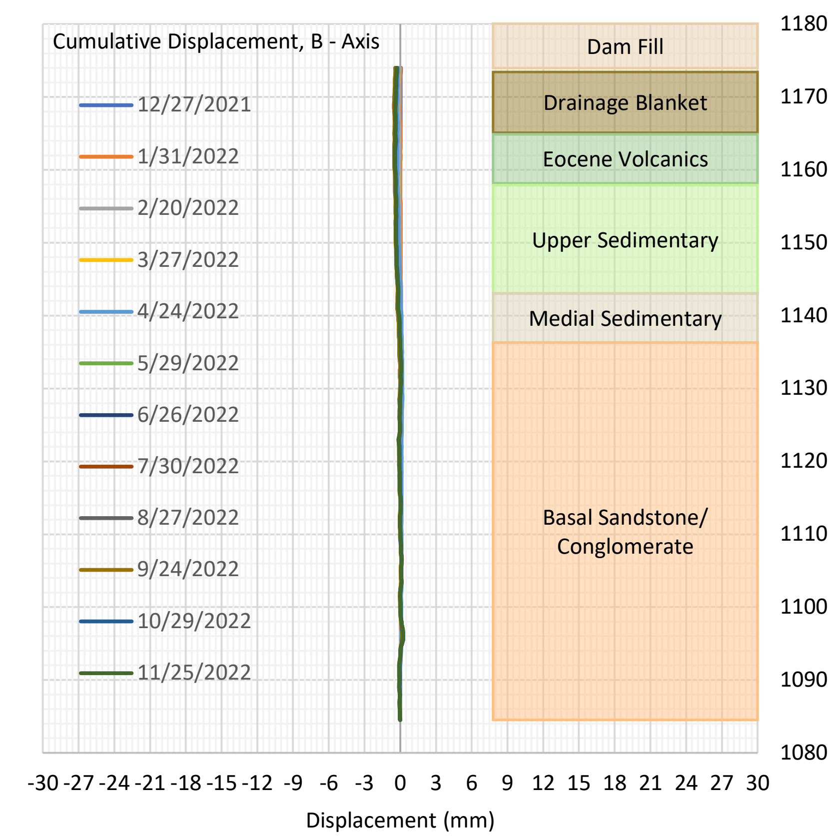
TITLE: LL DAM INCLINOMETER PLOTS
LL-I10-12 (NBB)
DEC. 2021 TO NOV. 2022

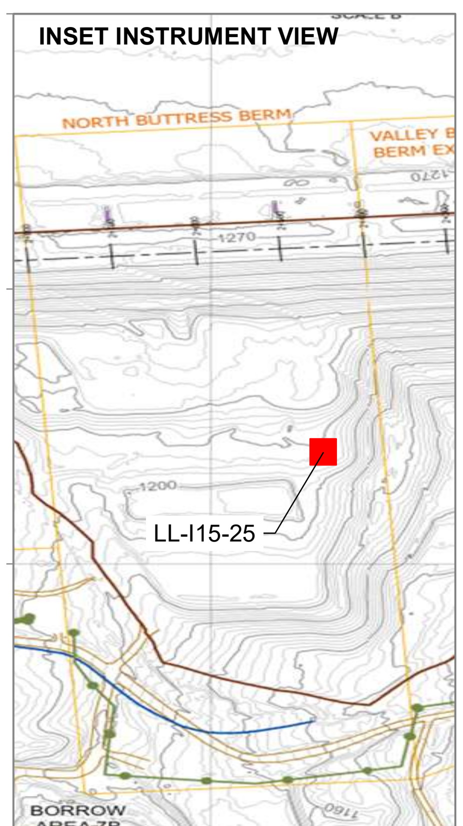
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-18











NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Volcanic	1169-1159	1.0	N/A	N/A
Mudstone	1157.5-1084	0.5	N/A	1.0

Station	Baseline Reading	Instrument Type
2+550	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

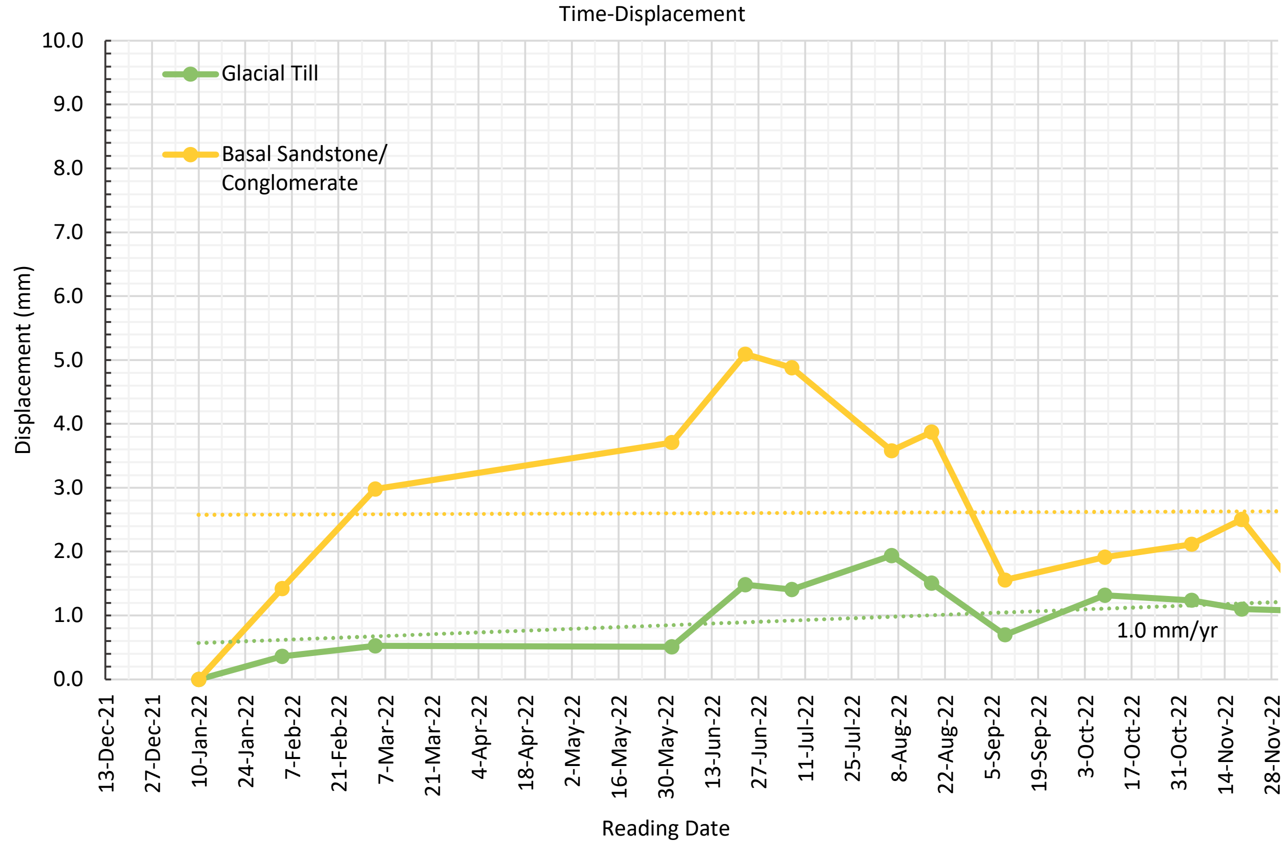
CLIENT: Highland Valley Copper / Teck

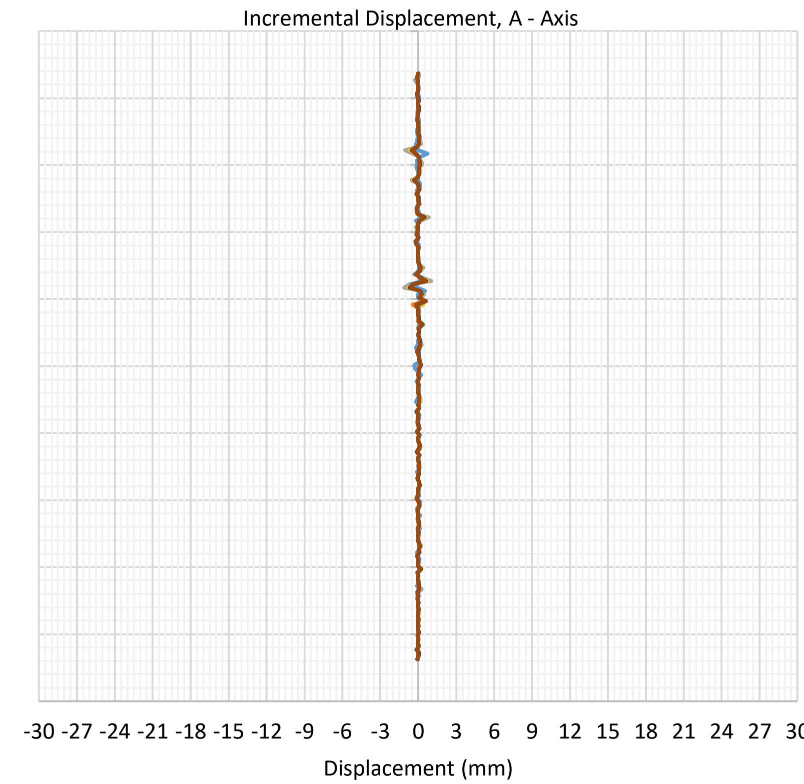
Klohn Crippen Berger

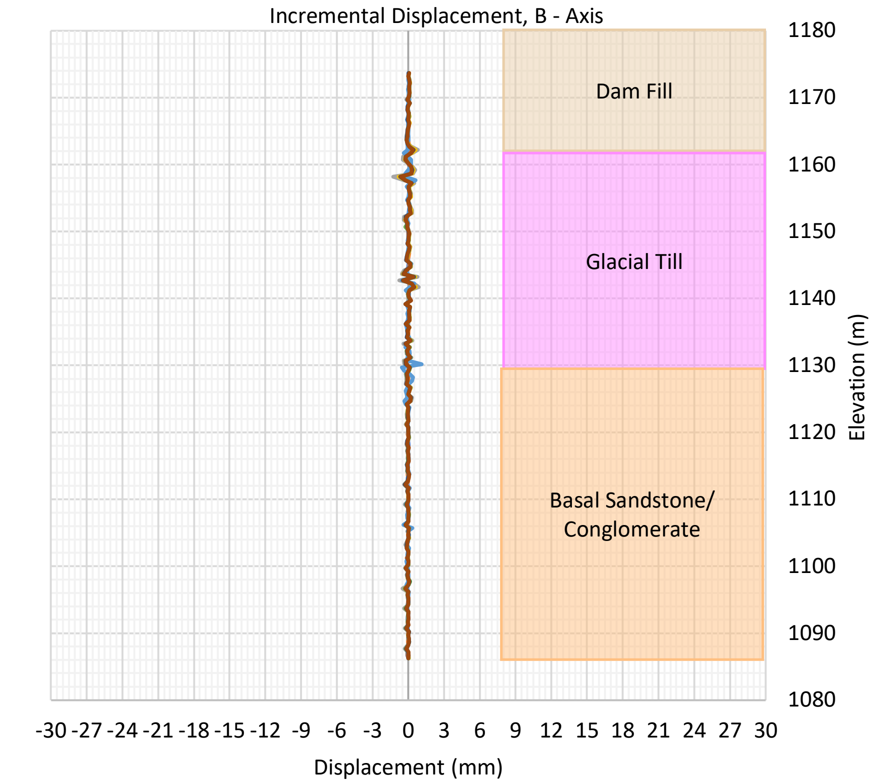
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

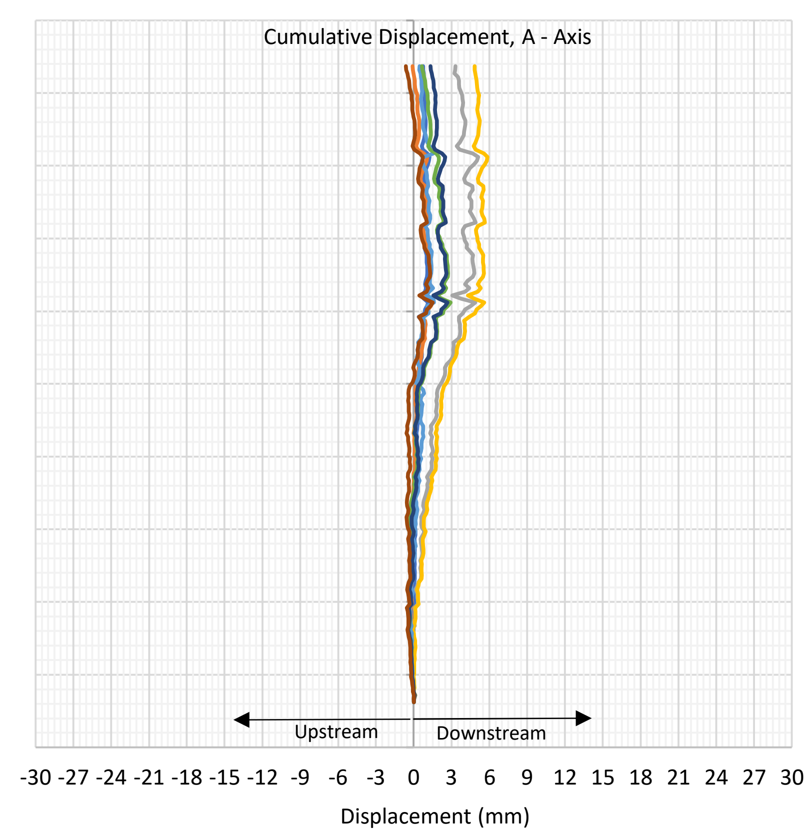
TITLE: LL DAM INCLINOMETER PLOTS
LL-I15-25 (NBB)
DEC. 2021 TO NOV. 2022

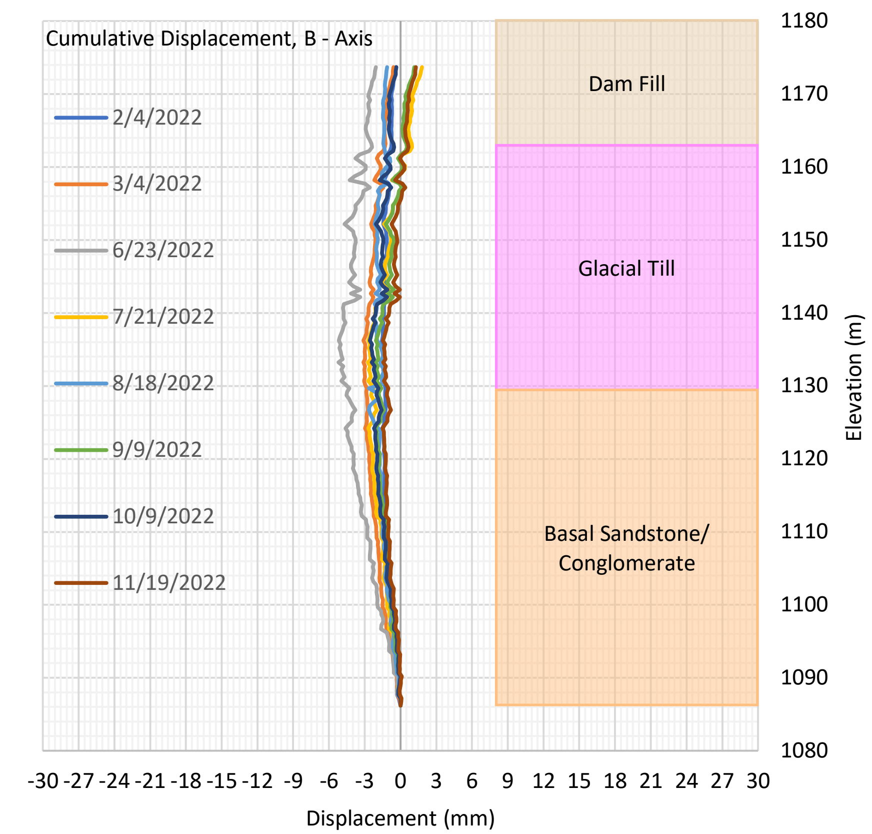
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-19

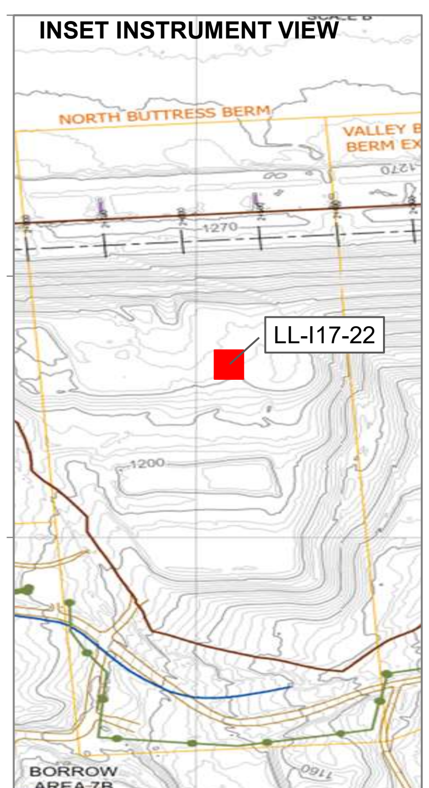












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5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Glacial Till	1145.2-1138.2	1.0	N/A	N/A
Basal Sandstone	1130.2-1086.2	0.5	3.0	6.0

Station	Baseline Reading	Instrument Type
2+570	2022-02-04	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

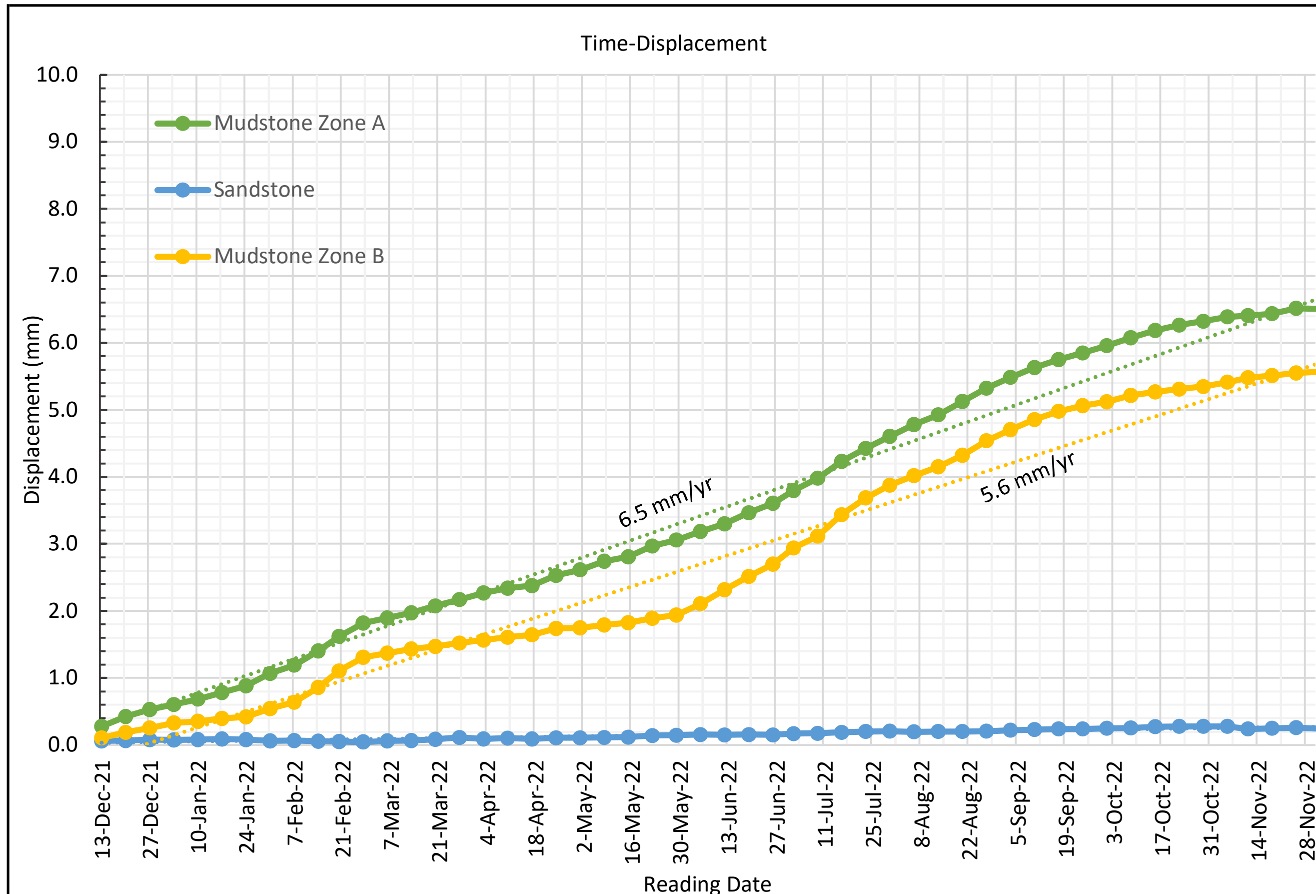
CLIENT: Highland Valley Copper / Teck

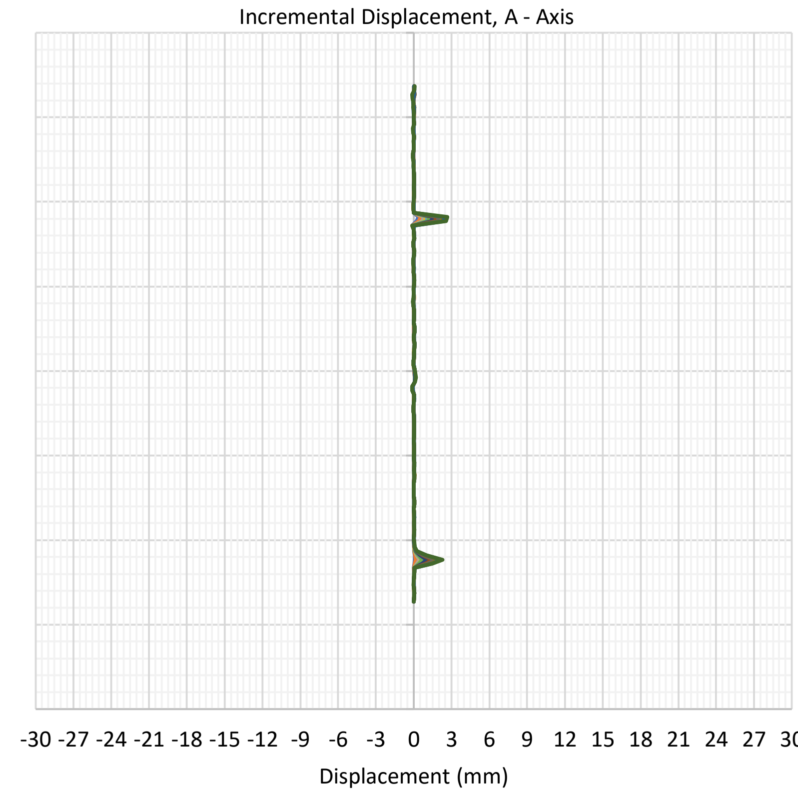
Klohn Crippen Berger

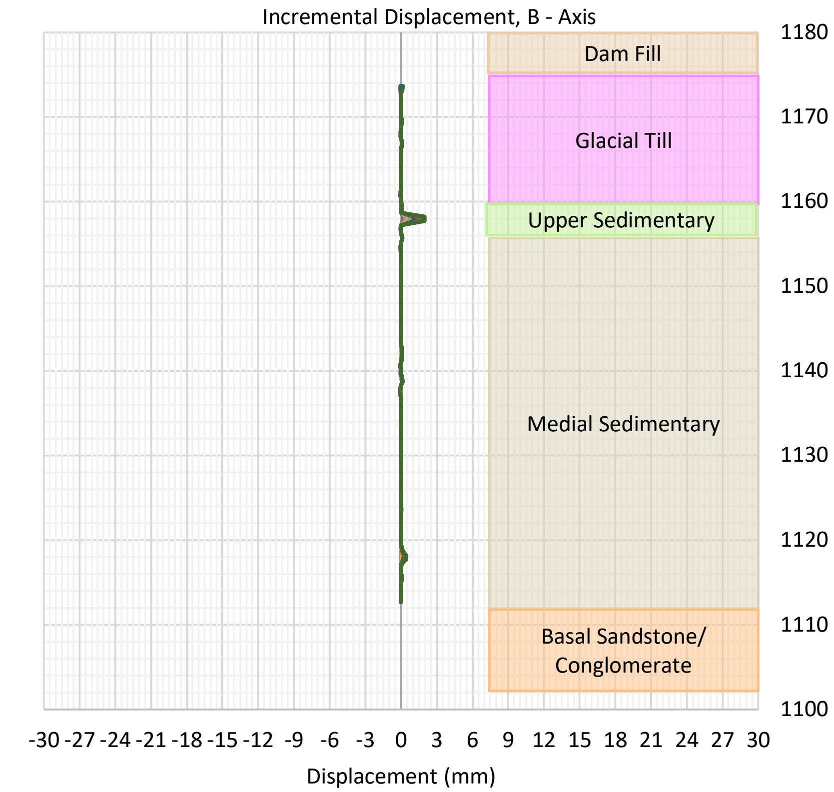
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

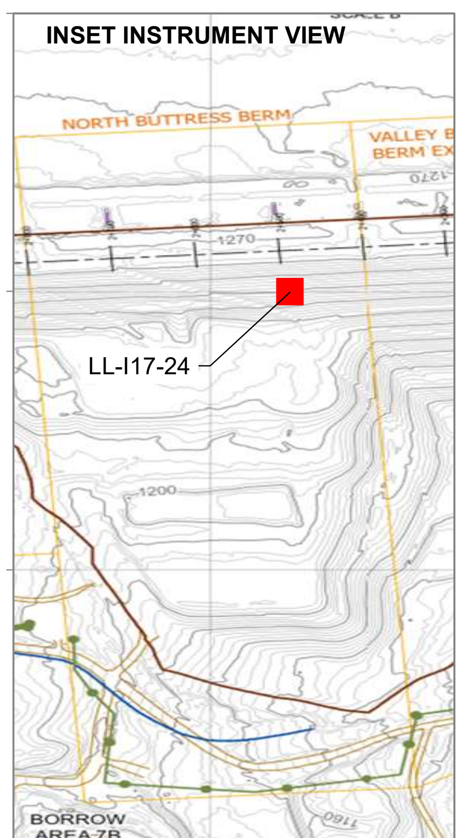
TITLE: LL DAM INCLINOMETER PLOTS
LL-I17-22 (NBB)
DEC. 2021 TO NOV. 2022

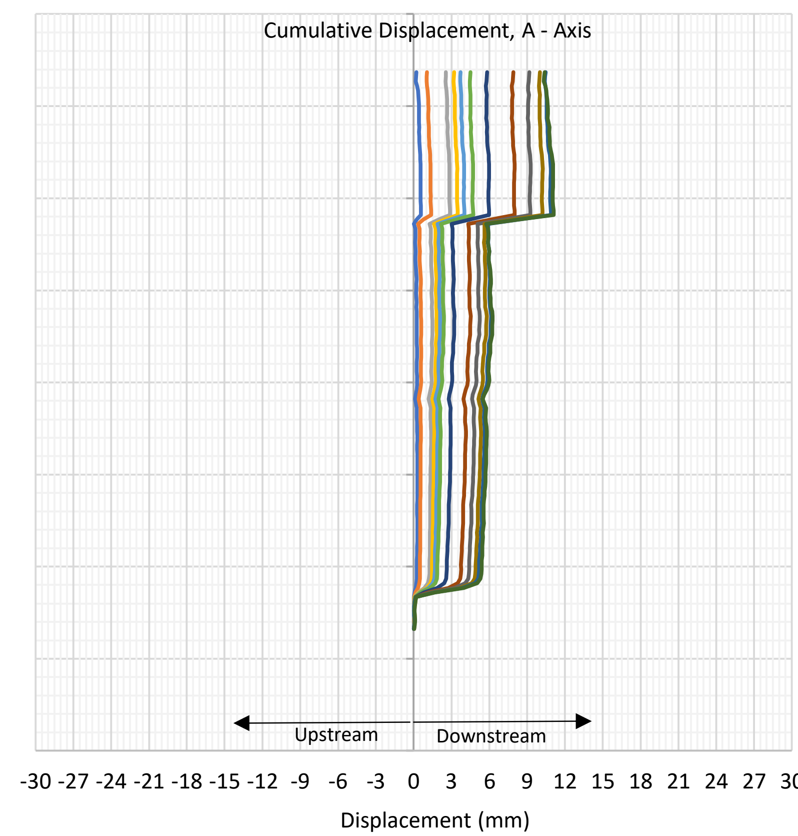
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-20

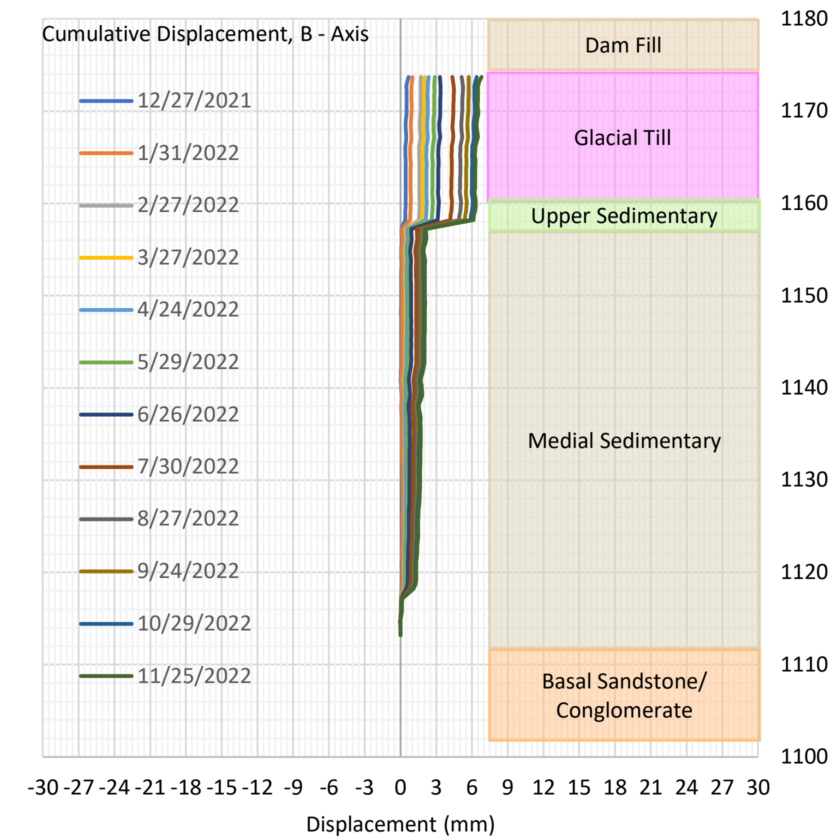












NOTES

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3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Mudstone Zone A	1159.7-1151.7	3.0	4.0	8.0
Sandstone	1141.7-1135.7	3.0	N/A	N/A
Mudstone Zone B	1120.7-1112.7	3.0	4.5	9.0

Station	Baseline Reading	Instrument Type
2+575	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

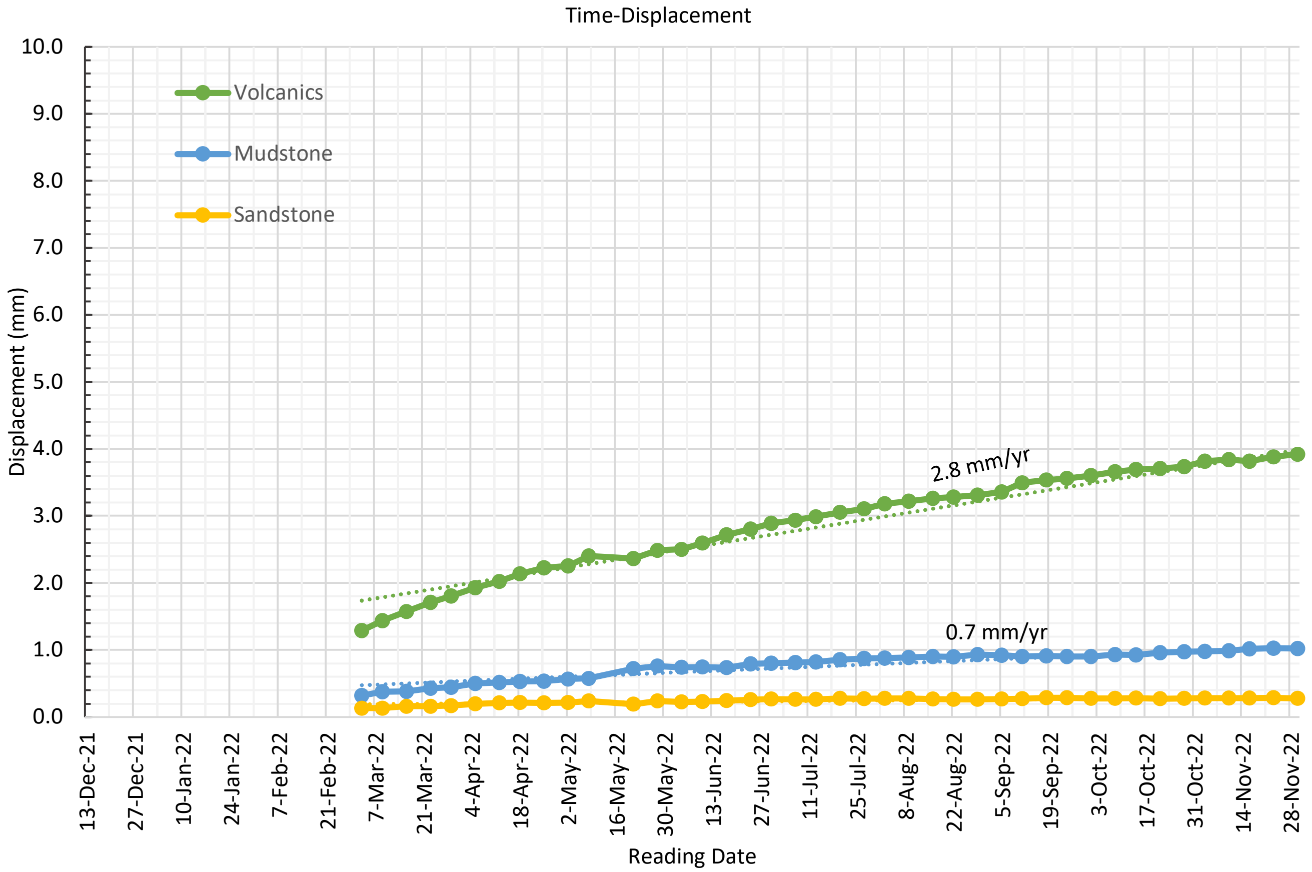
CLIENT: Highland Valley Copper / Teck

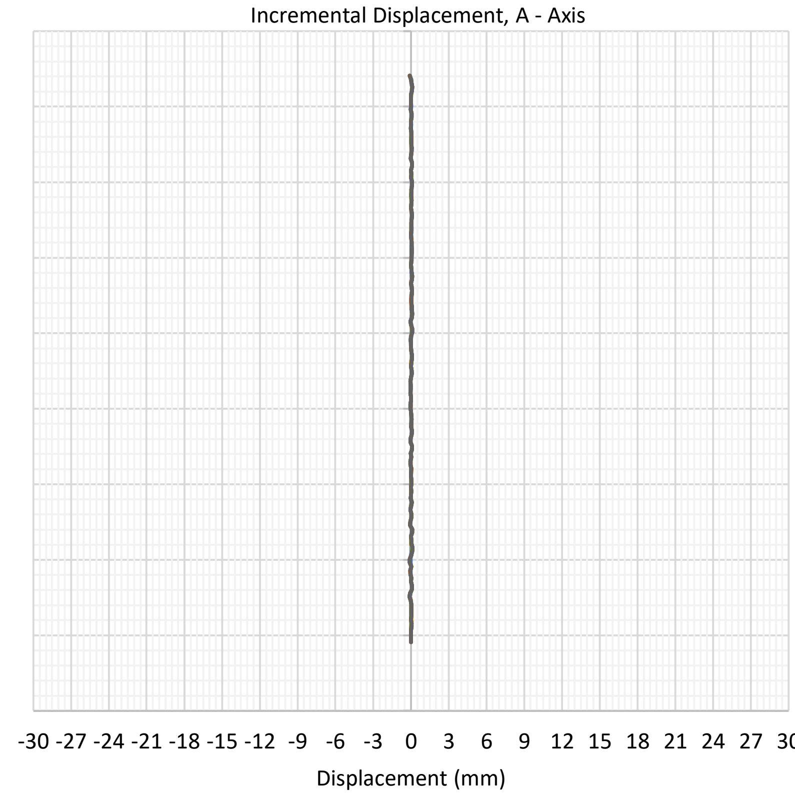
Klohn Crippen Berger

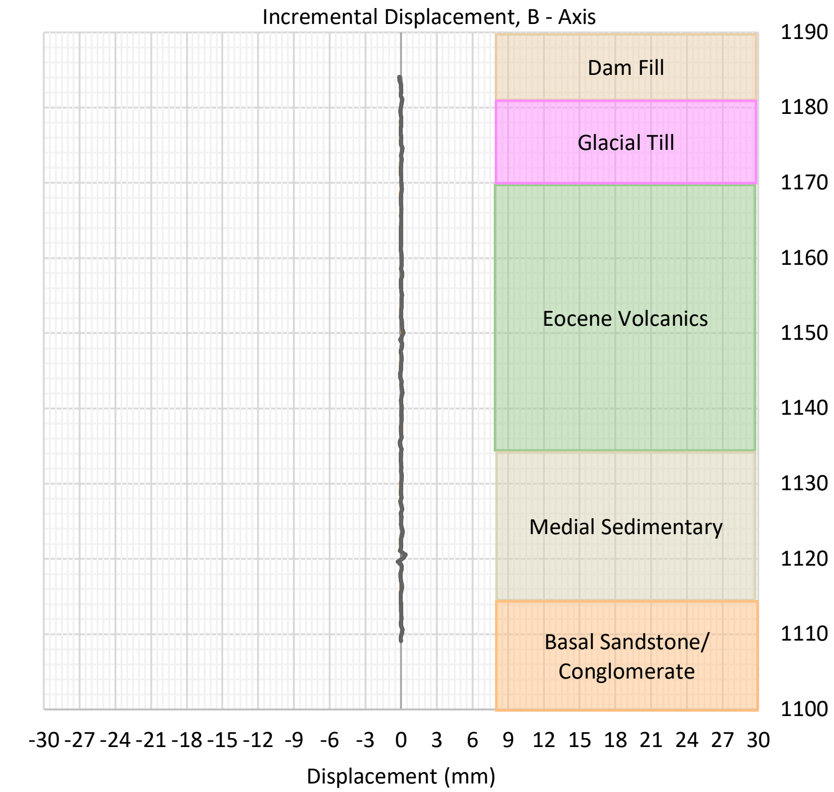
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

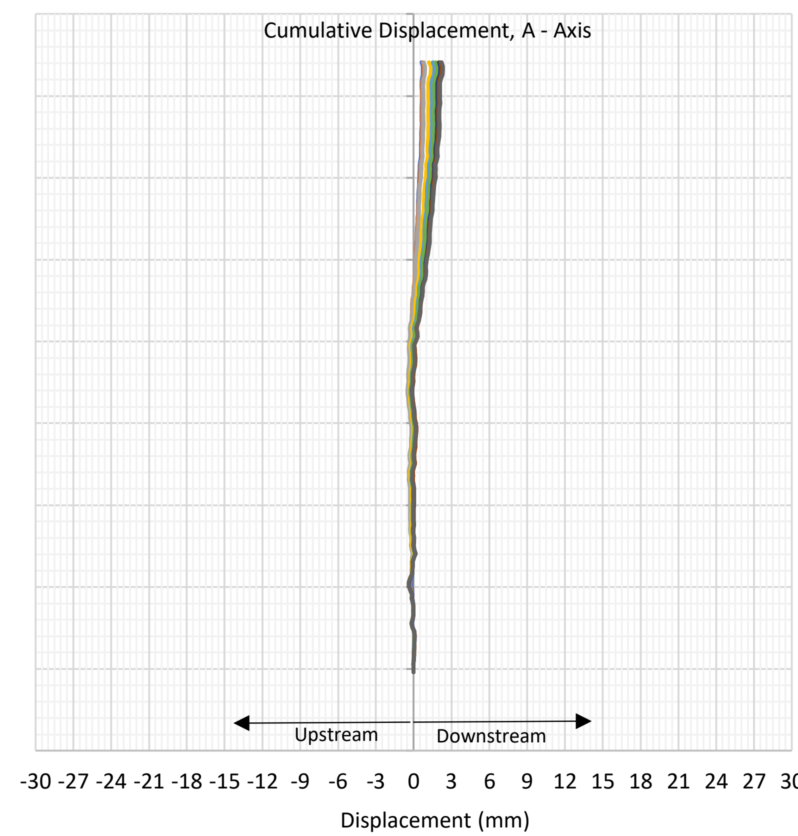
TITLE: LL DAM INCLINOMETER PLOTS
LL-I17-24 (NBB)
DEC. 2021 TO NOV. 2022

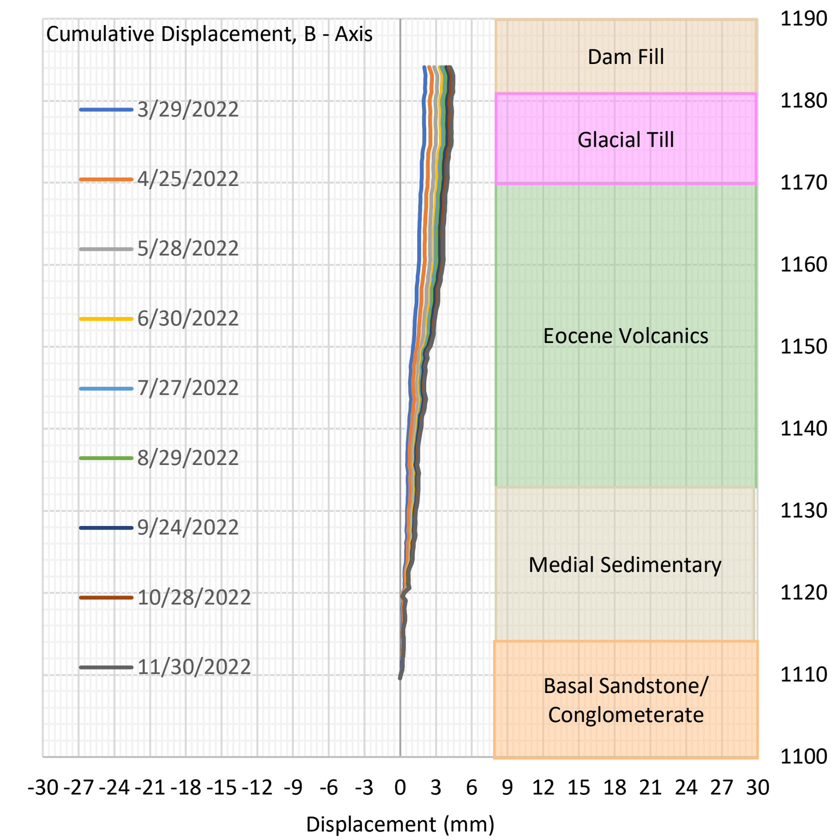
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-21

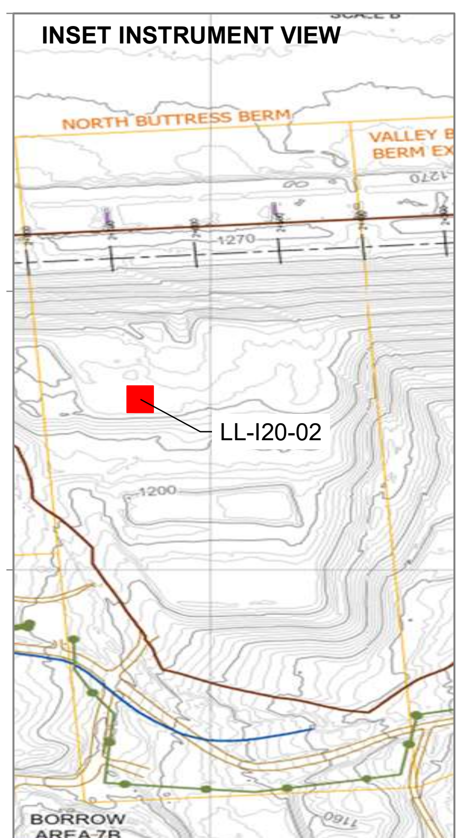












Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Volcanics	1183.6-1130.1	3.0	N/A	N/A
Mudstone	1130.1-1114.1	3.0	N/A	N/A
Sandstone	1114.1-1110.1	3.0	N/A	N/A

Station	Baseline Reading	Instrument Type
2+700	2022-03-03	SAAV

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NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

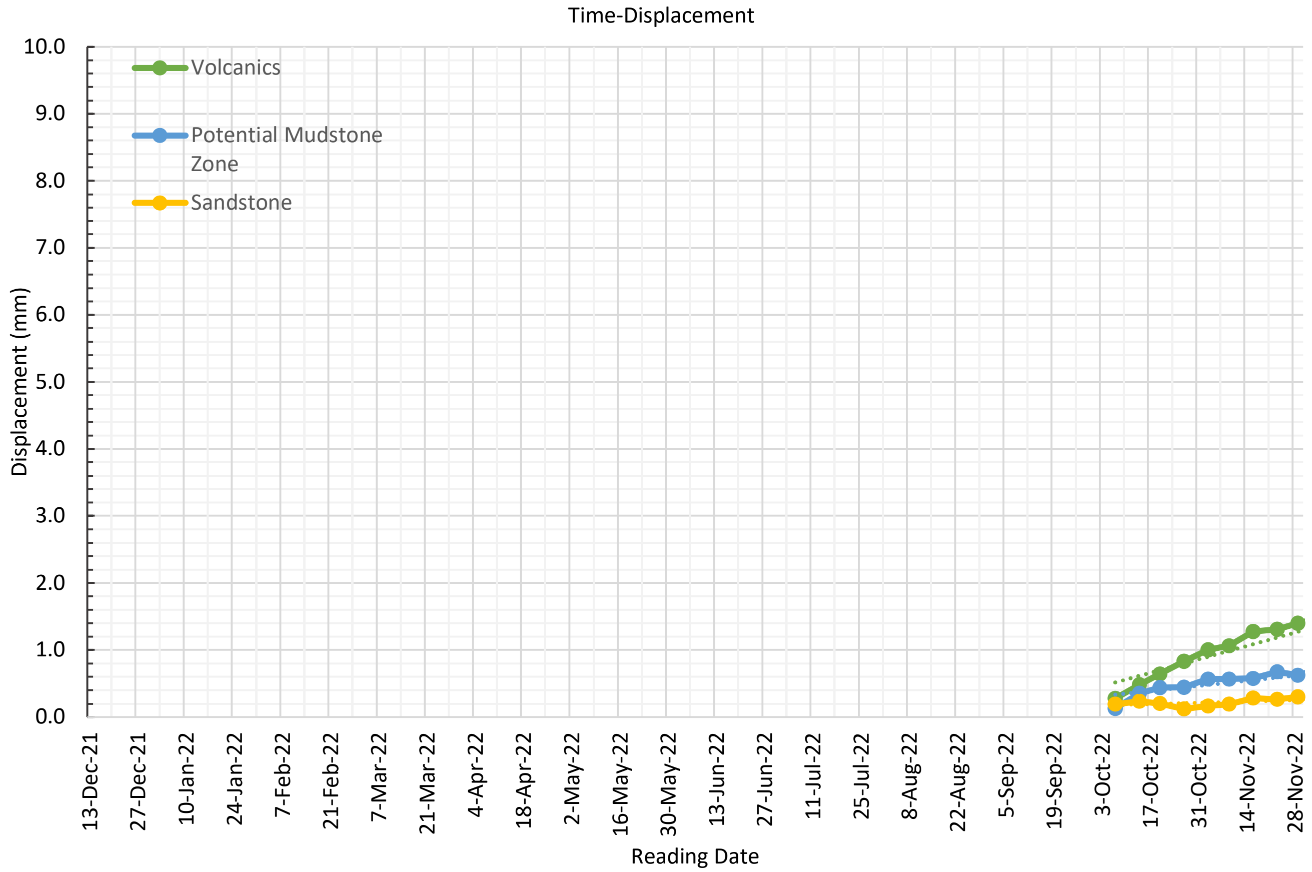
CLIENT: Highland Valley Copper / Teck

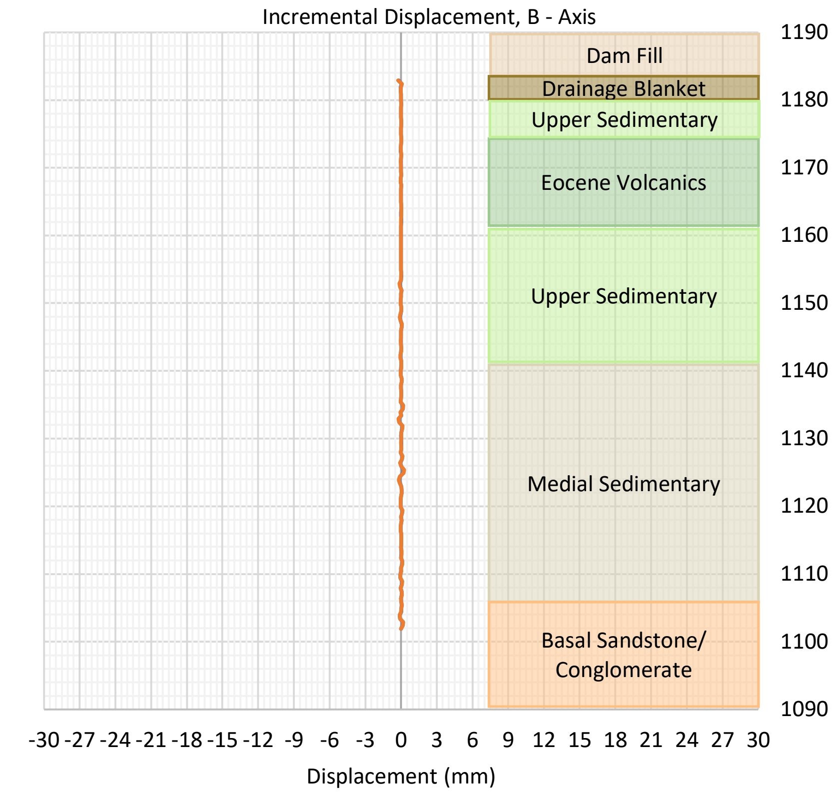
Klohn Crippen Berger

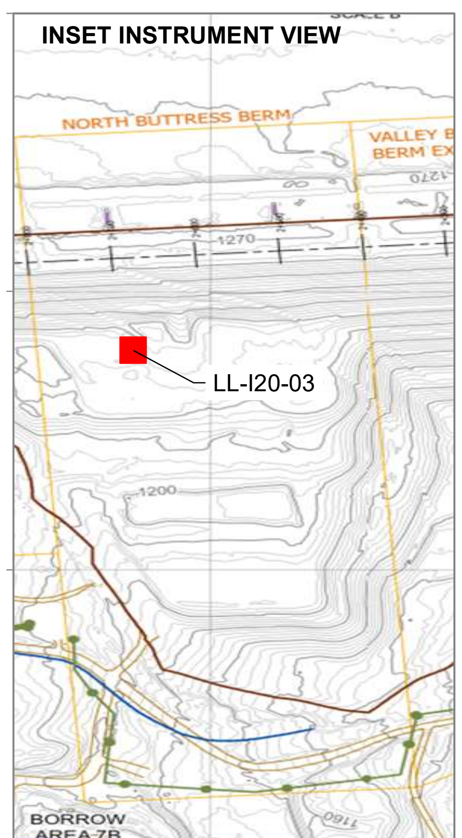
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

