REPORT

2022 Annual Facility Performance Report

Greenhills Operations Tailings Storage Facility

Submitted to:

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Executive Summary

This report presents the 2022 annual facility performance report for the tailings storage facility (TSF), including Site C and Site D Coarse Coal Refuse (CCR) facilities at the Teck Coal Limited, Greenhills Operations (GHO) mine site. Available data including instrumentation data were reviewed for the period between 1 September 2021 and 31 August 2022 (the reporting period).

The site visit was carried out during the week of 29 August 2022. Based on observations during the site visit the GHO TSF appeared to be in good condition with no identified deficiencies that required immediate action.

Review of Key Hazards

Performance is assessed for each of the following potential failure modes/hazards by comparing the design basis against observed performance and available data during the monitoring period:

- **Instability**
  - Investigations have confirmed foundation materials. Analysis and design, based on investigated materials, indicate stability meets or exceeds design criteria, including design loads up to the 1-in-10,000-year event.
  - Available piezometer data indicate expected conditions.
  - GPS data are consistent with expectations.
  - No conditions such as cracks, settling, or bulging of the TSF embankments were observed during the 2022 site visit or monthly inspections that would indicate instability.
  - No conditions such as bulging of the Site C and D CCR facilities were observed during the 2022 site visit or monthly inspections that would indicate instability.
    - Cracking was observed on the lowest bench of the Site C CCR facility, as a result of movement of the historic landslide at the toe. Monitoring and planning for remediation were ongoing at the time of this report and conditions do not present a safety concern to the Main Tailings Dam.
- **Overtopping**
  - The GHO TSF can store storm events up to and including the 72-hour probable maximum flood including allowance for climate change, when operated at a freeboard of 2.4 m, which exceeds the guidance of CDA (2013) and requirements of the Health, Safety and Reclamation Code for Mines in BC (EMLI 2021).
  - Minimum freeboard requirements were established based on Canadian Dam Association Guidelines (CDA 2013) and were maintained throughout the reporting period.
- **Internal erosion**
  - During the reporting period a dry tailings beach was developed in select locations at the upstream face of the Main Tailings Dam around deposition Spigot #1 and #2.
  - The hydraulic head at the upstream face of the West Tailings Dam and select locations of the Main Tailings Dam during the reporting period were equal to the pond elevation and the hydraulic head downstream from the till blanket is near the foundation. As such, the hydraulic gradient is sufficient that the potential for internal erosion to occur must be considered.

- The results of material testing and analysis indicate that filter criteria are met between the clay blanket (till) and the CCR (with occasional exception) and between the tailings and clay blanket (till). Constructed conditions are considered to meet design intent.
- No rapid changes in seepage rates, presence of fines in seepage, rapid changes in available piezometric readings within embankment fill, or foundations or depressions/sinkholes were observed during the 2022 site visit or monthly inspections.

Consequence of Failure

Teck no longer adopts a classification system that has levels of potential human loss of life and instead aims to eliminate any credible risk of loss of life and reduce all other credible catastrophic risks to As Low As Reasonably Practicable. Adopting this approach meets or exceeds regulatory requirements and aligns with Teck's goal to eliminate any risk for loss of life, which is consistent with industry best practices.

Summary of Significant Changes

There were no significant changes in the performance of the TSF during the reporting period.

A tailings beach was developed against a portion of the upstream face of the Main Tailings Dam during the reporting period.

Construction of the raise of the Main and West Tailings Dams to an approximate elevation of 1,736 m was completed in October 2022.

Significant Changes in Instrumentation or Visual Monitoring Records

No significant changes were noted during the 2022 site inspection or monthly visual inspections, except as noted in the following subsections.

Available piezometric data were indicative of expected conditions.

Prism data for the monitoring period was limited as a result of embankment raise construction in 2021 and 2022. Instruments were re-established following the 2022 construction period.

GPS instrument MD-5, renamed 'Site C Toe GPS', was moved from the downstream slope of the Main Tailings Dam to the toe of Site C CCR Facility to provide additional monitoring in the location of observed cracking related to movements of the historic landslide.

Inclinometers were re-baselined in early 2023.

Significant Changes to Stability and/or Surface Water Control

Changes to stability of the Site C or integrity during the reporting period included observation of cracking on the lowest bench of the Site C CCR facility, as a result of movement of the historic landslide at the toe. Monitoring and planning for remediation were ongoing at the time of this report and conditions do not present a safety concern to the Main Tailings Dam.

There were no significant changes in surface water management and the facility had sufficient capacity to store the 72-hour probable maximum flood throughout the 2021/2022 reporting period.

Operation, Maintenance, and Surveillance Manual and Emergency Preparedness Plan

The operation, maintenance, and surveillance manual was updated on 6 July 2022 (GHO 2022a), with further updates to the ‘Figures and Appendices’ in November 2022.

The Emergency Preparedness and Response Plan (EPRP) was reviewed in 2021. Finalization of the EPRP was in progress during the reporting period.