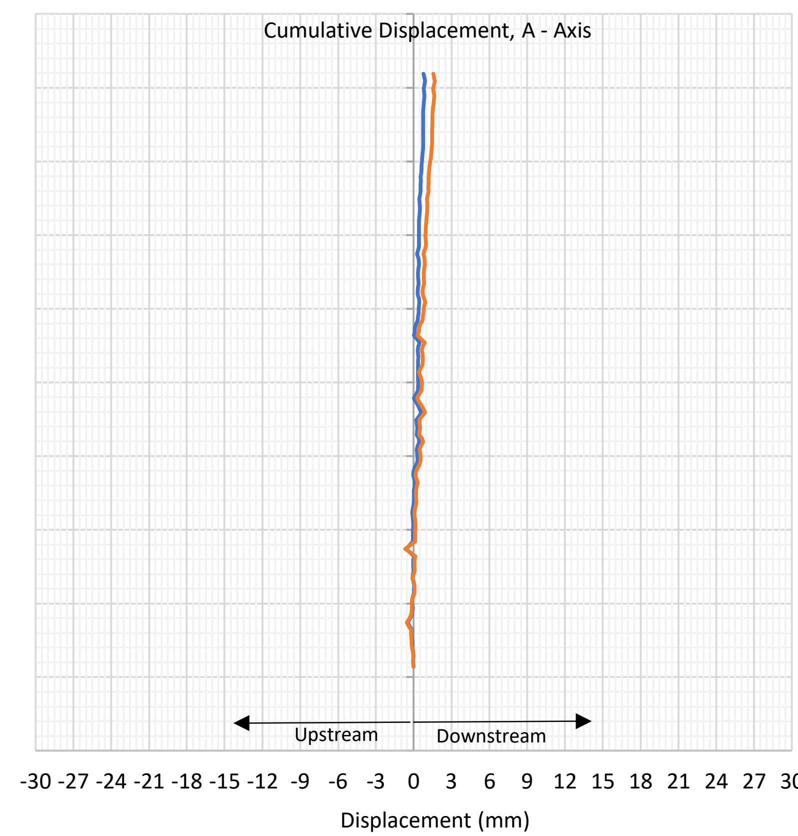
TITLE: LL DAM INCLINOMETER PLOTS
LL-I20-02 (NBB)
DEC. 2021 TO NOV. 2022

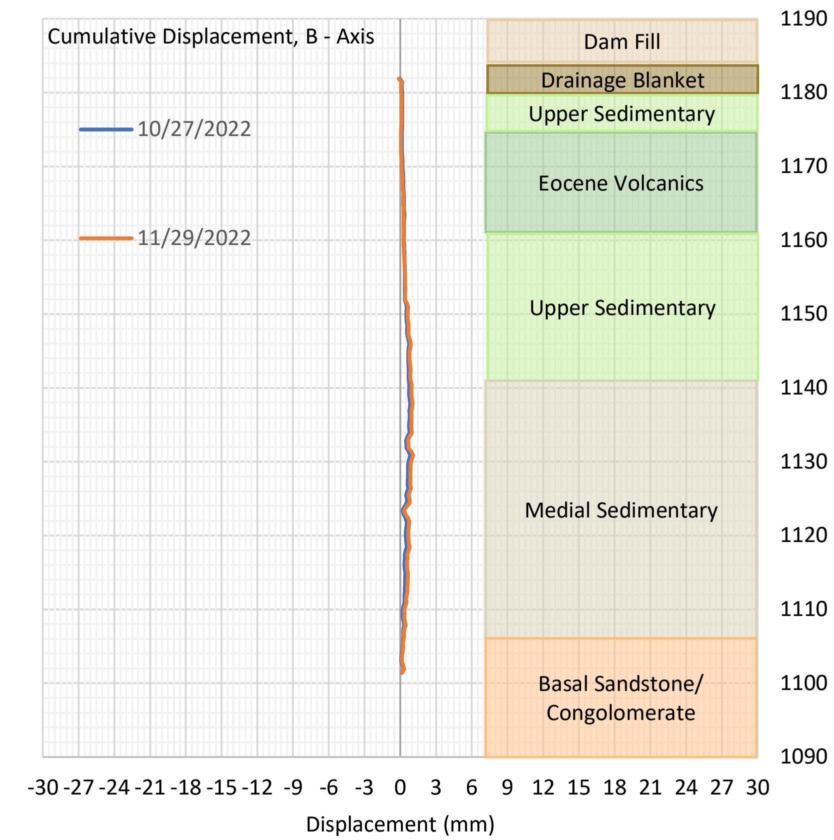
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-22











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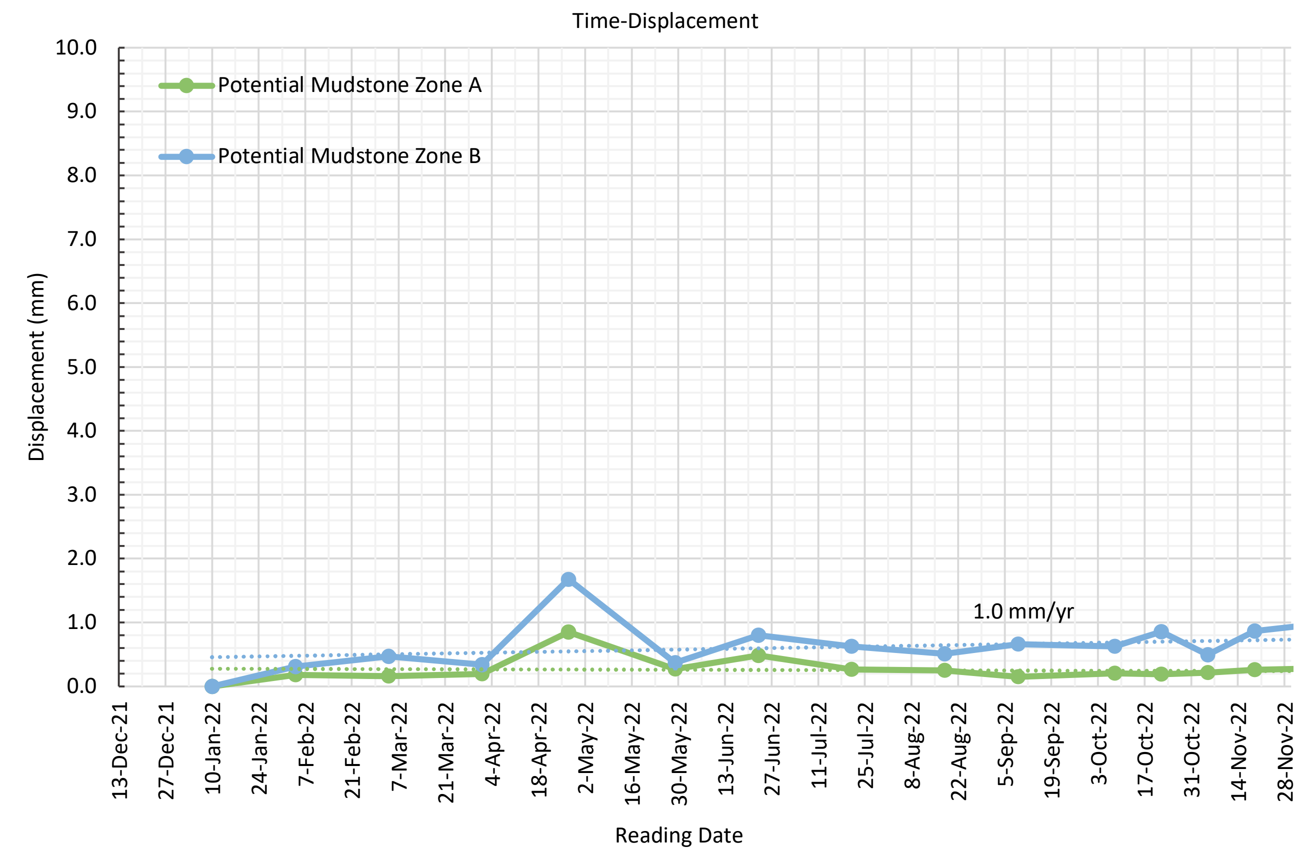
Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Volcanics	1181.4-1130.4	3.0	N/A	N/A
Pot. Mudstone	1130.4-1114.4	3.0	N/A	N/A
Sandstone	1114.4-1101.9	3.0	N/A	N/A

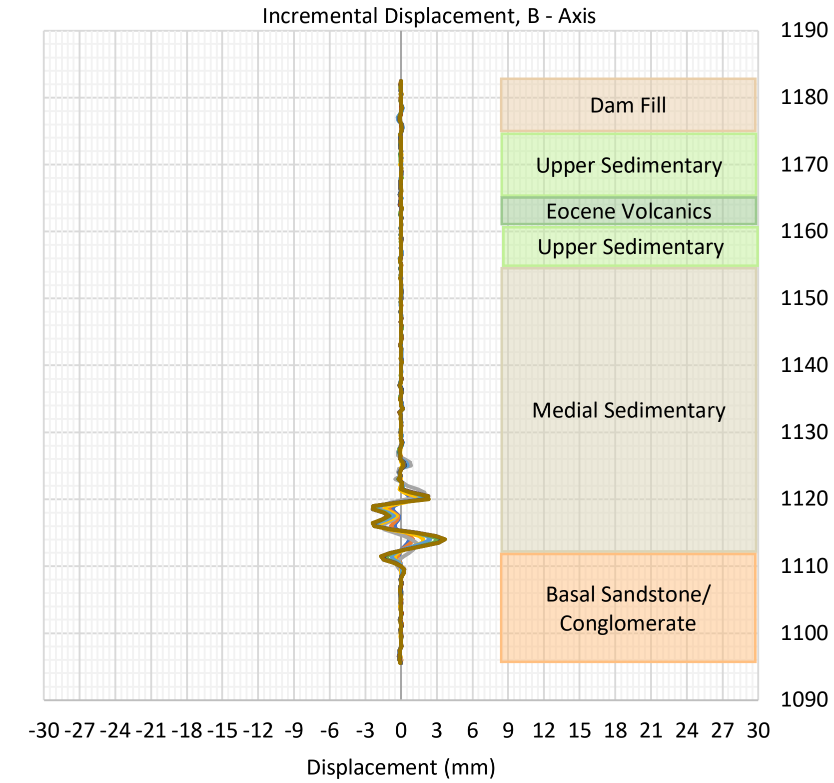
Station	Baseline Reading	Instrument Type
2+700	2022-10-07	SAAV

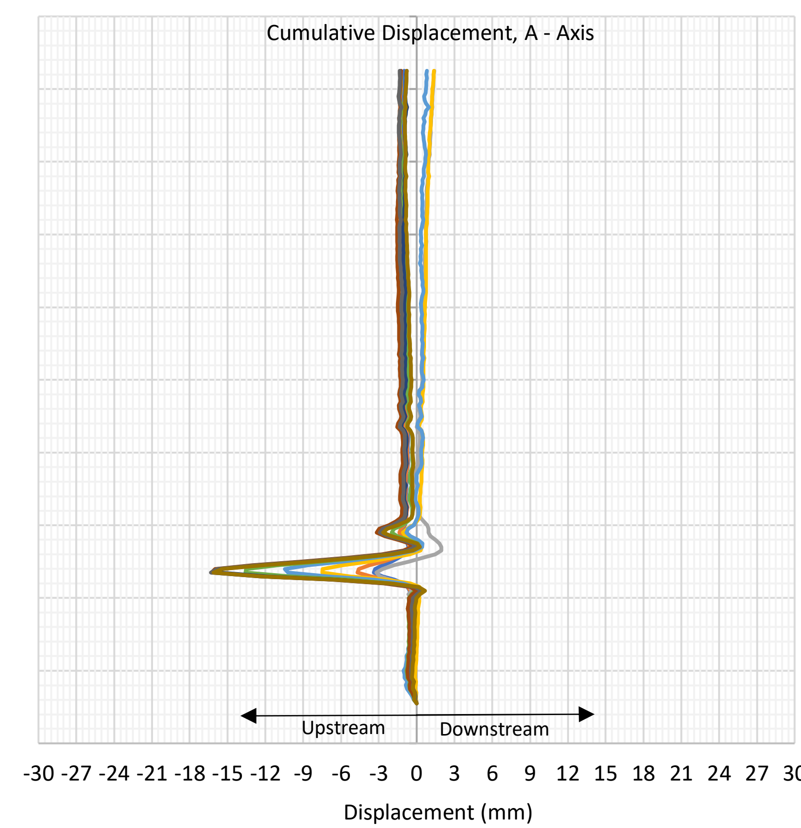
NOT FOR CONSTRUCTION

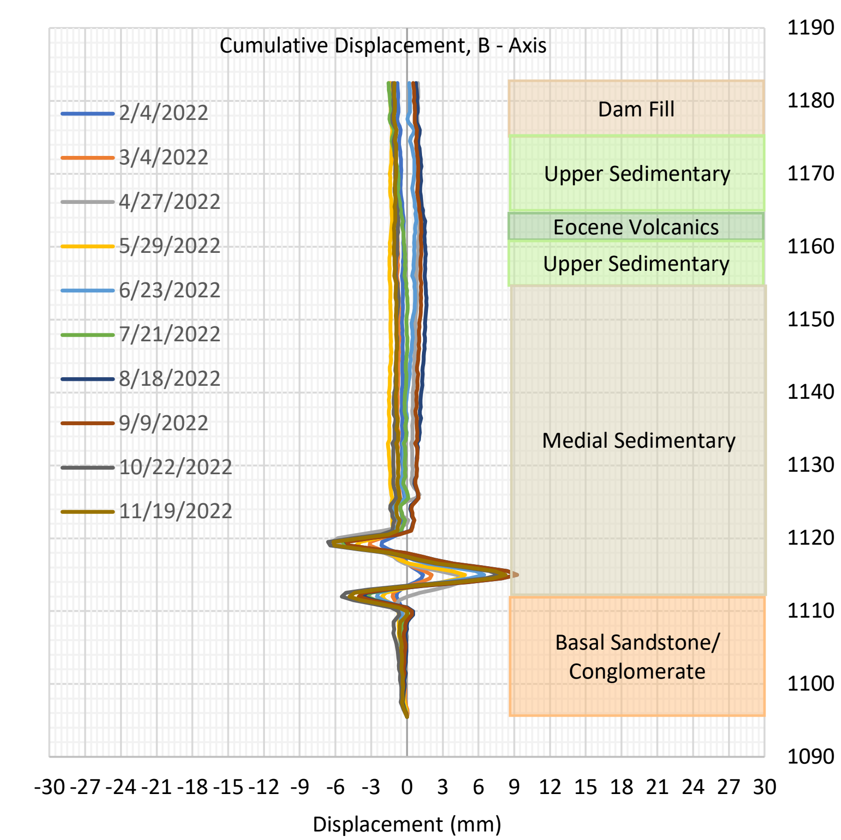
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

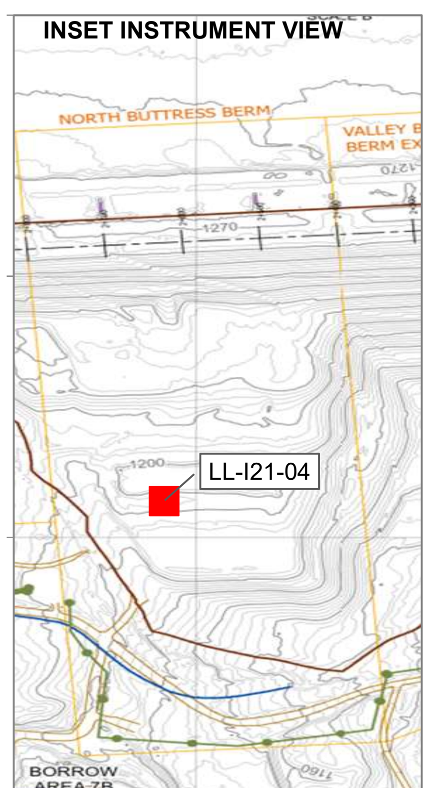
CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE LL DAM INCLINOMETER PLOTS LL-I20-03 (NBB) DEC. 2021 TO NOV. 2022
	SCALE: NTS / PROJECT No.: M02341C42 / FIG. No.: II-B-23











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5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Pot. Mudstone A	1139.1-1126.1	1.0	N/A	N/A
Pot. Mudstone B	1121.1-1110.1	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
2+590	2022-02-04	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

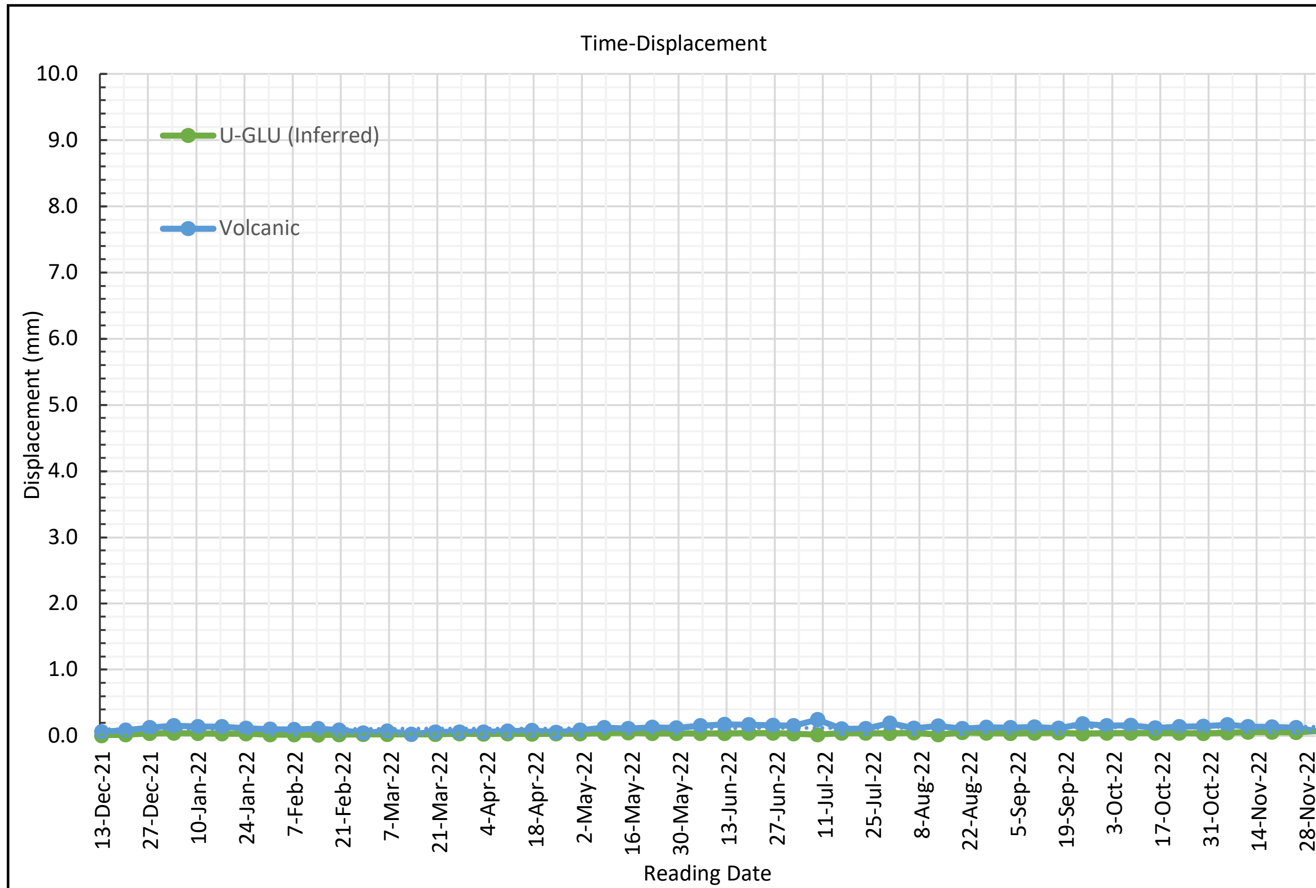
Klohn Crippen Berger

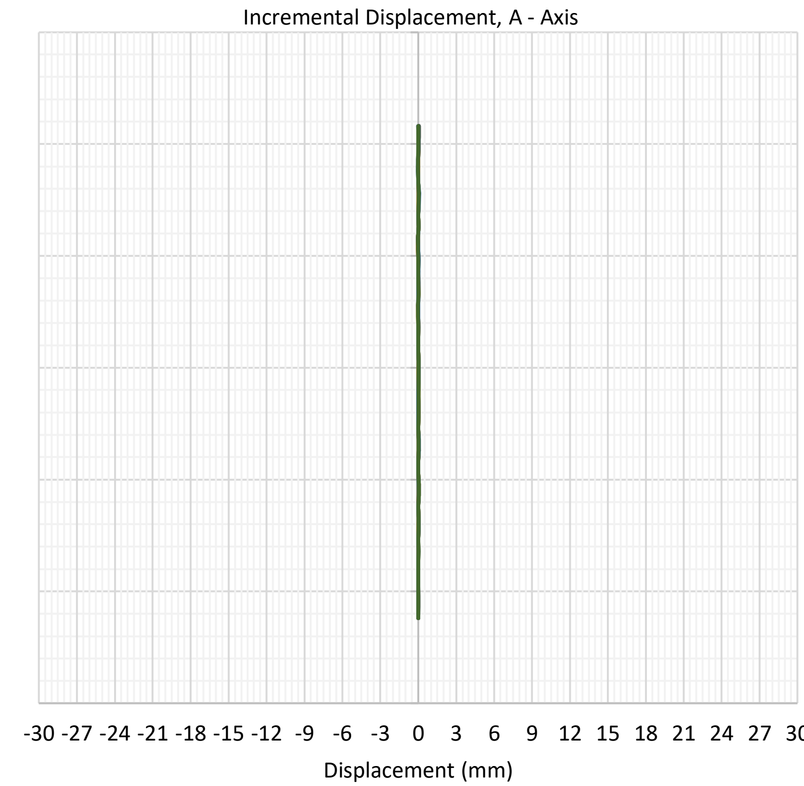
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

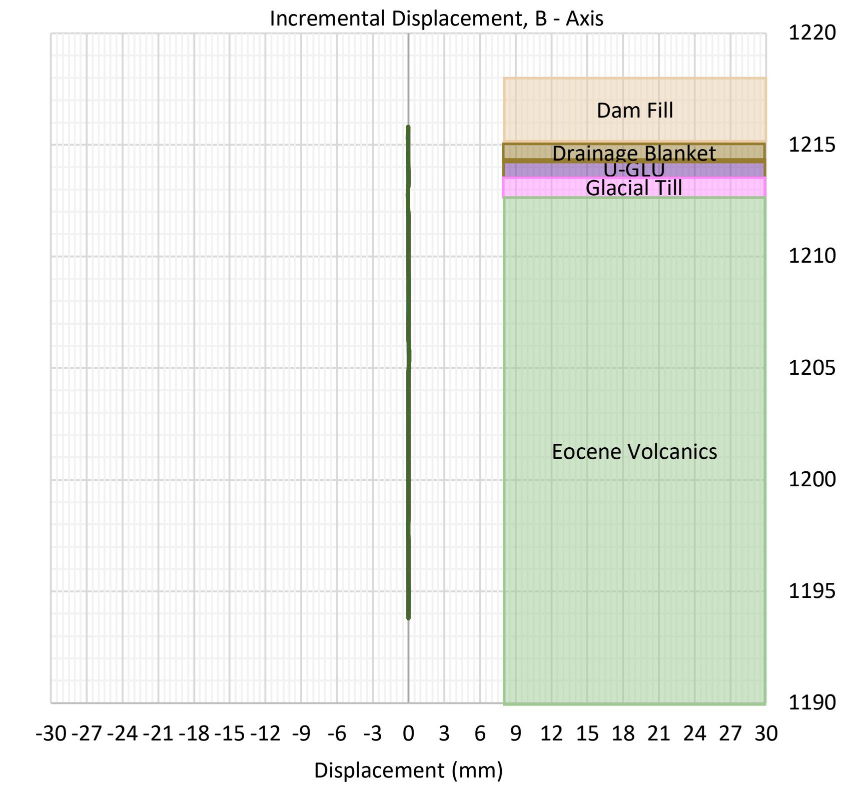
TITLE: LL DAM INCLINOMETER PLOTS
LL-I21-04 (NBB)
DEC. 2021 TO NOV. 2022

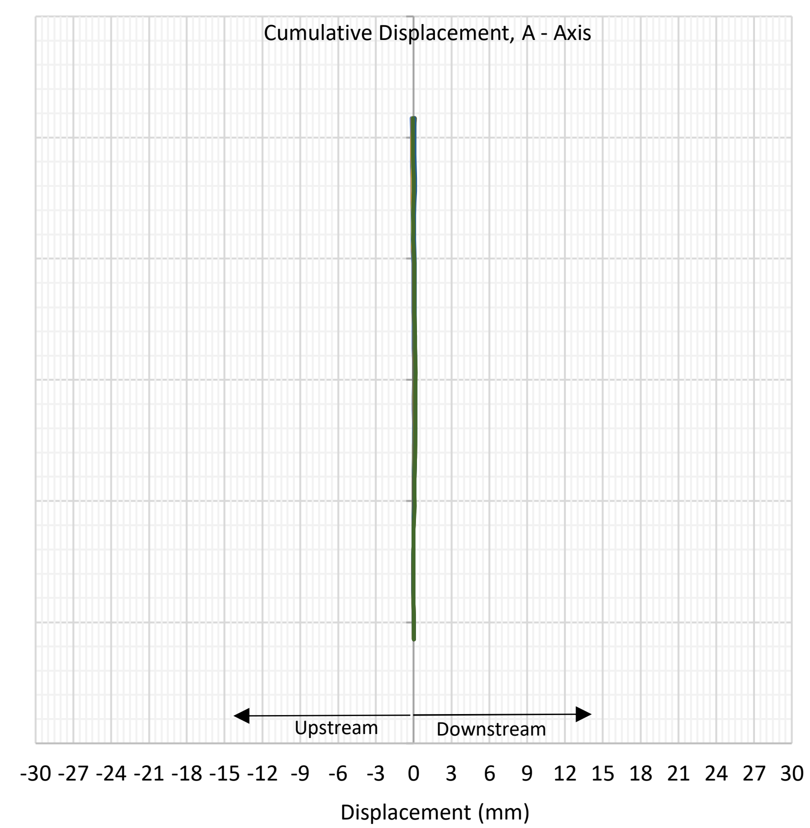
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-24

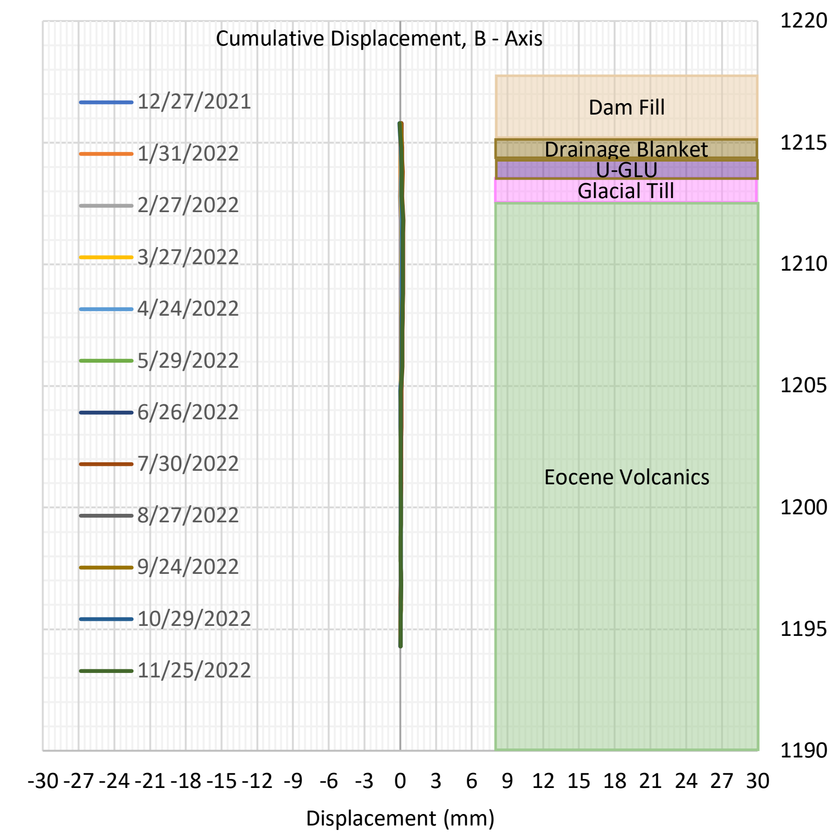
North Dam Bedrock

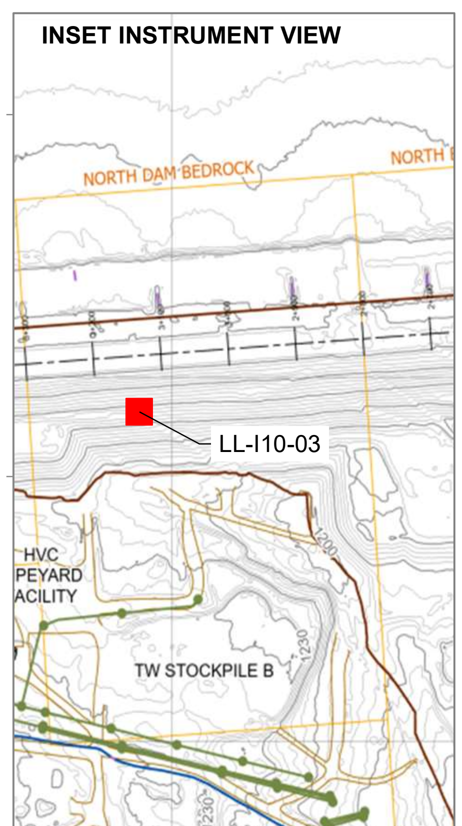












NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
U-GLU	1214.3-1212.8	1.0	N/A	N/A
Volcanic	1212.8-1193.8	2.0	N/A	N/A

Station	Baseline Reading	Instrument Type
3+150	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

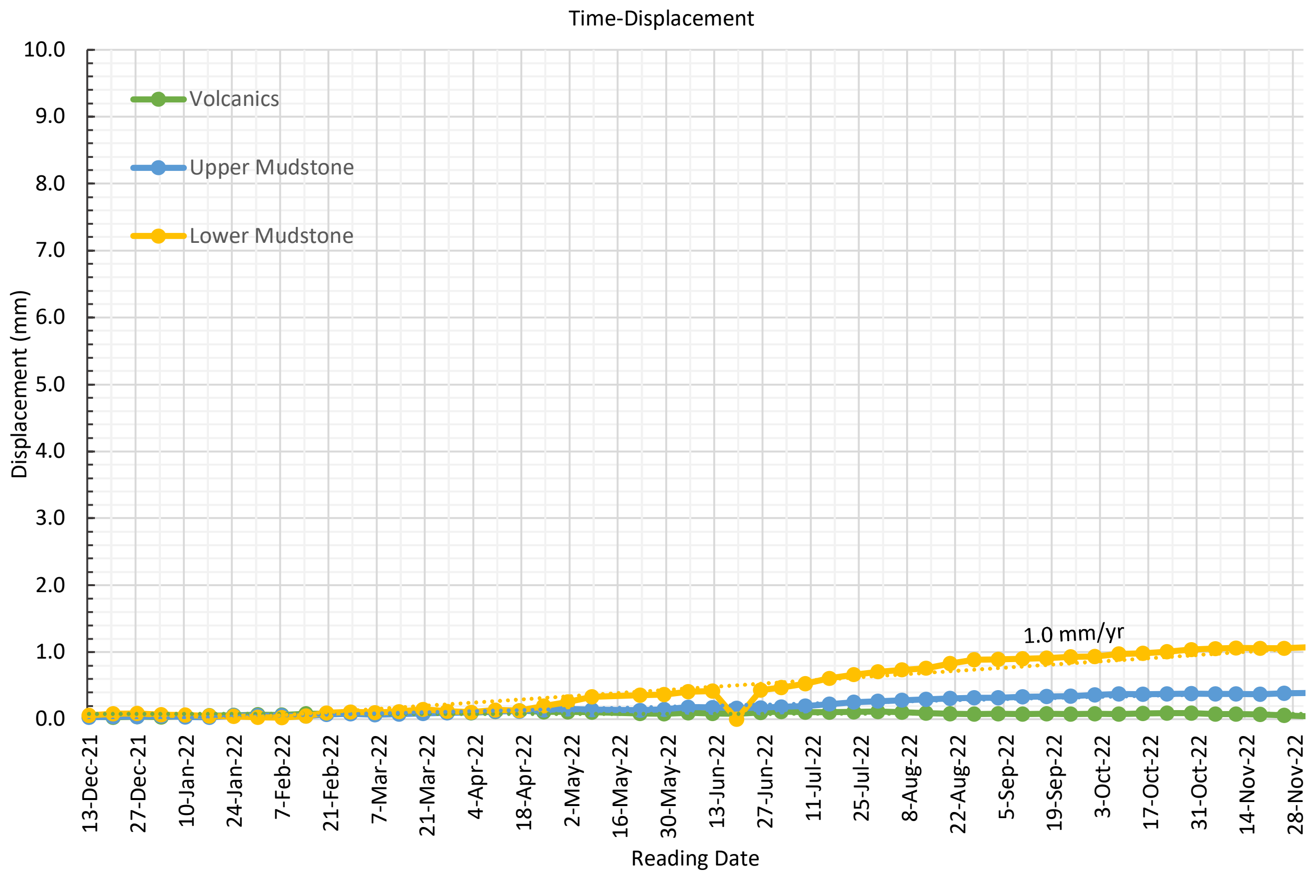
CLIENT: Highland Valley Copper / Teck

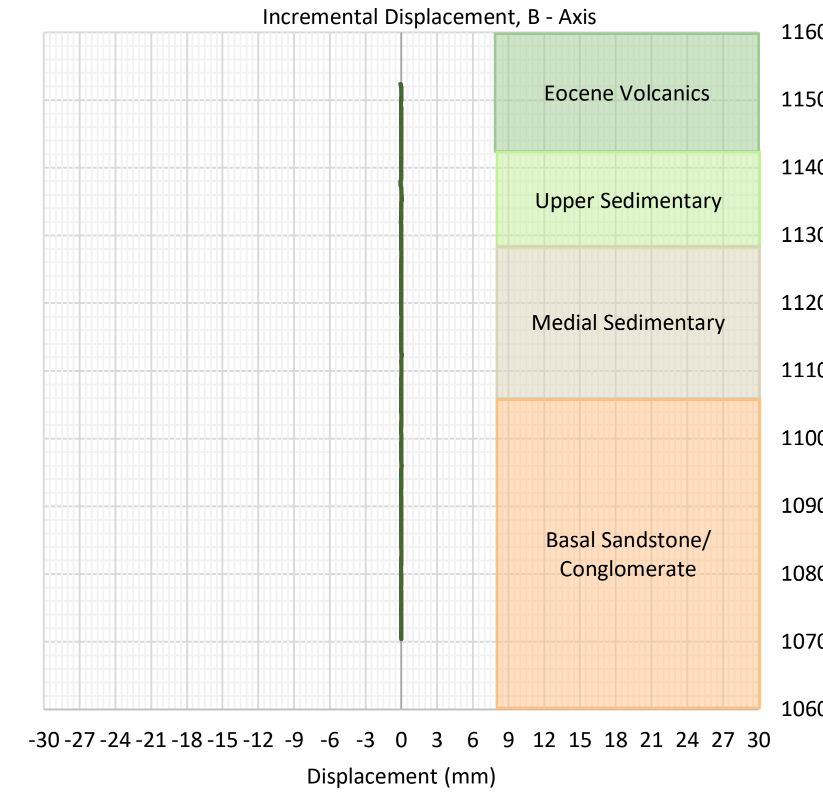
Klohn Crippen Berger

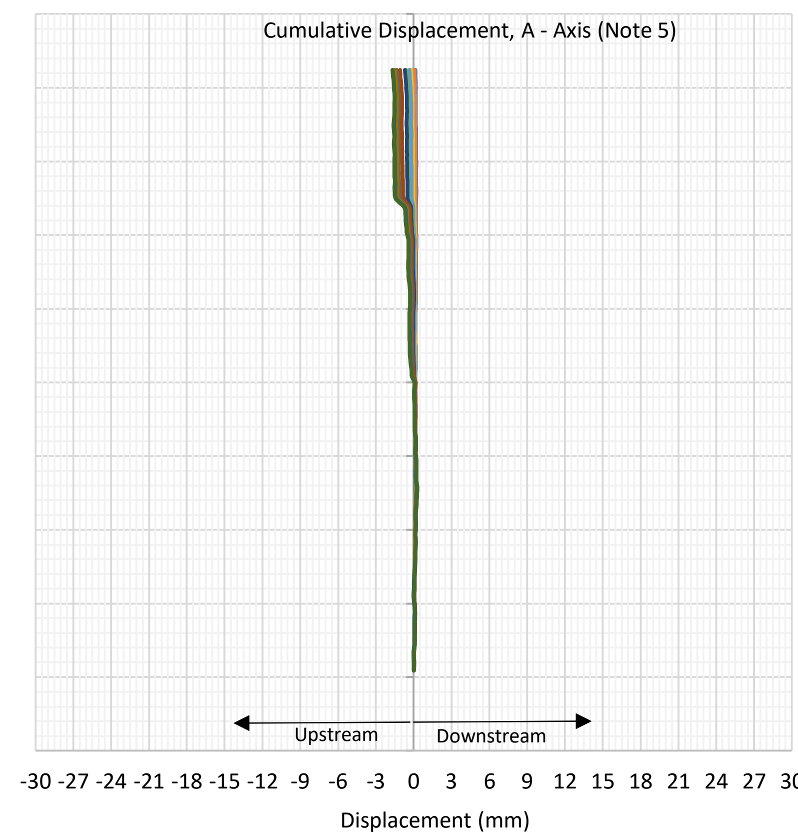
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

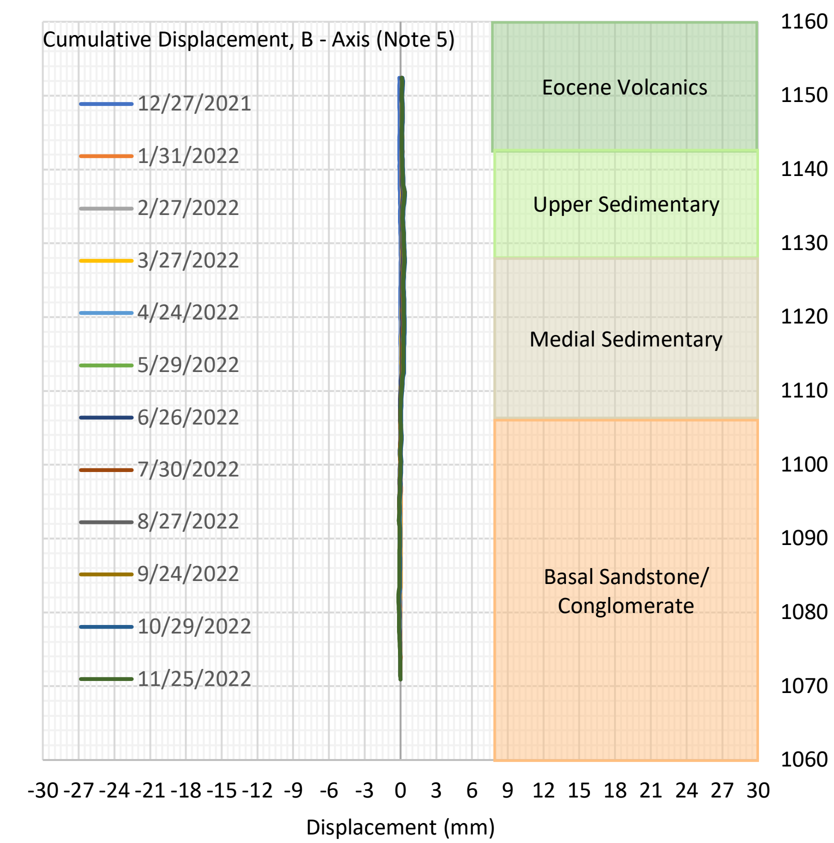
TITLE: LL DAM INCLINOMETER PLOTS LL-I10-03 (NORTH DAM BEDROCK) DEC. 2021 TO NOV. 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-25

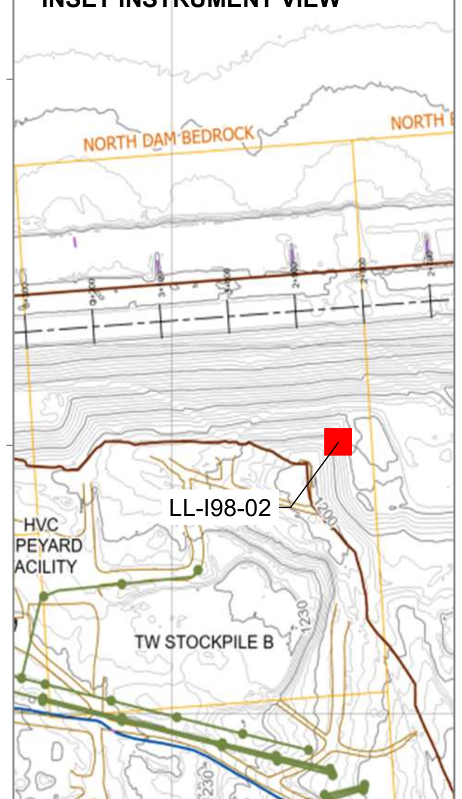








INSET INSTRUMENT VIEW



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5. AZIMUTH CORRECTION HAS NOT BEEN APPLIED TO THIS INSTRUMENT.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Volcanics	1151.9-1142.4	1.0	N/A	N/A
Upper Mudstone	1137.9-1127.9	0.9	1.8	3.6
Lower Mudstone	1112.9-1106.9	0.9	1.8	3.6

Station	Baseline Reading	Instrument Type
2+860	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

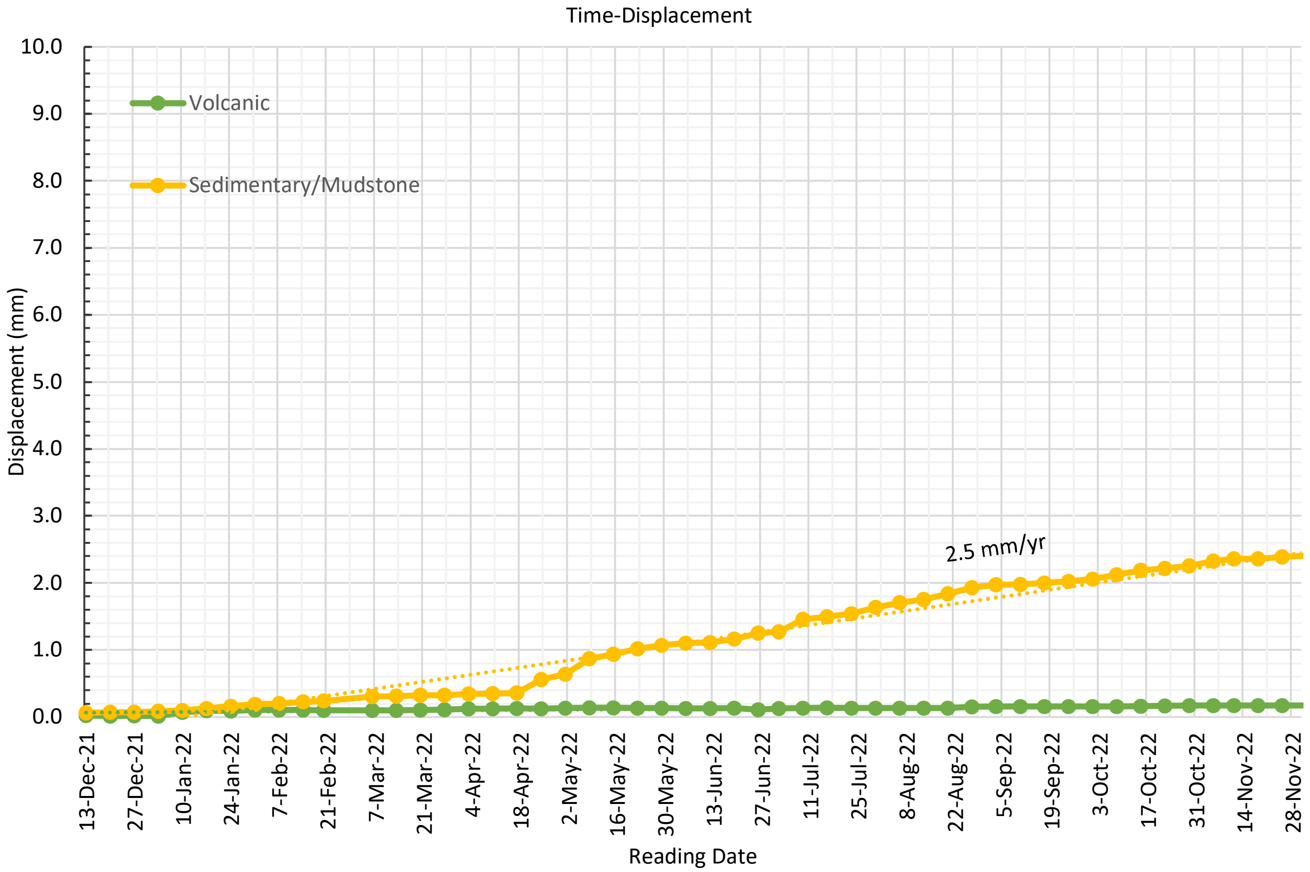
CLIENT: Highland Valley Copper / Teck

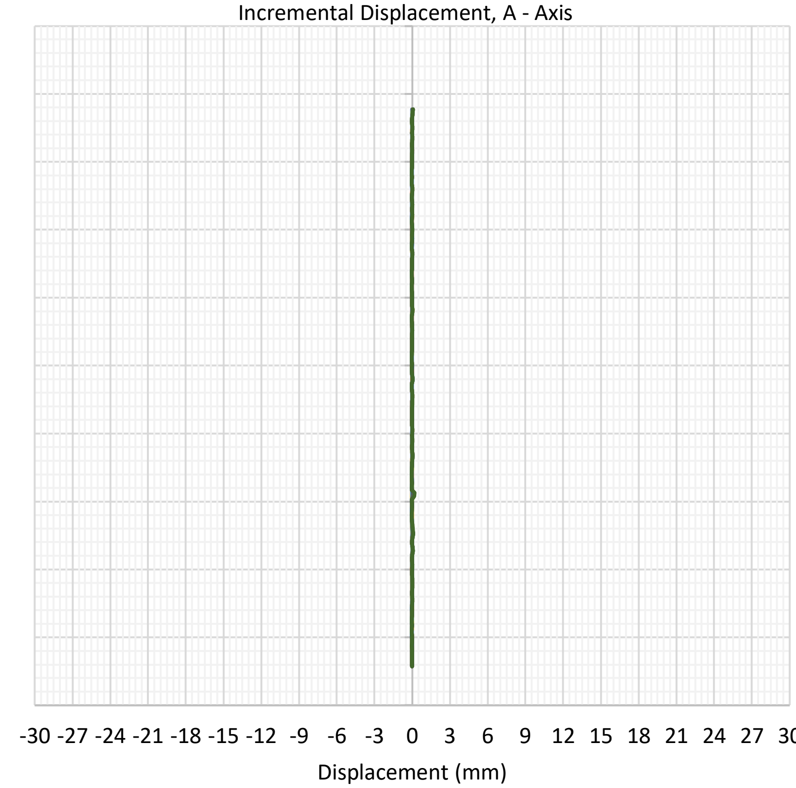
Klohn Crippen Berger

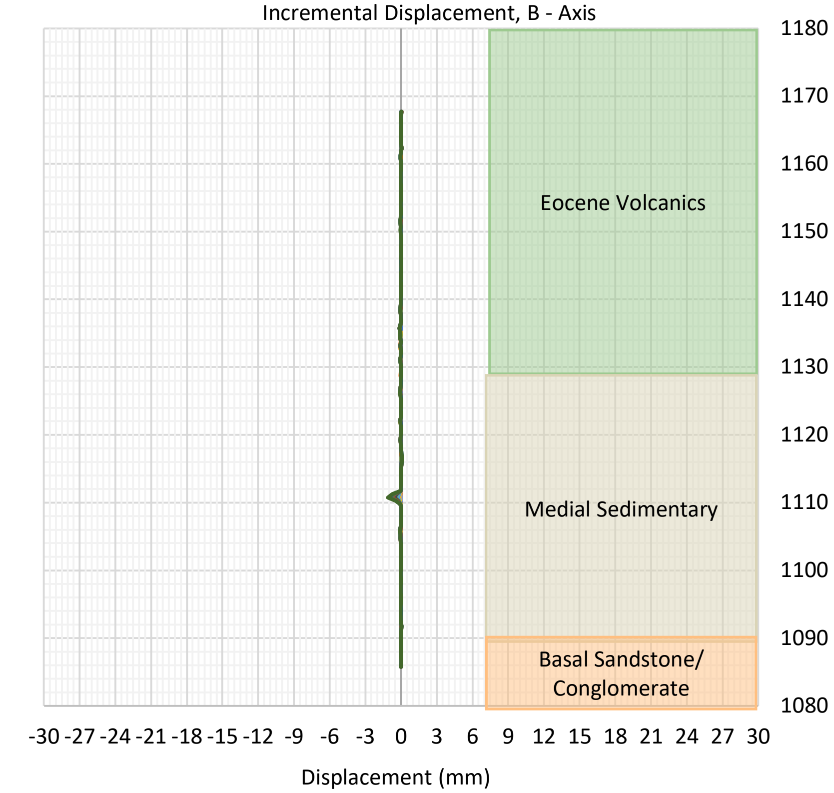
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

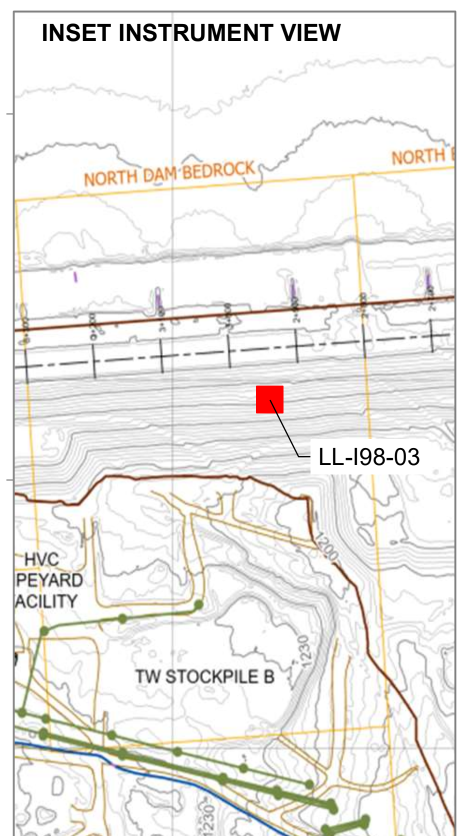
TITLE: LL DAM INCLINOMETER PLOTS
LL-I98-02 (NORTH DAM BEDROCK)
DEC. 2021 TO NOV. 2022

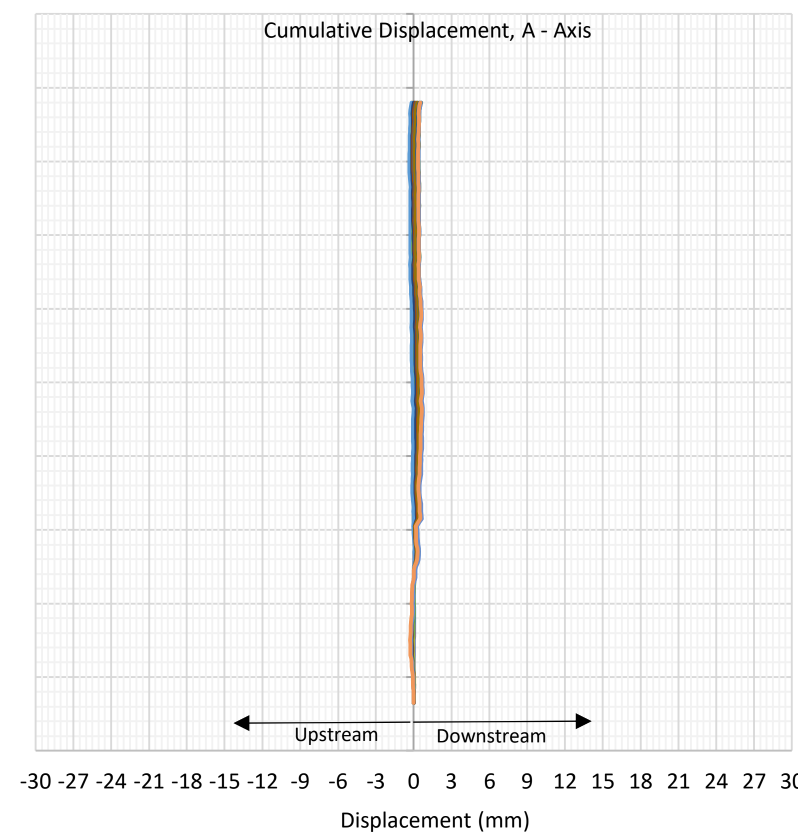
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-26

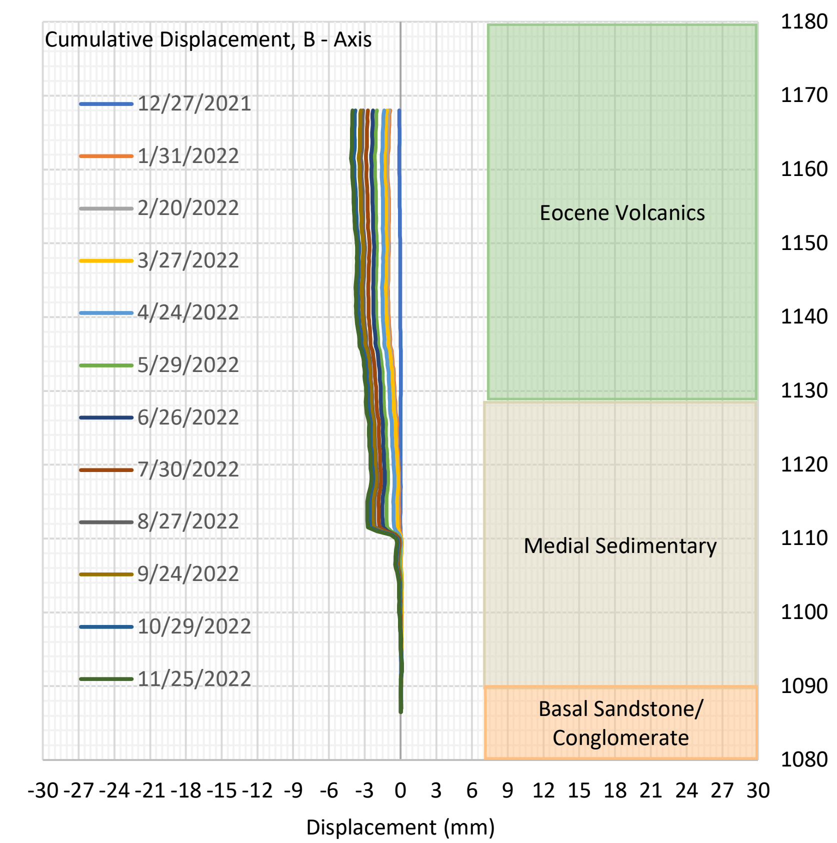












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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Volcanic	1132.0-1129.0	1.0	N/A	N/A
Sed/Mudstone	1118.0-1102.5	1.0	1.9	3.8

Station	Baseline Reading	Instrument Type
2+950	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

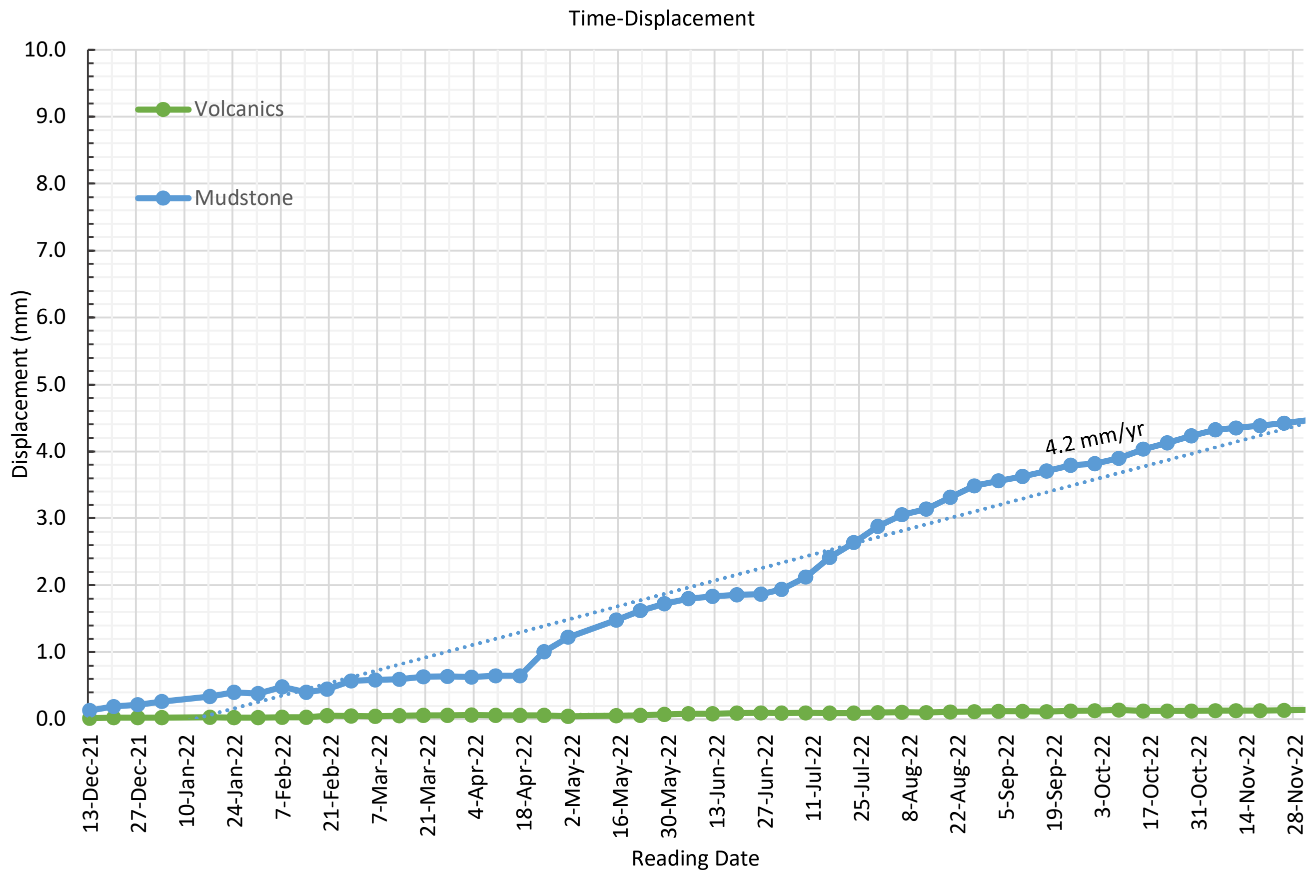
CLIENT: Highland Valley Copper / Teck

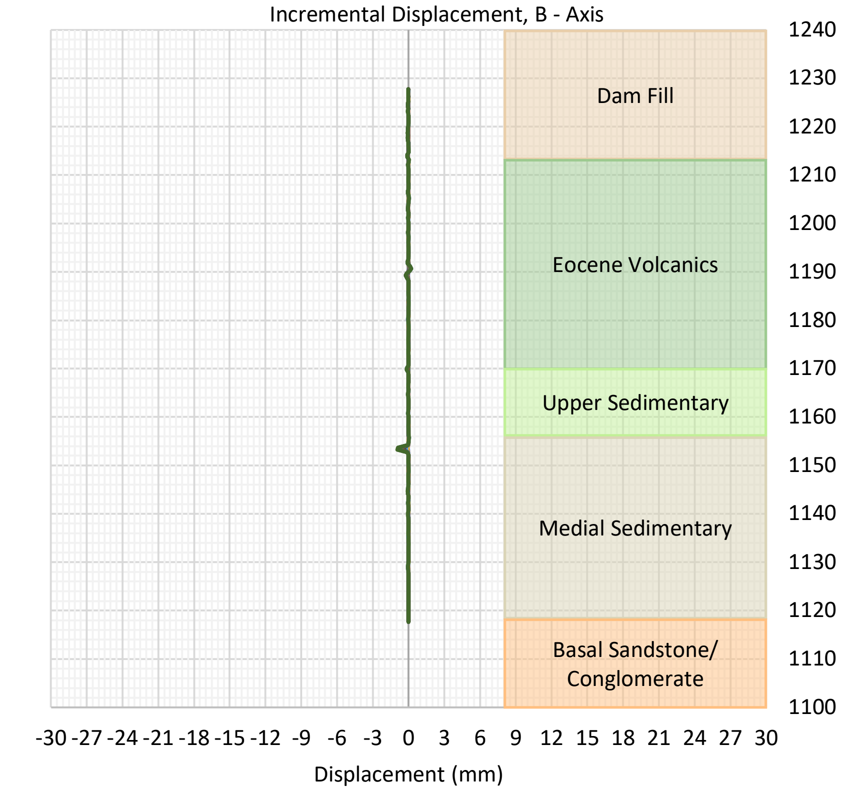
Klohn Crippen Berger

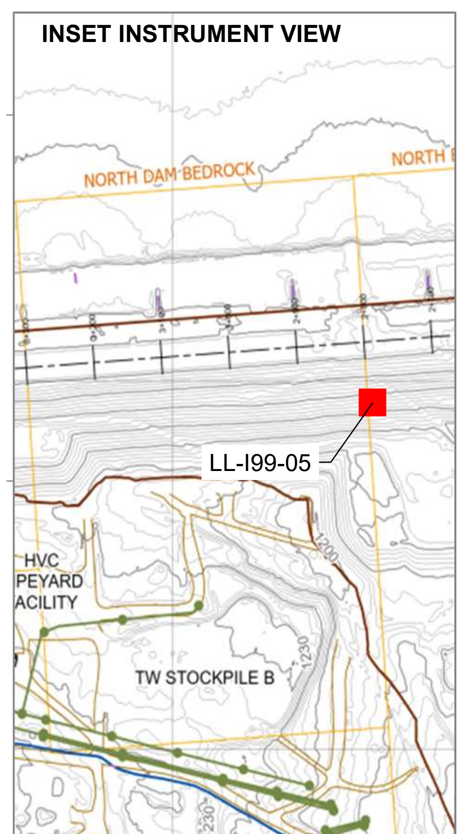
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

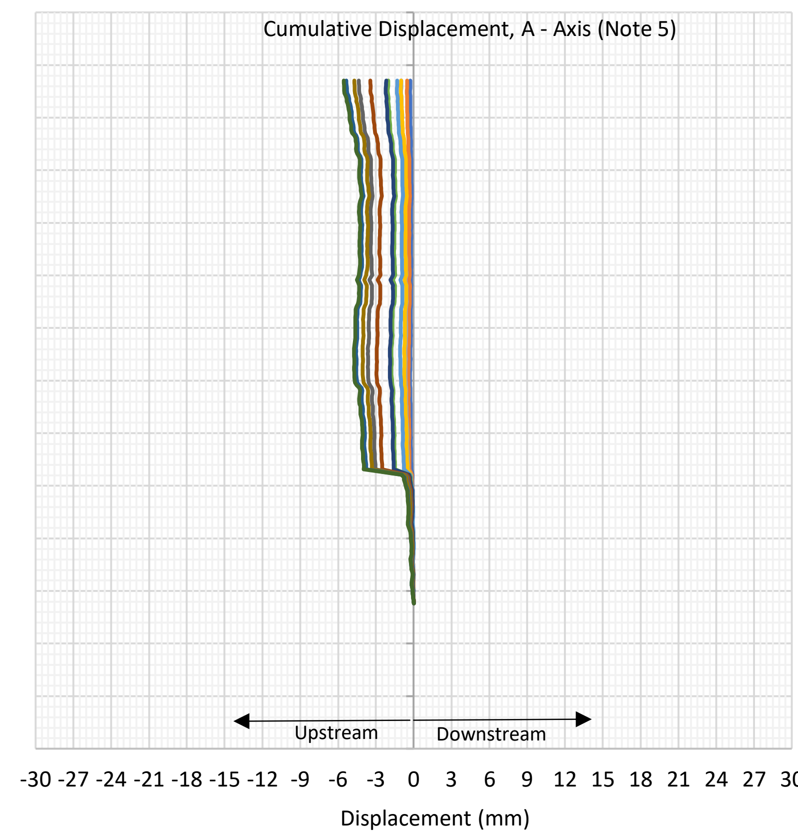
TITLE: LL DAM INCLINOMETER PLOTS
LL-I98-03 (NORTH DAM BEDROCK)
DEC. 2021 TO NOV. 2022

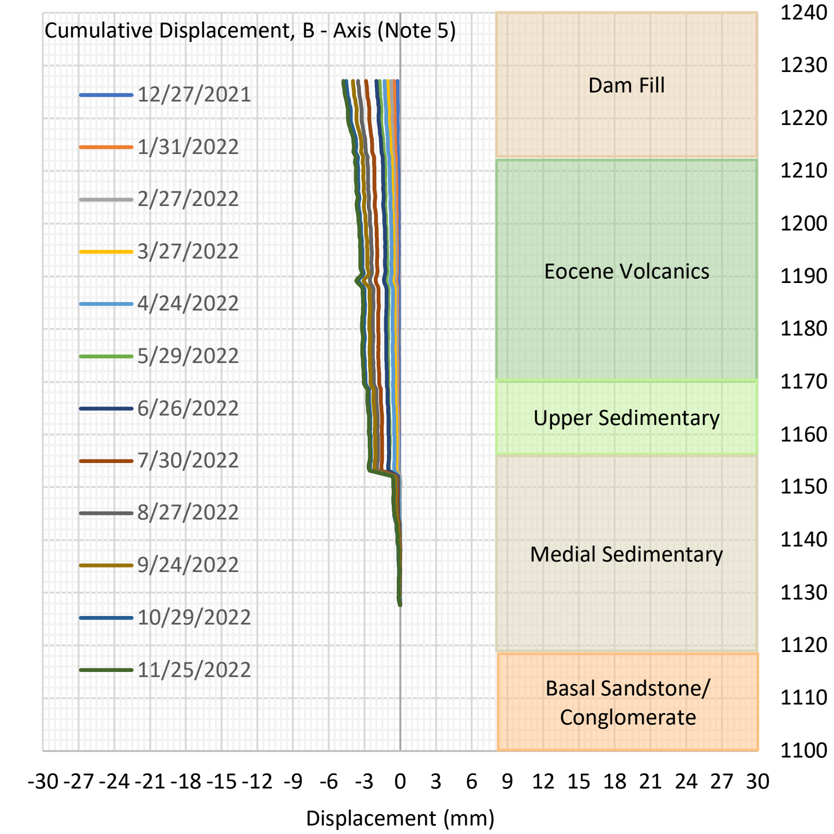
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-27











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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Volcanics	1203.1-1201.1	1.0	N/A	N/A
Mudstone	1166.1-1147.6	1.2	2.4	4.8

Station	Baseline Reading	Instrument Type
2+800	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

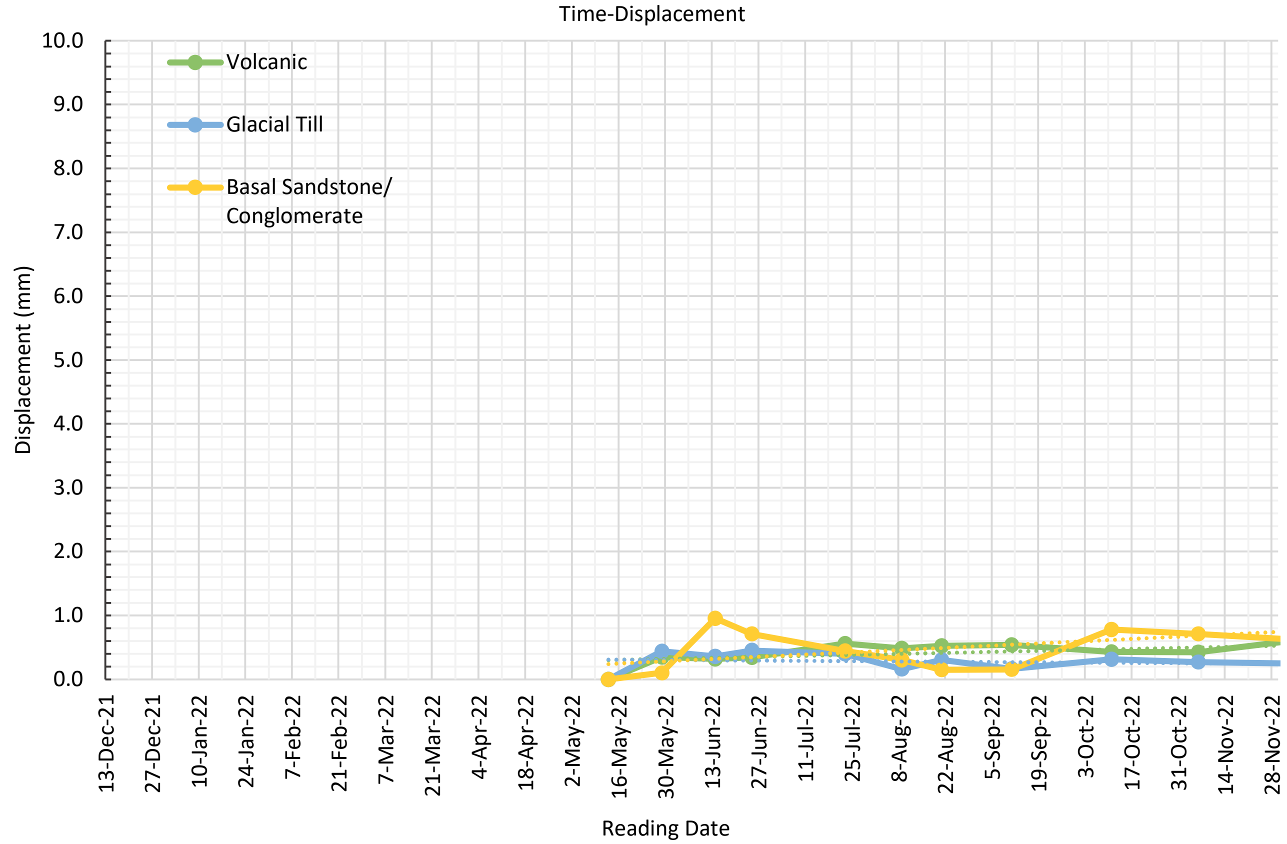
CLIENT: Highland Valley Copper / Teck

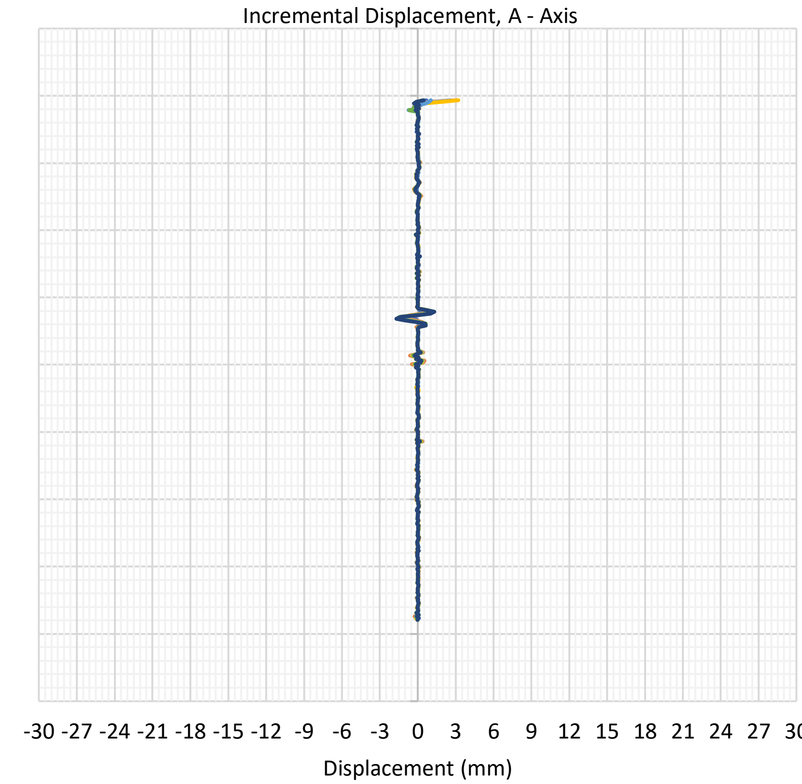
Klohn Crippen Berger

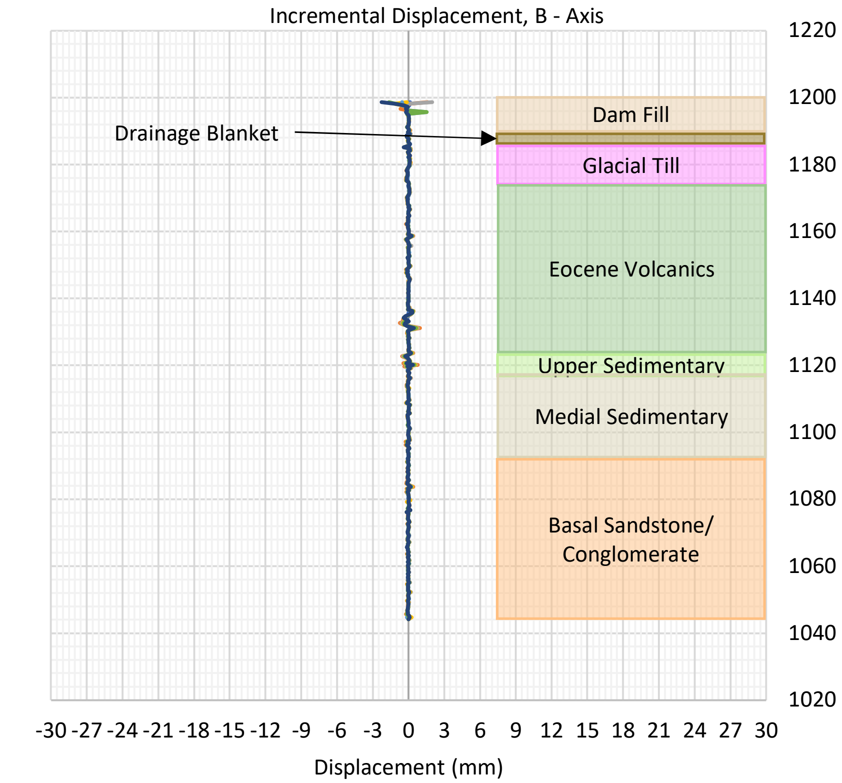
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT

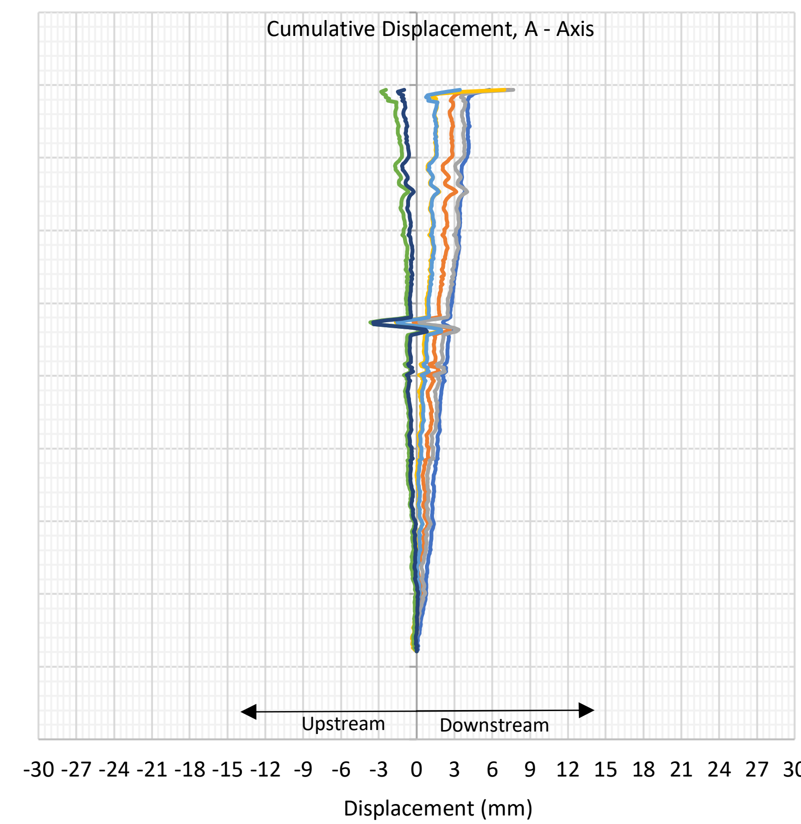
TITLE: LL DAM INCLINOMETER PLOTS LL-I99-05 (NORTH DAM BEDROCK) DEC. 2021 TO NOV. 2022

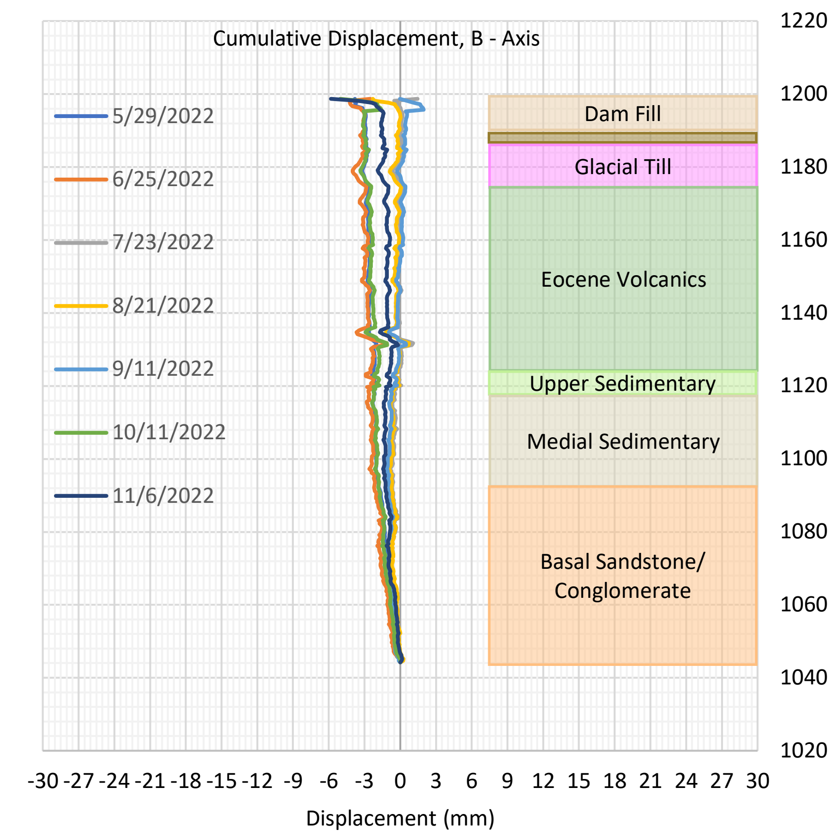
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-28

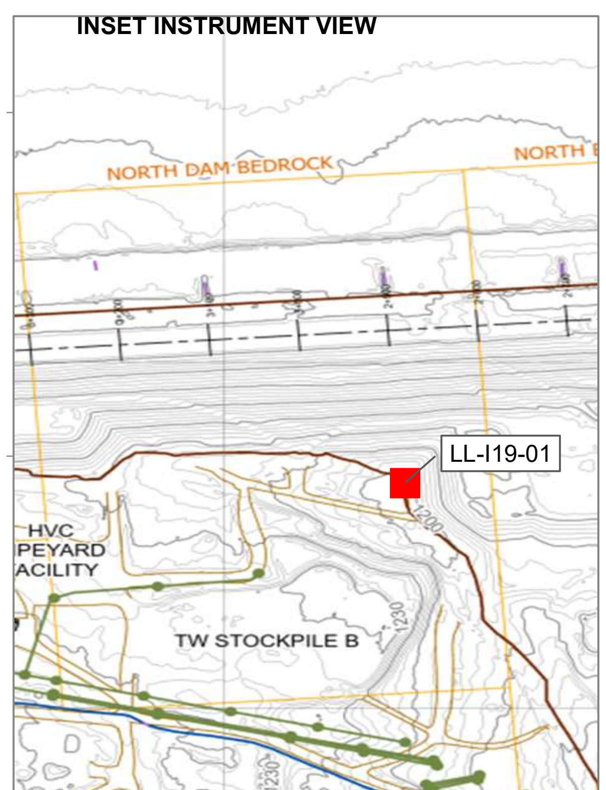












NOTES

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5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Glacial Till	1137.7-1129.7	0.5	N/A	1.0
Volcanic	1125.7-1118.1	1.0	N/A	N/A
Basal Sandstone	1084.7-1056.7	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
2+900	2022-05-29	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

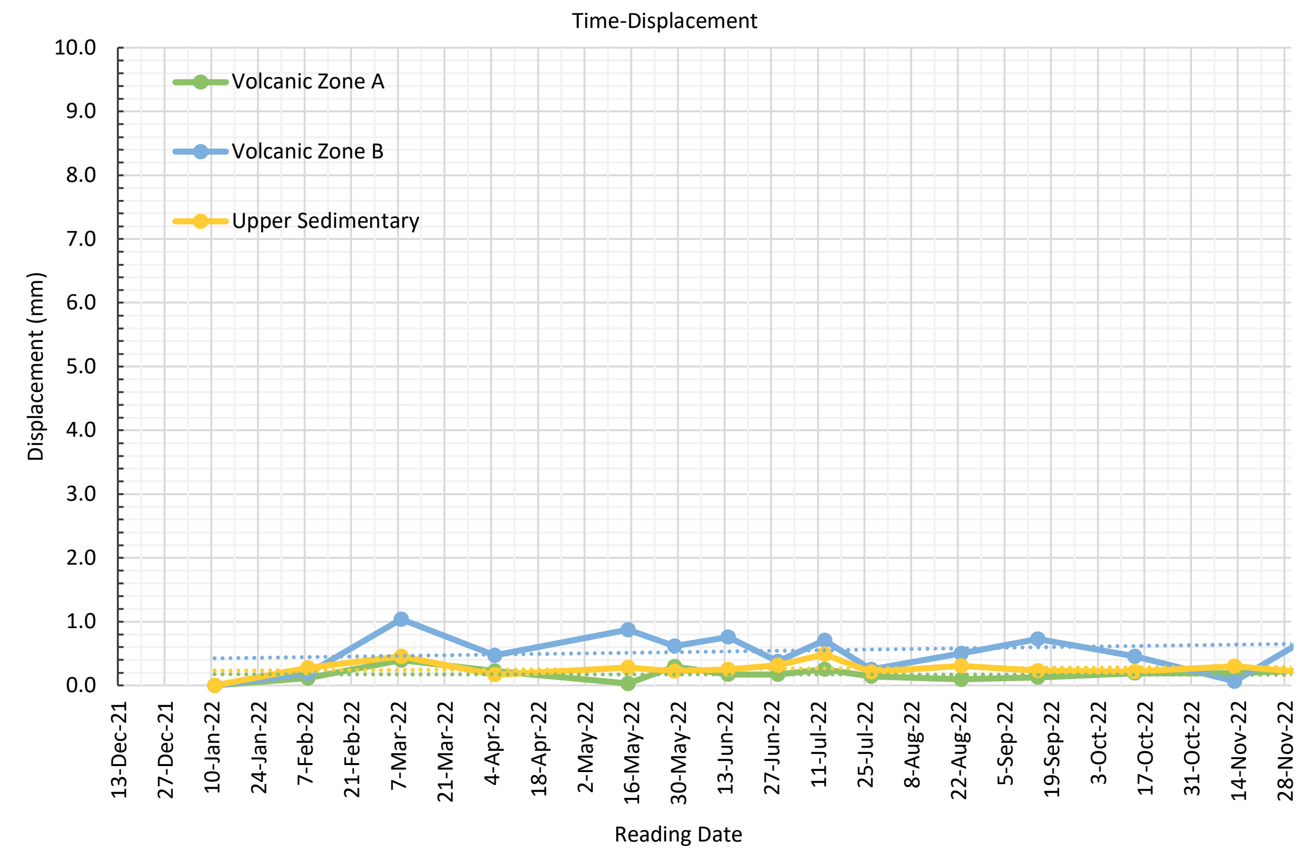
CLIENT: Highland Valley Copper / Teck

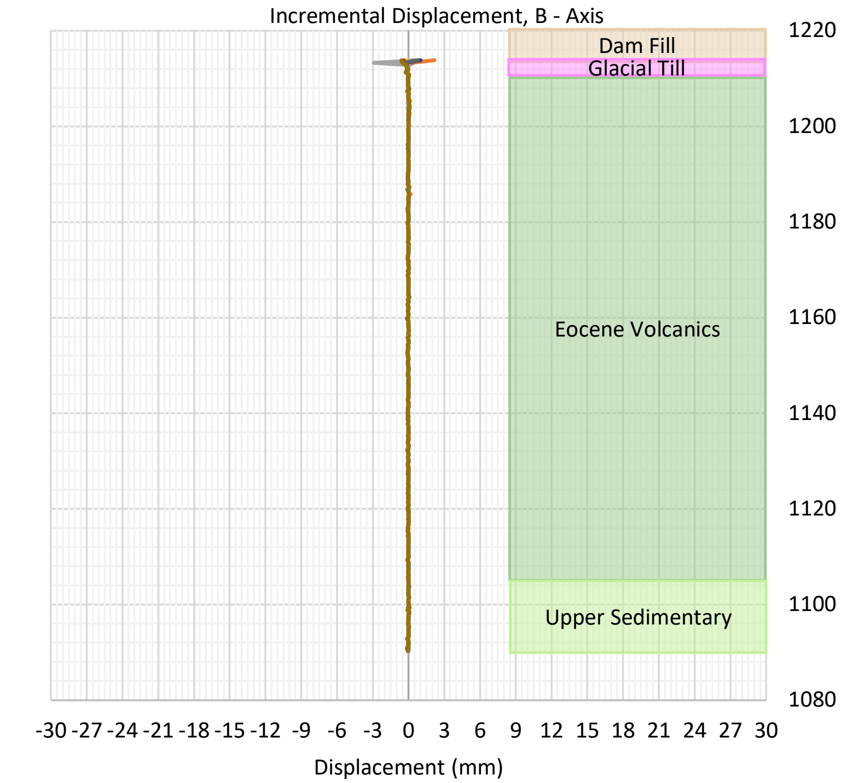
Klohn Crippen Berger

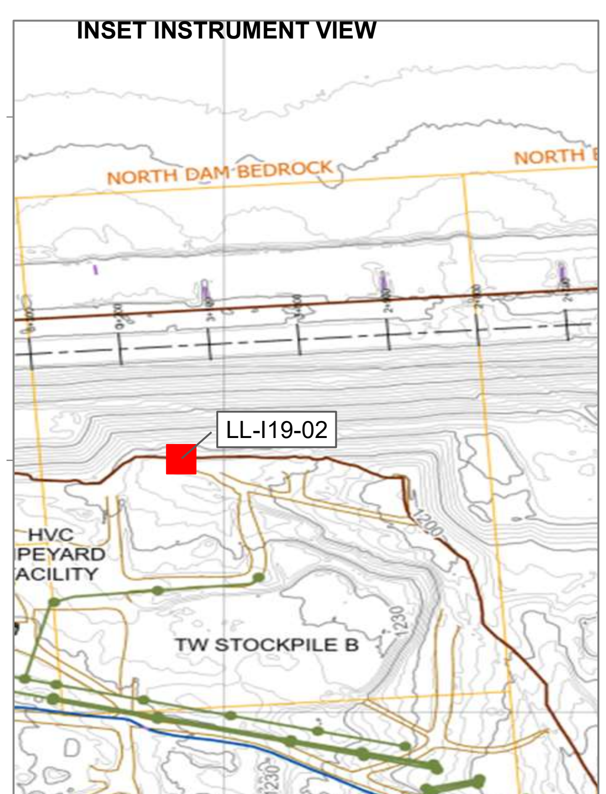
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

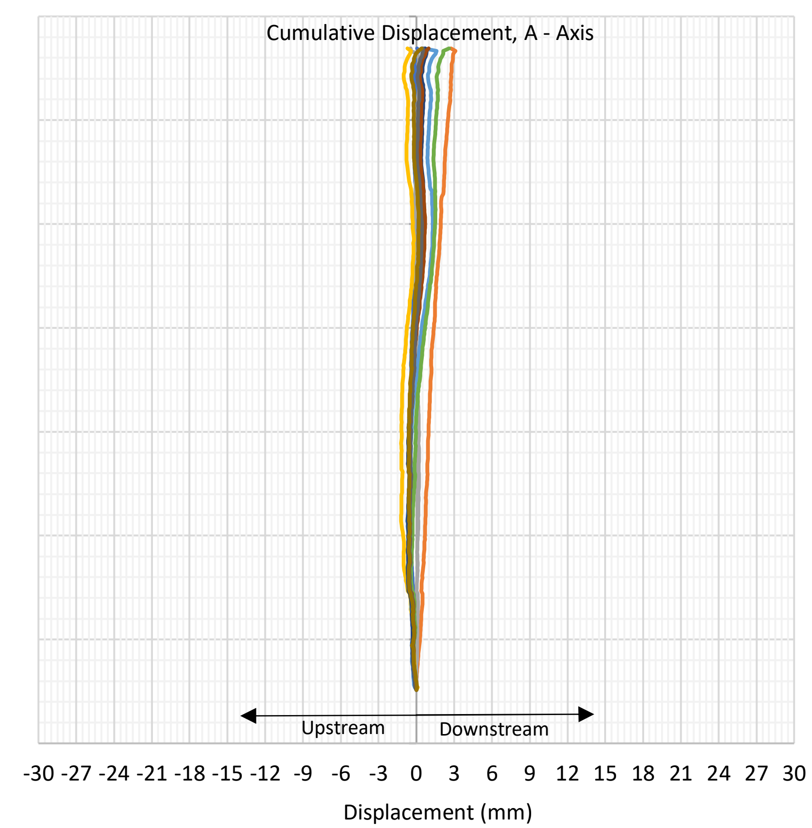
TITLE: LL DAM INCLINOMETER PLOTS
LL-I19-01 (NORTH DAM BEDROCK)
DEC. 2021 TO NOV. 2022

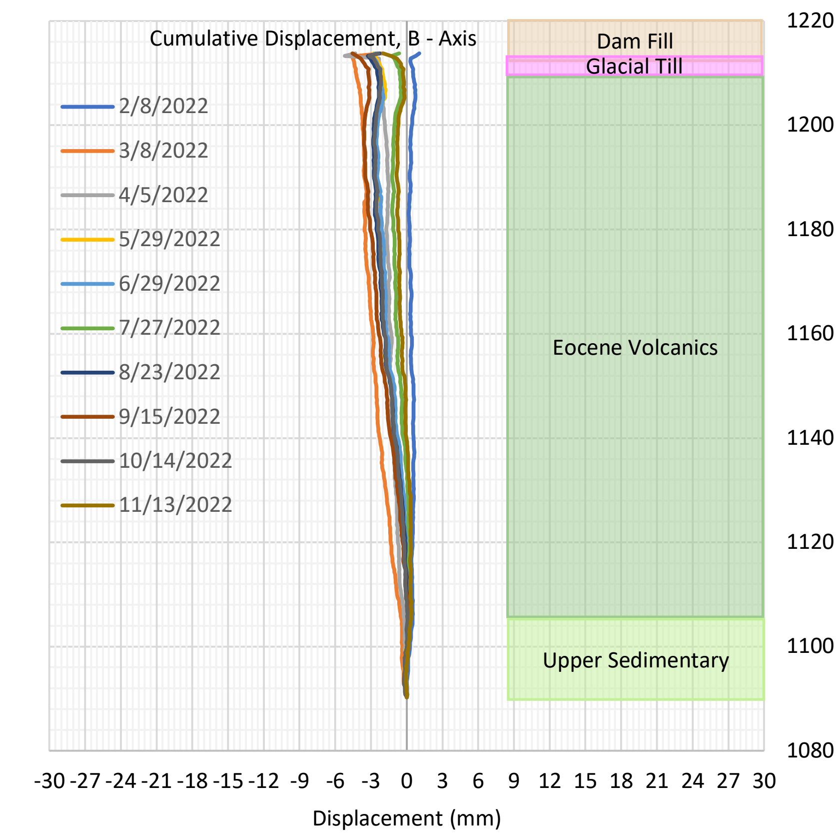
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-29











NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Volcanic Zone A	1209.8-1203.8	0.5	N/A	1.0
Volcanic Zone B	1129.8-1109.8	1.0	N/A	N/A
Upper Sedimentary	1099.8-1090.2	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
3+150	2022-02-08	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

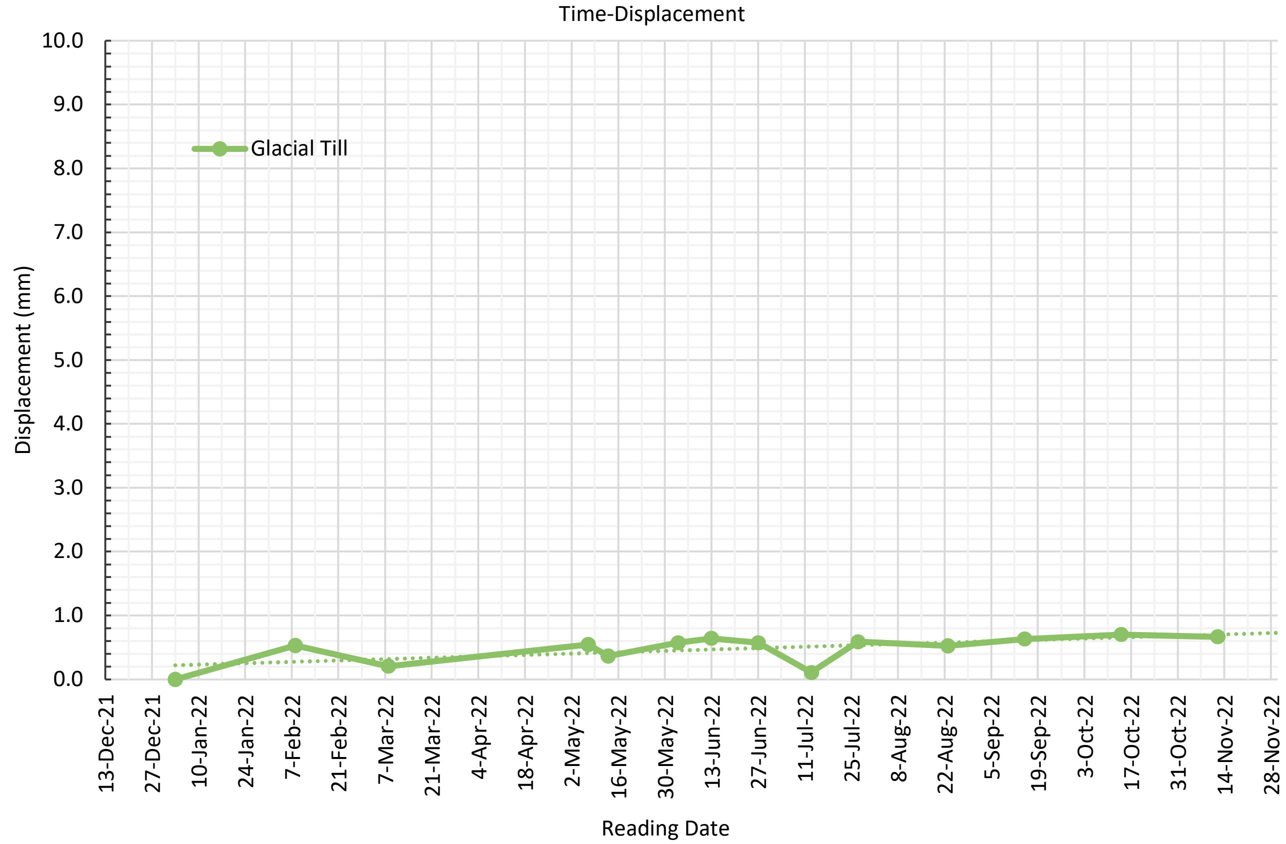
CLIENT
Highland Valley Copper / Teck

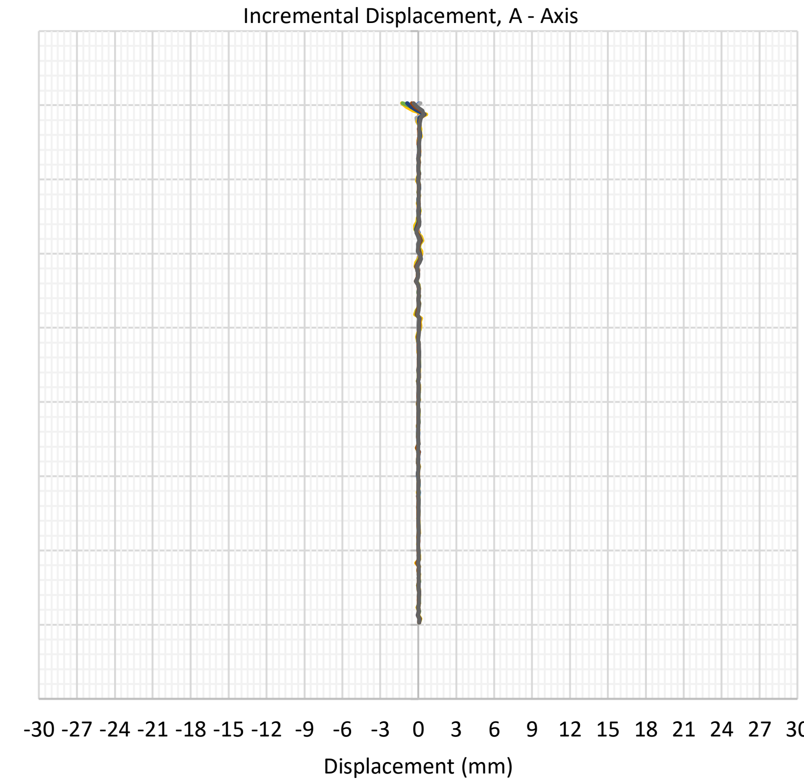
Klohn Crippen Berger

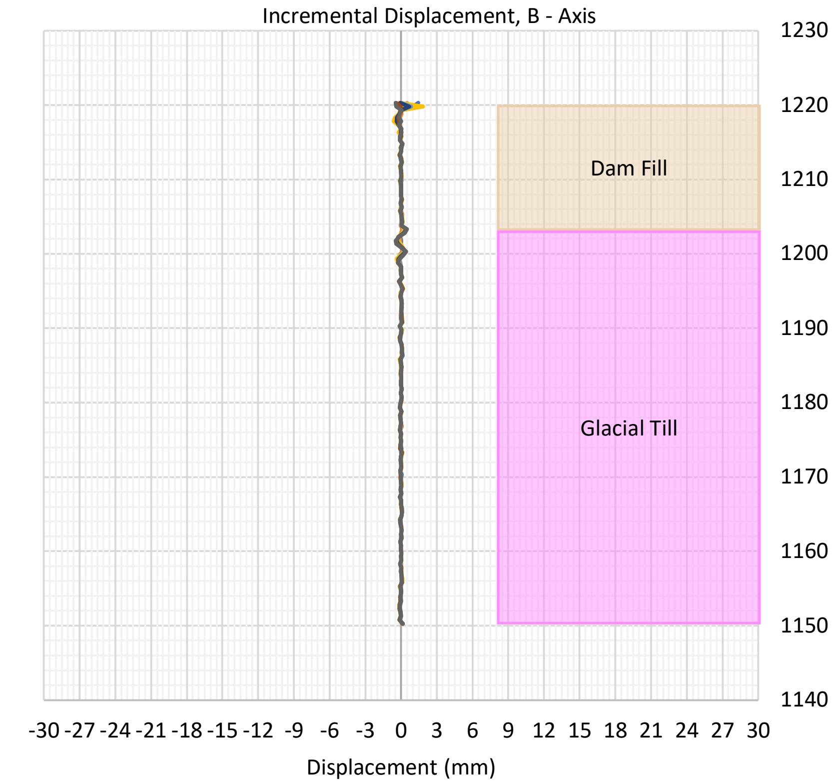
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

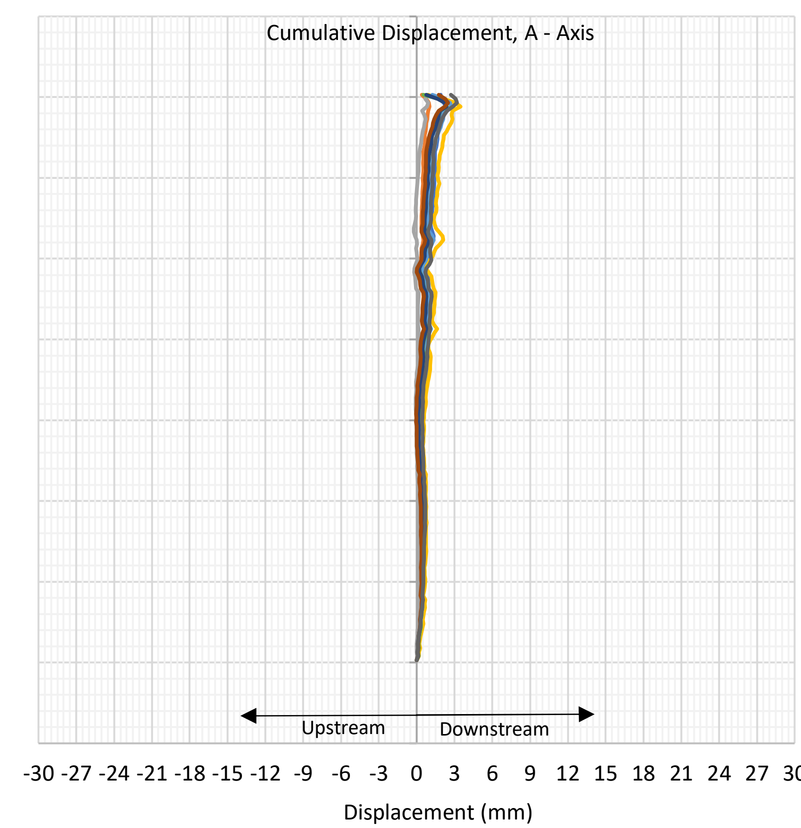
TITLE
LL DAM INCLINOMETER PLOTS
LL-I19-02 (NORTH DAM BEDROCK)
DEC. 2021 TO NOV. 2022

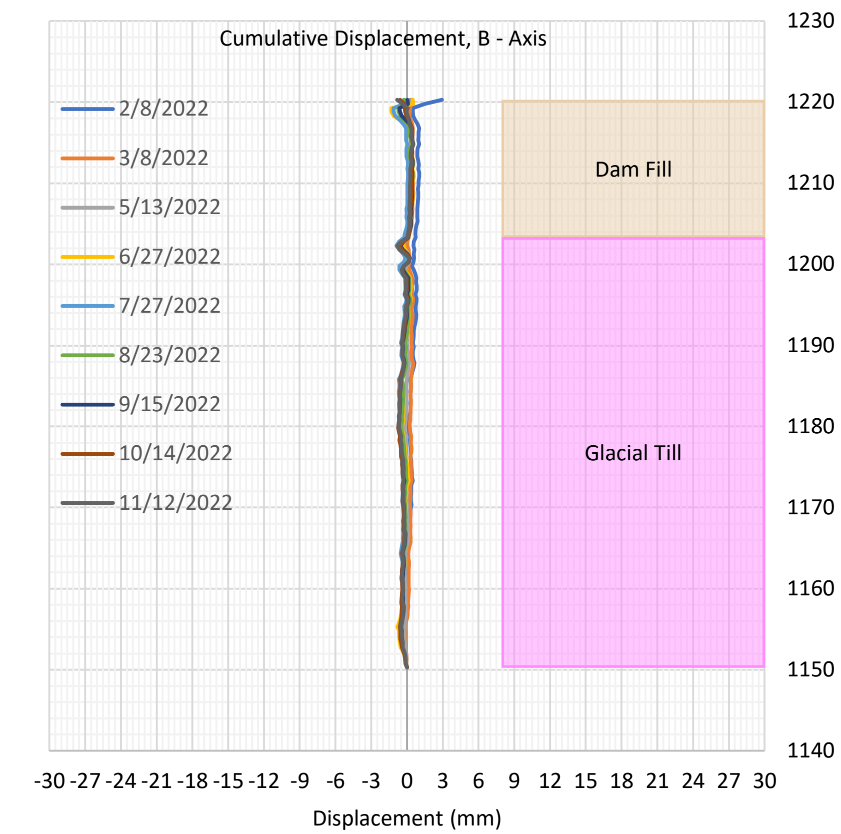
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-30

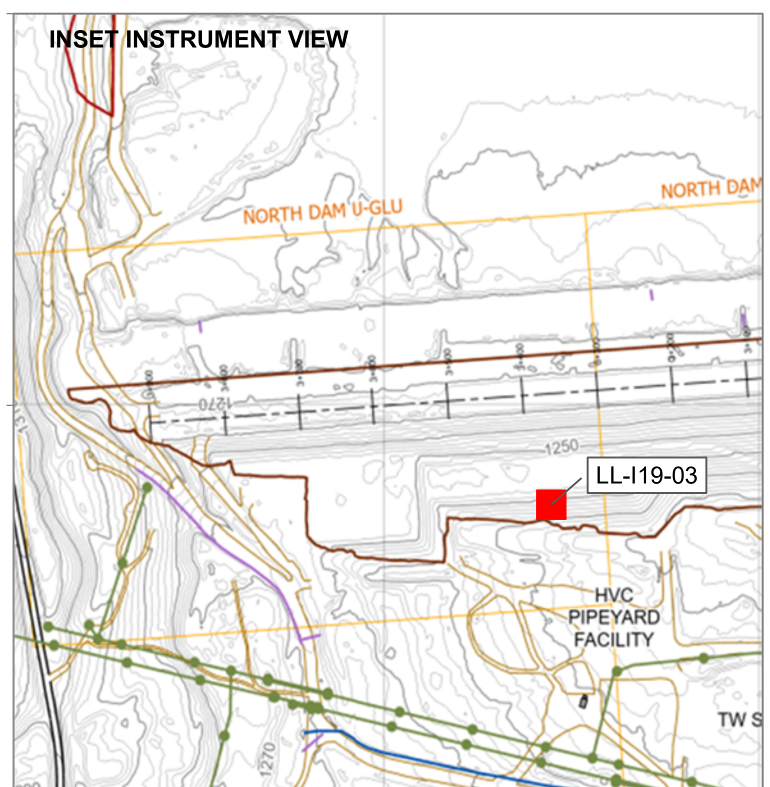












NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Glacial Till	1211.8-1197.8	0.5	N/A	N/A

Station	Baseline Reading	Instrument Type
3+400	2022-02-08	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

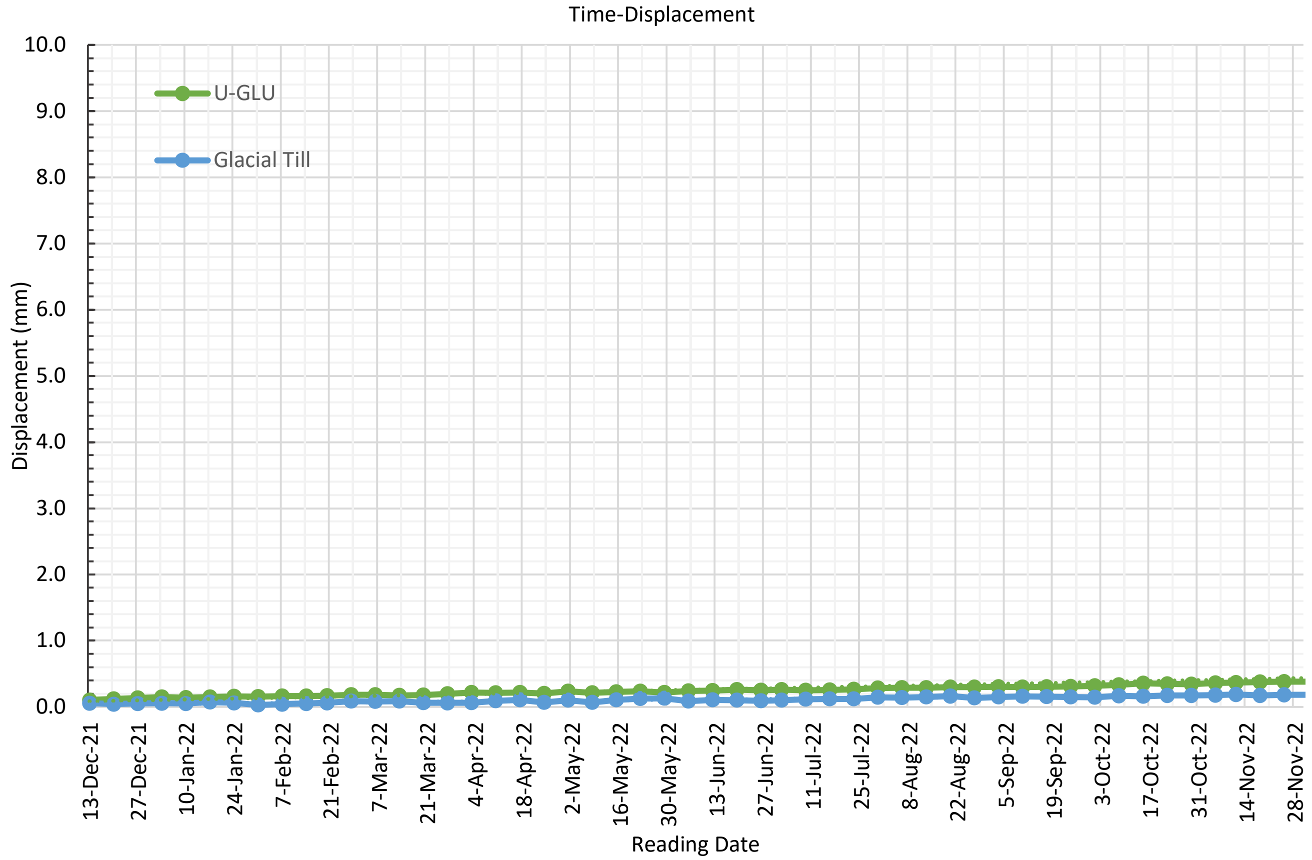
Klohn Crippen Berger

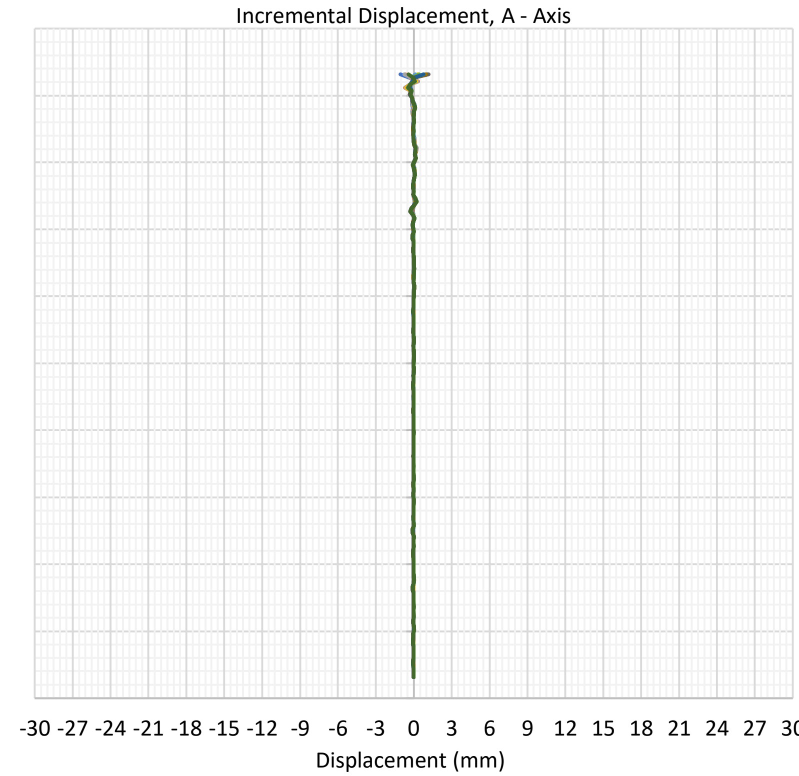
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

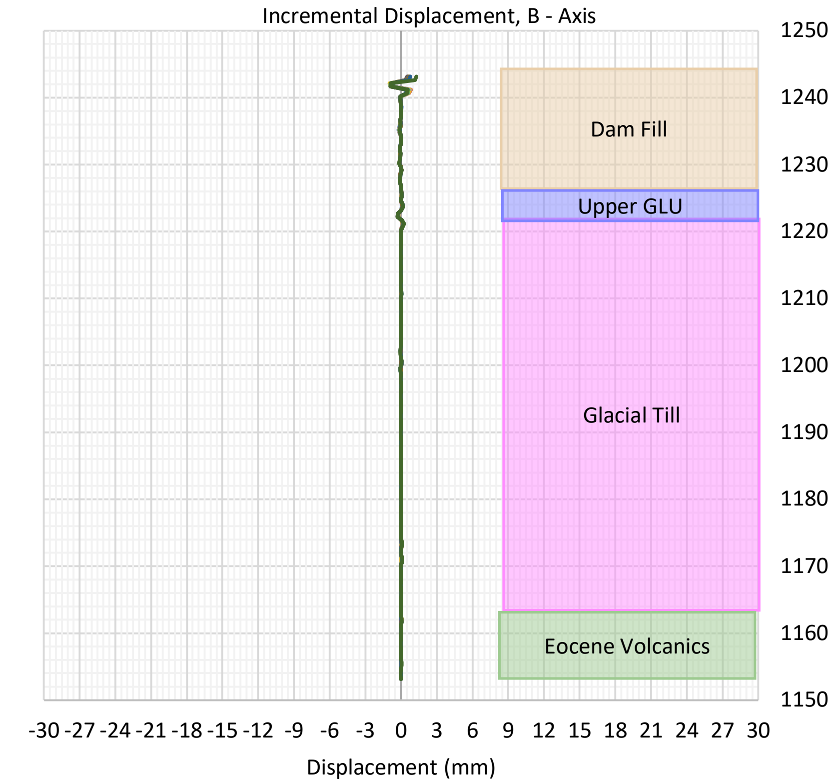
TITLE: LL DAM INCLINOMETER PLOTS
LL-I19-03 (NORTH DAM BEDROCK)
DEC. 2021 TO NOV. 2022

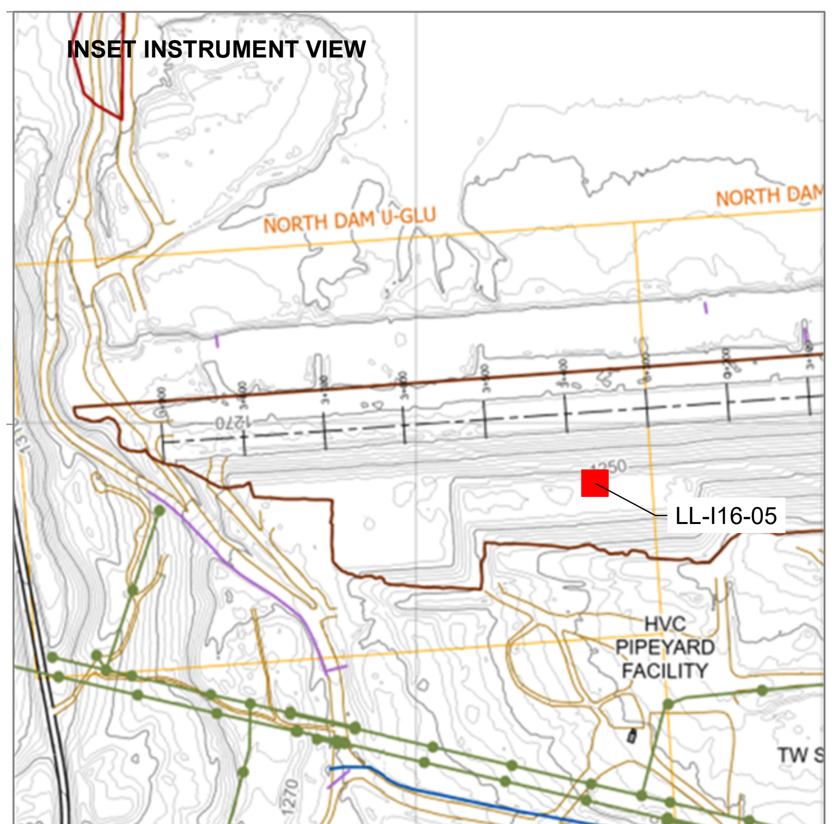
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-31

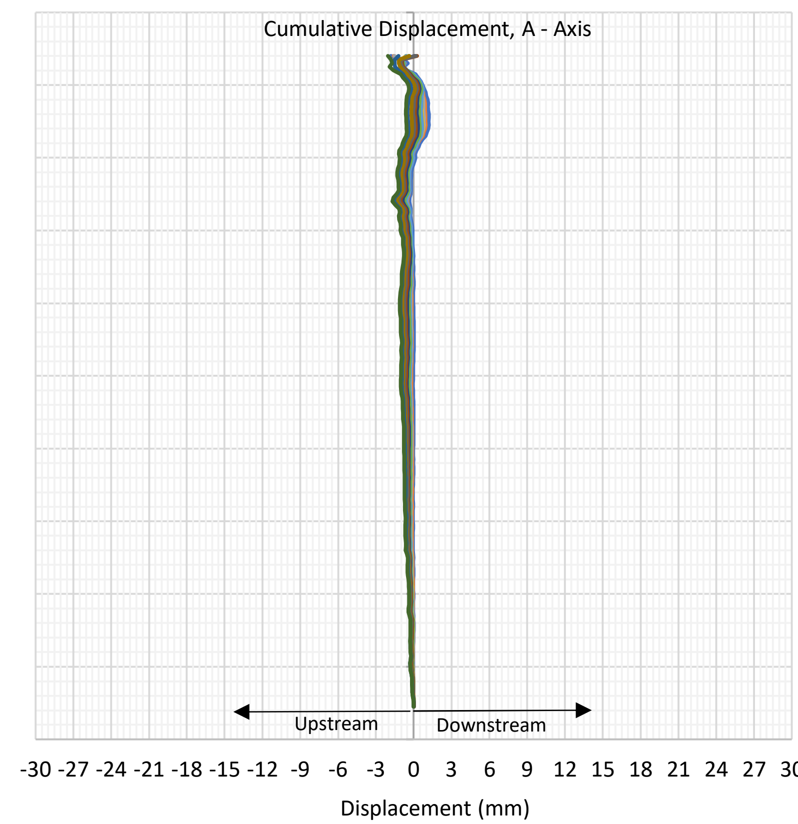
North Dam Upper Glaciolacustrine

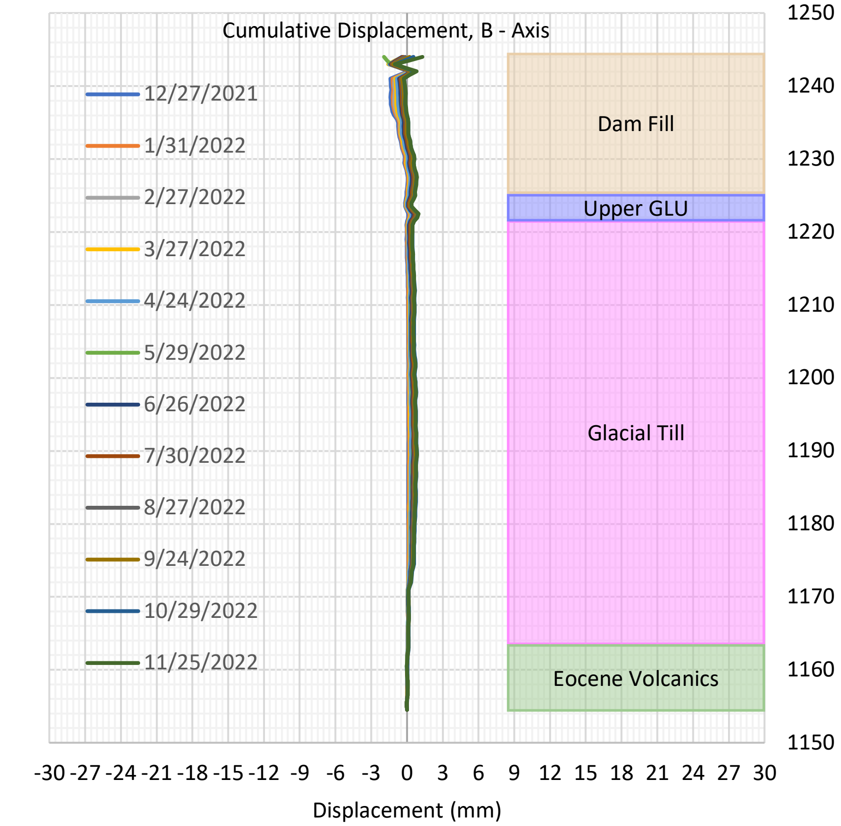












NOTES

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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
U-GLU	1225.0-1220.0	2.0	4.0	10.0
Glacial Till	1169.0-1160.5	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
3+400	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

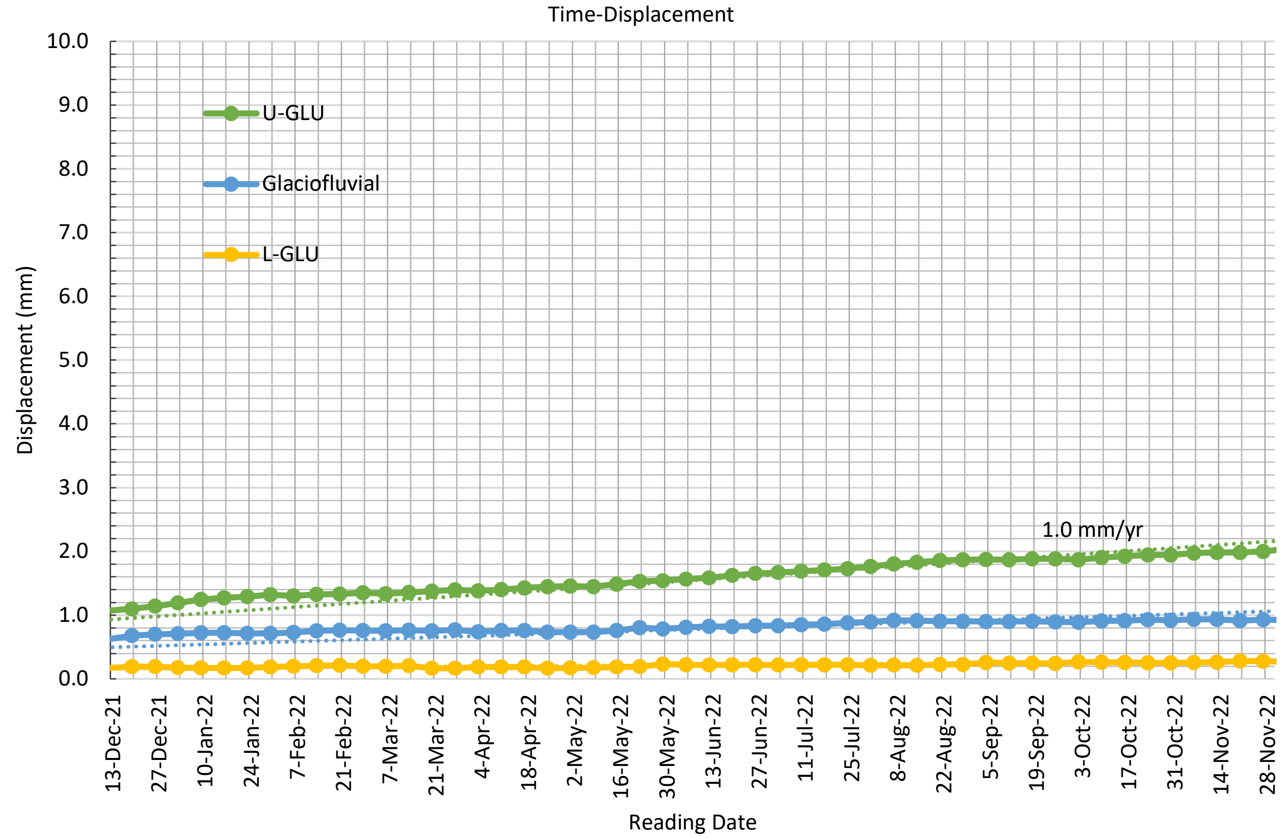
CLIENT
Highland Valley Copper / Teck

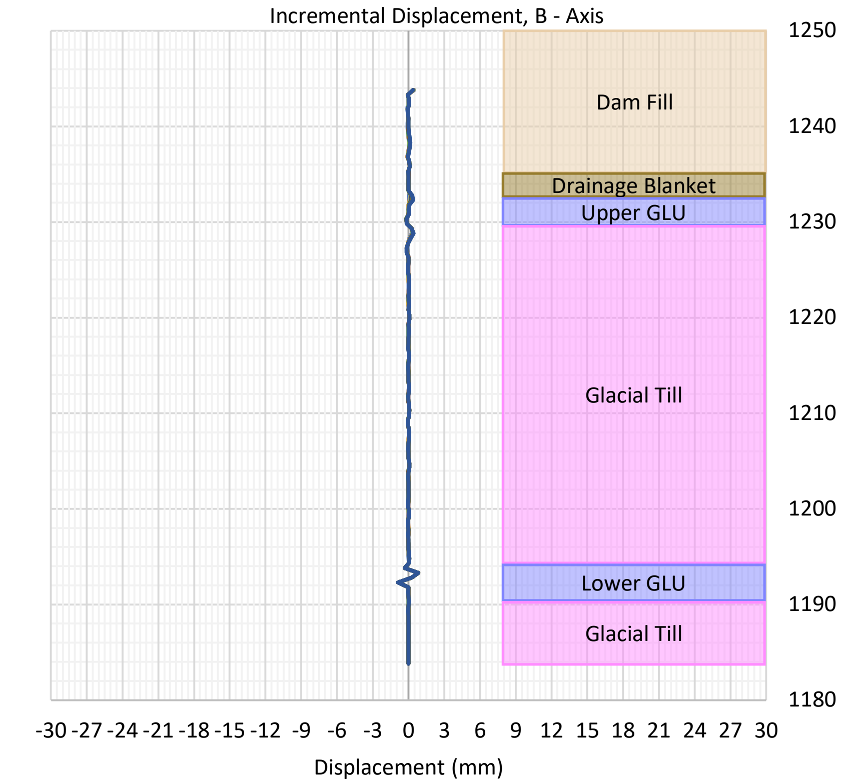
Klohn Crippen Berger

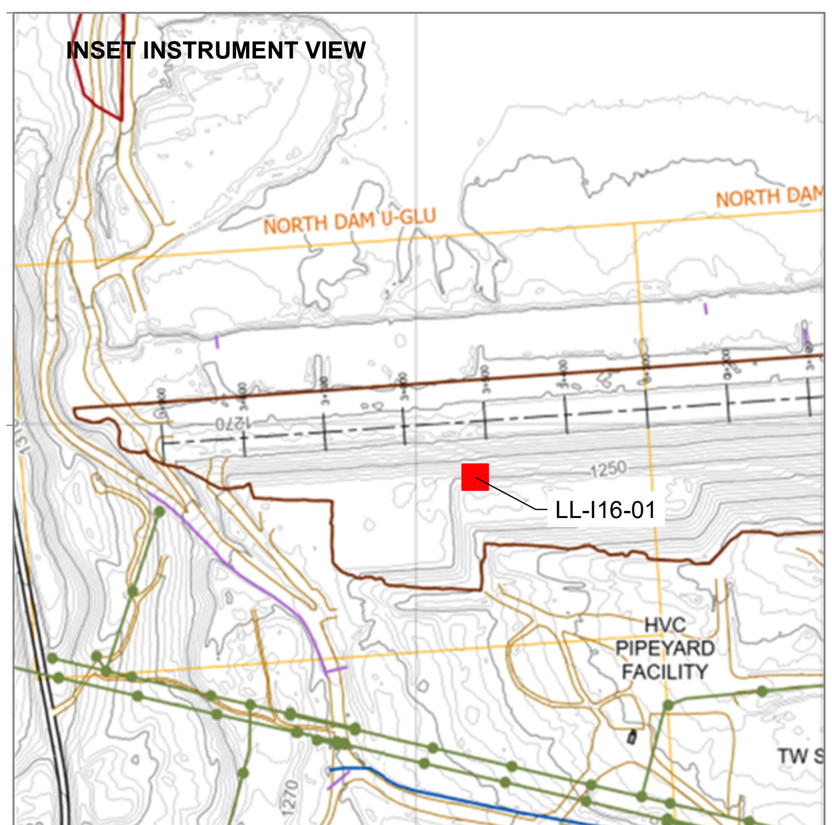
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

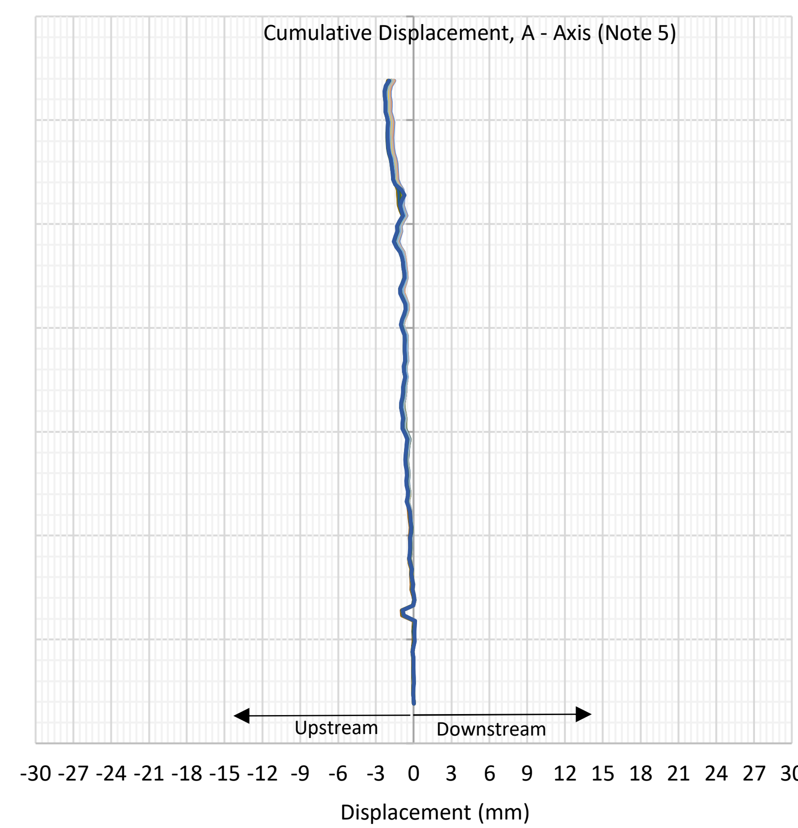
TITLE
LL DAM INCLINOMETER PLOTS
LL-I16-05 (NORTH DAM U-GLU)
DEC. 2021 TO NOV. 2022

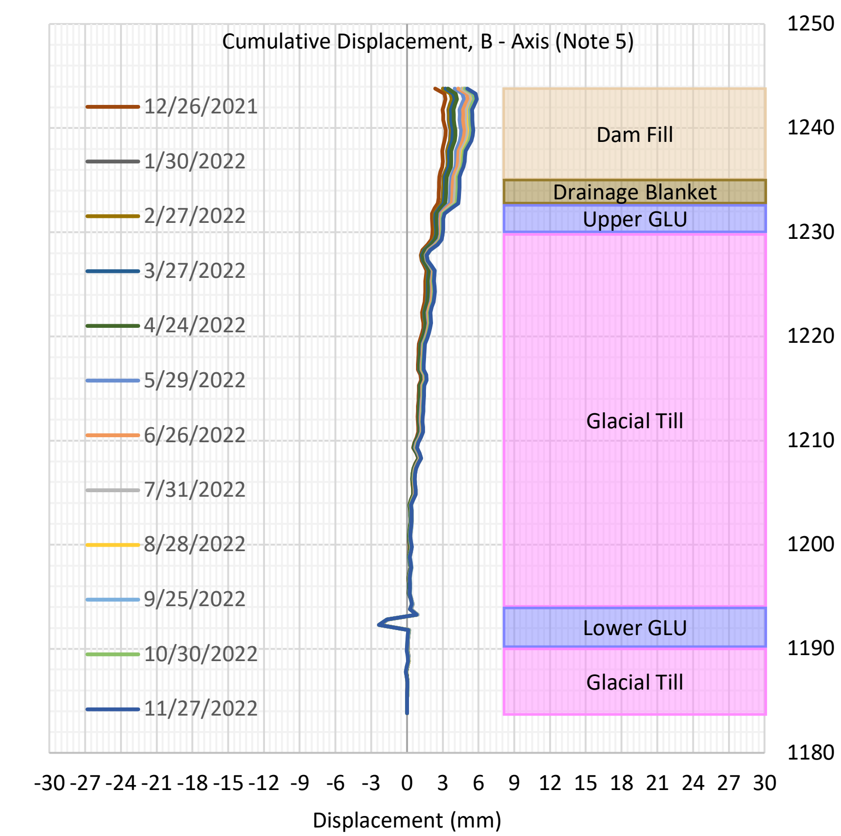
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-32











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5. AZIMUTH CORRECTION HAS NOT BEEN APPLIED TO THIS INSTRUMENT

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
U-GLU	1233.0-1225.0	1.0	2.0	5.0
Glaciofluvial	1209.0-1199.0	1.0	N/A	N/A
L-GLU	1196.0-1190.0	1.0	2.0	5.0

Station	Baseline Reading	Instrument Type
3+510	2021-05-23	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

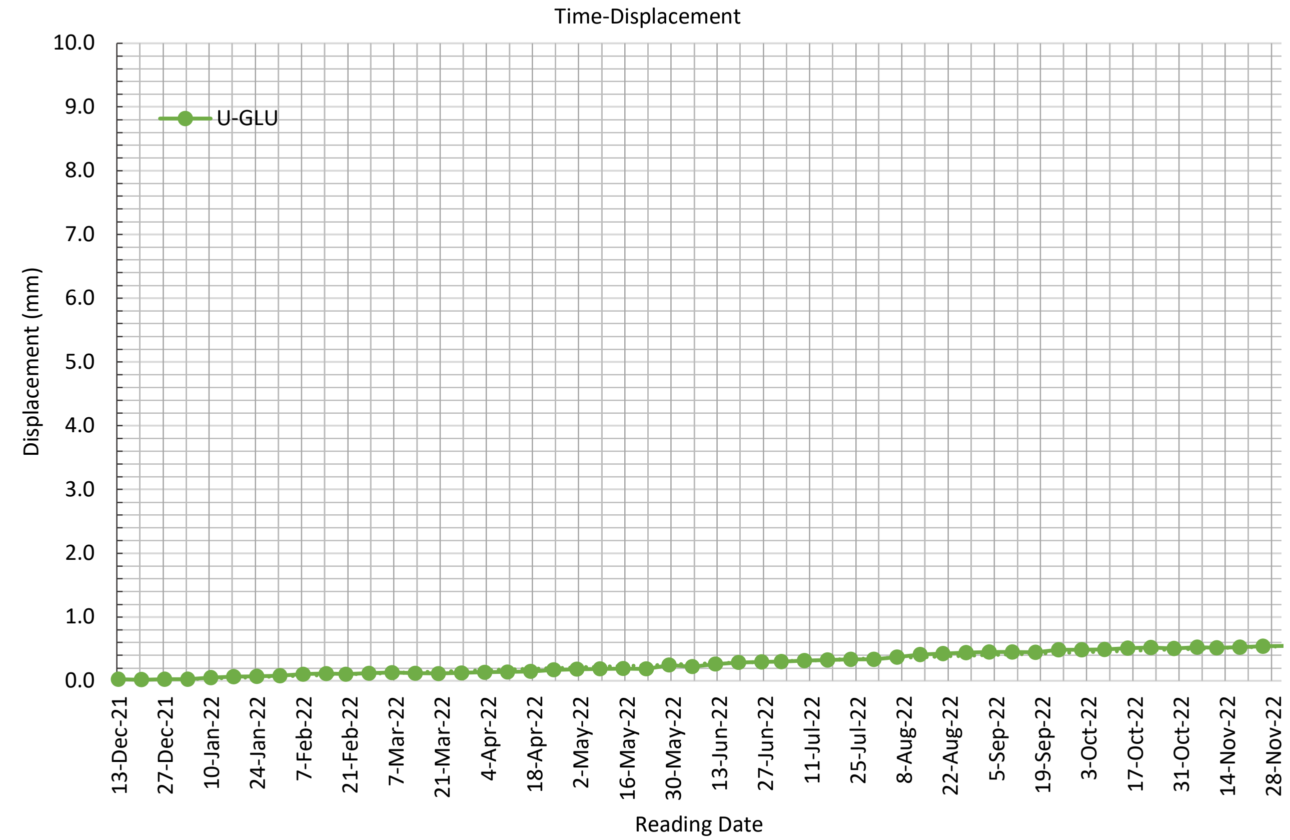
CLIENT
Highland Valley Copper / Teck

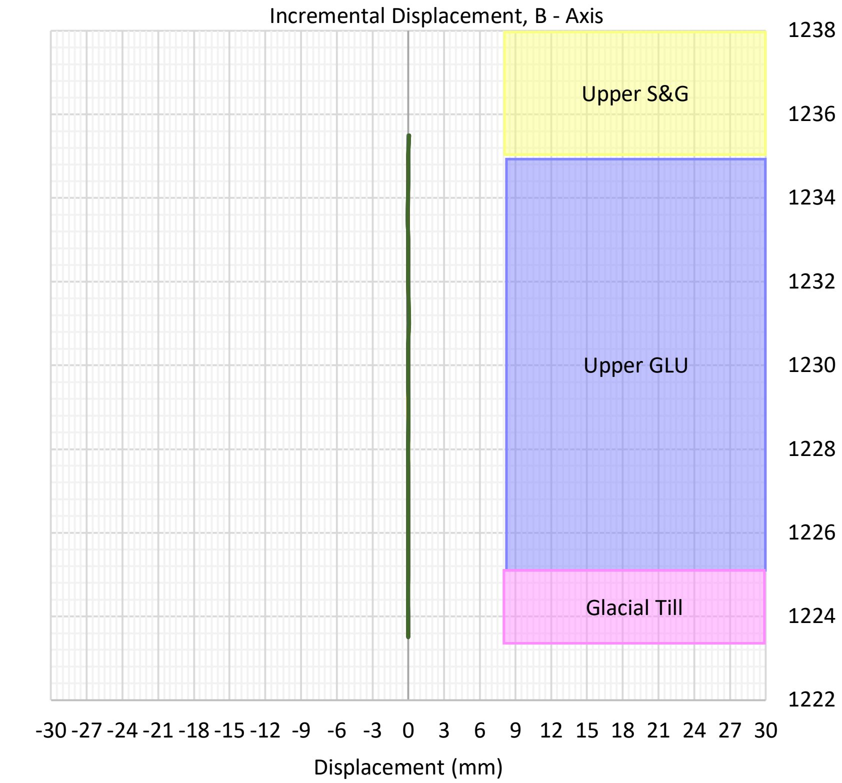
Klohn Crippen Berger

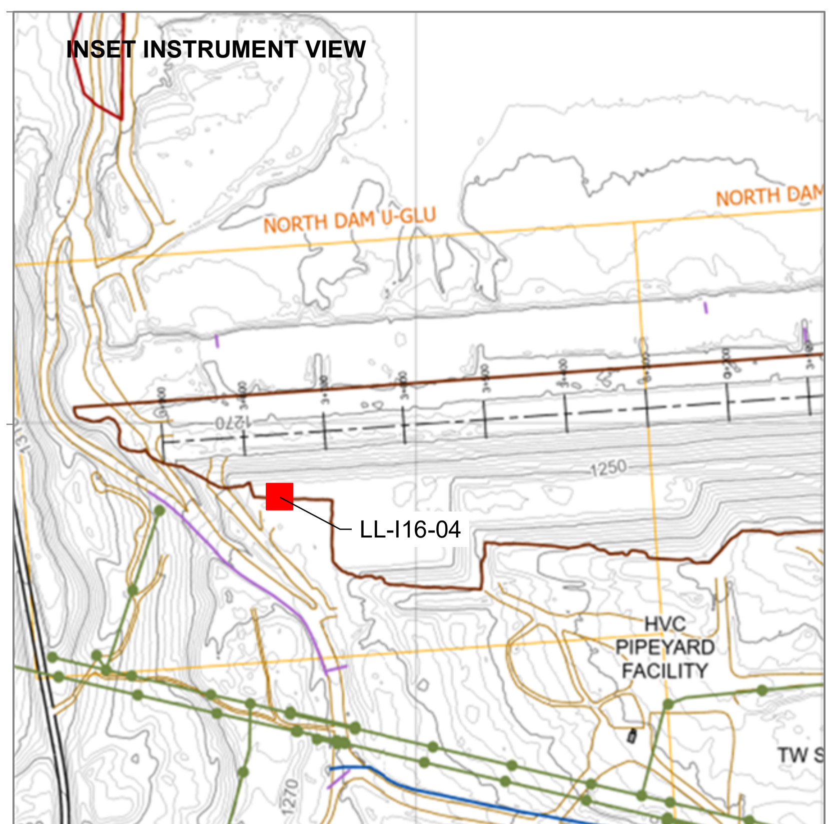
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

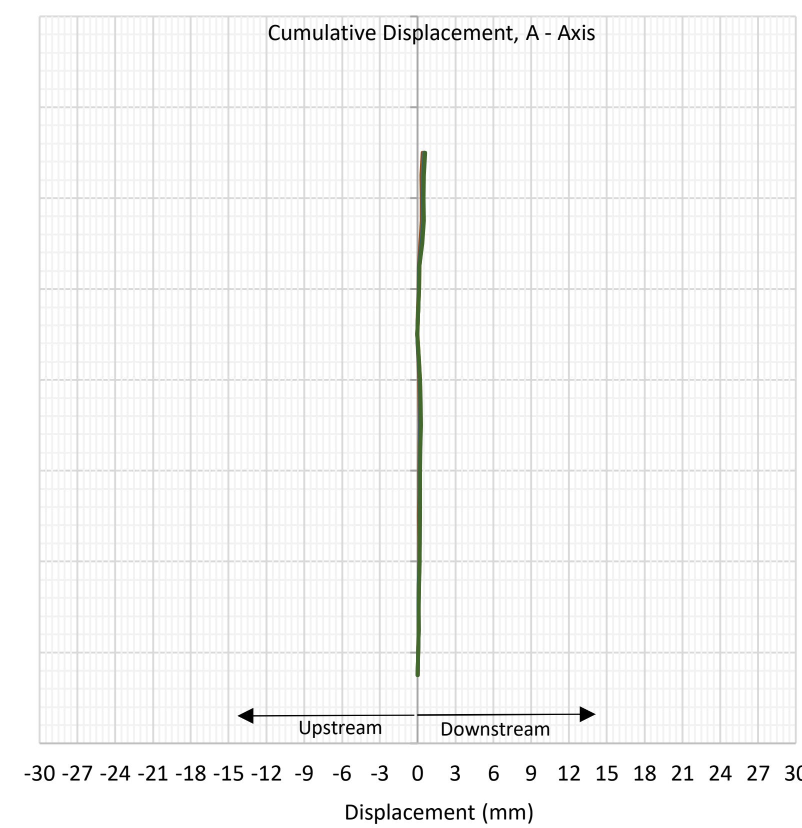
TITLE
LL DAM INCLINOMETER PLOTS
LL-I16-01 (NORTH DAM U-GLU)
DEC. 2021 TO NOV. 2022

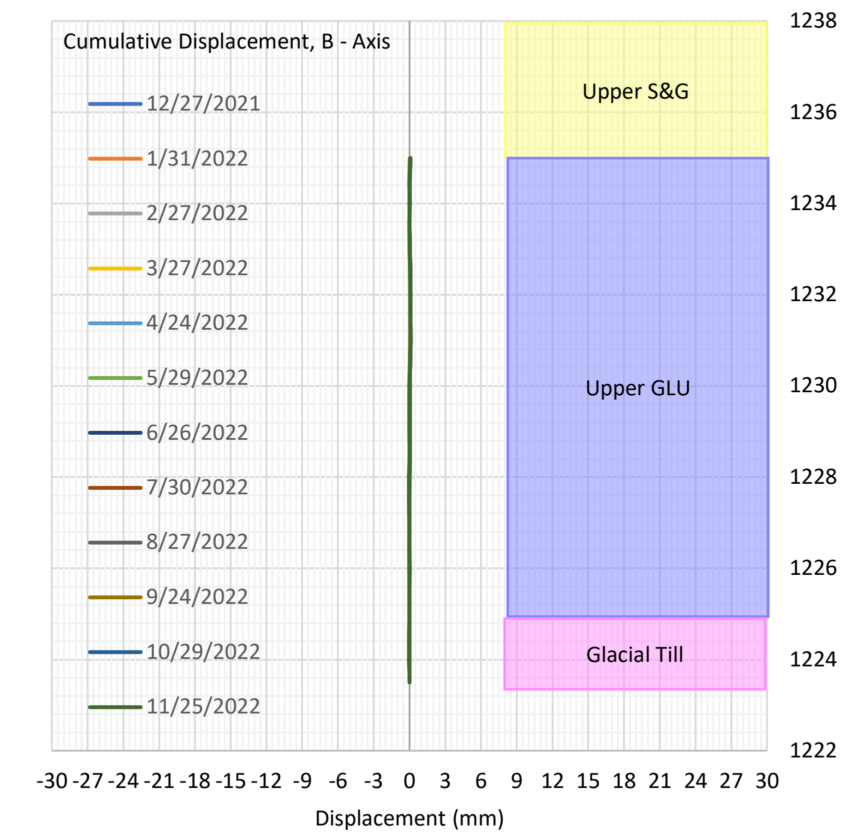
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-33











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Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
U-GLU	1235.0-1225.5	0.5	N/A	1.0

Station	Baseline Reading	Instrument Type
3+750	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

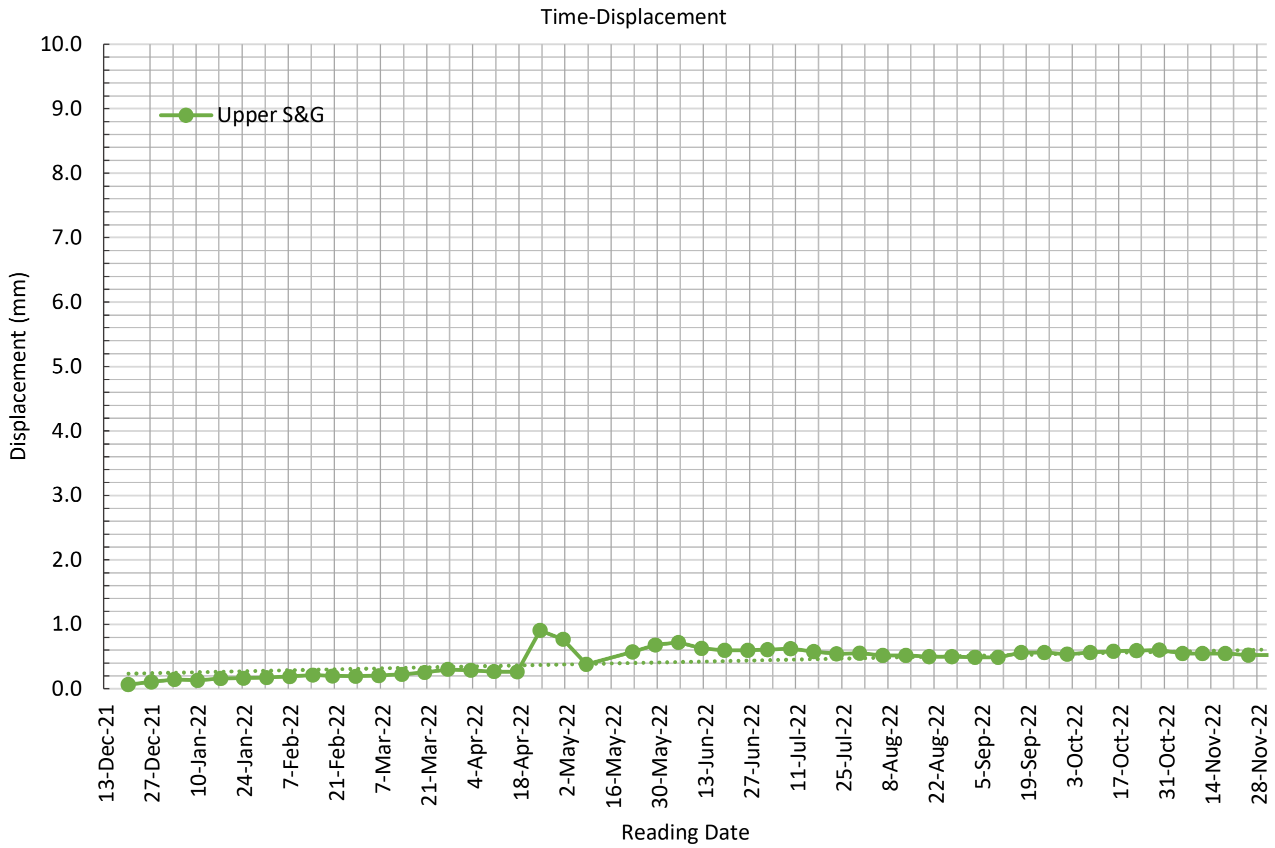
CLIENT
Highland Valley Copper / Teck

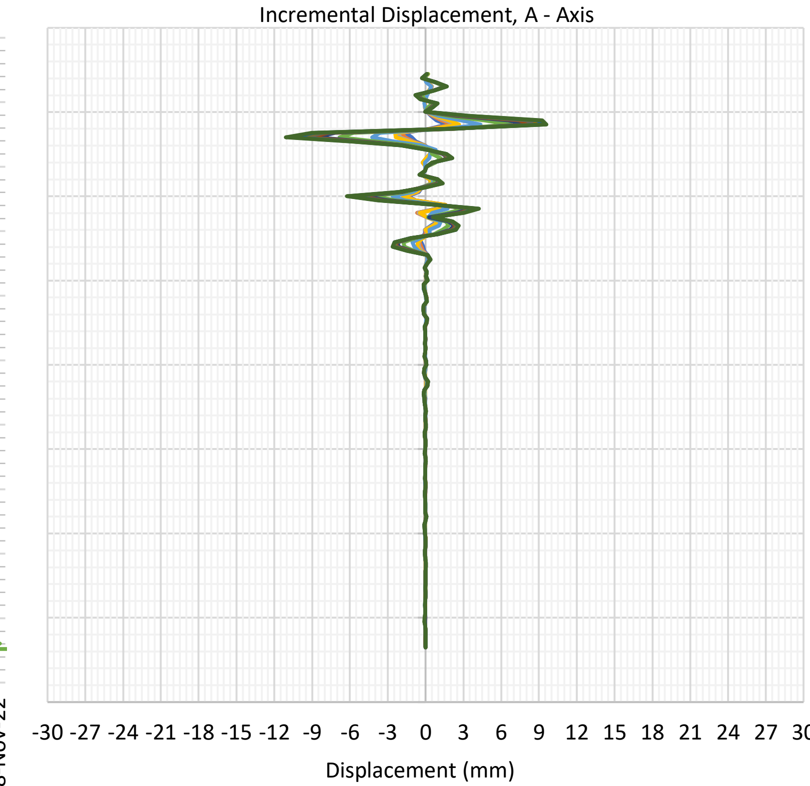
Klohn Crippen Berger

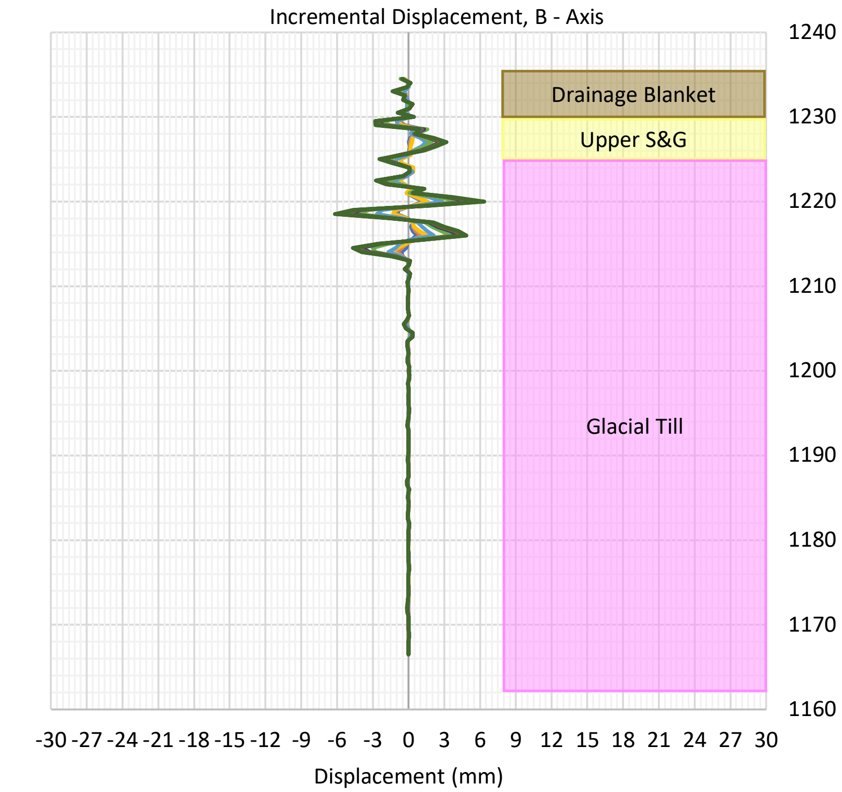
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

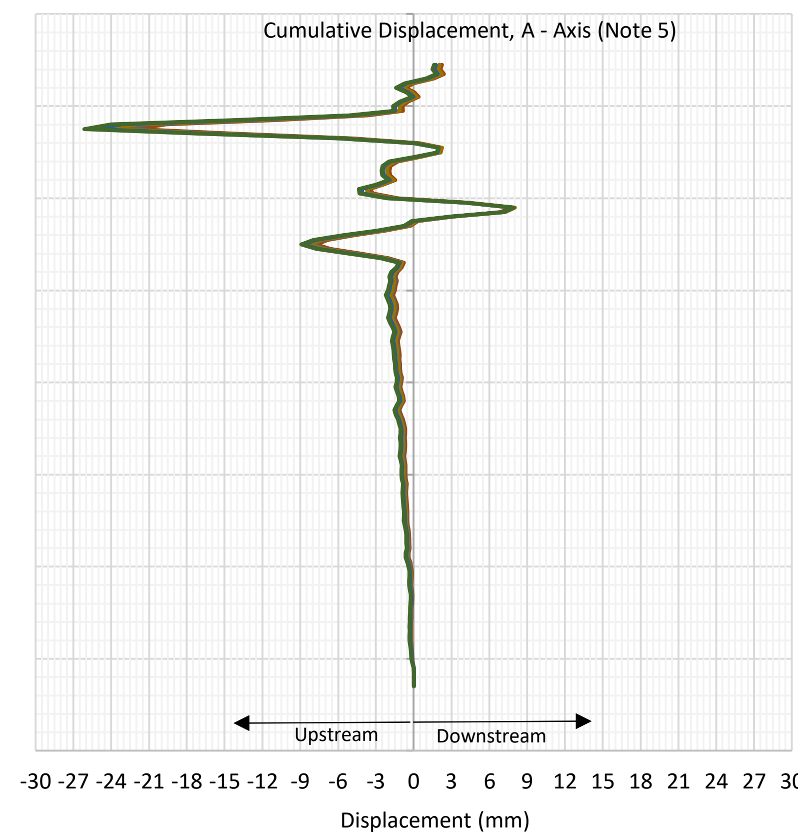
TITLE
LL DAM INCLINOMETER PLOTS
LL-I16-04 (NORTH DAM U-GLU)
DEC. 2021 TO NOV. 2022

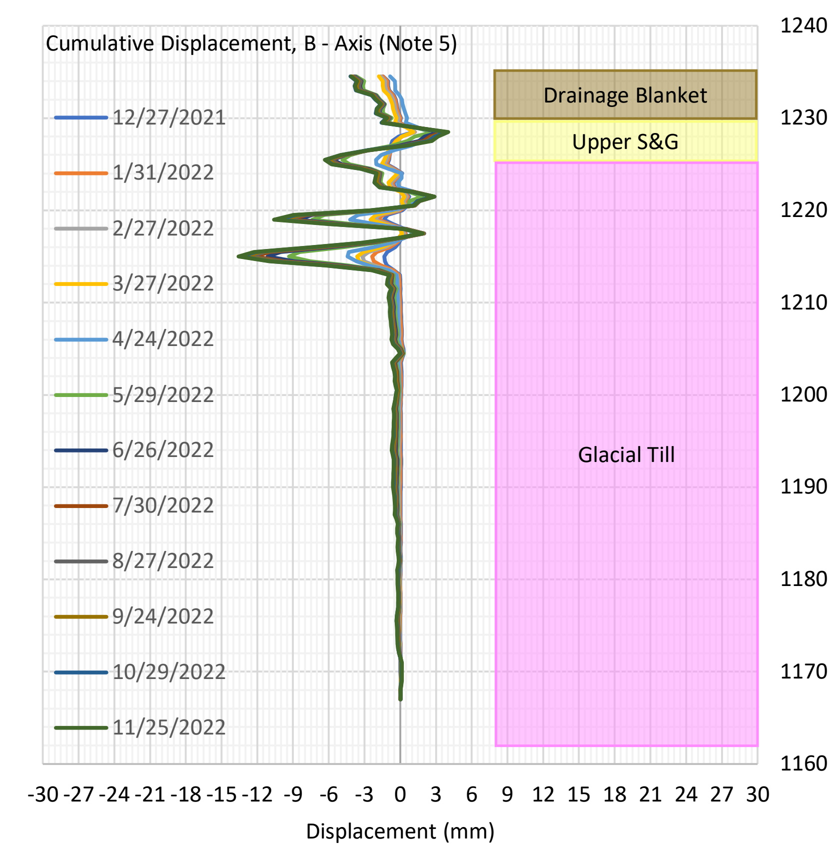
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-34

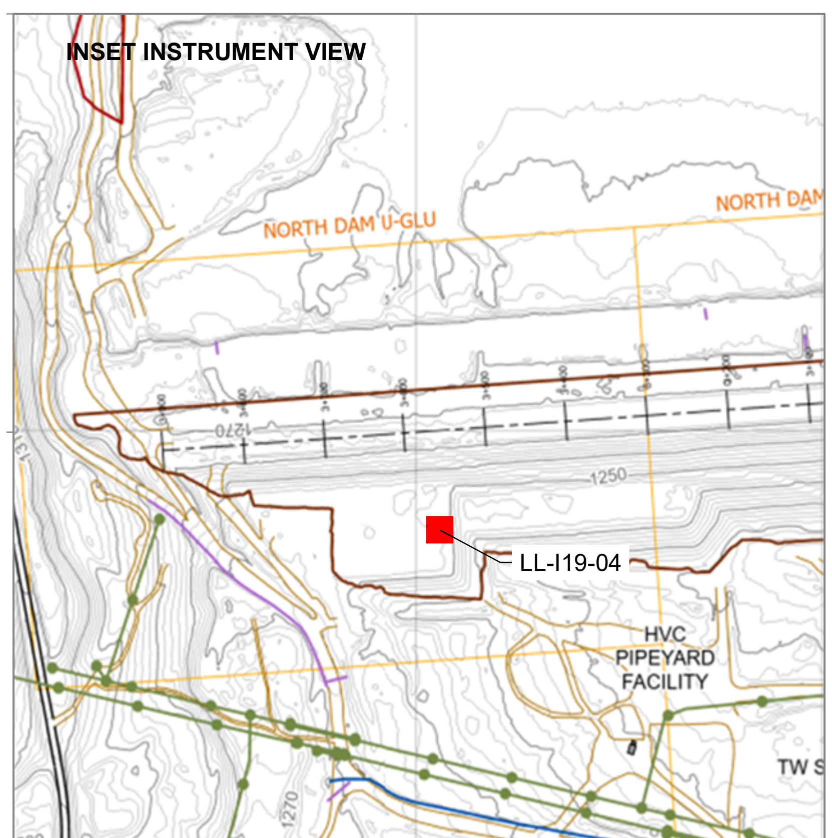












Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Upper S&G	1230.0-1213.0	1.0	N/A	N/A

Station	Baseline Reading	Instrument Type
3+350	2021-12-20	SAAV

NOTES

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5. AZIMUTH CORRECTION HAS NOT BEEN APPLIED TO THIS INSTRUMENT.

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE: LL DAM INCLINOMETER PLOTS
LL-I19-04 (NORTH DAM U-GLU)
DEC. 2021 TO NOV. 2022

SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	II-B-35

APPENDIX III

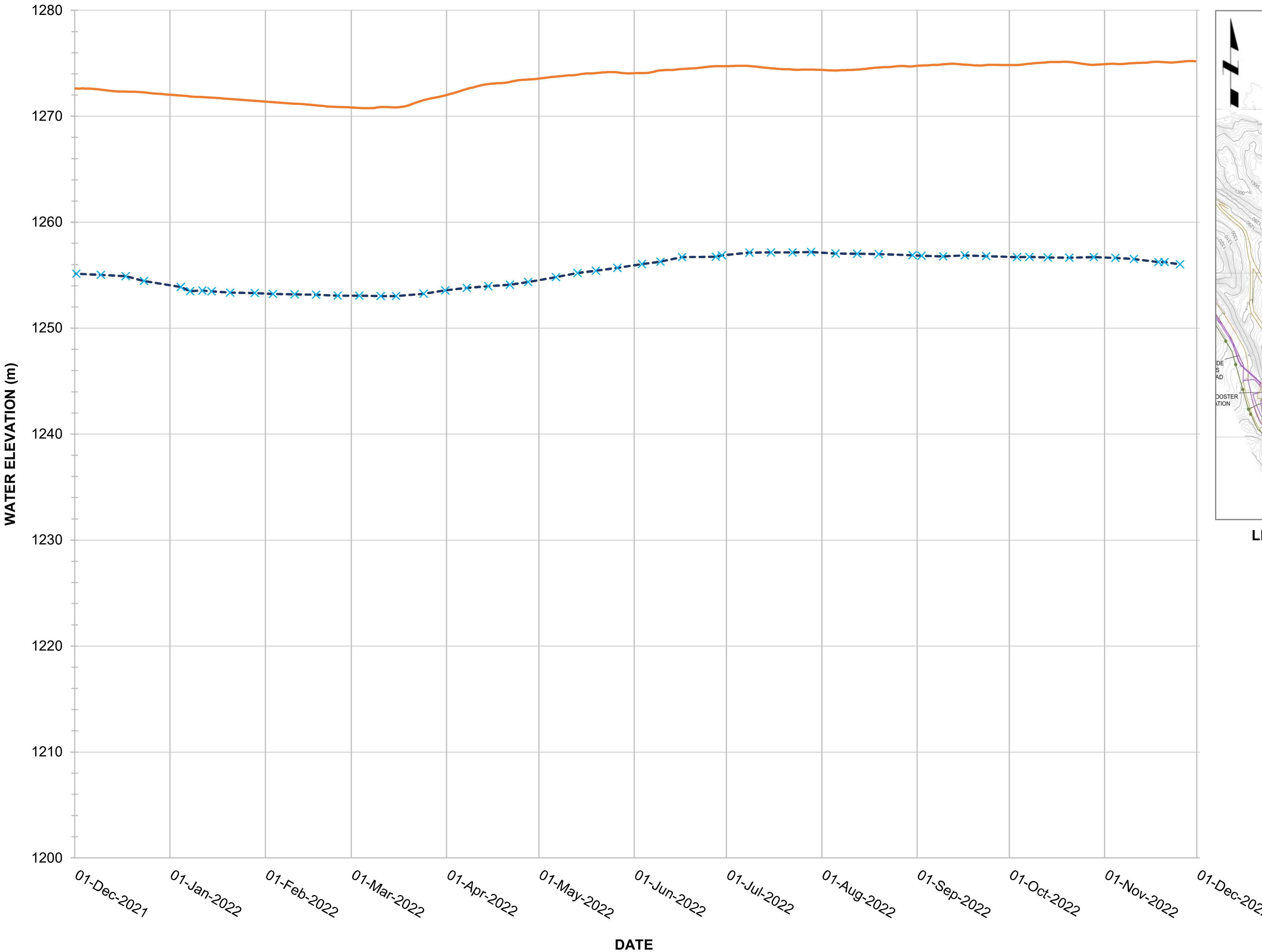
H-H Dam Instrumentation Summary

APPENDIX III-A

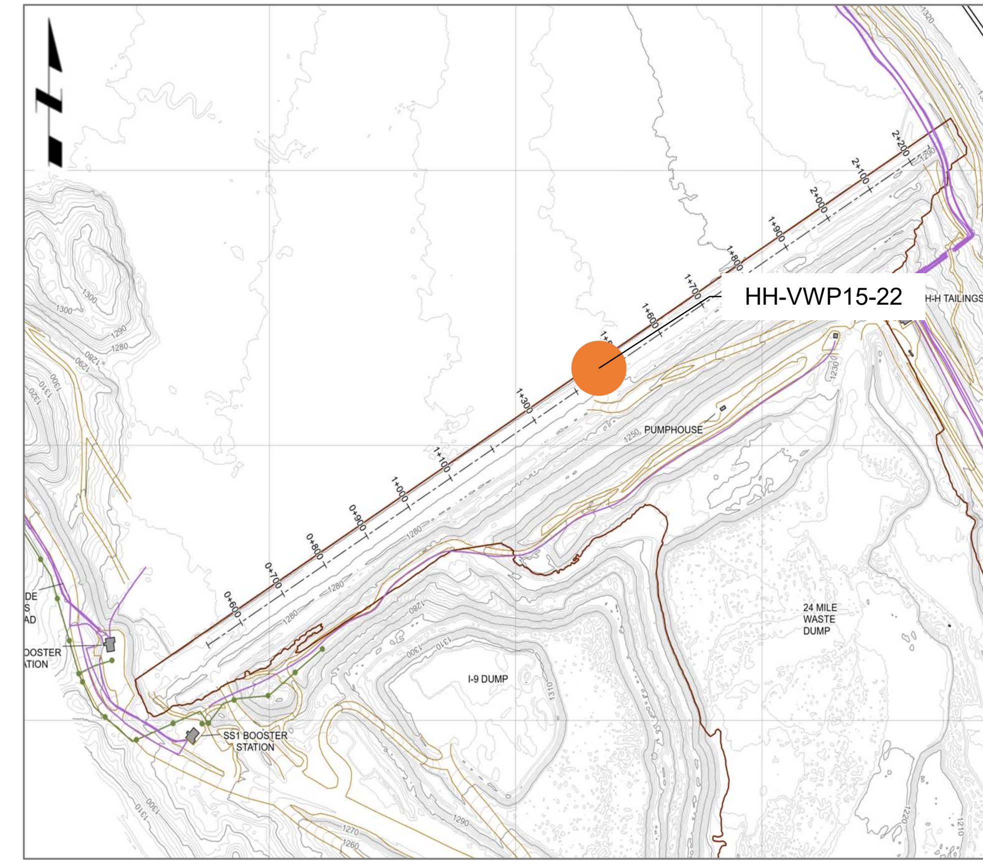
H-H Dam Piezometer Plots

H-H DAM PIEZOMETER PLOTS:

December 1, 2021 to November 30, 2022



INSET INSTRUMENT VIEW



LEGEND

HH-VWP15-22 (U/S Dam Fill)

L-L TAILINGS POND

NOTES

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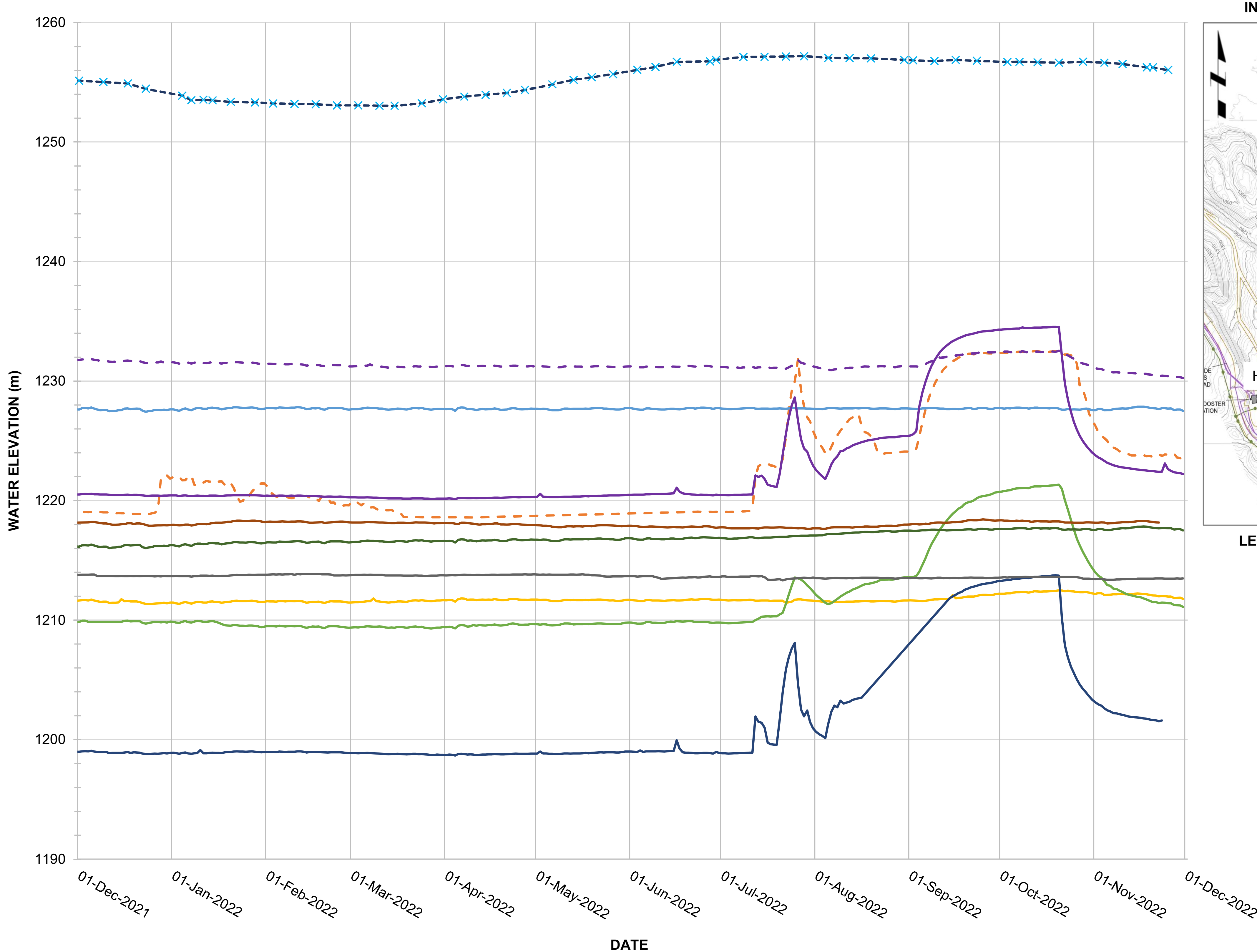
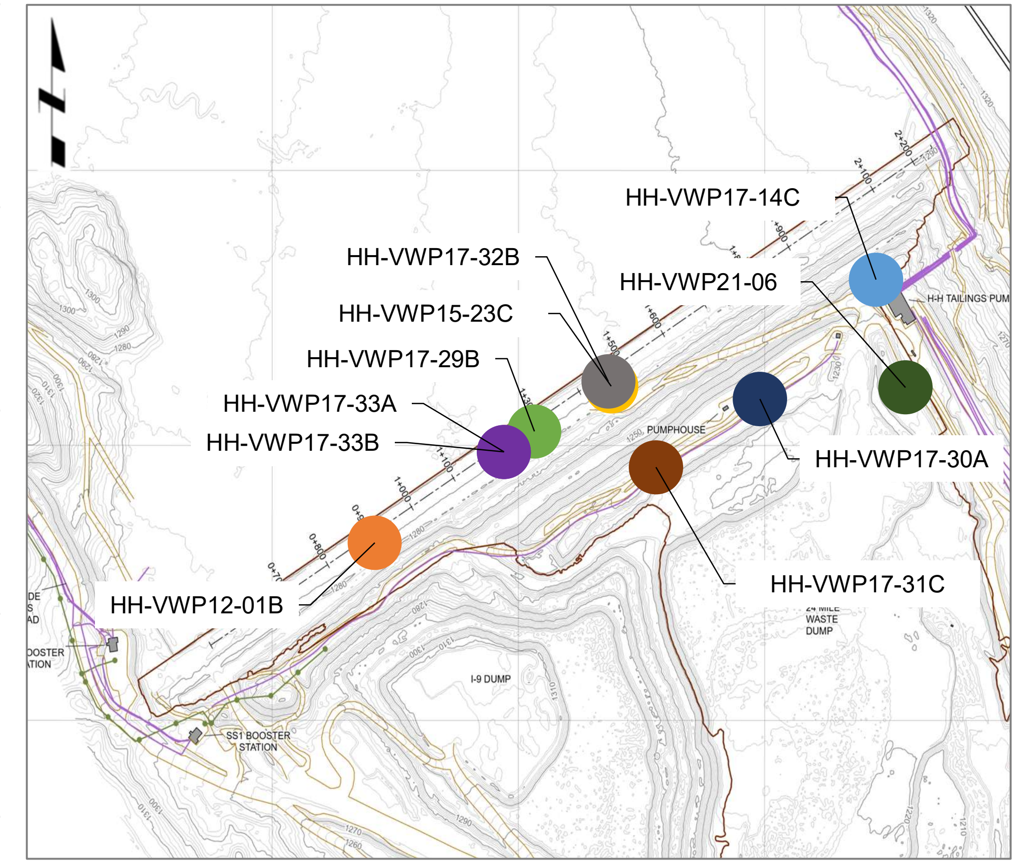
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM UPSTREAM OF CORE DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS
	SCALE: AS SHOWN; PROJECT No.: M02341C42; FIG. No.: III-A-1

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-001-HH - UPSTREAM OF CORE SINCE 2021.XLSX - 2023-03-28 10:38



INSET INSTRUMENT VIEW



LEGEND

- HH-VWP12-01B (Glacial Till)
- HH-VWP15-23C (Granular Fill)
- HH-VWP17-14C (Rock Fill)
- HH-VWP17-29B (Silty Sand and Gravel)
- HH-VWP17-30A (Silty Sand and Gravel)
- HH-VWP17-31C (Dam Fill - Sand and Gravel)
- HH-VWP17-32B (Dam Fill - Sand and Gravel)
- HH-VWP17-33A (Silty Sand and Gravel)
- HH-VWP17-33B (USG)
- HH-VWP21-06 (USG)
- L-L TAILINGS POND

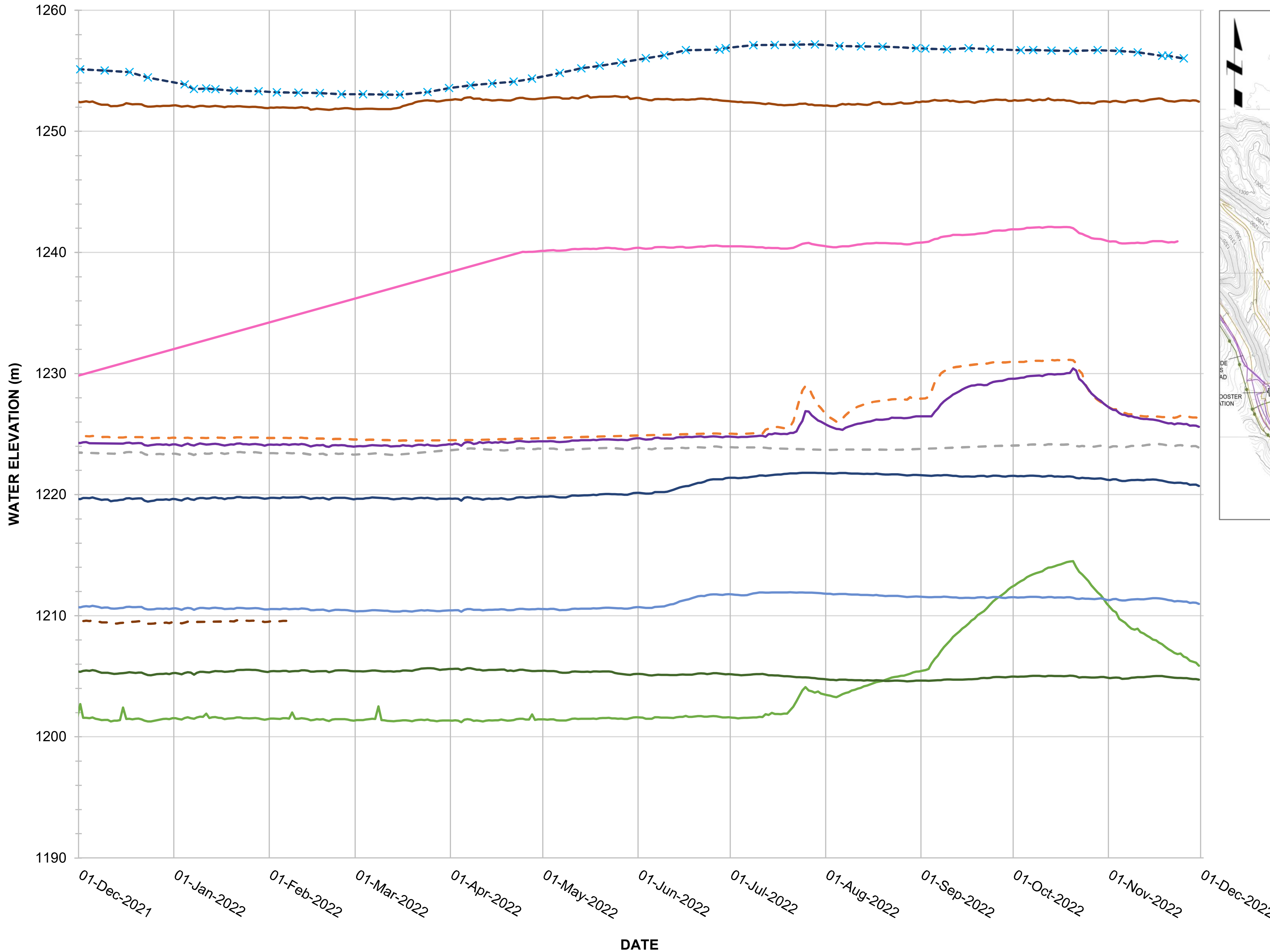
NOTES

NOT FOR CONSTRUCTION

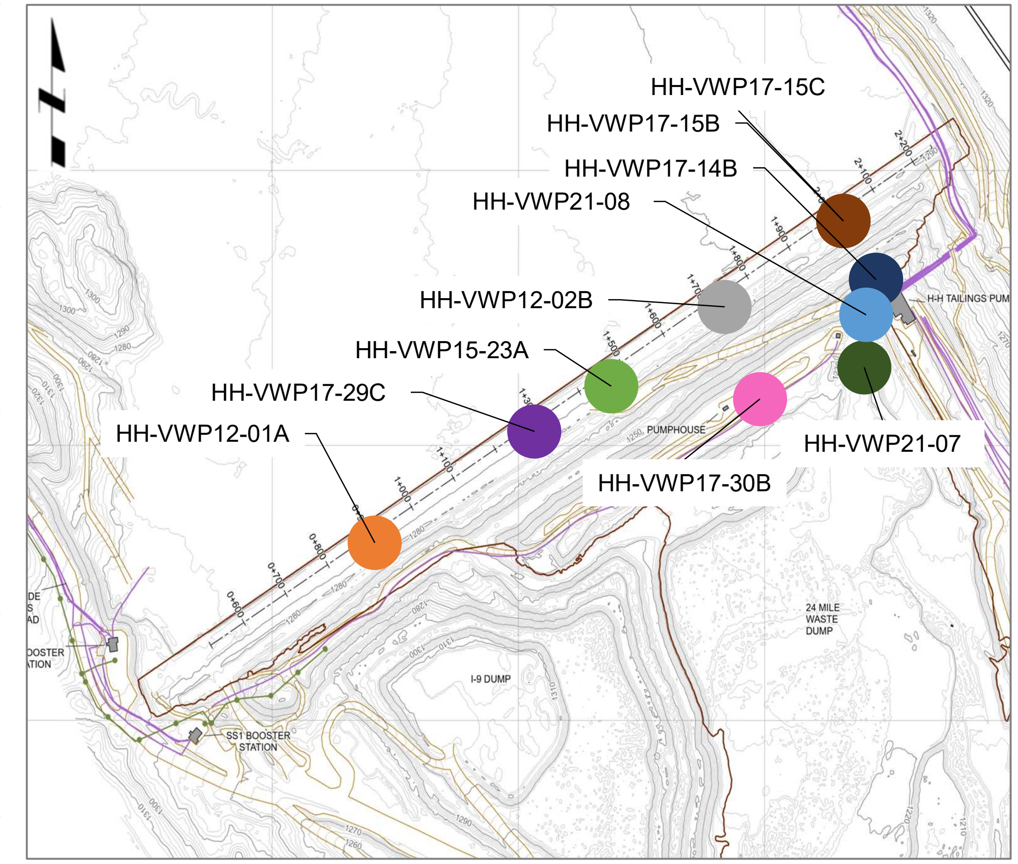
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE H-H DAM DAM FILL, SAND AND GRAVEL DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS
	SCALE AS SHOWN · PROJECT No. M02341C42 · FIG. No. III-A-2

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-002-HH - DAM FILL, SAND AND GRAVEL SINCE 2021.XLSX - 2023-03-28 10:39



INSET INSTRUMENT VIEW



LEGEND

- HH-VWP12-01A (Sand and Gravel)
- HH-VWP12-02B (Glacial Till)
- HH-VWP15-23A (Stratified Glacial Till)
- HH-VWP17-14B (Glacial Till)
- HH-VWP17-15B (Glacial Till)
- HH-VWP17-15C (Rock Fill and GT Contact)
- HH-VWP17-29C (Glacial Till)
- HH-VWP17-30B (Glacial Till)
- HH-VWP21-07 (Glacial Till)
- HH-VWP21-08 (Glacial Till)
- L-L TAILINGS POND

NOTES

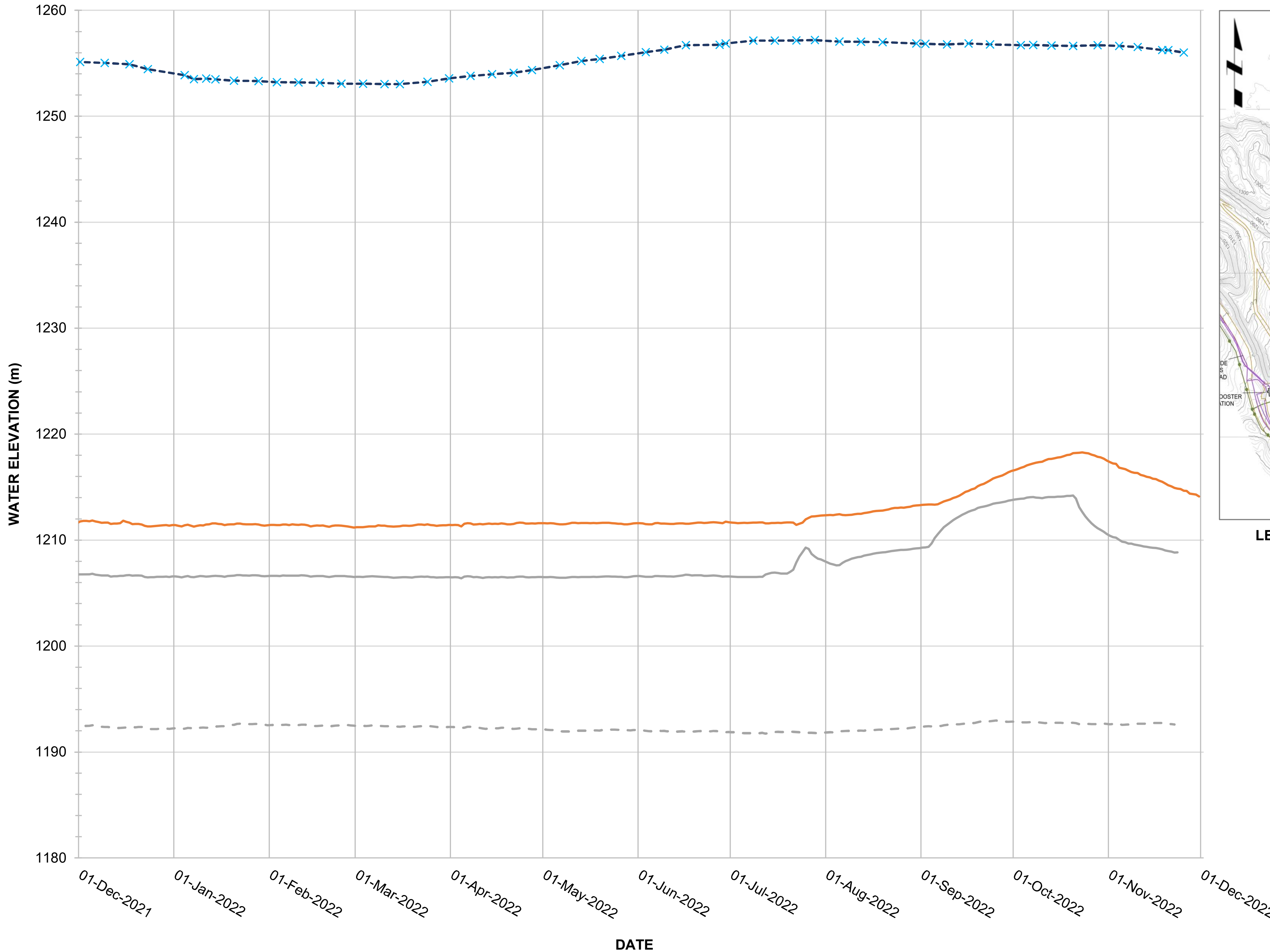
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

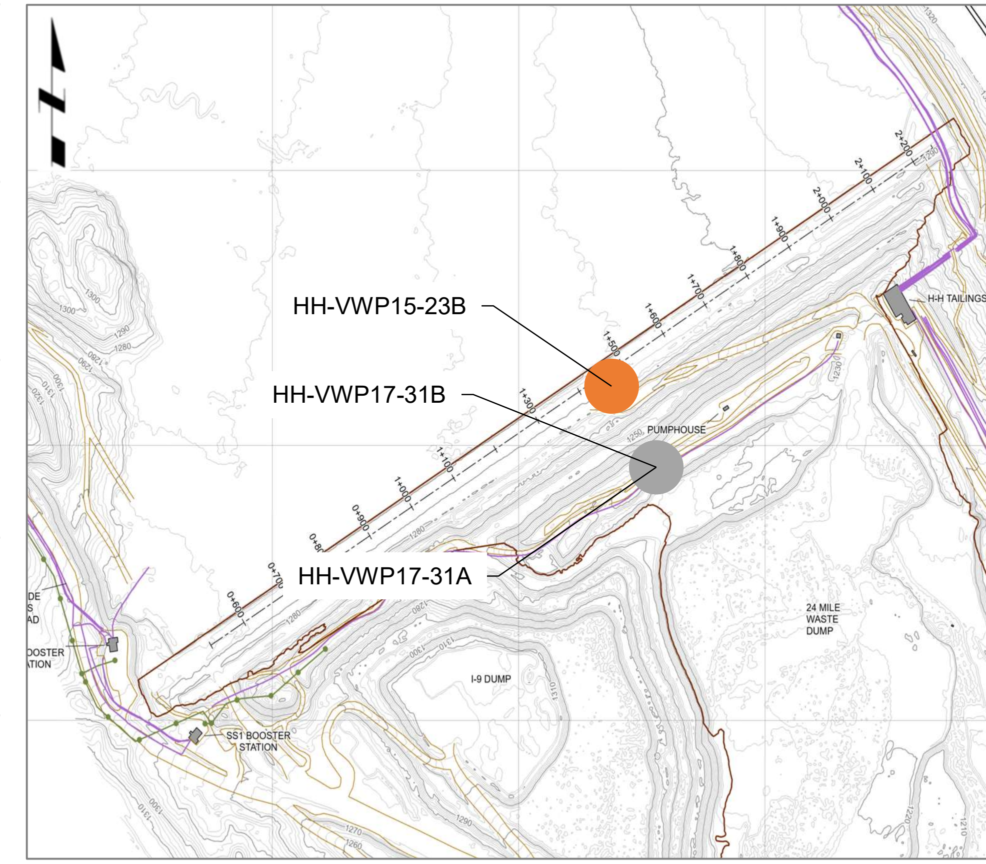
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM GLACIAL TILL, CLAY AND SILT DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	III-A-3

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-003-HH - GLACIAL TILL AND CLAY, SILT SINCE 2021.XLSX - 2023-03-28 10:39



INSET INSTRUMENT VIEW



LEGEND

- HH-VWP15-23B (L-GLU)
- HH-VWP17-31A (Clay Layer 2)
- HH-VWP17-31B (Clay Layer 1)
- L-L TAILINGS POND

NOTES

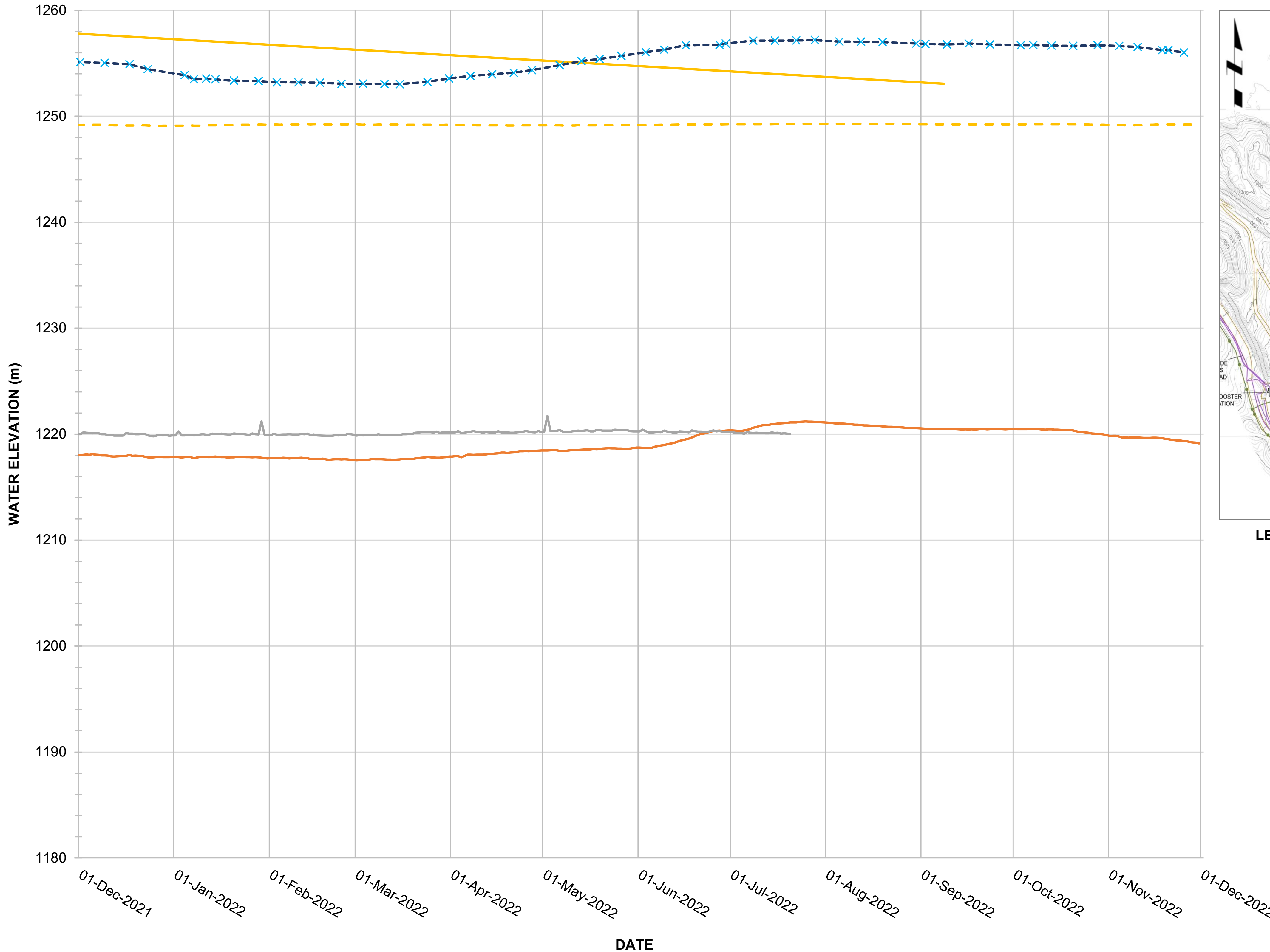
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

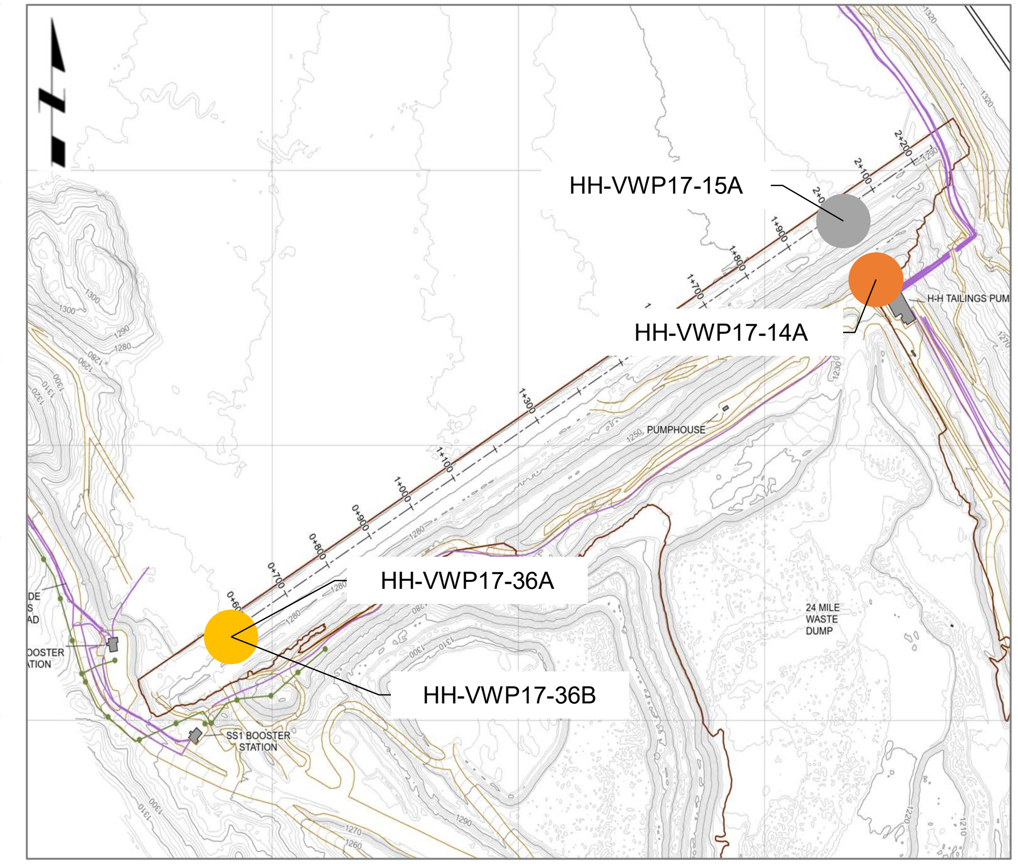
CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE H-H DAM GLACIOLACUSTRINE DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	III-A-4

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-004-HH - GLACIOLACUSTRINE SINCE 2021.XLSX - 2023-03-28 10:45



INSET INSTRUMENT VIEW



LEGEND

- HH-VWP17-14A (Granodiorite)
- HH-VWP17-15A (Weathered Bedrock)
- HH-VWP17-36A (Granodiorite)
- HH-VWP17-36B (Glacial Till)
- L-L TAILINGS POND

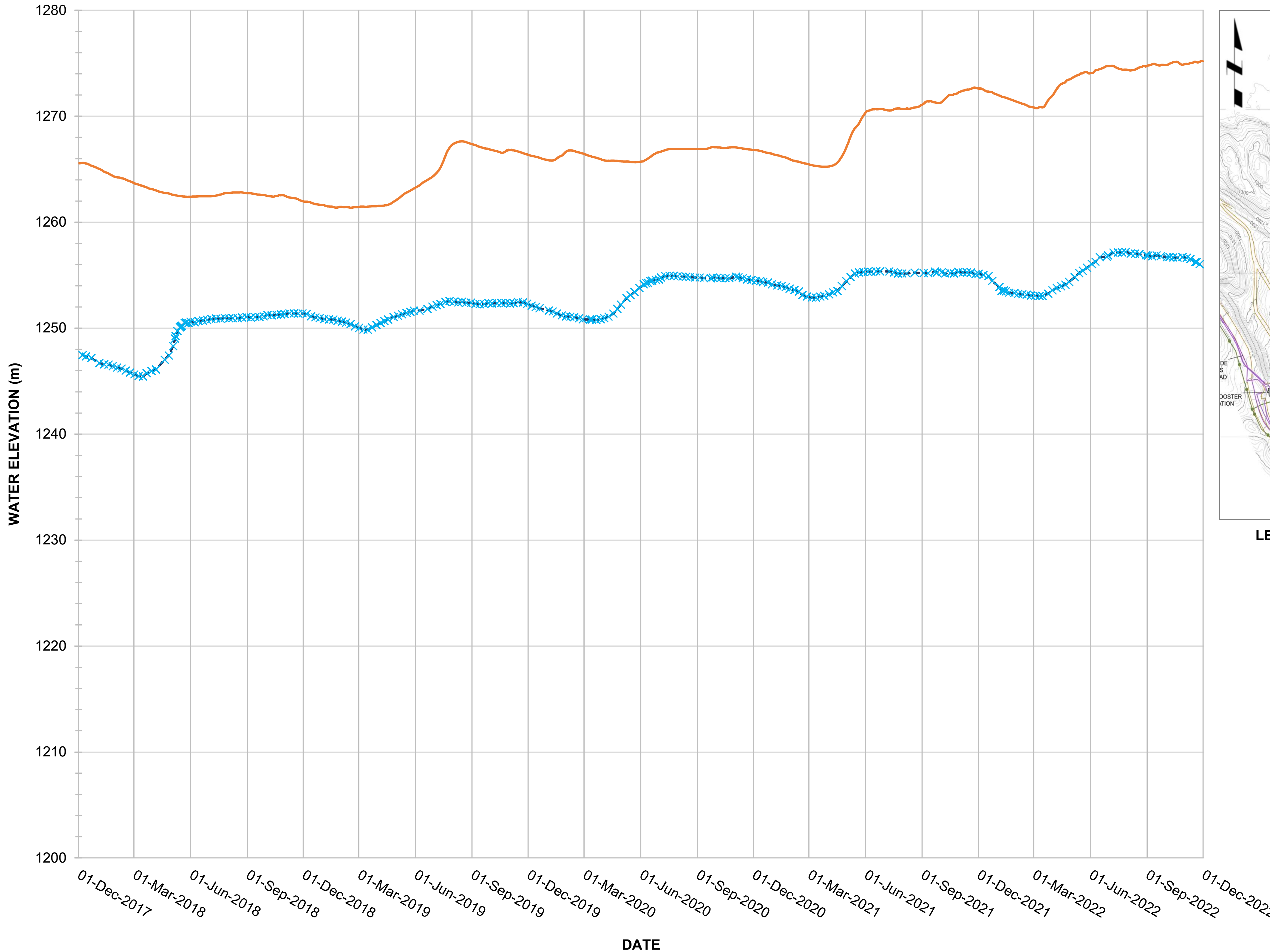
NOTES

NOT FOR CONSTRUCTION

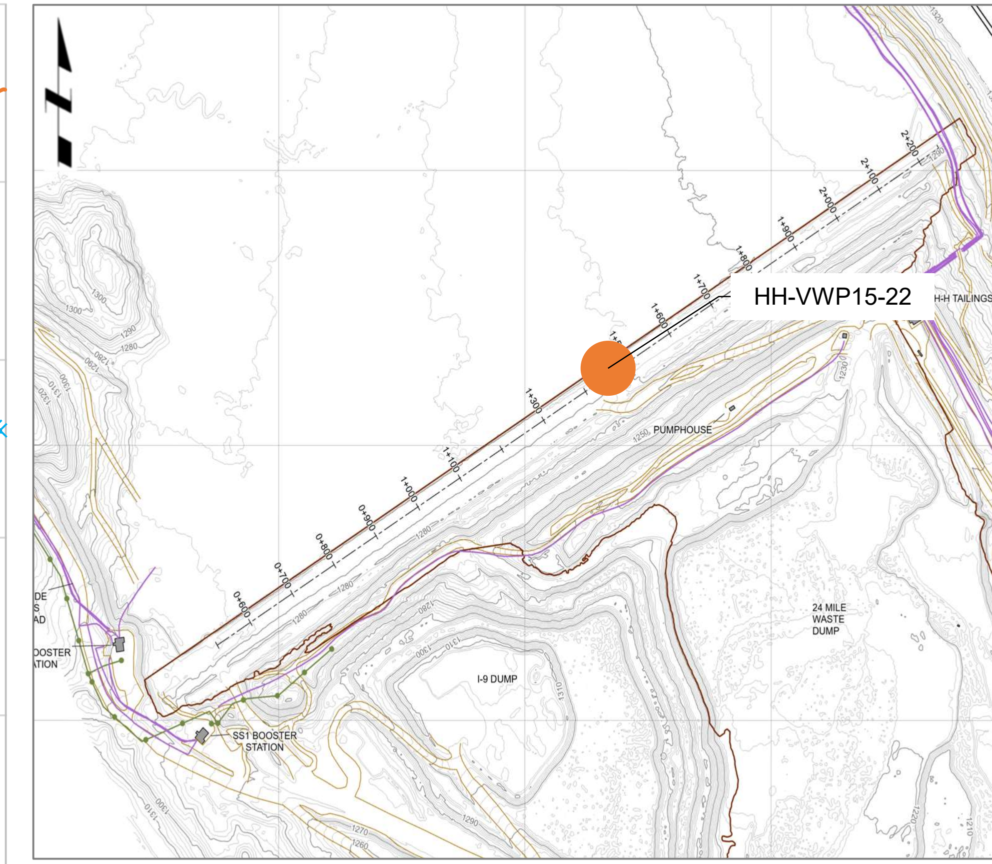
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM FOUNDATION ROCK DEC. 2021 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	III-A-5



INSET INSTRUMENT VIEW



LEGEND

HH-VWP15-22 (U/S Dam Fill)

L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

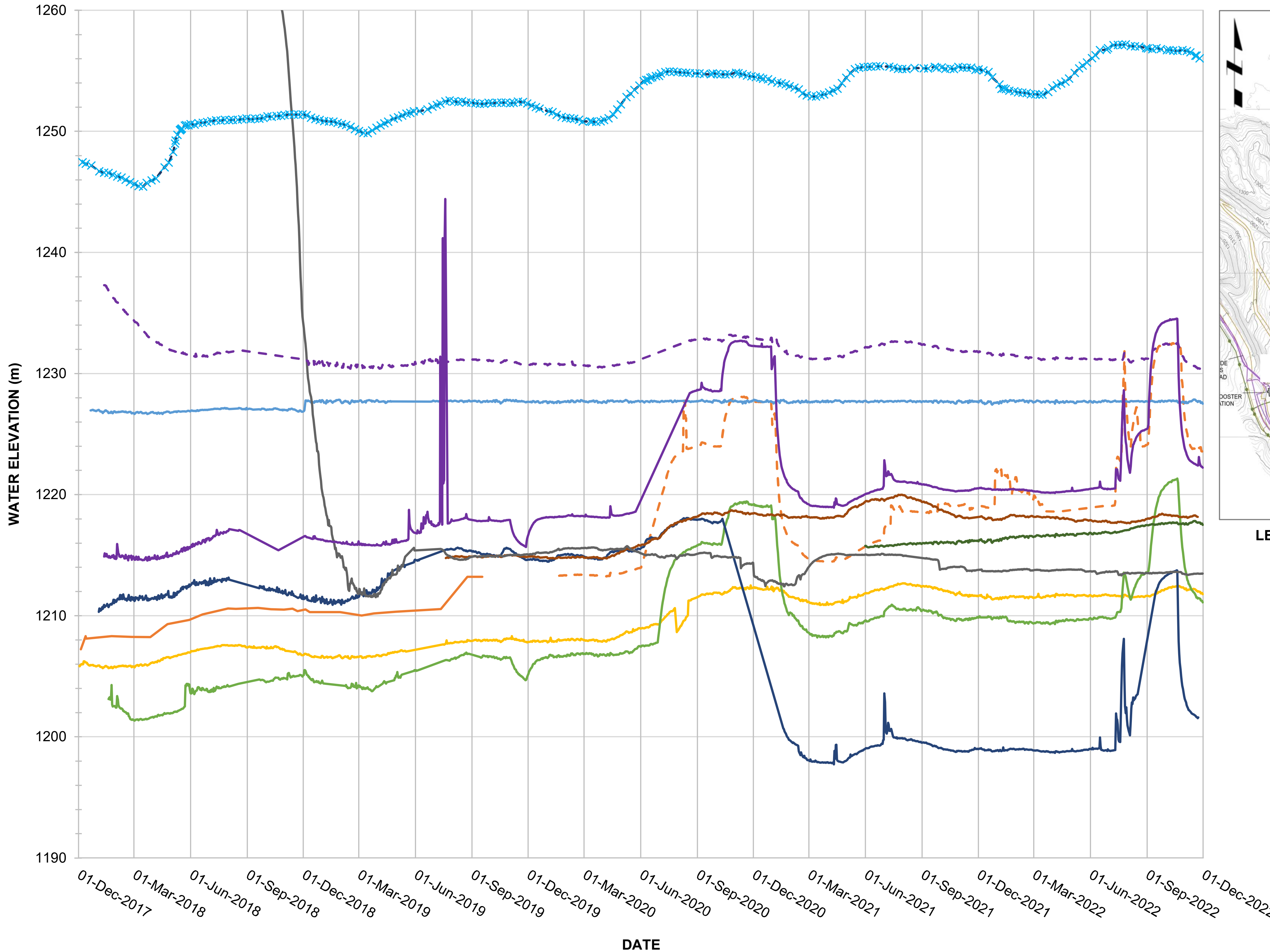
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM UPSTREAM OF CORE DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	III-A-101

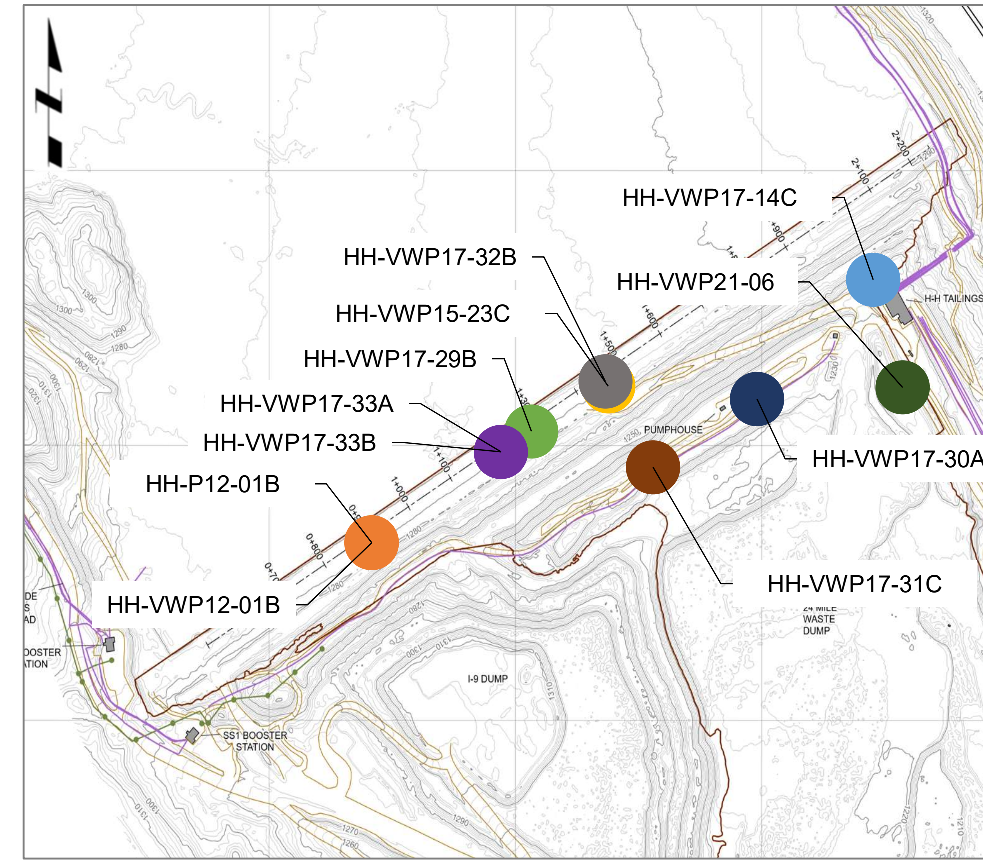
FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-101-HH - UPSTREAM OF CORE SINCE 2018.XLSX - 2023-03-28 10:41

H-H DAM PIEZOMETER PLOTS:

December 1, 2017 to November 30, 2022



INSET INSTRUMENT VIEW



LEGEND

- HH-P12-01B (Glacial Till)
- HH-VWP12-01B (Glacial Till)
- HH-VWP15-23C (Granular Fill)
- HH-VWP17-14C (Rock Fill)
- HH-VWP17-29B (Silty Sand and Gravel)
- HH-VWP17-30A (Silty Sand and Gravel)
- HH-VWP17-31C (Dam Fill - Sand and Gravel)
- HH-VWP17-32B (Dam Fill - Sand and Gravel)
- HH-VWP17-33A (Silty Sand and Gravel)
- HH-VWP17-33B (USG)
- HH-VWP21-06 (USG)
- L-L TAILINGS POND

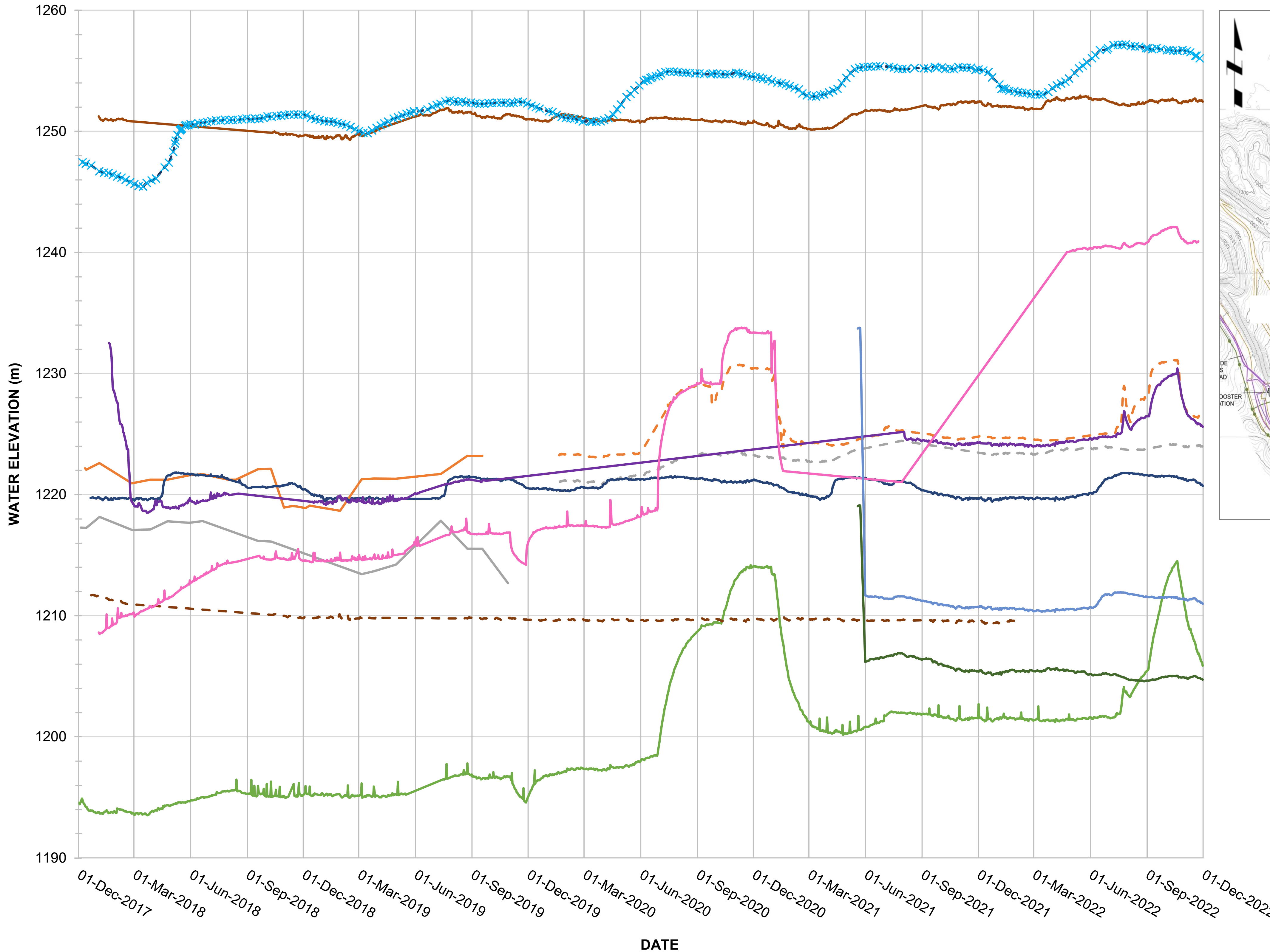
NOTES

NOT FOR CONSTRUCTION

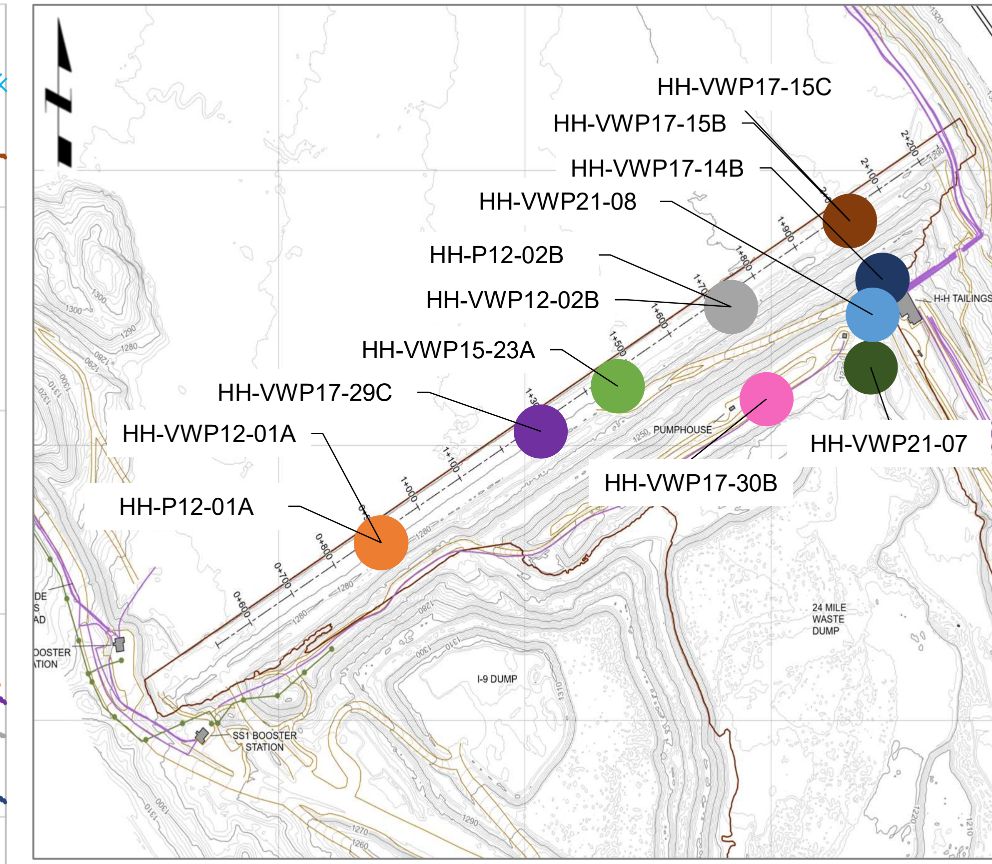
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM DAM FILL, SAND AND GRAVEL DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS
	SCALE: AS SHOWN; PROJECT No. M02341C42; FIG. No. III-A-102

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-102-HH - DAM FILL, SAND AND GRAVEL SINCE 2018.XLSX - 2023-03-28 10:41



INSET INSTRUMENT VIEW



LEGEND

- HH-P12-01A (Sand and Gravel)
- HH-P12-02B (Glacial Till)
- HH-VWP12-01A (Sand and Gravel)
- HH-VWP12-02B (Glacial Till)
- HH-VWP15-23A (Stratified Glacial Till)
- HH-VWP17-14B (Glacial Till)
- HH-VWP17-15B (Glacial Till)
- HH-VWP17-15C (Rock Fill and GT Contact)
- HH-VWP17-29C (Glacial Till)
- HH-VWP17-30B (Glacial Till)
- HH-VWP21-07 (Glacial Till)
- HH-VWP21-08 (Glacial Till)
- L-L TAILINGS POND

NOTES

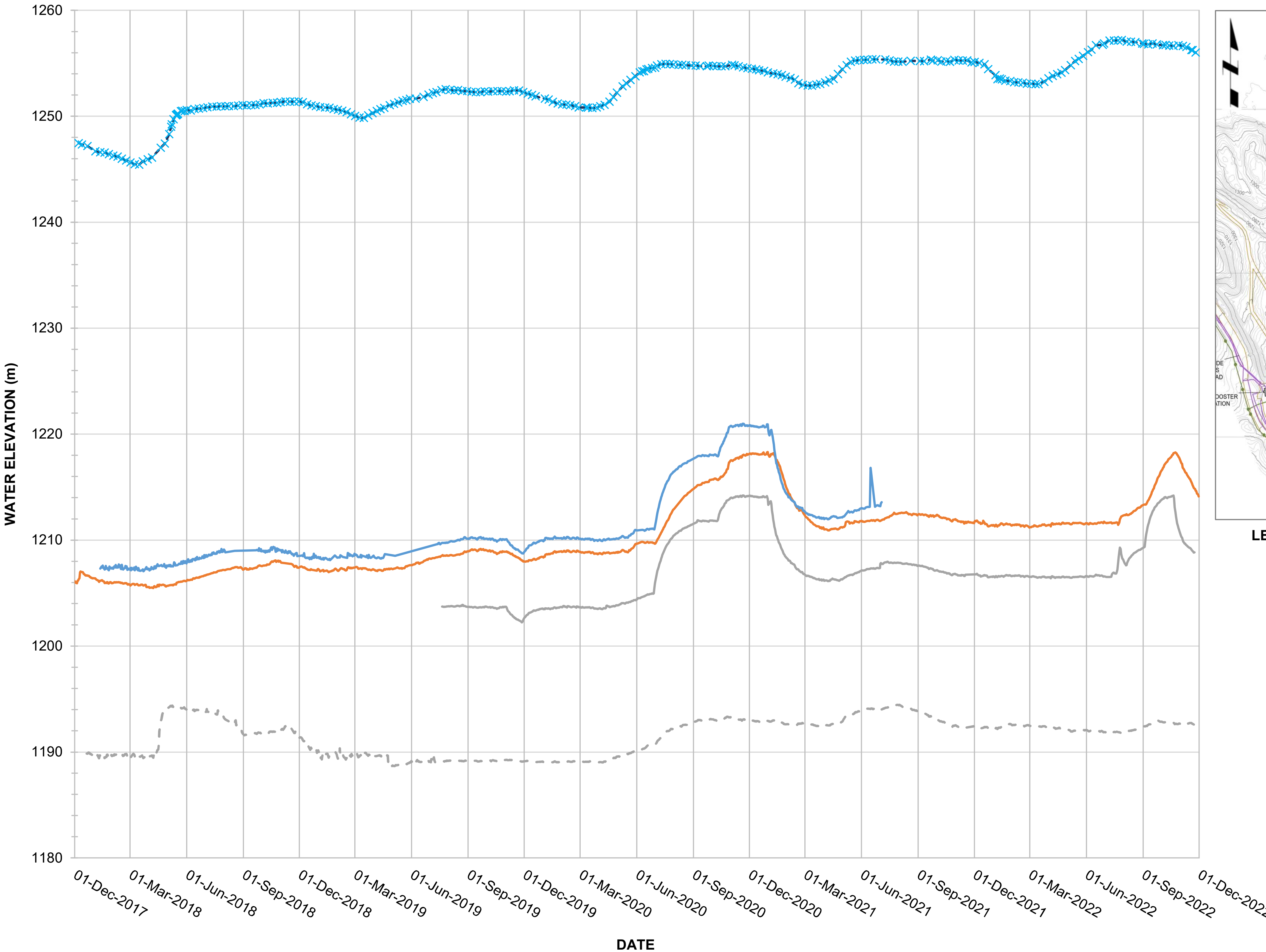
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

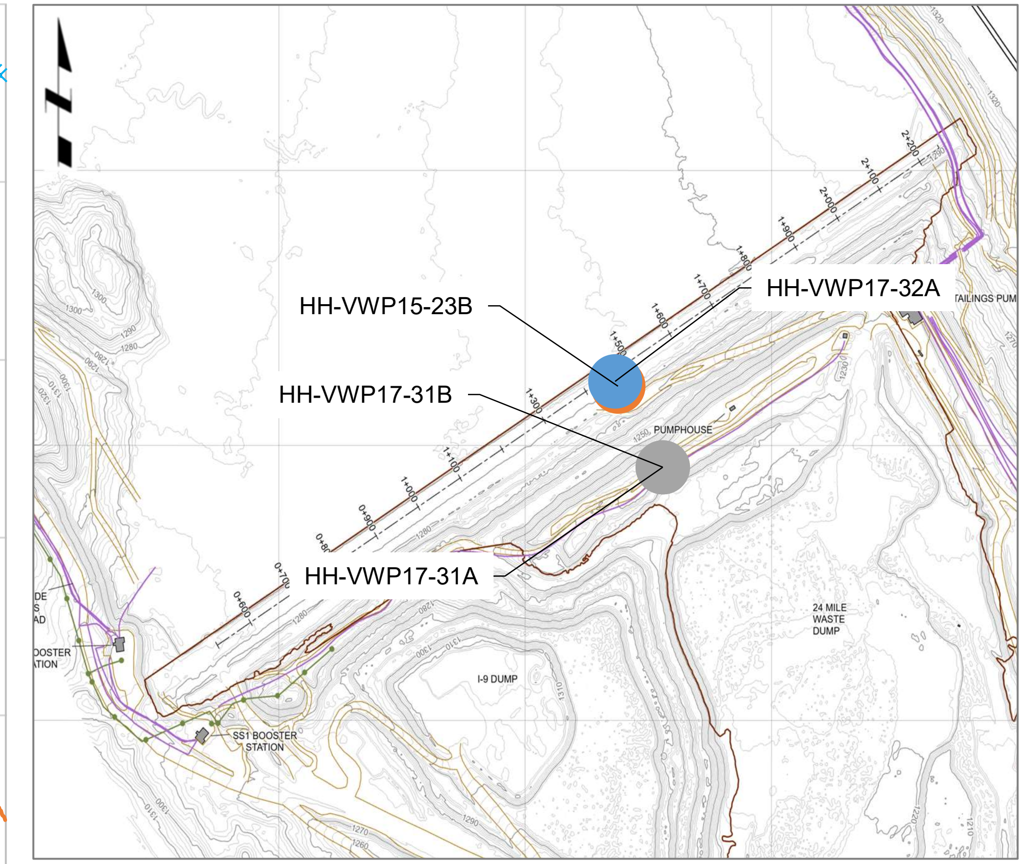
CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE H-H DAM GLACIAL TILL, CLAY AND SILT DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	III-A-103

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-103-HH - GLACIAL TILL AND CLAY, SILT SINCE 2018.XLSX - 2023-03-28 10:42



INSET INSTRUMENT VIEW



LEGEND

- HH-VWP15-23B (L-GLU)
- HH-VWP17-31A (Clay Layer 2)
- HH-VWP17-31B (Clay Layer 1)
- HH-VWP17-32A (Clay Layer 2)
- L-L TAILINGS POND

NOTES

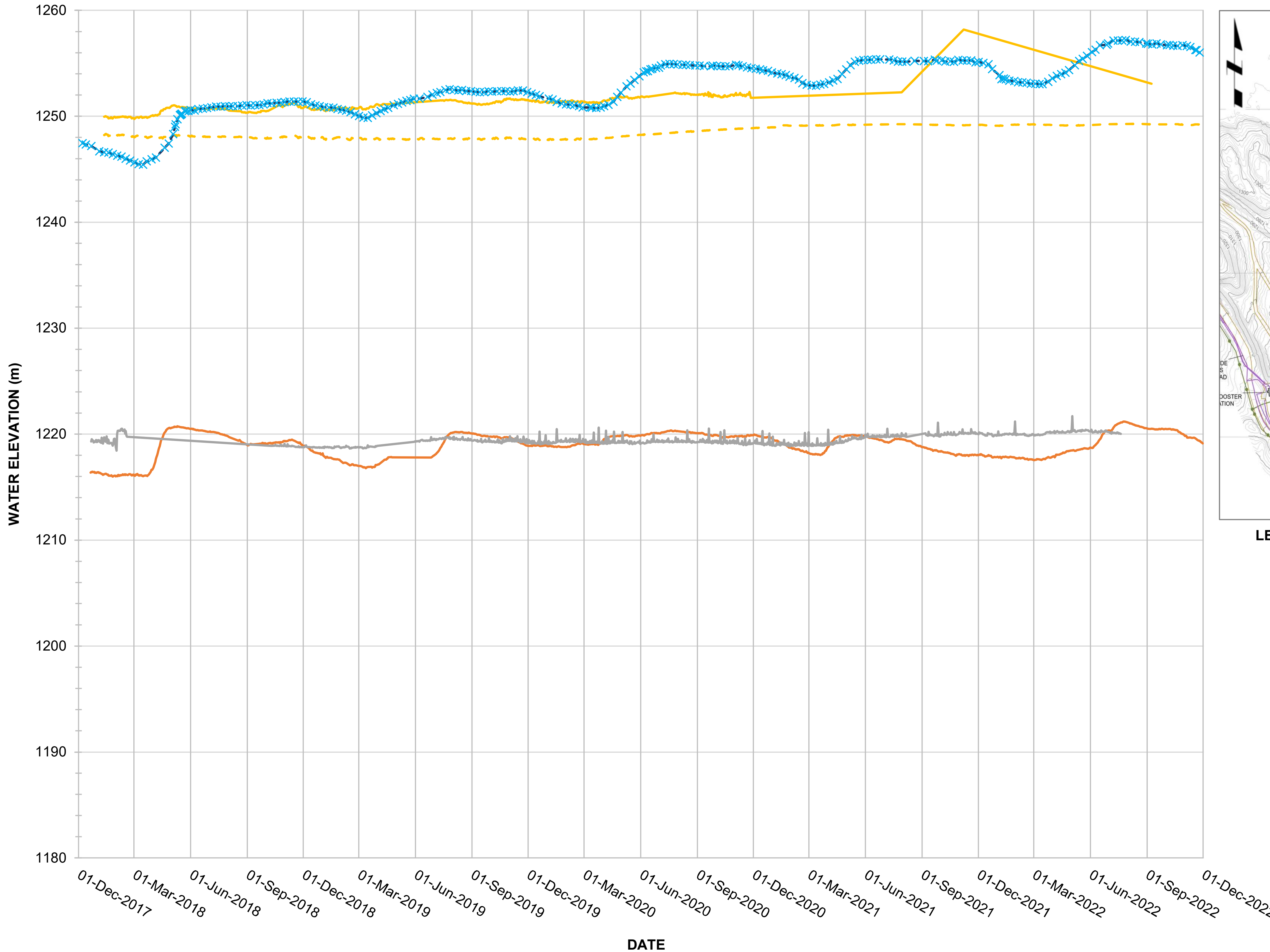
NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

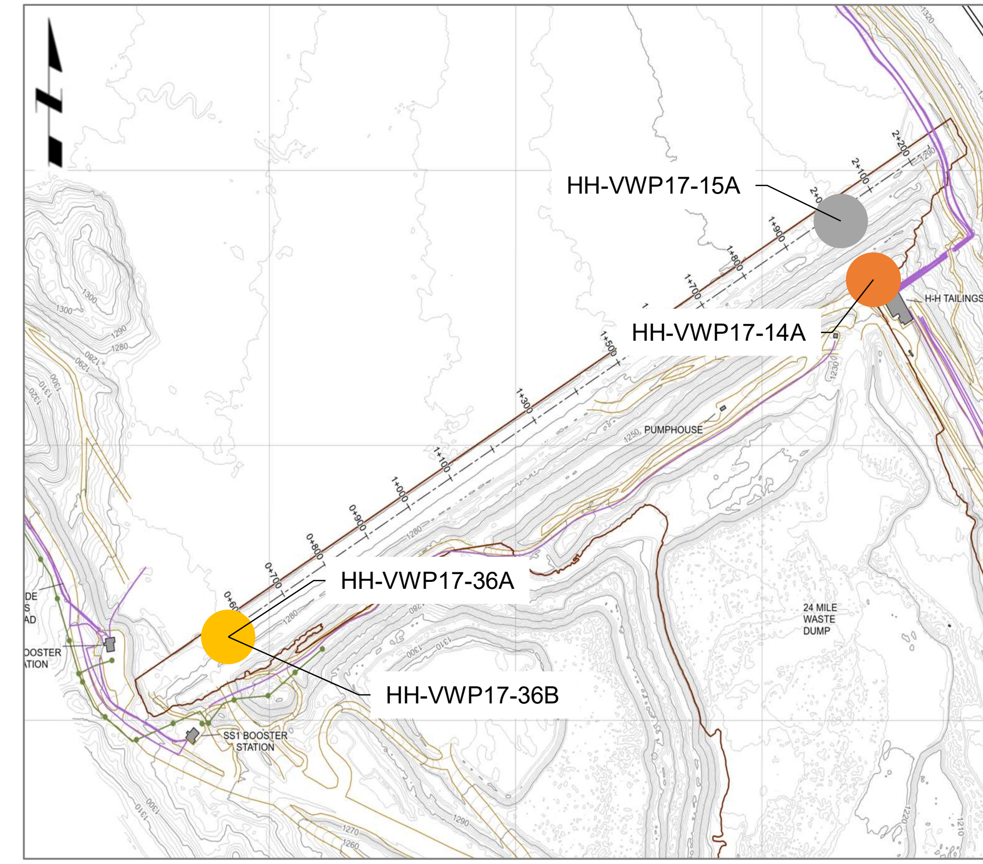
CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE H-H DAM GLACIOLACUSTRINE DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	III-A-104

FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-104-HH - GLACIOLACUSTRINE SINCE 2018.XLSX - 2023-03-28 10:43



INSET INSTRUMENT VIEW



LEGEND

- HH-VWP17-14A (Granodiorite)
- HH-VWP17-15A (Weathered Bedrock)
- HH-VWP17-36A (Granodiorite)
- HH-VWP17-36B (Glacial Till)
- L-L TAILINGS POND

NOTES

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

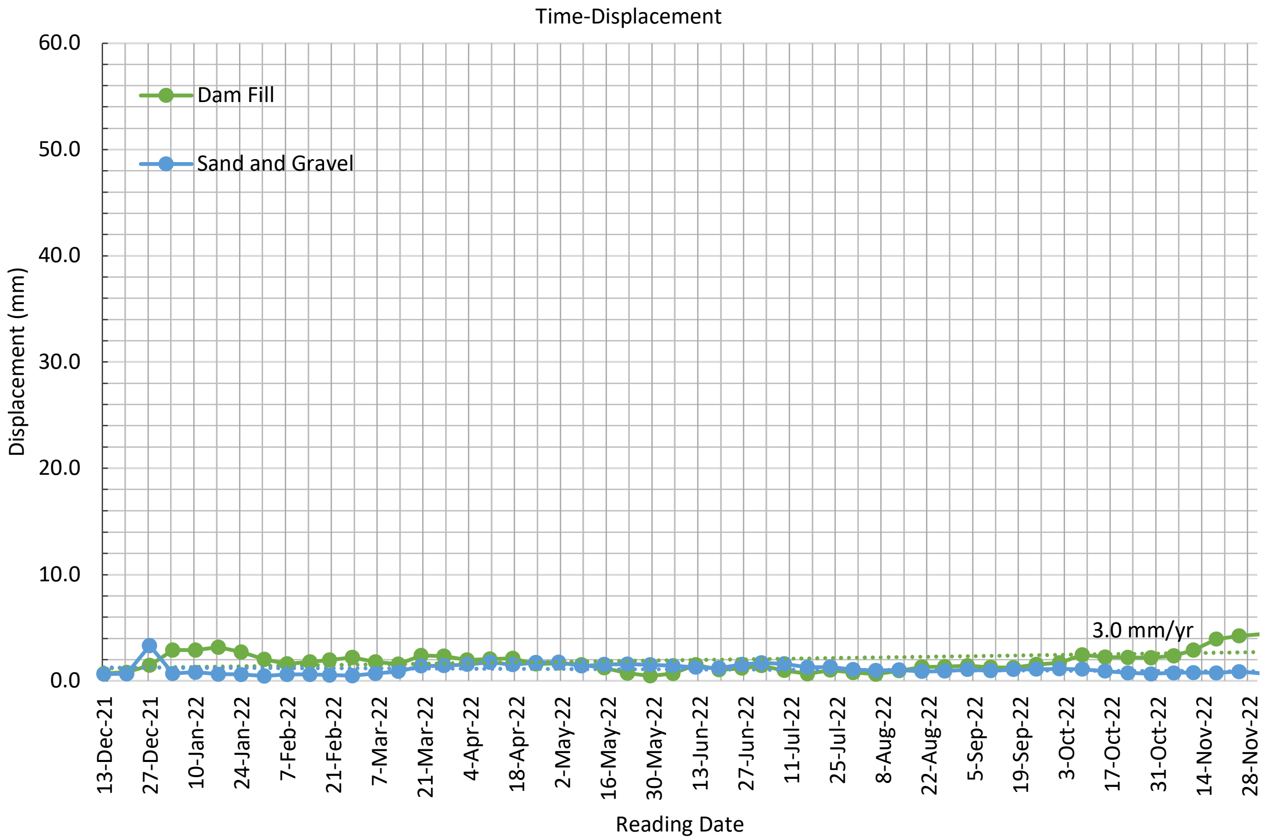
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM FOUNDATION ROCK DEC. 2017 TO NOV. 2022 PIEZOMETER PLOTS

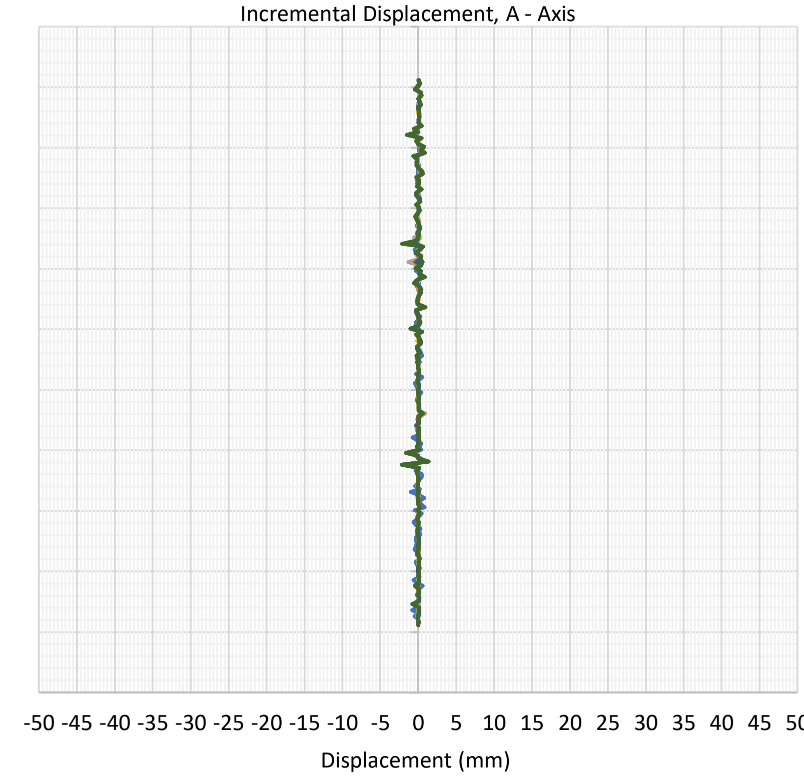
SCALE	PROJECT No.	FIG. No.
AS SHOWN	M02341C42	III-A-105

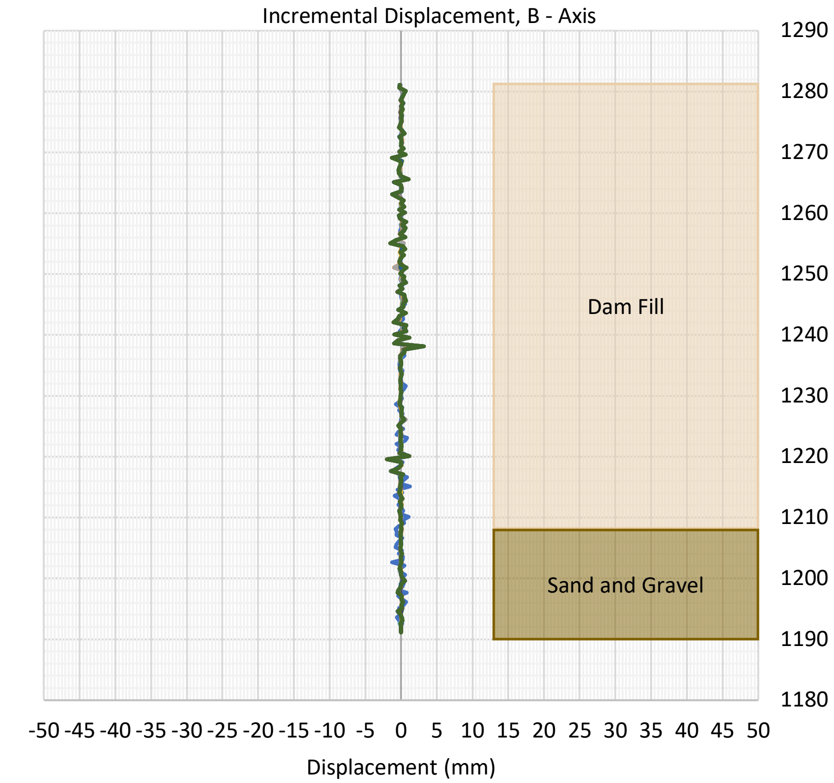
FILE PATH: \\INT.KLOHN.COM\PROJDATA\M\VCR\M02341C42-HVC-2022 AFPR\300 DESIGN\385 FIGURE UPDATES\APPENDIX PIEZOMETER PLOTS\III-105-HH - FOUNDATION ROCK SINCE 2018.XLSX - 2023-03-28 10:43

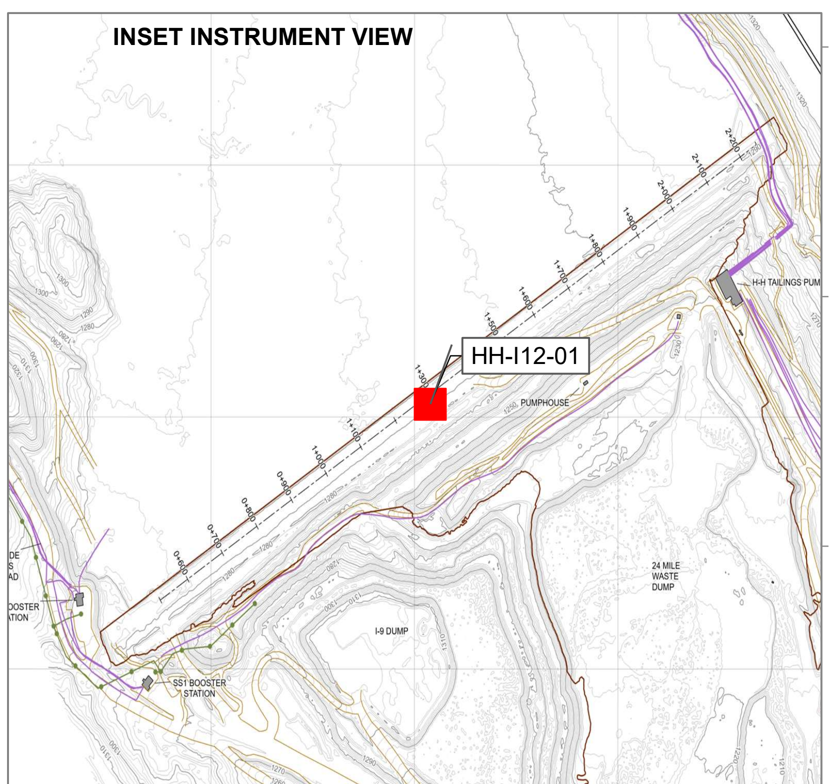
APPENDIX III-B

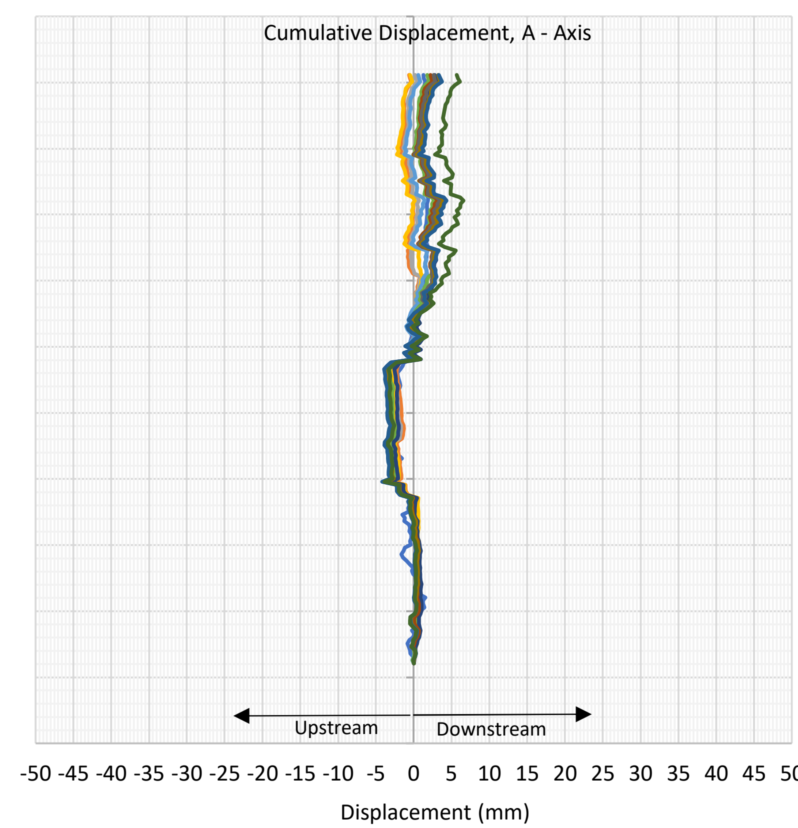
H-H Dam Inclinometer Plots

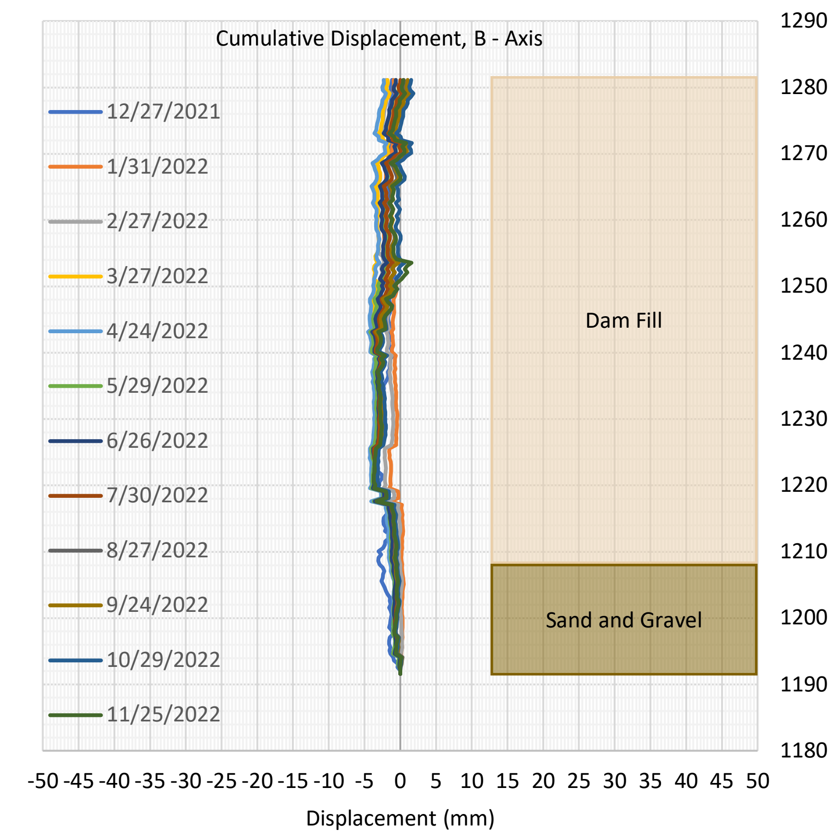












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Dam Fill	1276.1-1211.1	10.0	N/A	N/A
Sand and Gravel	1209.1-1192.1	3.0	N/A	N/A

Station	Baseline Reading	Instrument Type
1+275	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

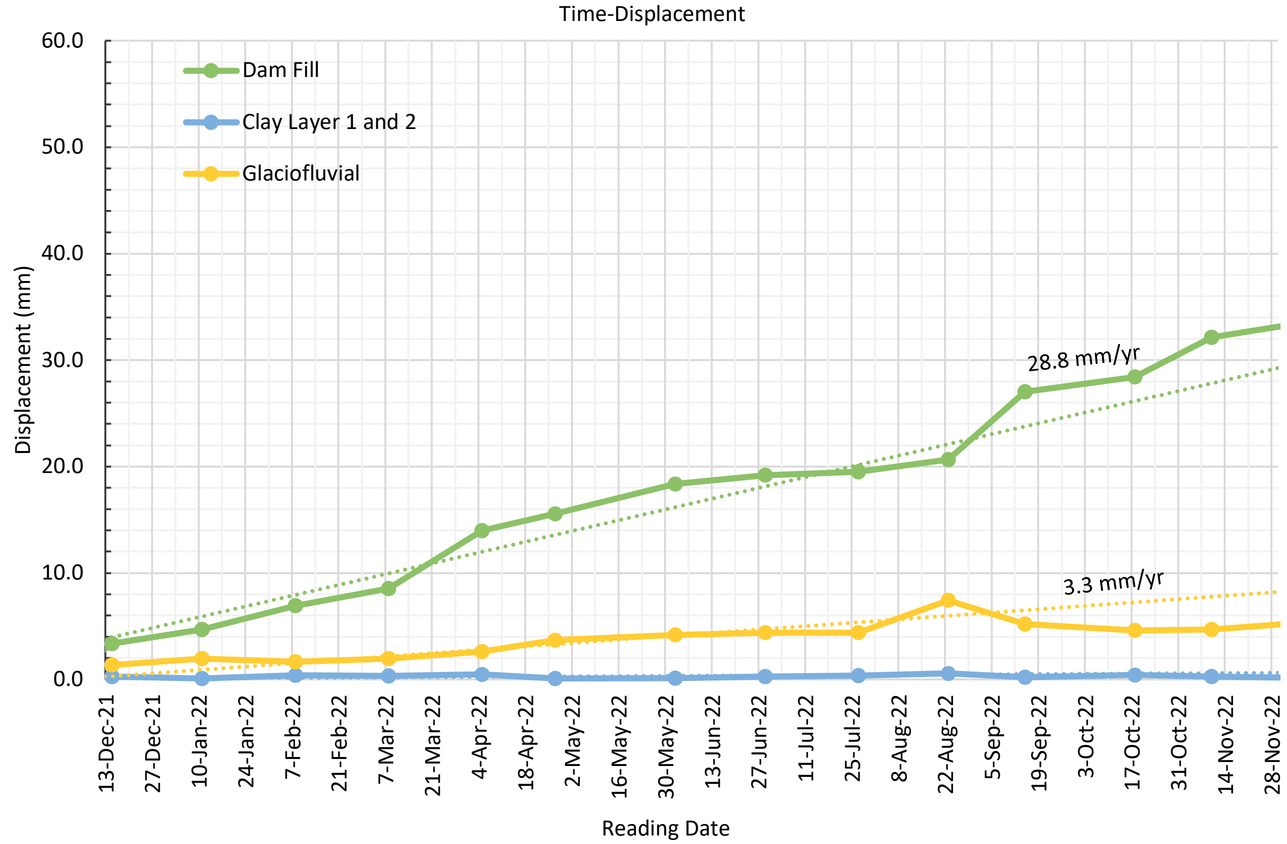
CLIENT
Highland Valley Copper / Teck

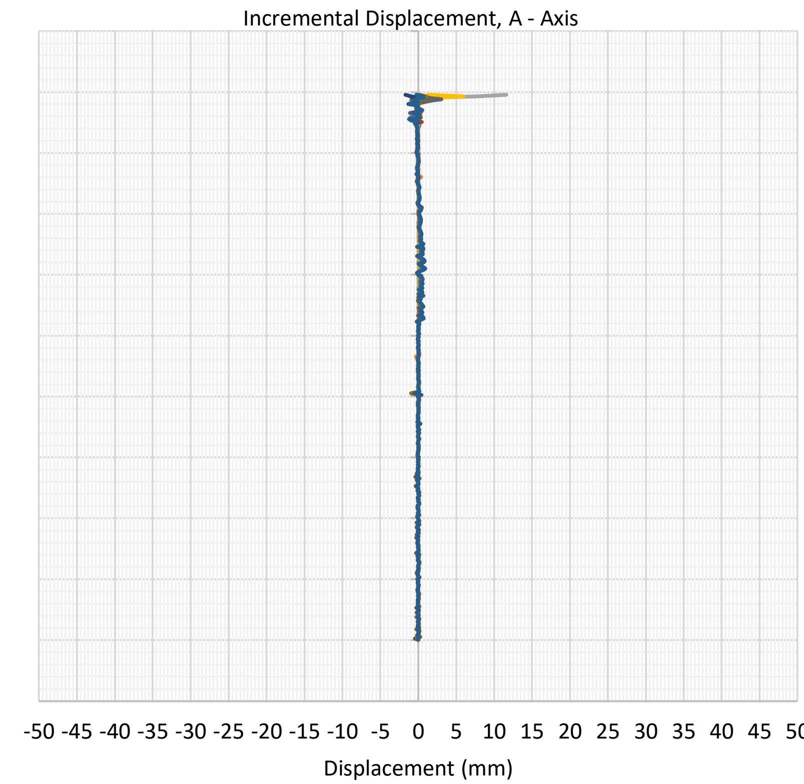
Klohn Crippen Berger

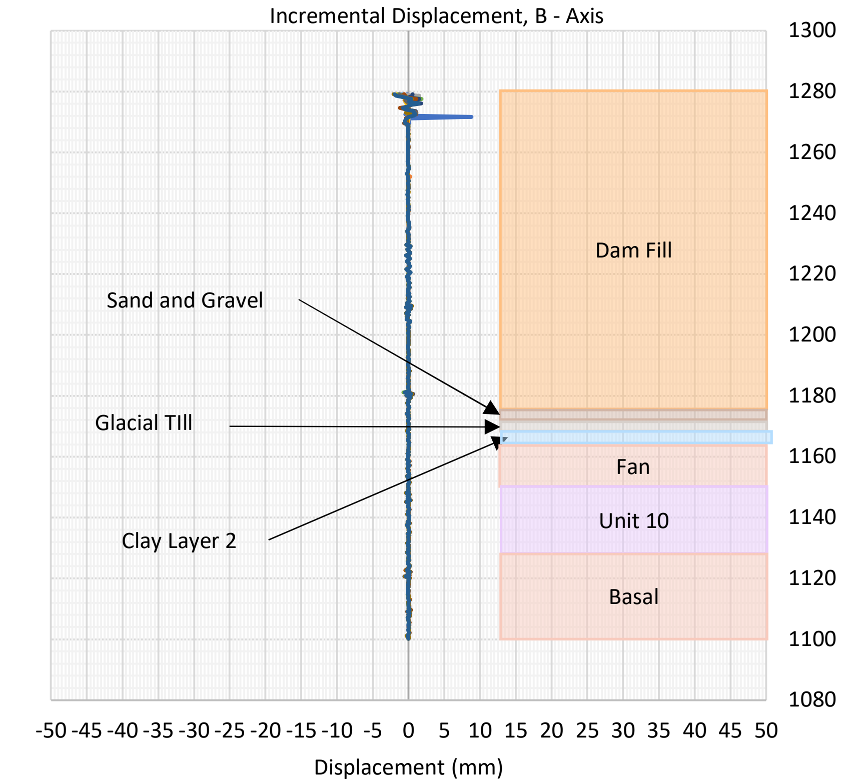
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

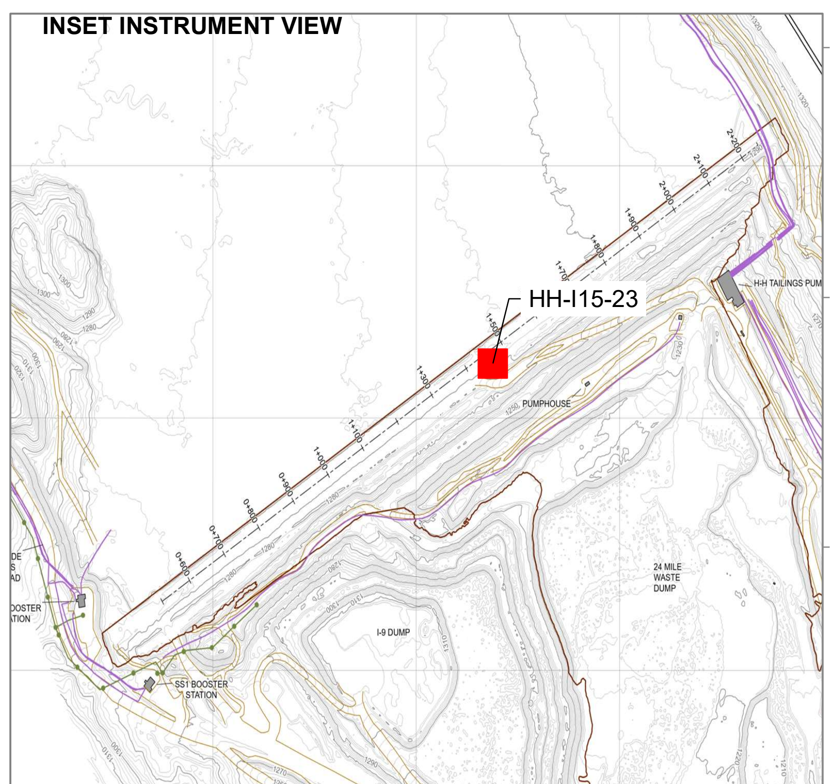
TITLE
HH DAM INCLINOMETER PLOTS
HH-I12-01 (MID SEGMENT)
DEC. 2021 TO NOV. 2022

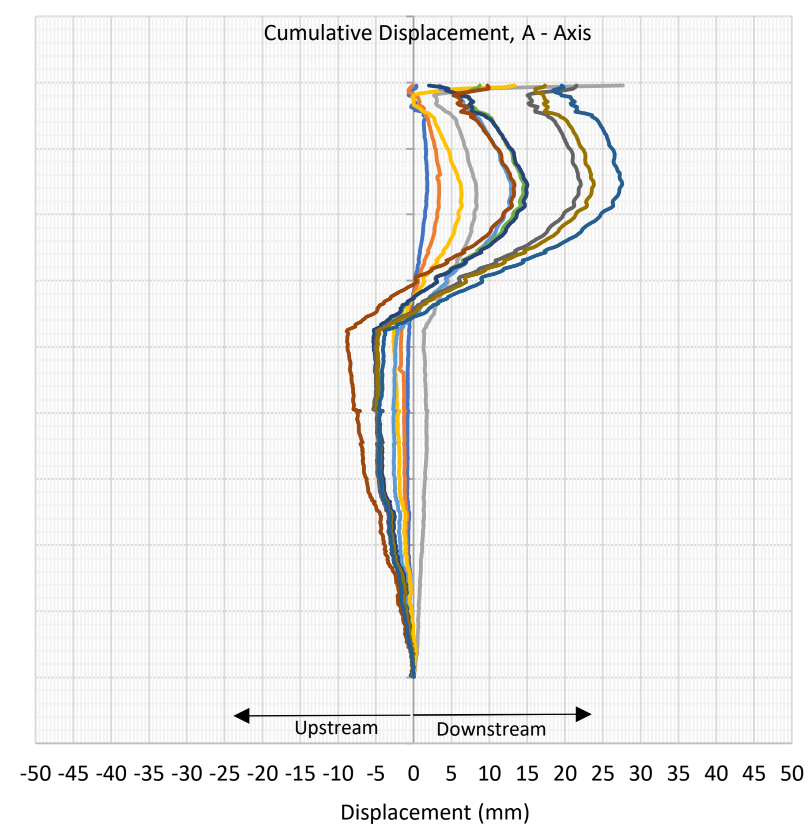
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	III-B-1

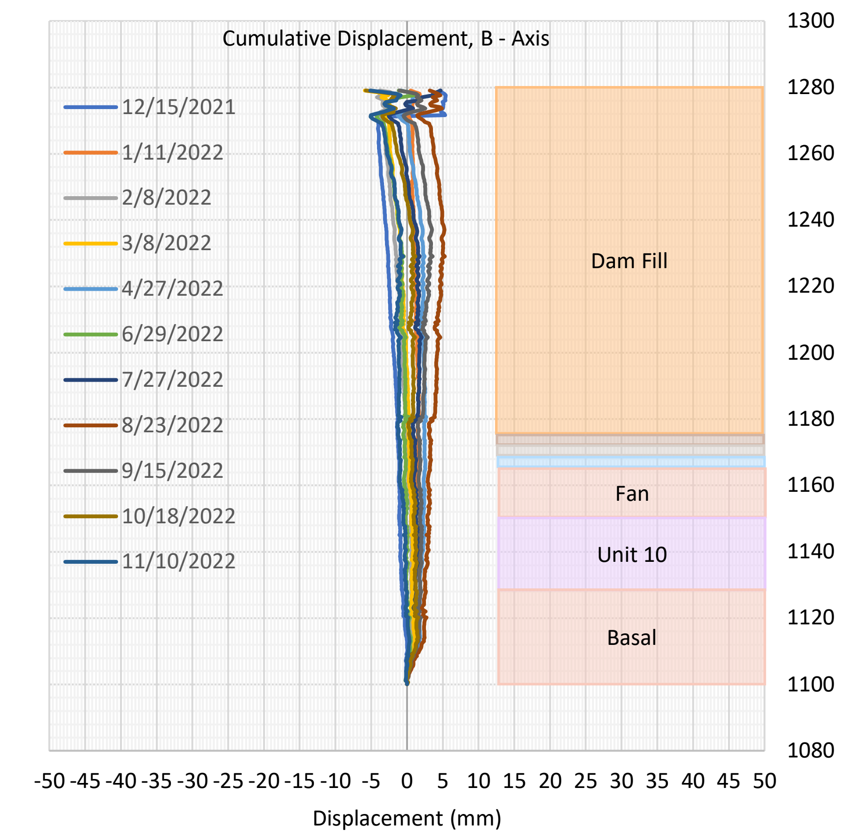












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Dam Fill	1249.2-1176.2	N/A	N/A	N/A
Clay Layer 1 and 2	1176.2-1165.2	1.0	3.0	N/A
Glaciofluvial	1165.2-1100.2	3.0	N/A	N/A

Station	Baseline Reading	Instrument Type
1+460	2021-12-15	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

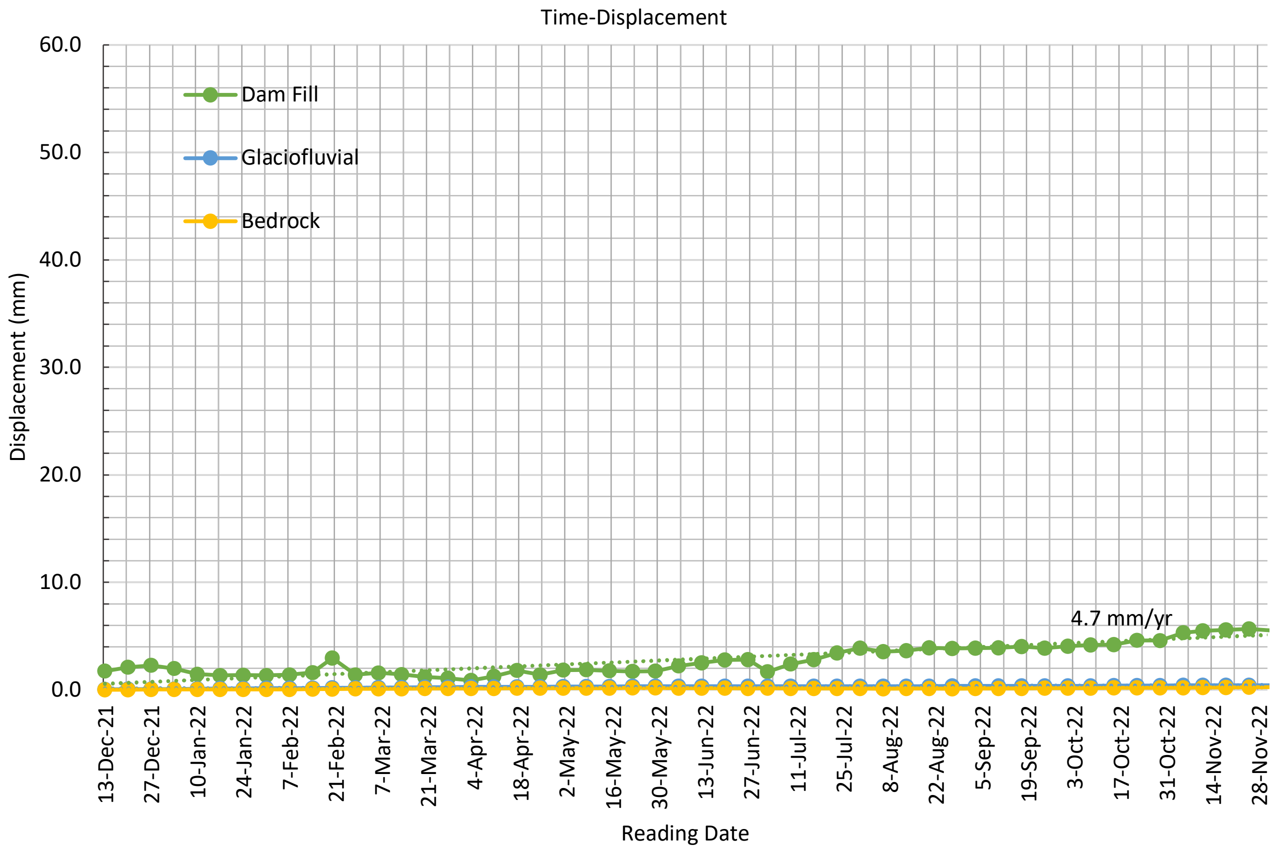
CLIENT: Highland Valley Copper / Teck

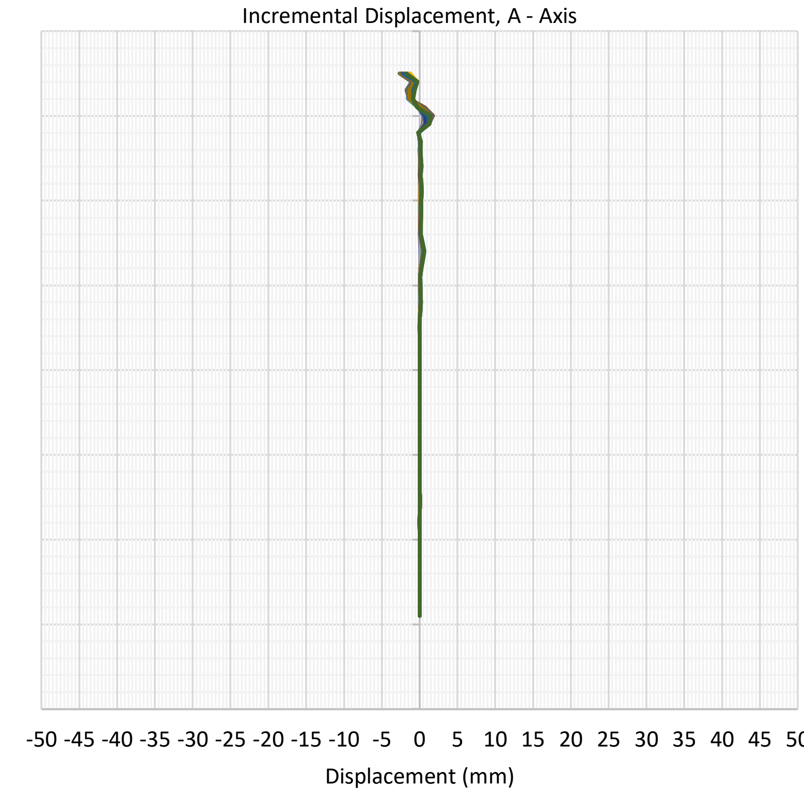
Klohn Crippen Berger

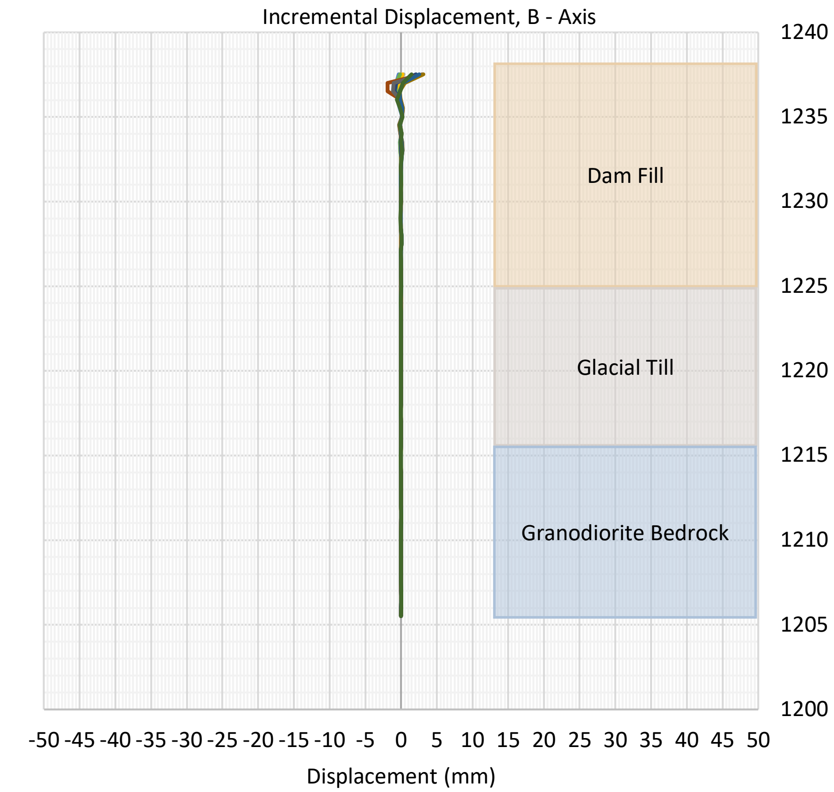
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

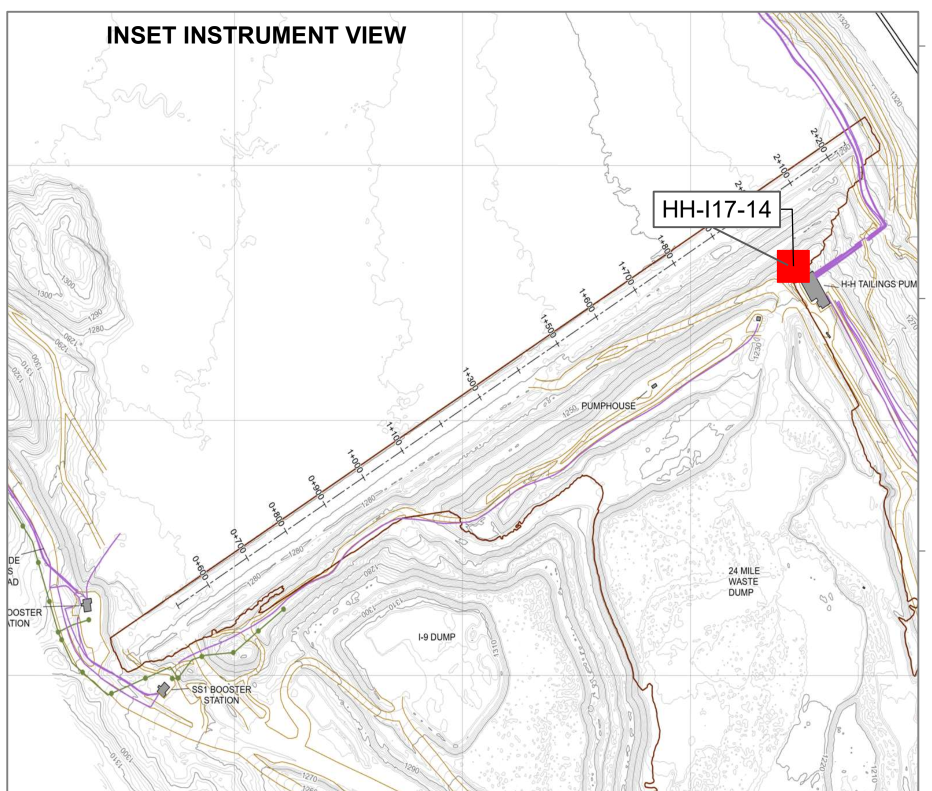
TITLE: HH DAM INCLINOMETER PLOTS
HH-I15-23 (MID SEGEMENT)
DEC. 2021 TO NOV. 2022

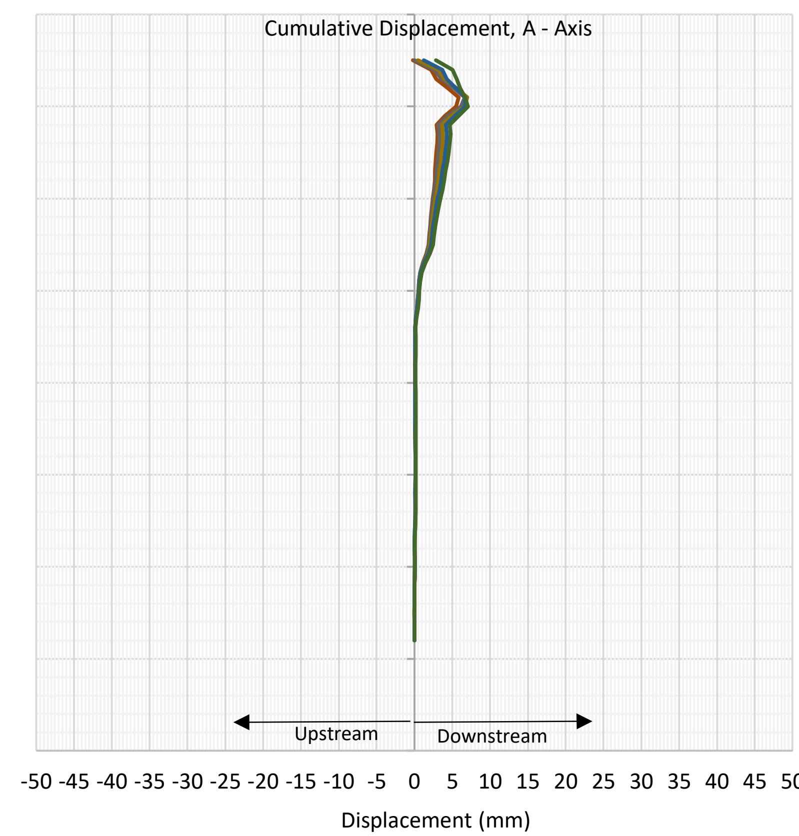
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	III-B-2

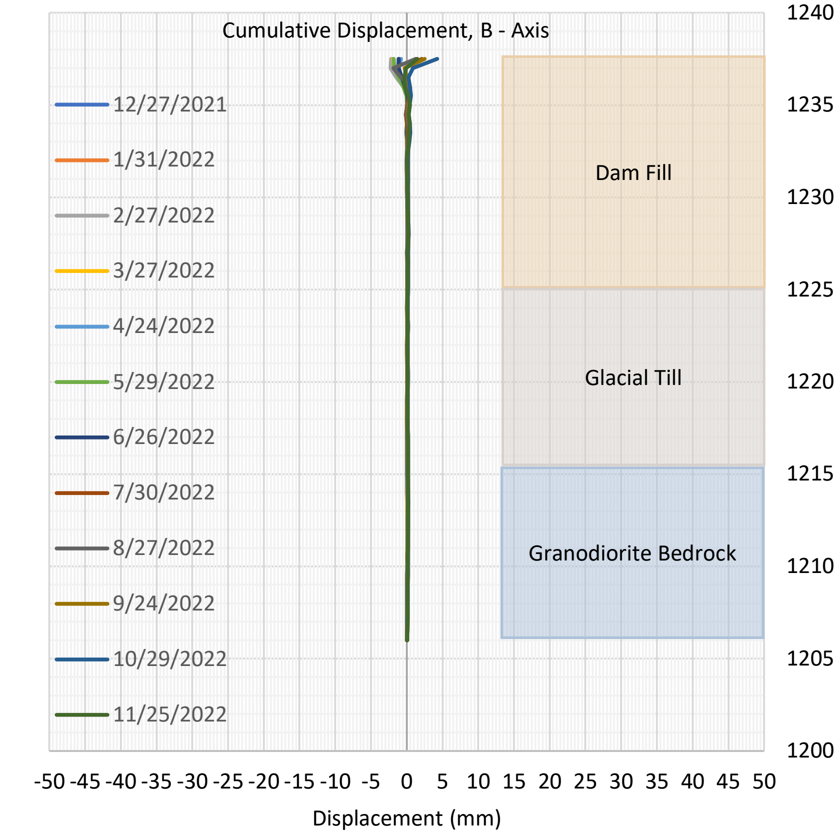












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Dam Fill	1236.5-1221.0	3.0	N/A	N/A
Glaciofluvial	1224.5-1221.5	3.0	N/A	N/A
Bedrock	1215.5-1206.5	3.0	N/A	N/A

Station	Baseline Reading	Instrument Type
2+000	2021-12-13	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

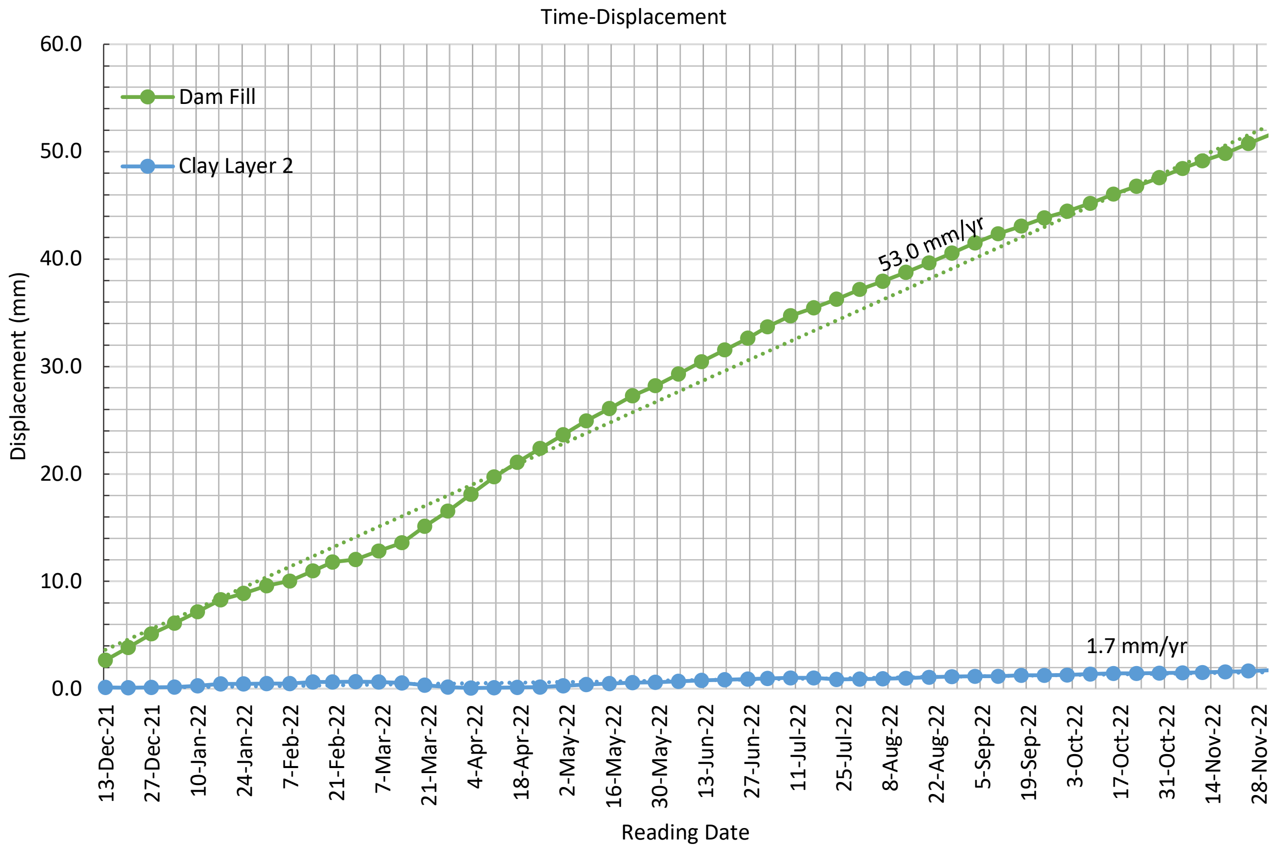
CLIENT
Highland Valley Copper / Teck

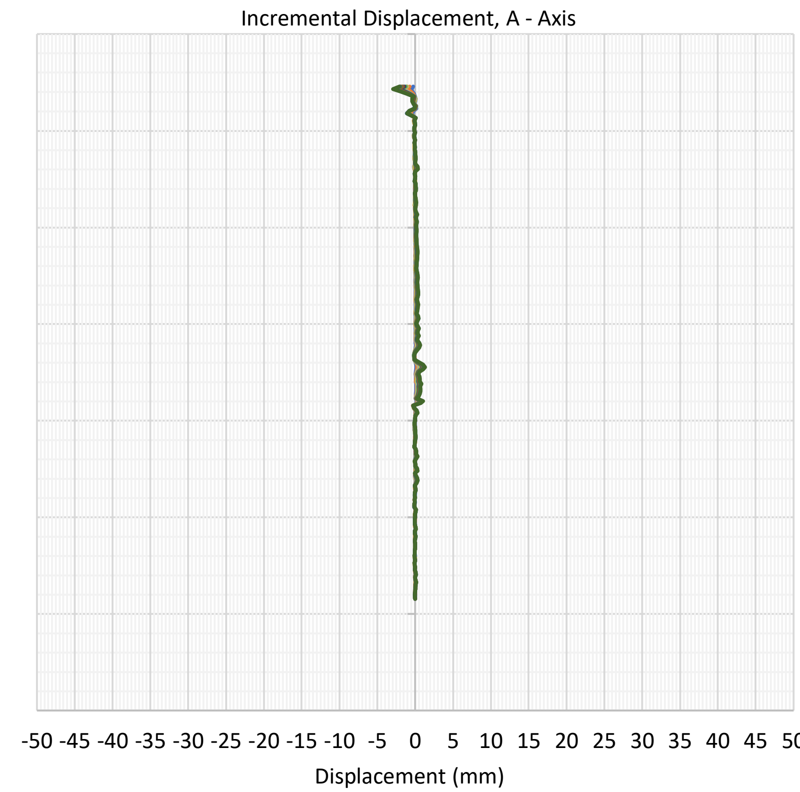
Klohn Crippen Berger

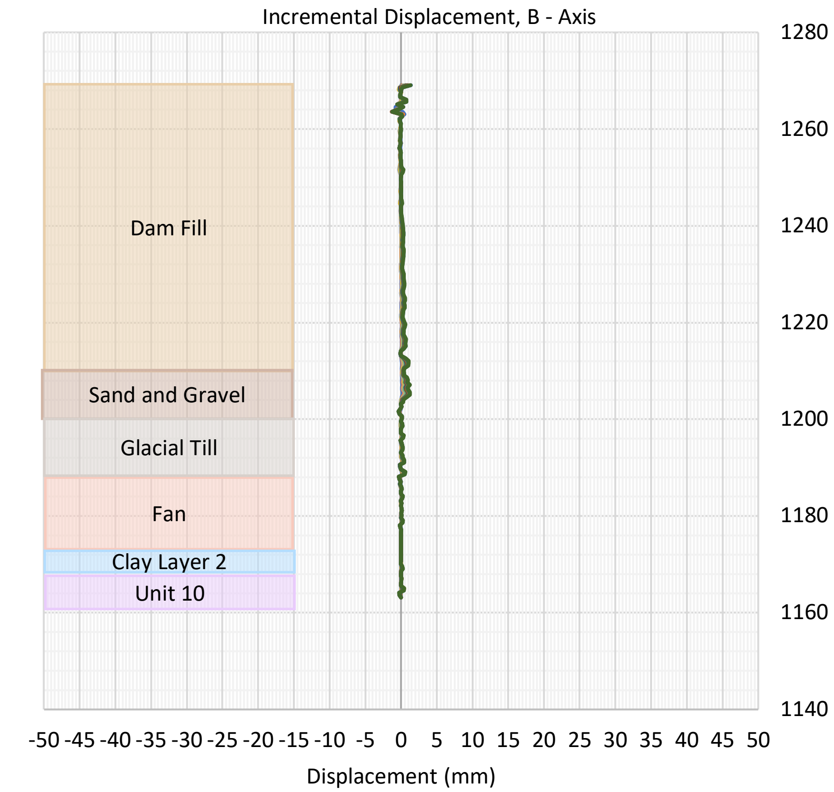
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

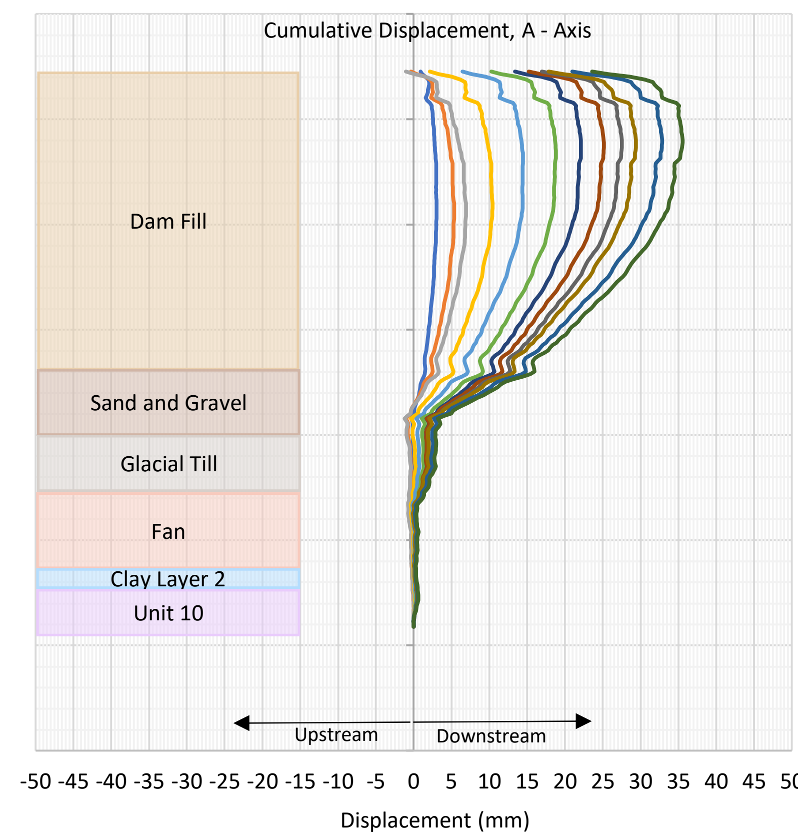
TITLE
HH DAM INCLINOMETER PLOTS
HH-I17-14 (EAST SEGMENT)
DEC. 2021 TO NOV. 2022

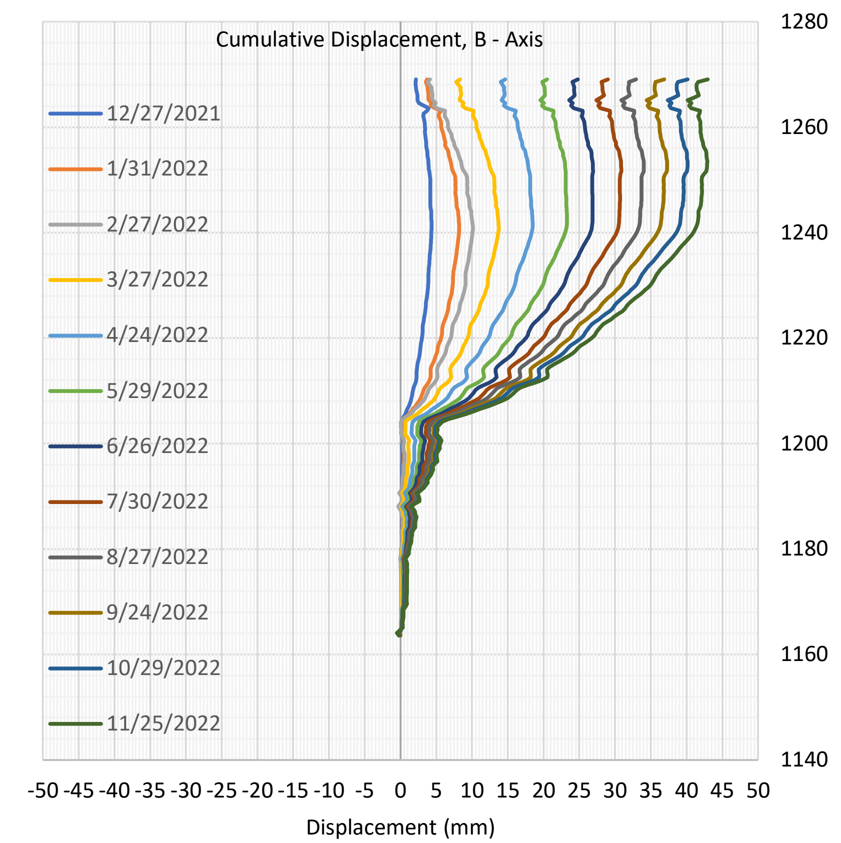
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	III-B-3

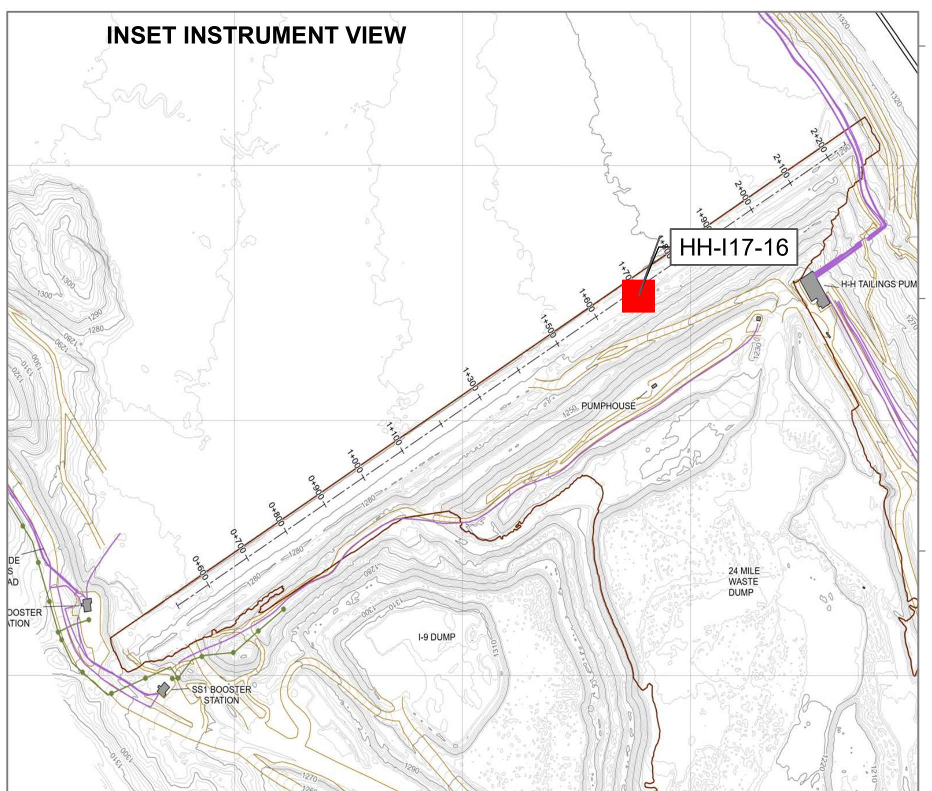












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Dam Fill	1245.1-1190.1	10.0	N/A	N/A
Clay Layer 2	1188.1-1166.6	1.0	3.0	N/A

Station	Baseline Reading	Instrument Type
1+700	2021-12-09	SAAV

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

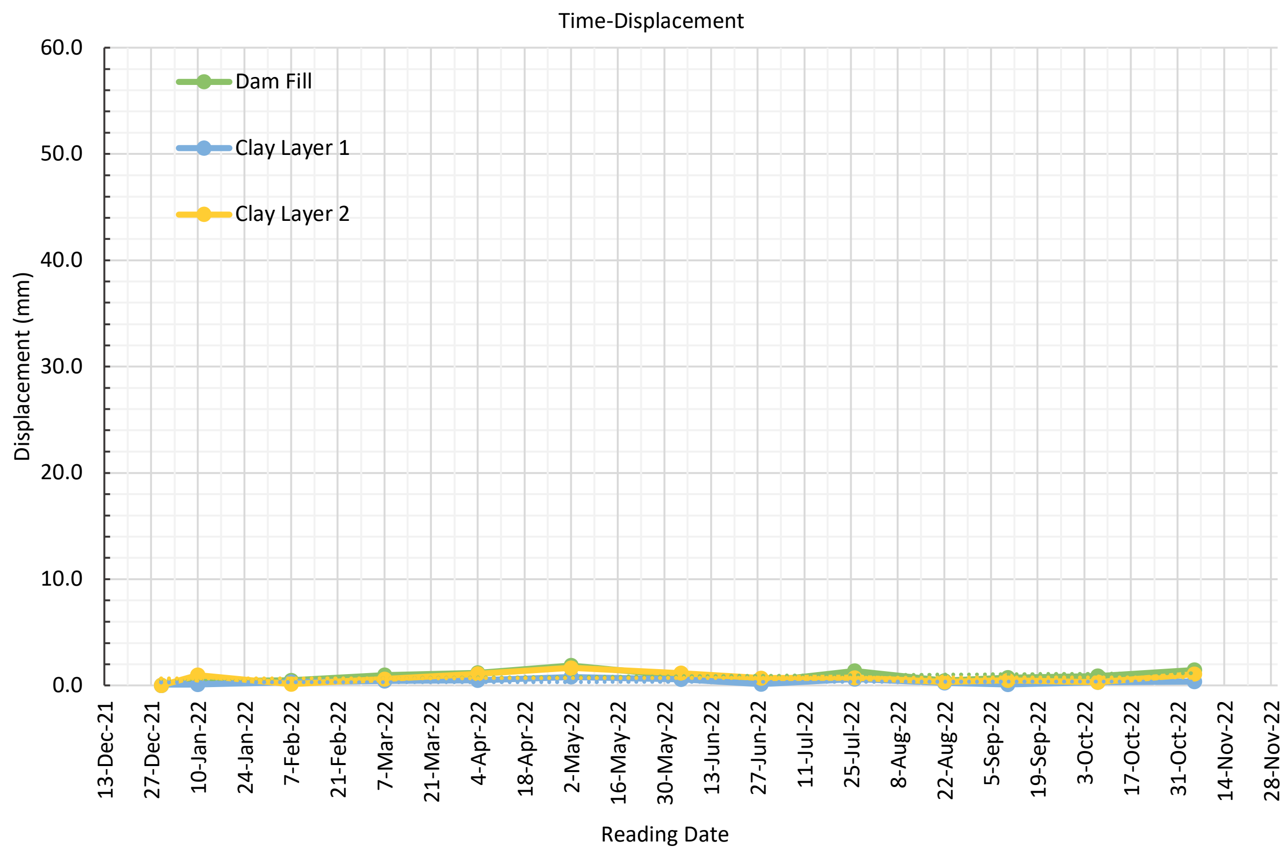
CLIENT
Highland Valley Copper / Teck

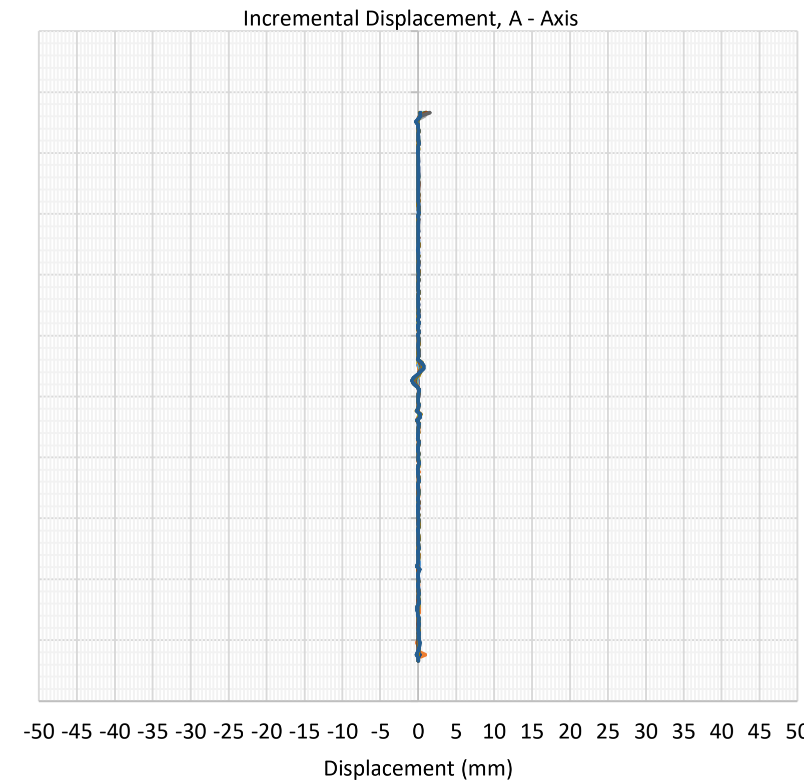
Klohn Crippen Berger

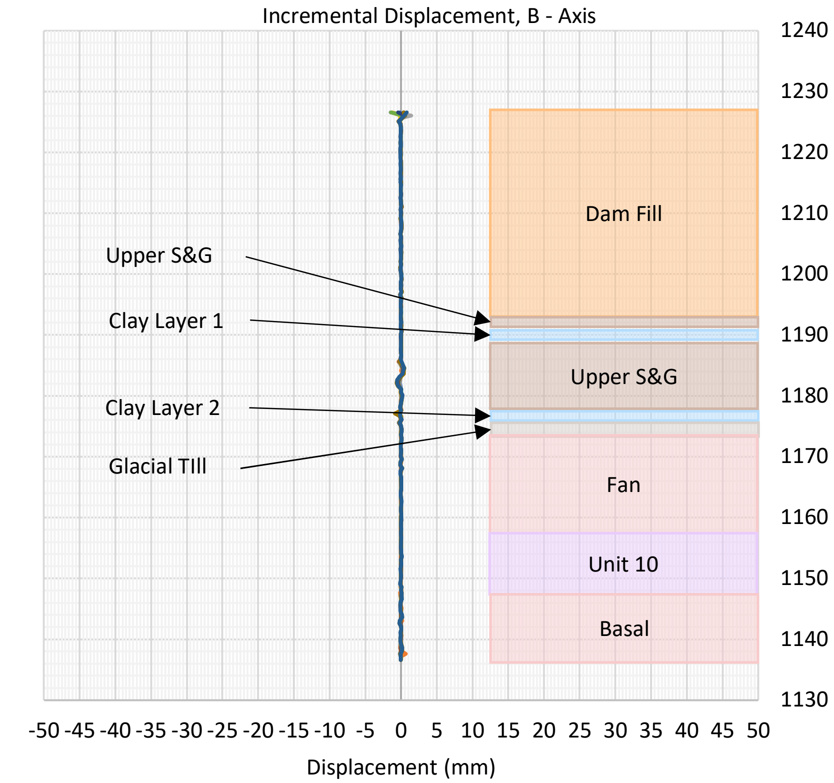
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

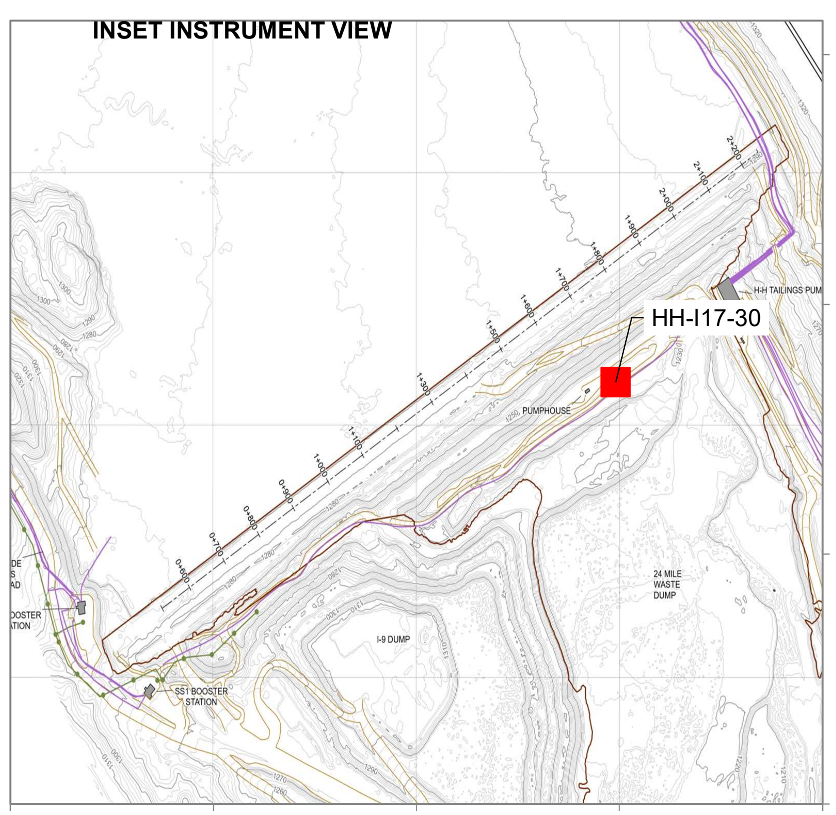
TITLE
HH DAM INCLINOMETER PLOTS
HH-I17-16 (MID SEGMENT)
DEC. 2021 TO NOV. 2022

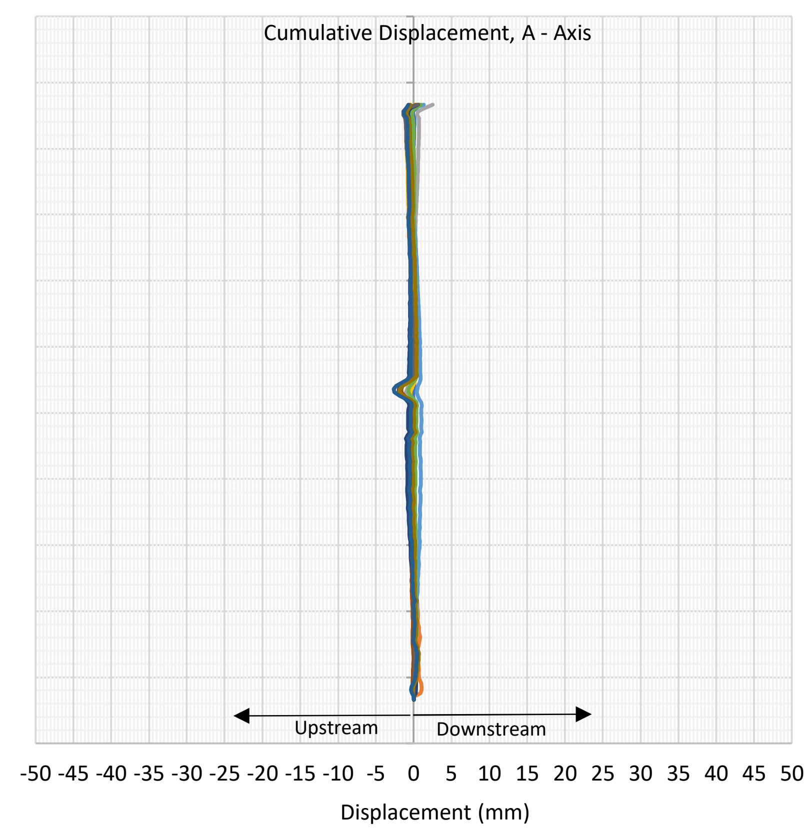
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	III-B-4

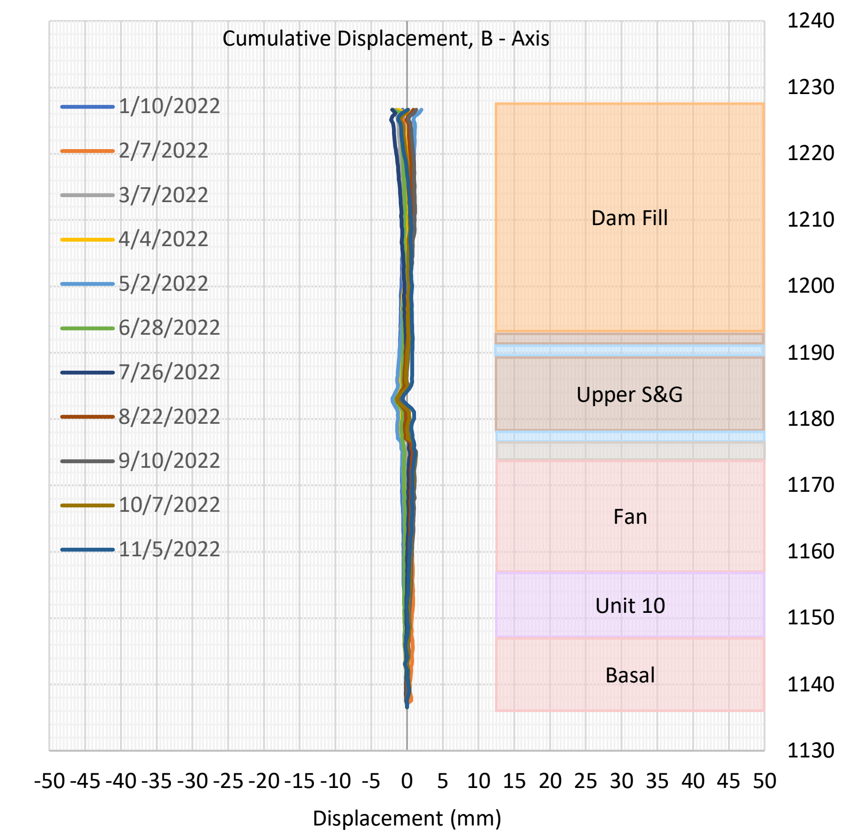












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Dam Fill	1222.7-1196.7	3.0	N/A	N/A
Clay Layer 1	1196.7-1180.7	1.0	3.0	N/A
Clay Layer 2	1180.7-1136.7	1.0	3.0	N/A

Station	Baseline Reading	Instrument Type
1+650	2022-01-10	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

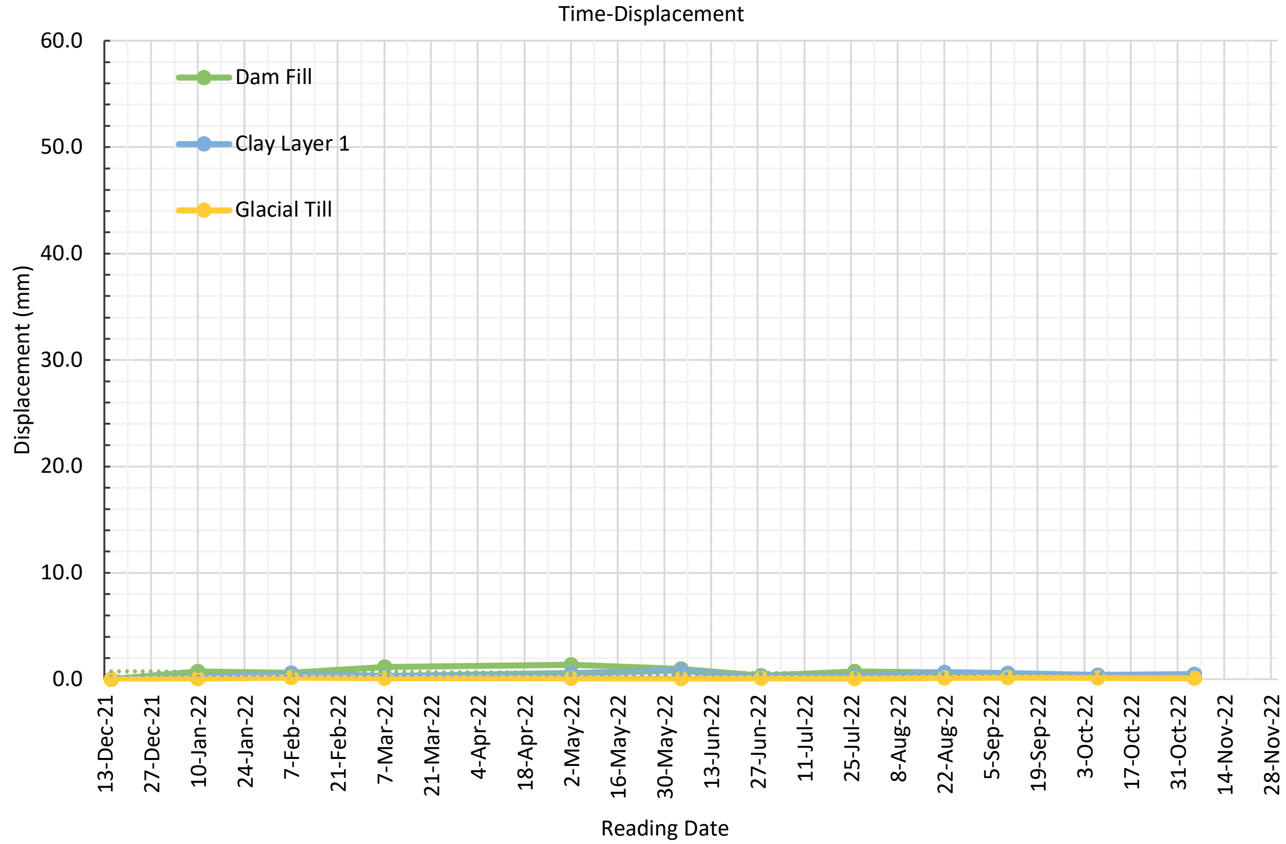
CLIENT
Highland Valley Copper / Teck

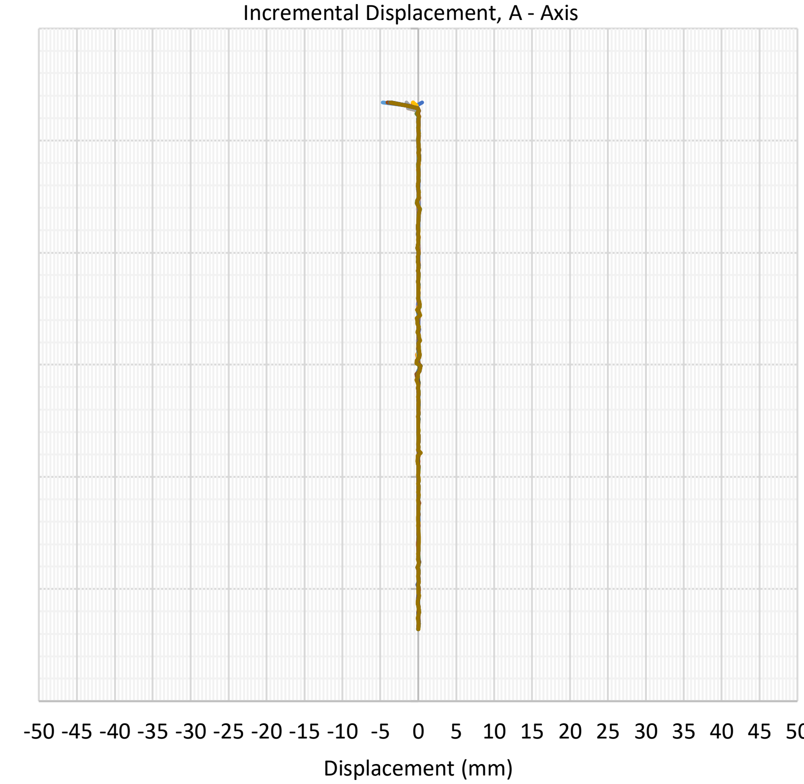
Klohn Crippen Berger

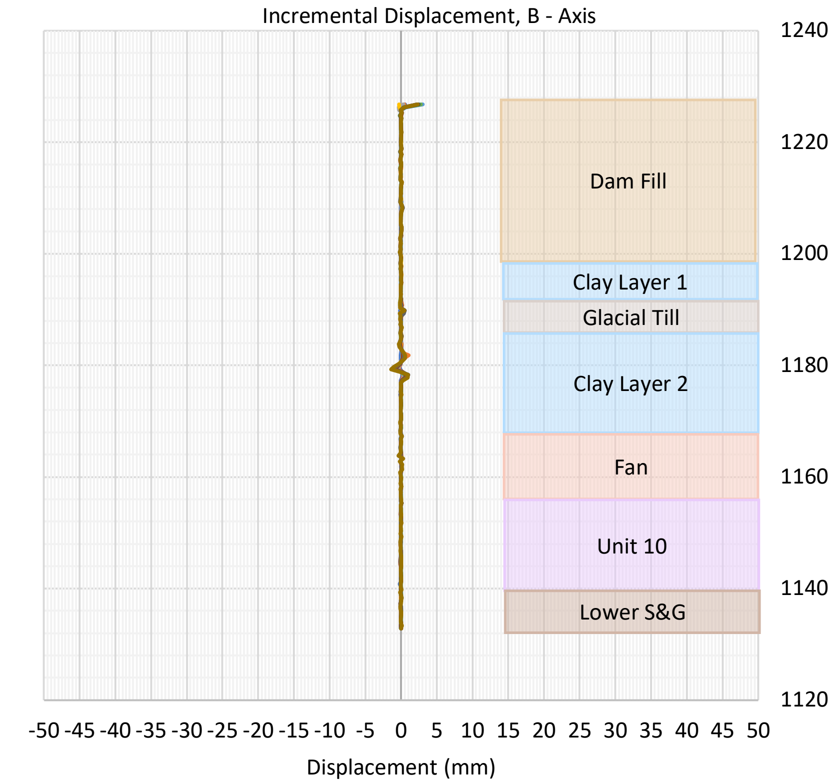
PROJECT
HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

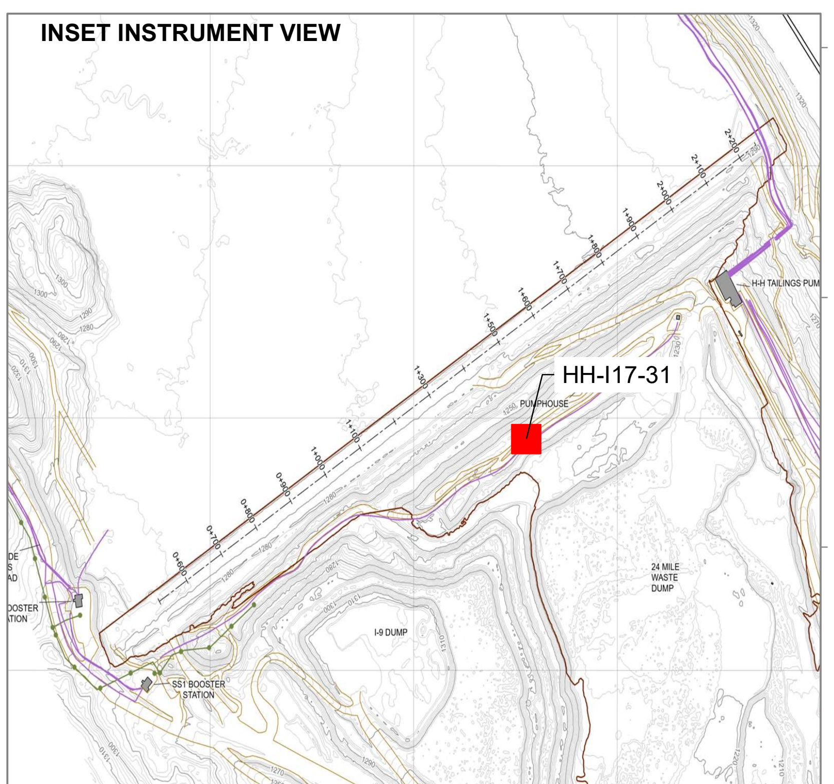
TITLE
HH DAM INCLINOMETER PLOTS
HH-I17-30 (MID SEGEMENT)
DEC. 2021 TO NOV. 2022

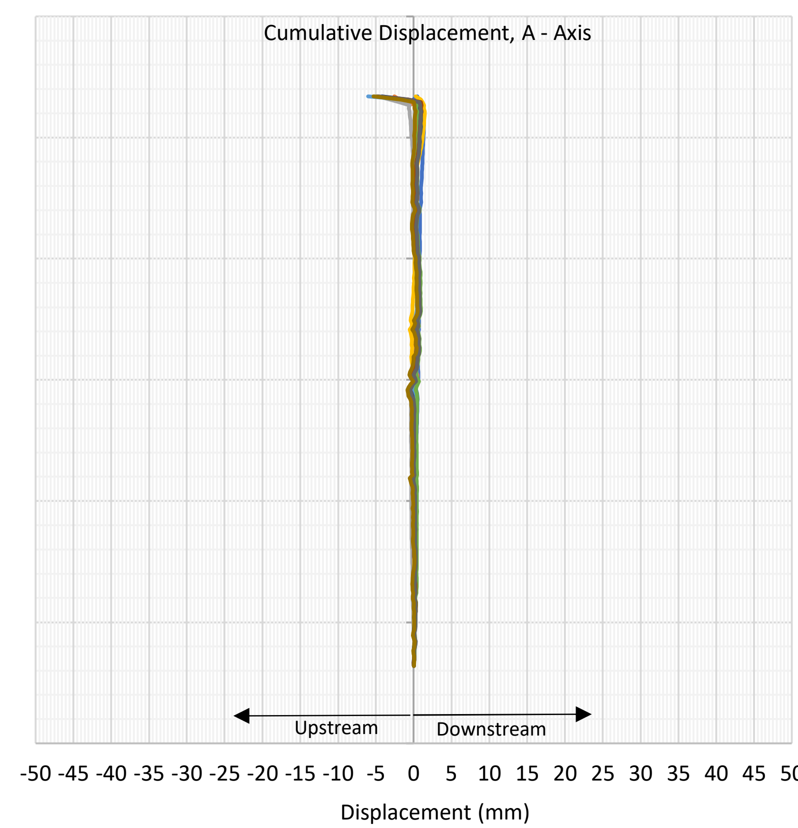
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	III-B-5

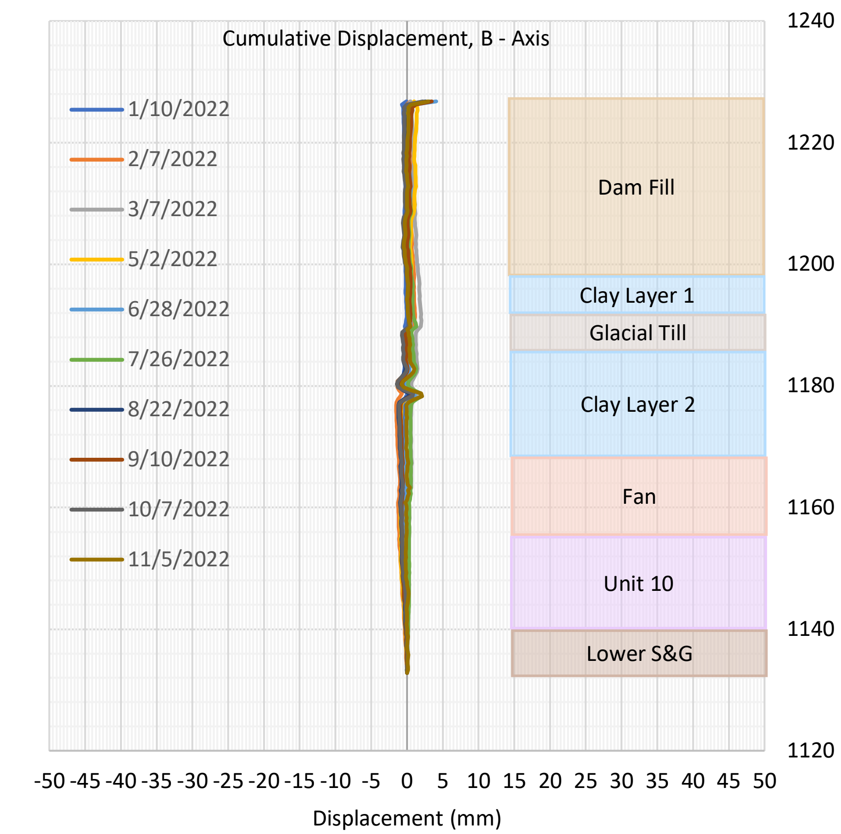












NOTES

1. DATA PROCESSED AND PROVIDED BY HVC
2. LAST READING OF EACH MONTH PLOTTED ON THE INCREMENTAL AND CUMULATIVE PROFILES.
3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Dam Fill	1221.8-1197.8	3.0	N/A	N/A
Clay Layer 1	1198.8-1186.8	1.0	3.0	N/A
Glacial Till	1170.8-1168.8	1.0	N/A	N/A

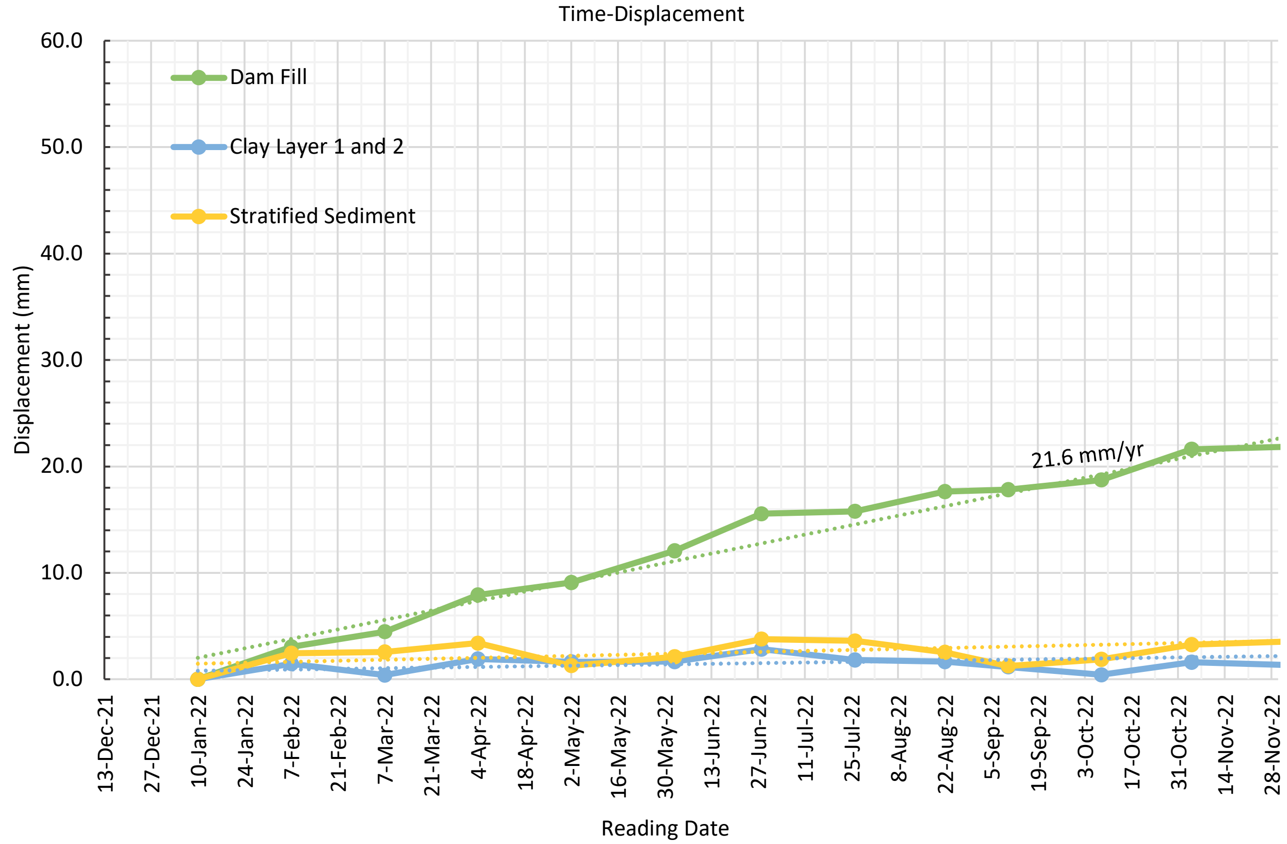
Station	Baseline Reading	Instrument Type
1+450	2022-01-10	SI

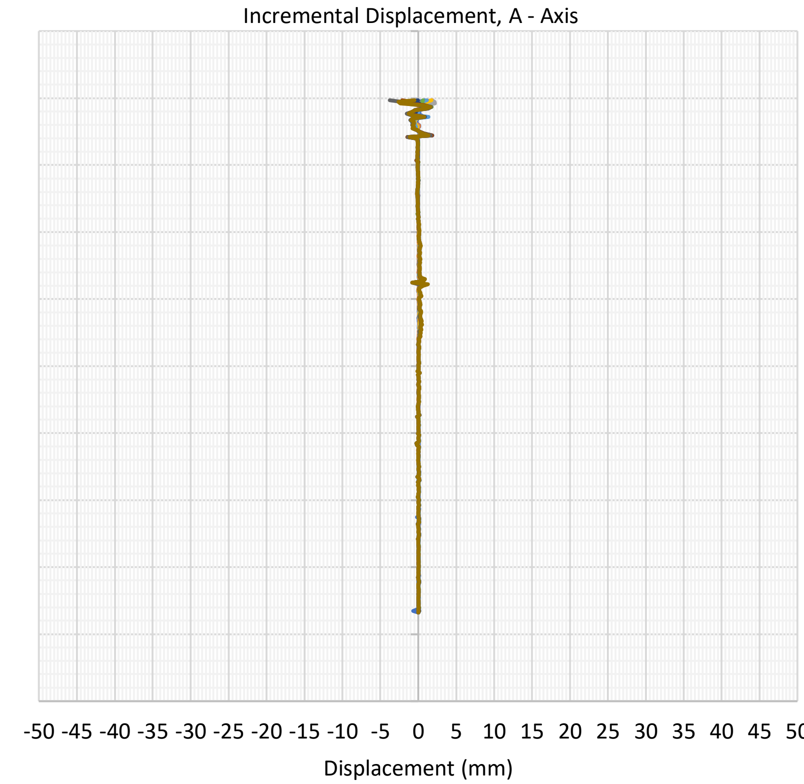
NOT FOR CONSTRUCTION

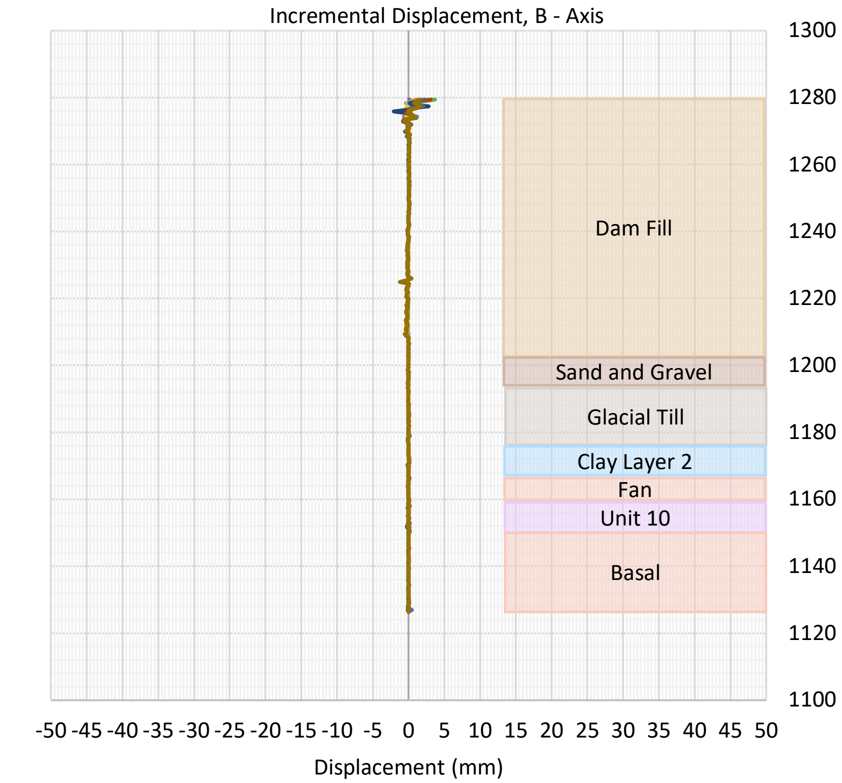
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

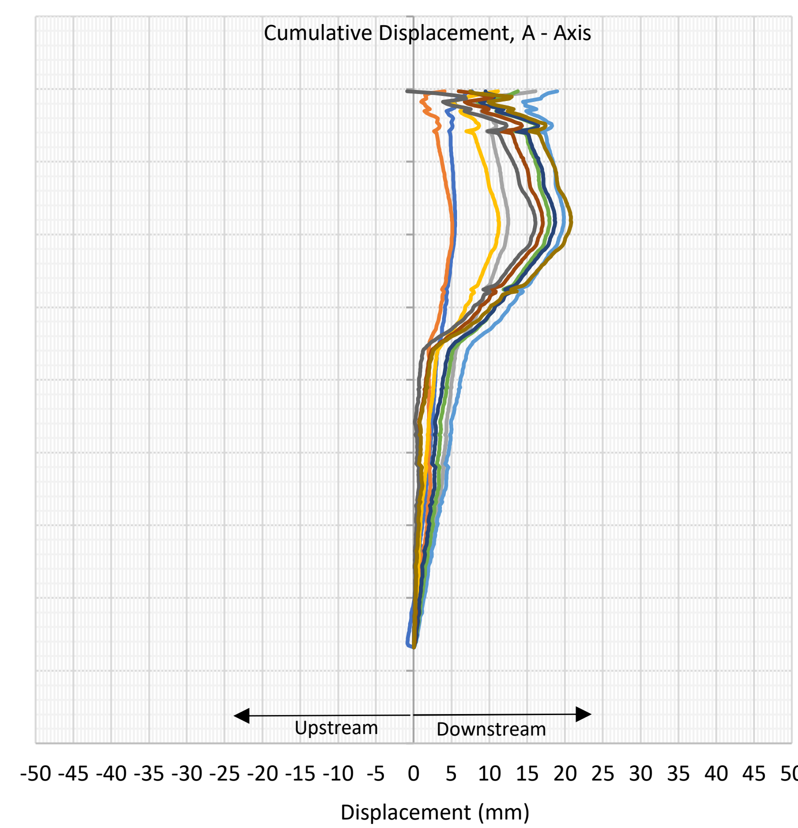
CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: HH DAM INCLINOMETER PLOTS HH-I17-31 (MID SEGEMENT) DEC. 2021 TO NOV. 2022

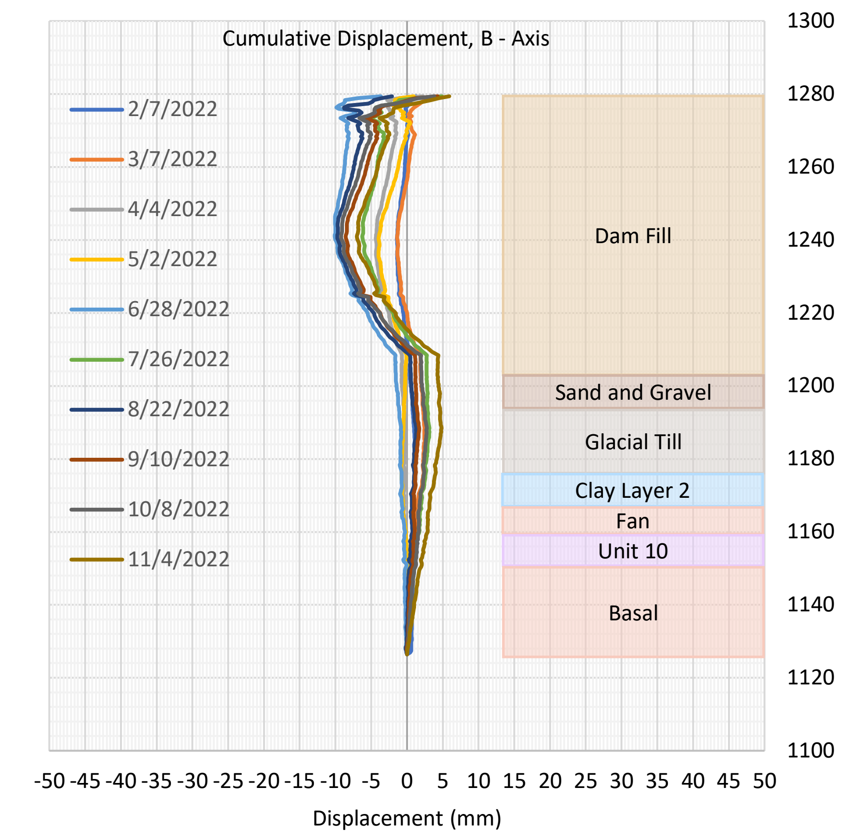
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	III-B-6

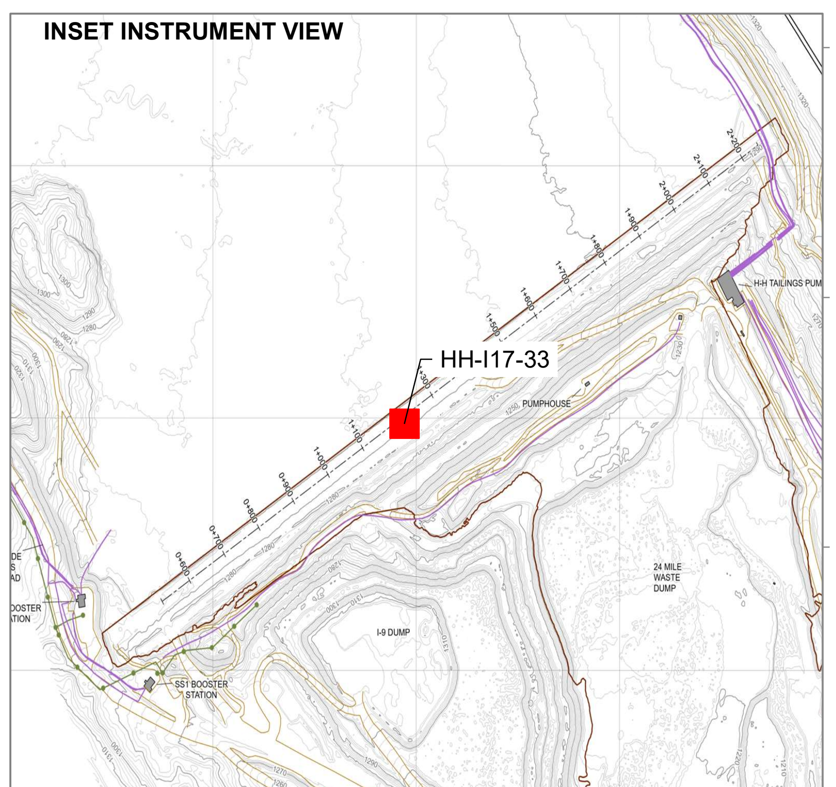












NOTES

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3. X-AXIS, Y-AXIS, AND LEGEND IS THE SAME FOR THE INCREMENTAL AND CUMULATIVE PROFILES.
4. INCREMENTAL DISPLACEMENT PROFILES ARE BASED ON READINGS WITHIN ONE WEEK OF THE CUMULATIVE PROFILES.
5. DATA SHOWN ON THE PLOTS IS AFTER THE INSTRUMENT WAS BASELINED. HVC HAVE MONITORED THIS INSTRUMENT PRIOR TO THE BASELINE AND MET THE READING FREQUENCY.

Geological Unit	EL. Range (m)	NL(mm/month)	T1 (mm/month)	T2 (mm/month)
Dam Fill	1241.5-1204.5	N/A	N/A	N/A
Clay Layer 1 and 2	1204.5-1168.5	1.0	3.0	N/A
Stratified Sediment	1168.5-1127.5	3.0	N/A	N/A

Station	Baseline Reading	Instrument Type
1+200	2022-02-07	SI

NOT FOR CONSTRUCTION

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck

Klohn Crippen Berger

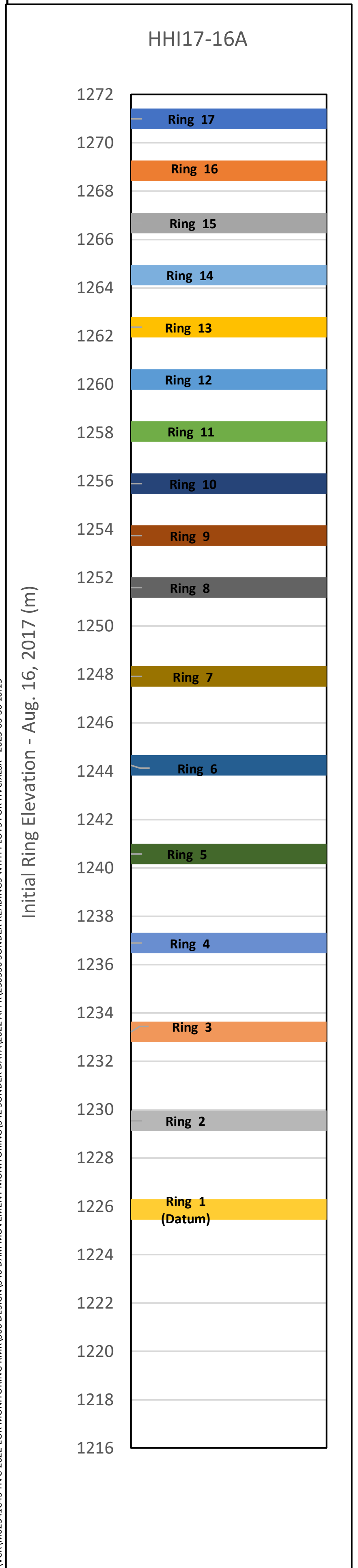
PROJECT: HIGHLAND TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

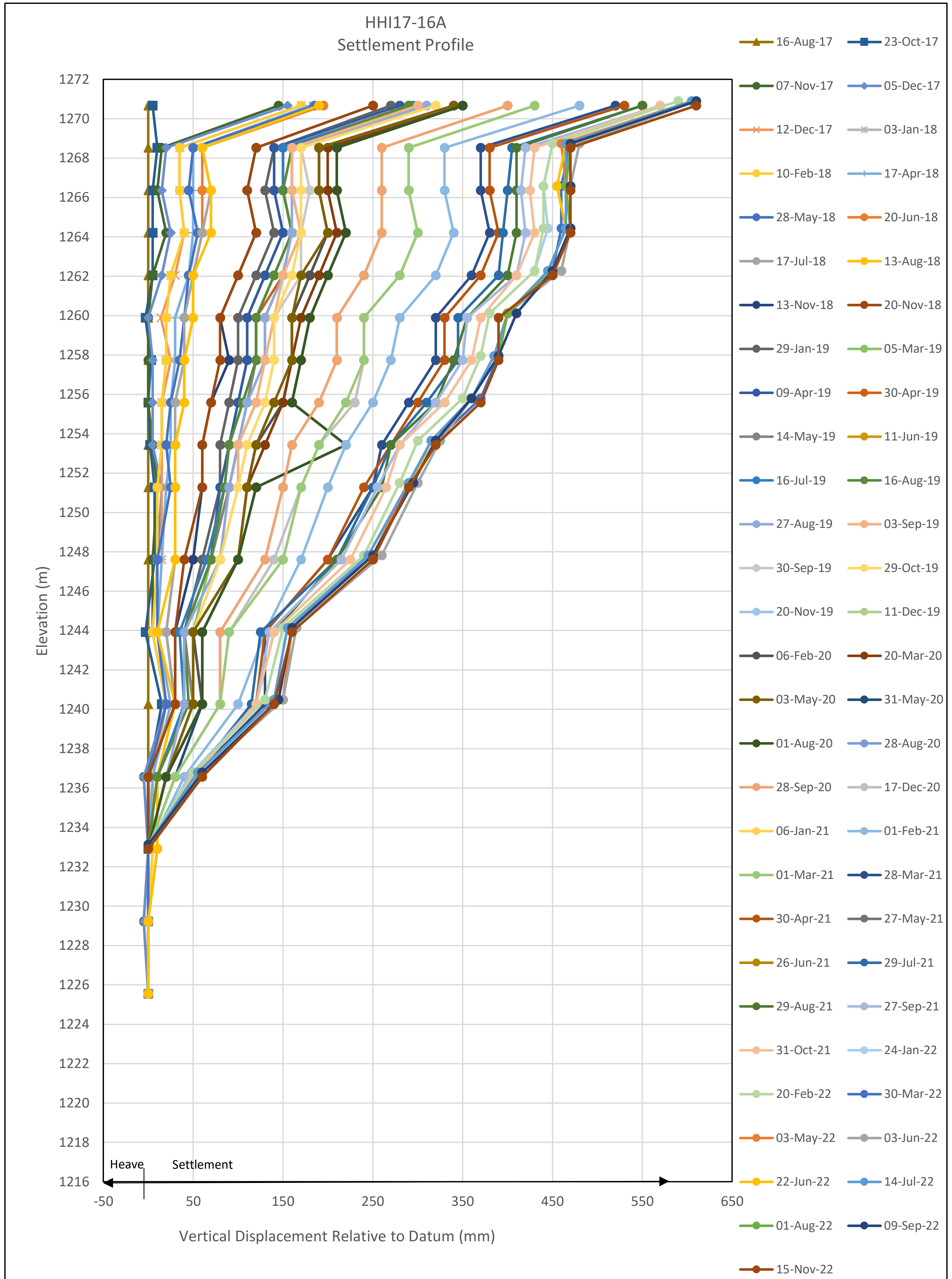
TITLE: HH DAM INCLINOMETER PLOTS
HH-I17-33 (MID SEGEMENT)
DEC. 2021 TO NOV. 2022

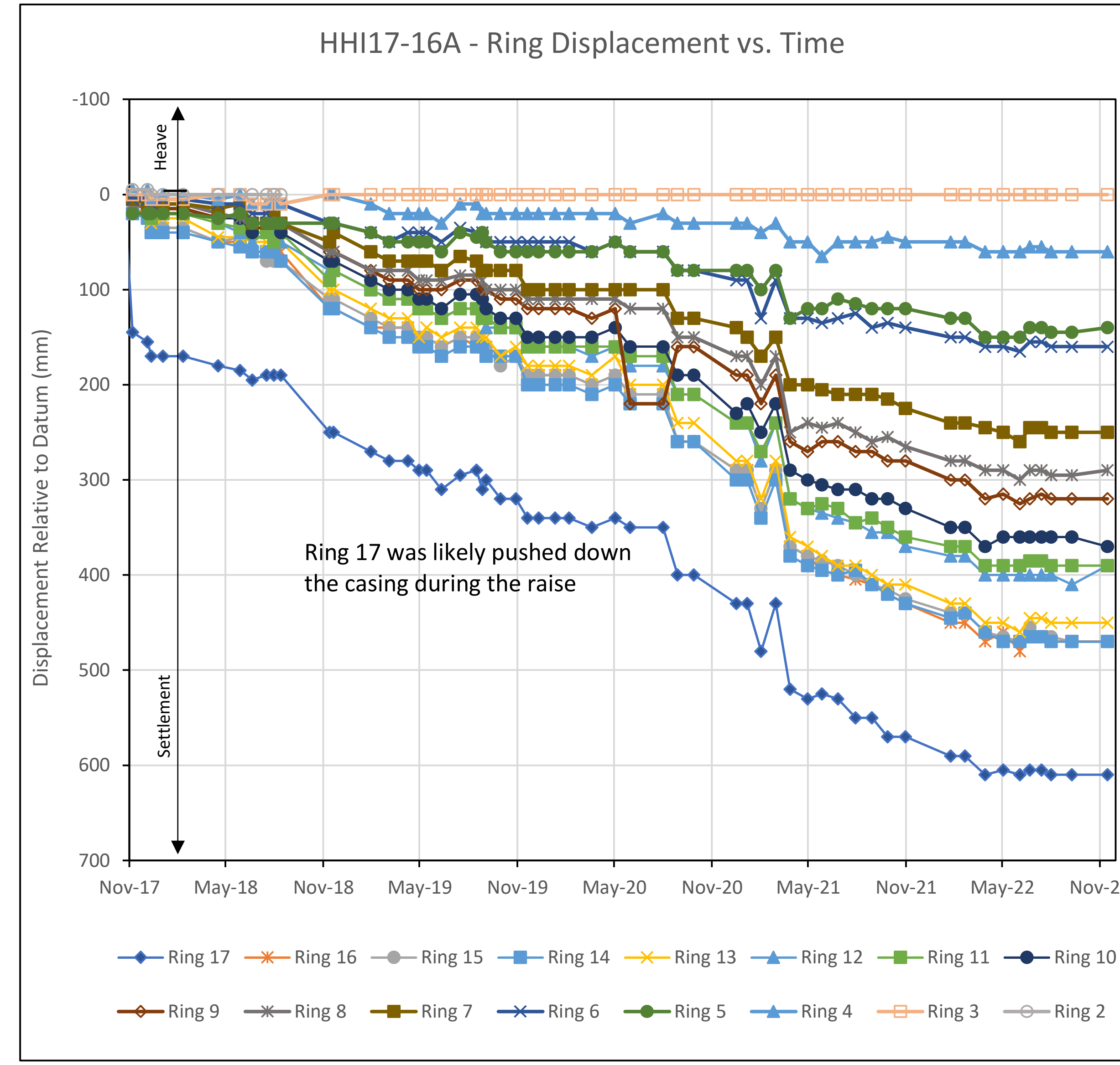
SCALE	PROJECT No.	FIG. No.
NTS	M02341C42	III-B-7

APPENDIX III-C

H-H Dam Sondex Plots





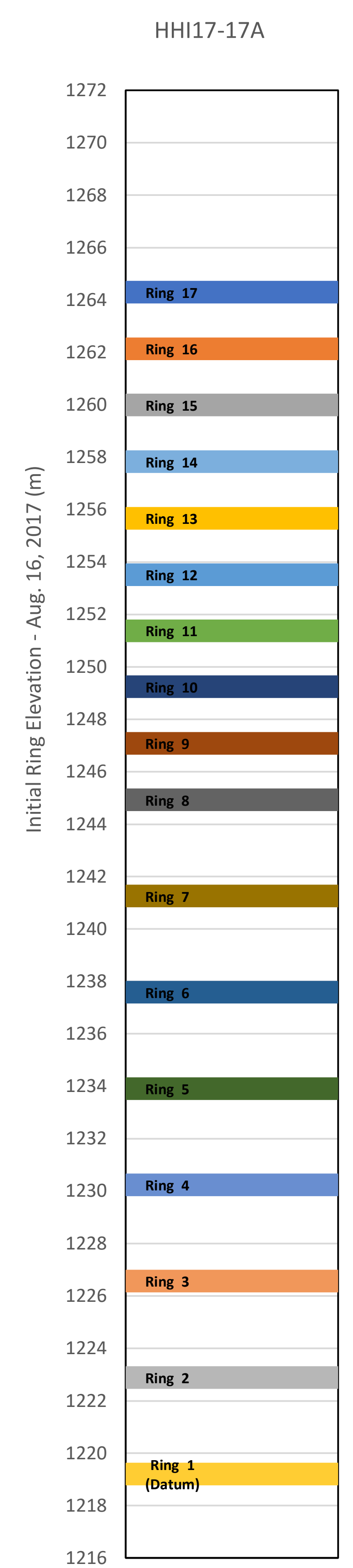


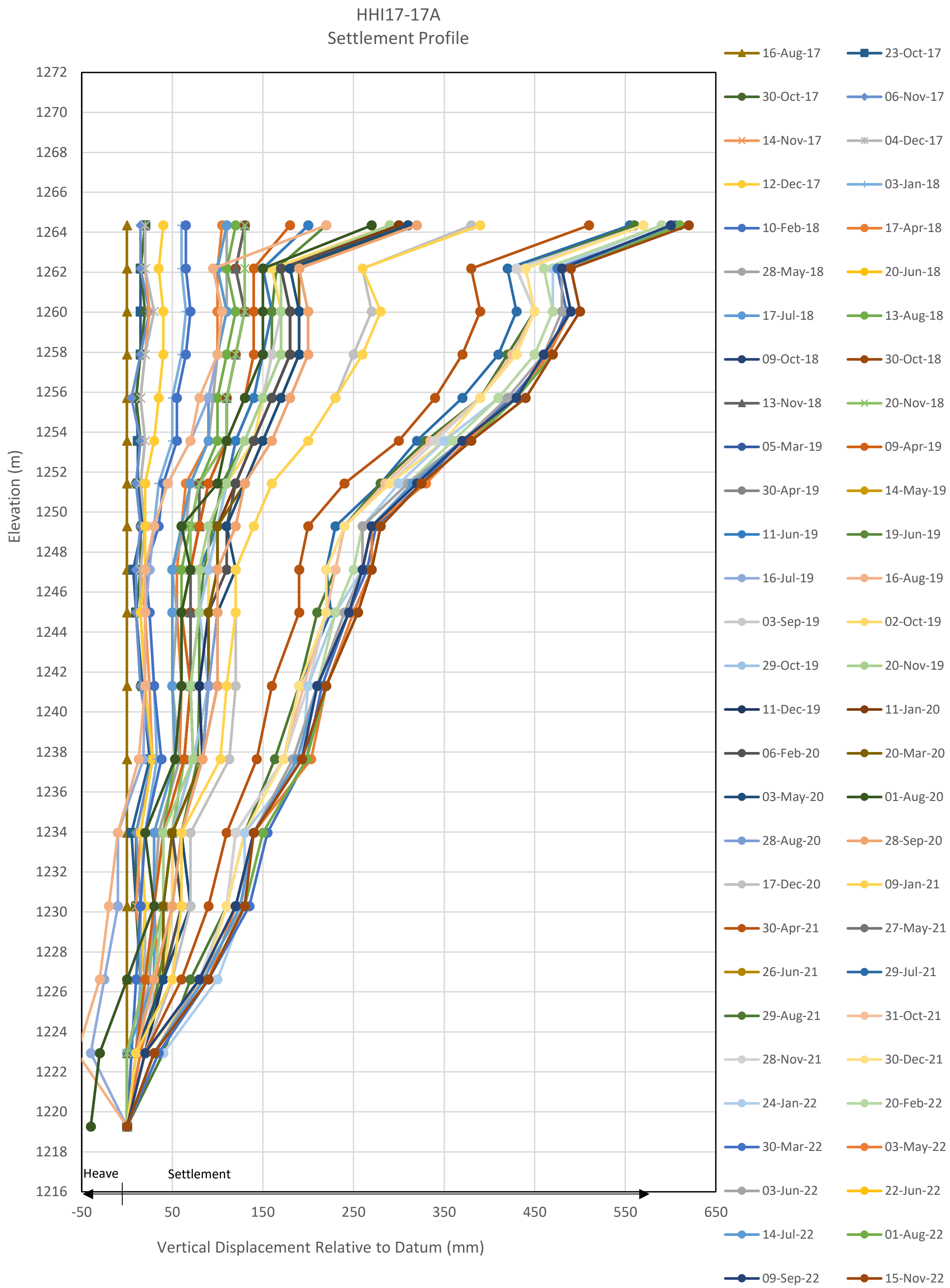
Notes:

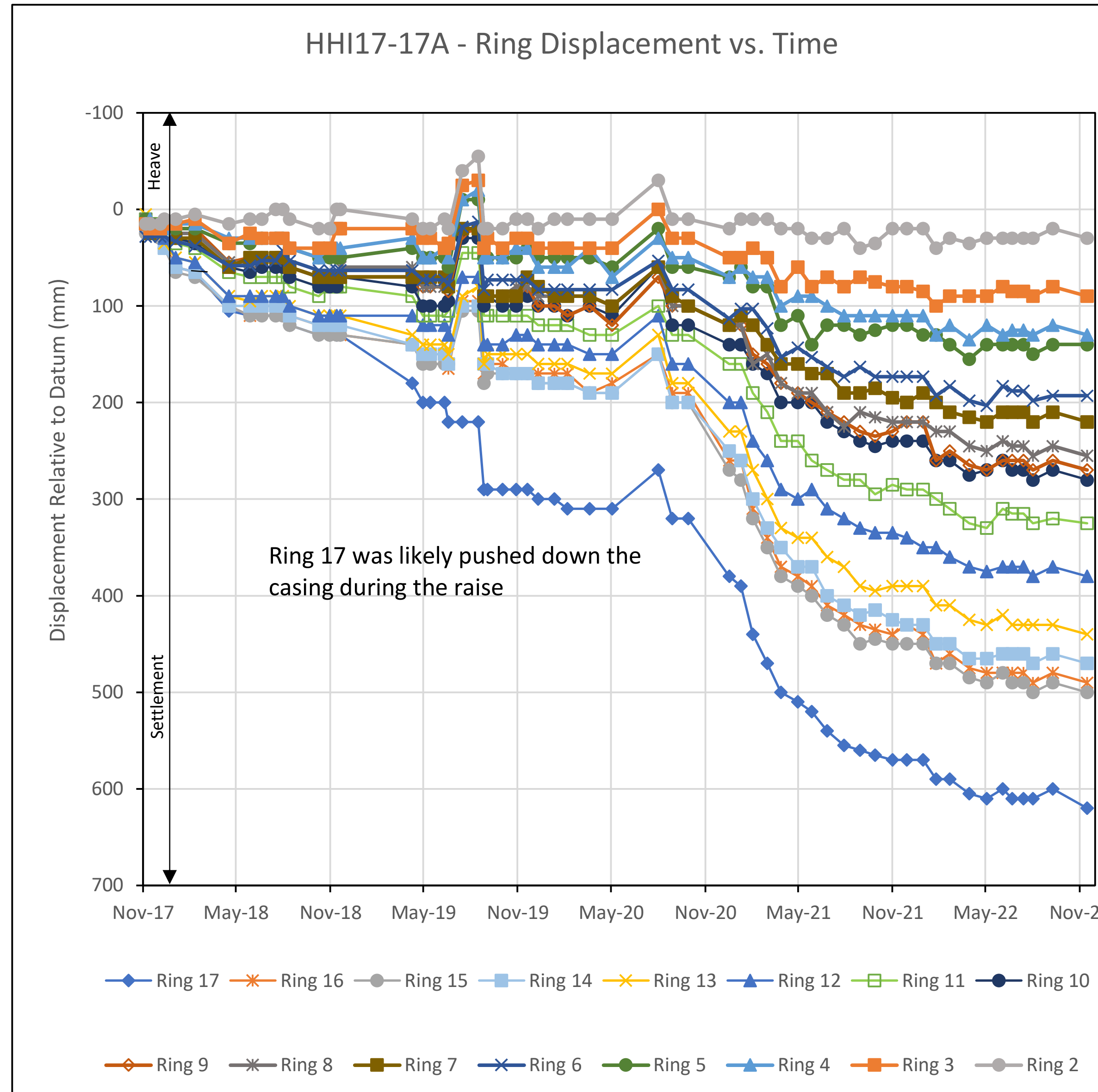
1. Ring displacements are calculated relative to the initial elevations for each ring. The datum is the bottom ring (Ring 1).
2. Positive displacements represent settlement. Negative displacements represent heave.
3. The Ring 12 reading from December 11, 2017 was not consistent with readings in the rings above and below, due to a suspected data entry error. The reading was adjusted to match the trends of Ring 11 and Ring 13.
4. Data from October 09, and 30, 2018 were not consistent with other readings and not showed here.
5. No readings recorded for Ring 1 and 2 after October 09, 2018
6. Data from November 28, 2021, and December 30, 2021, appeared to be outliers and are not shown here

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM VERTICAL DISPLACEMENTS HH-I17-33A (SONDEX) - NOVEMBER 2022
PROJECT No. M02341C42	FIG No. III-C-1







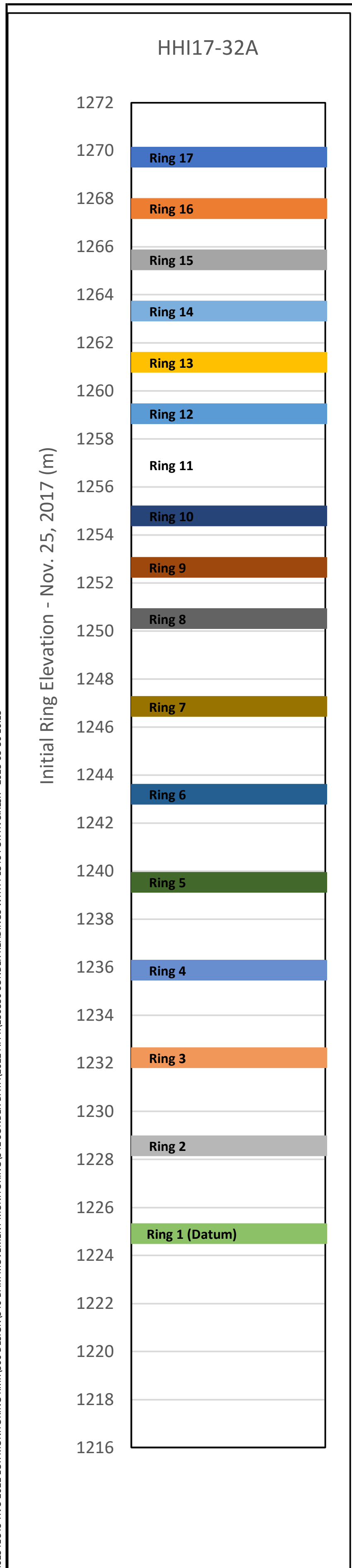
Notes:

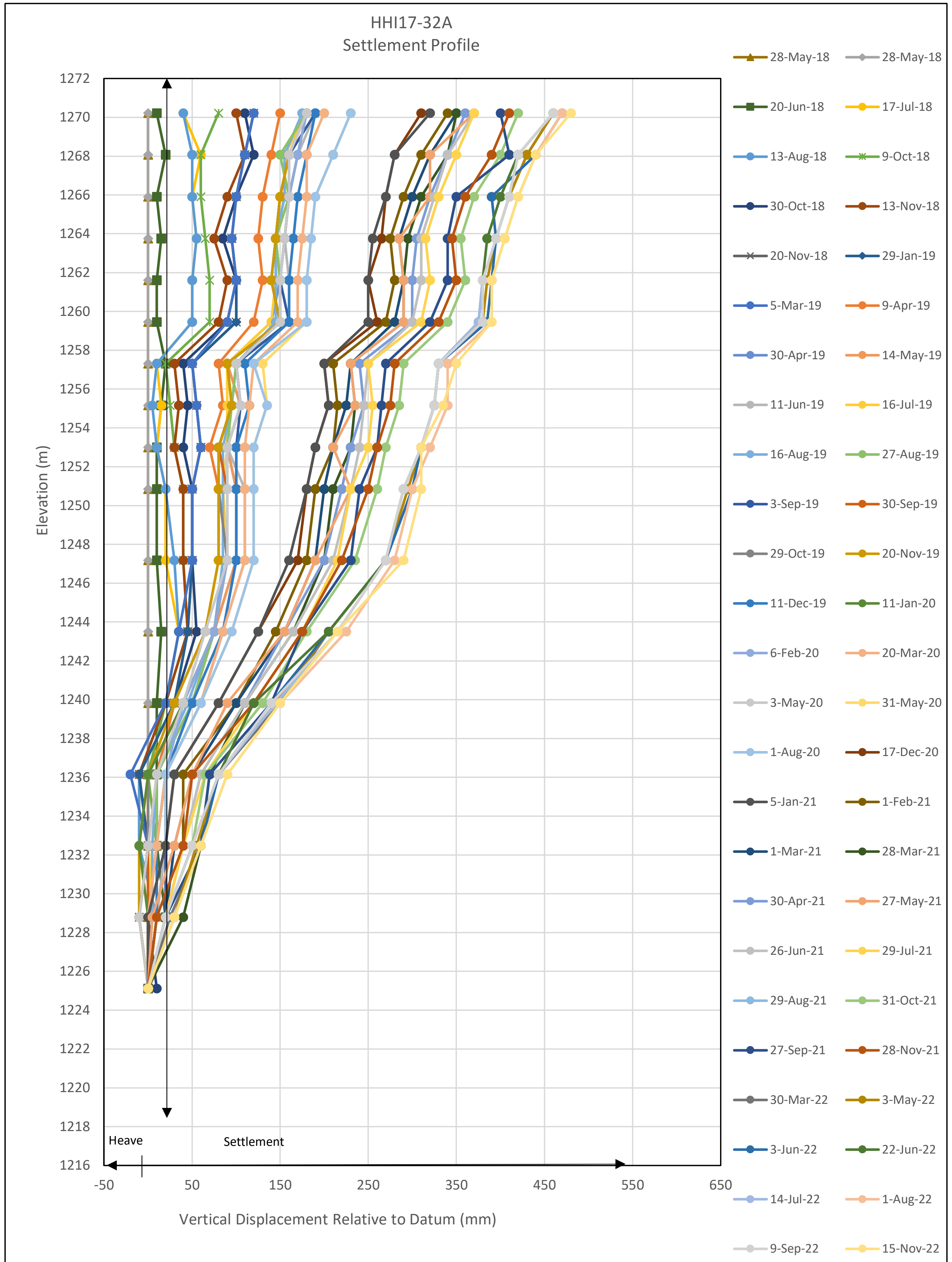
1. Ring displacements are calculated relative to the initial elevations for each ring. The datum is the bottom ring (Ring 1).
2. Positive displacements represent settlement. Negative displacements represent heave.
3. The following readings were not consistent with readings in the rings above and below, due to suspected data entry errors. The readings were adjusted to match the trends of adjacent rings:
   - Ring 5 (December 11, 2017, January 3, 2018, February 10, 2018)
   - Ring 6 (January 3, 2018)
4. Data from March 05, 2019 were not consistent with other readings and are not shown here

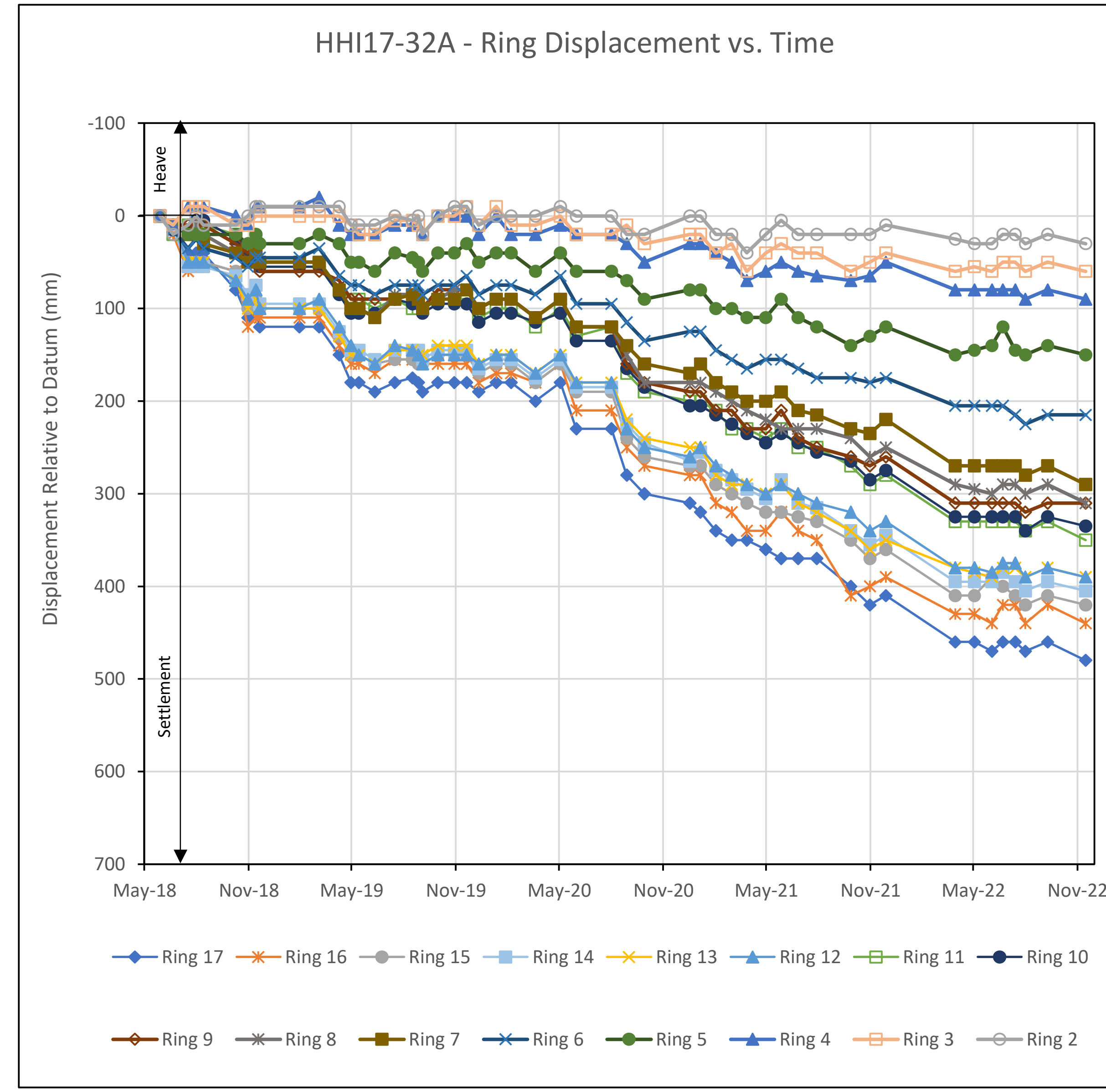
TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT	PROJECT
Highland Valley Copper / Teck	HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE H-H DAM VERTICAL DISPLACEMENTS HH-I17-33A (SONDEX) - NOVEMBER 2022
	PROJECT No. M02341C42 · FIG No. III-C-2

FILE PATH: Z:\M\VCR\M02341C43-HVC-2022 FOR MONITORING RMR\300 DESIGN\340 DAM MOVEMENT MONITORING\342 SONDEX DATA\2022 AFPR\230330 SONDEX READINGS WITH PLOTS FOR HVC.XLSX - 2023-03-30 10:15







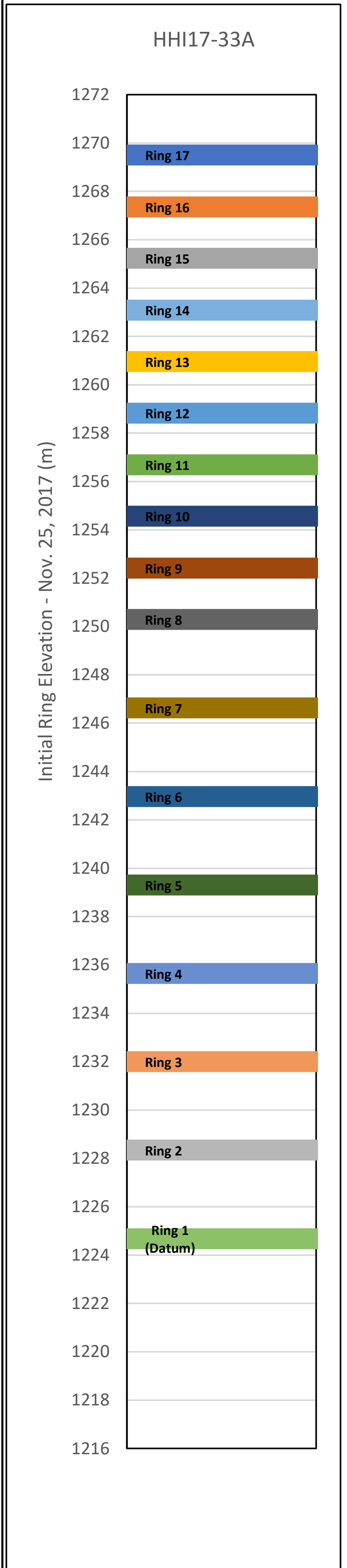
Notes:

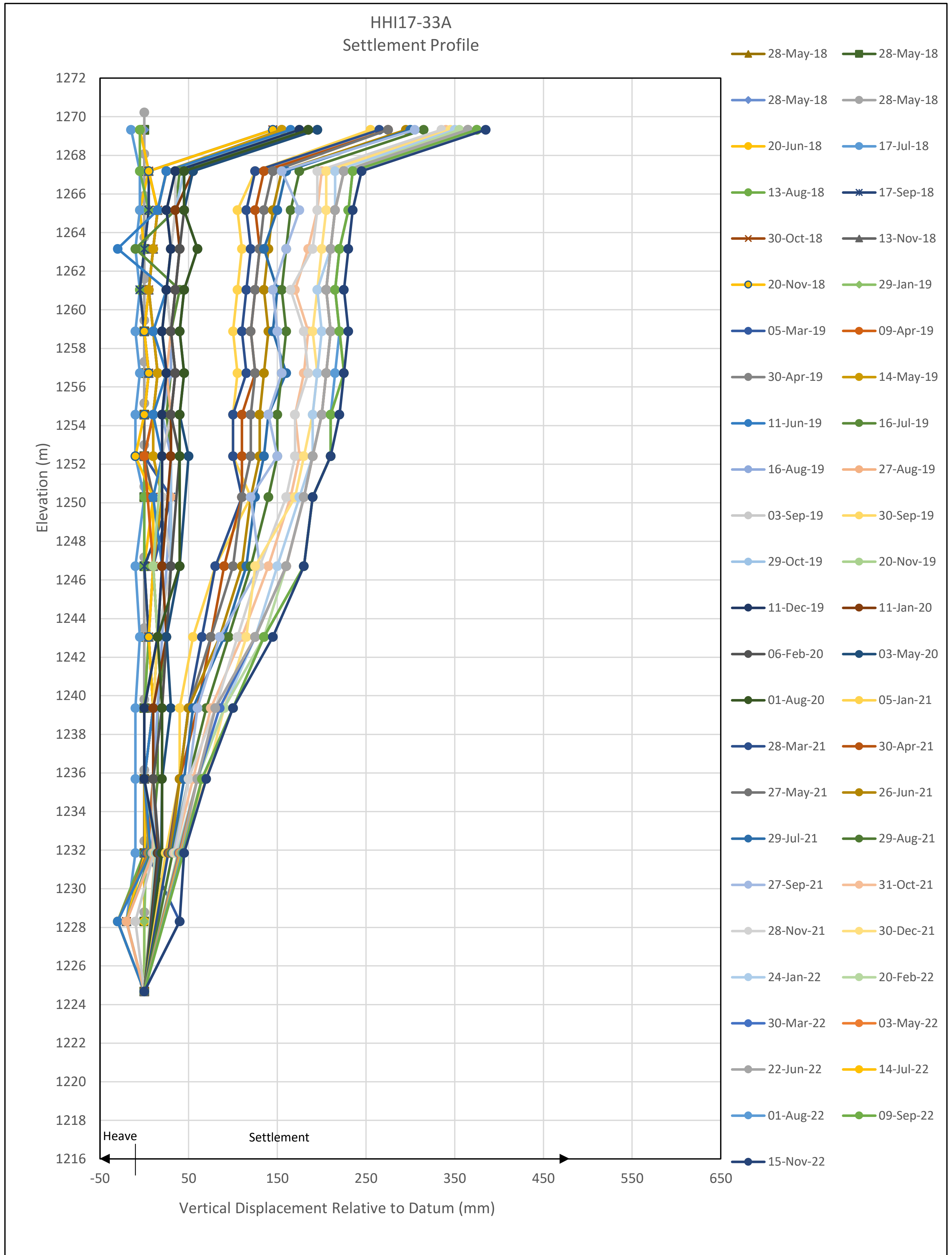
1. Ring displacements are calculated relative to the initial elevations for each ring. The datum is the bottom ring (Ring 1).
2. Positive displacements represent settlement. Negative displacements represent heave.
3. Readings of October 30, and November 13, 2018 were not consistent and are adjusted.
4. The baseline reading of vertical displacement plot is May 28, 2018.
5. Data from August 29, 2021 appeared to be outliers and are not shown here.
6. Readings from September 27, 2021, onwards were not consistent for Ring 13 and are adjusted.

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

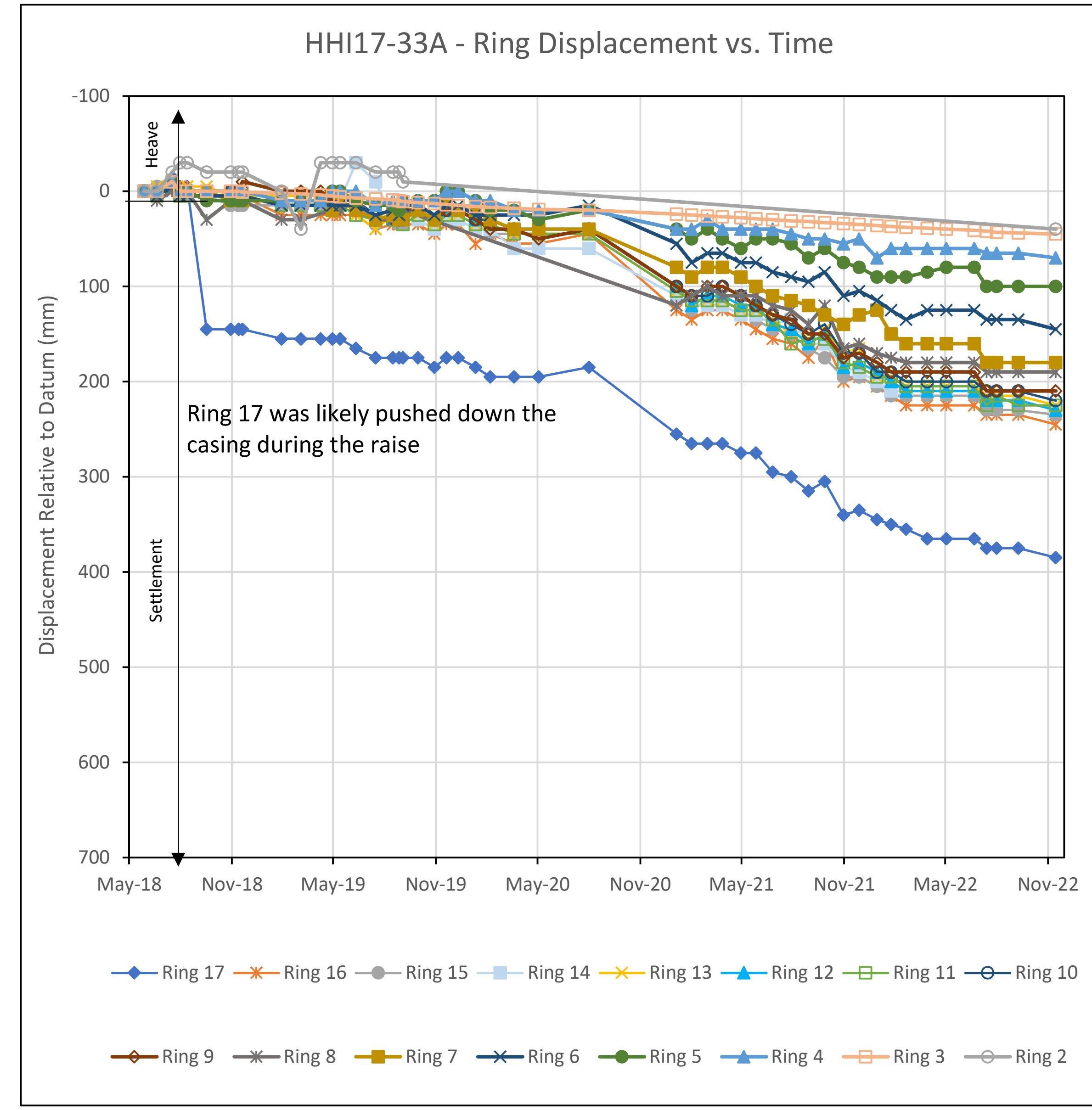
CLIENT Highland Valley Copper / Teck	PROJECT HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE H-H DAM VERTICAL DISPLACEMENTS HH-I17-33A (SONDEX) - NOVEMBER 2022
	PROJECT No. M02341C42 — FIG No. III-C-3

FILE PATH: Z:\M\VCR\M02341C43-HVC-2022 EOR MONITORING RMR\300 DESIGN\340 DAM MOVEMENT MONITORING\342 SONDEX DATA\2022 AFPR\230330 SONDEX READINGS WITH PLOTS FOR HVC.XLSX - 2023-03-30 10:15





Reading of Ring 3 in September 2018 is suspected to error. This ring became off-line after this date.



Notes:

1. Ring displacements are calculated relative to the initial elevations for each ring. The datum is the bottom ring (Ring 1).
2. Positive displacements represent settlement. Negative displacements represent heave.
3. Data from August 28, 2020 and September 28, 2020 appeared to be outliers and are not shown here.
4. Data for Ring 3 not available since September 17, 2018.
5. Data for Ring 2 and Ring 8 not available since September 30, 2019

TO BE READ WITH KLOHN CRIPPEN BERGER REPORT DATED: MARCH 2023

CLIENT: Highland Valley Copper / Teck	PROJECT: HIGHLAND TAILINGS STORAGE FACILITY 2022 ANNUAL FACILITY PERFORMANCE REPORT
Klohn Crippen Berger	TITLE: H-H DAM VERTICAL DISPLACEMENTS HH-I17-33A (SONDEX) - NOVEMBER 2022
	PROJECT No. M02341C42 / FIG No. III-C-4