Recommendations

There are no previous or current Priority 1 or 2 deficiencies/recommendations. One previous Priority 3 deficiency and/or recommendation (now closed) is presented in Table 12 in Section 6.5.

Abbreviations

Abbreviation	Definition
AFPR	annual facility performance report
CCR	coarse coal refuse (also known as coarse refuse/rejects; CR)
DSR	dam safety review
EoR	Engineer of Record
EPRP	Emergency Preparedness and Response Plan
GHO	Greenhills Operations
GISTM	Global Industry Standard on Tailings Management
HSRC	Health, Safety and Reclamation Code for Mines in BC
MTD	Main Tailings Dam
NBCC	National Building Code of Canada
OMS	operation, maintenance, and surveillance
PMF	probable maximum flood
QPO	quantifiable performance objective
QP	Qualified Person
RTK	real-time kinematic
SPT	standard penetration test
TARP	Trigger Action Response Plan
TSF	tailings storage facility
Teck	Teck Coal Limited
VW	vibrating wire
WSP	WSP Canada, formally WSP Golder and Golder Associates Ltd.
WTD	West Tailings Dam

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1.0 INTRODUCTION

1.1 Purpose, Scope of Work, and Method

At the request of Teck Coal Limited (Teck), Greenhills Operations (GHO), WSP Canada Inc. (WSP),(formally WSP Golder and Golder Associates Ltd.) has completed the 2022 annual facility performance report (AFPR) for the GHO tailings storage facility (TSF), which includes:

- Main Tailings Dam (MTD)
  - including Site C coarse coal refuse (CCR) and Site D CCR facilities, located on the downstream slope of the MTD
- West Tailings Dam (WTD)

This report consists of the following:

- a summary of site conditions and background information
- a summary of construction, operating, and/or maintenance activities for the reporting period
- site photographs and records of TSF inspection
- a review of
  - available instrumentation data
  - consequence classification
  - required operational documents
  - climate data
  - water balance
  - TSF safety relative to relevant potential failure modes
- findings and recommended actions

The 2022 site visit was carried out during the week of 29 August 2022 by WSP and Teck. Photographs of the TSF and CCR facilities are presented in Appendix A and a summary of observations during the August 2022 site visit is included in Appendix B.

This report is to be read in conjunction with the Study Limitations, which follows the text.

1.2 Regulatory Requirements

1.2.1 BC Health, Safety and Reclamation Code

The GHO TSF is regulated under the Health, Safety and Reclamation Code (HSRC) for Mines in British Columbia (EMLI 2021).

This AFPR has been prepared in accordance with the requirements of the HSRC (EMLI 2021) and in consideration of the guidelines for annual reports provided in the HSRC Guidance Document (Ministry of Energy and Mines 2016) and Teck Resources Limited's Guideline for Tailings and Water Retaining Structures (Teck Resources 2019). This report is intended to satisfy the requirements of an annual dam safety inspection and it is understood that this report will be submitted by Teck to the Chief Inspector of Mines for British Columbia.

1.2.2 Permits and Licences

Specific permits, including amendments, and licences that apply to the TSF, include the following:

- C-137 Permit (EMLI 2022)
- Environmental Management Act Permit PE-6248, 17 December 2021 (BC Ministry of Environment)

2.0 BACKGROUND

The GHO site is an active open pit steelmaking coal mine located 14 km north of Elkford, BC. The GHO site plan including the location of the TSF is shown in Figure 1.

The mine was started by Westar Mining Ltd. with production between 1982 and 1992, after which the site was temporarily inactive. In December 1993, mine ownership changed to a joint venture between Fording Coal Limited (Fording) and Pohang Steel Canada Ltd., and the mine was operated by Fording. The operating company changed from Fording to Elk Valley Coal Corporation in 2003 and then to Teck in 2008.

2.1 Greenhills Tailings Storage Facility

Tailings and process water in the GHO TSF are impounded on the southeast side by the MTD and on the west side by the WTD as shown in Figure 2. Both the MTD and WTD are designed and permitted to be raised to a crest elevation of 1,740 m. Construction of embankment raises to an elevation of 1,736 m was completed in October 2022 (construction record reporting was in progress at the time of this document).

The 2022 bathymetric survey, completed on 24 August 2022, indicates that the deepest point of the impoundment area is near the barge location at an elevation of approximately 1,725.8 m, which corresponded to a pond depth of about 5.2 m at the time of the survey.

2.2 Overview of Design, Construction, and Previous Operations

Raw coal from the open pit is processed at the wash plant to produce marketable steelmaking coal with by- product streams of CCR and fine refuse tailings. The CCR is unsaturated and comprises 50 mm minus gravel to sand-sized rock and coal particles. CCR is transported, dumped, and stored near the wash plant in stockpiles (Sites A to E, Figure 2). The fine refuse stream consists of a slurry of coal and rock particles (tailings). The tailings are silt-sized with a D50 (i.e., the diameter of the particle that 50% of a material by mass is smaller than) of around 0.2 mm. Tailings are transported by gravity to the TSF discharge points, located on the north side of the TSF and on the crest of the MTD (Figure 2). Tailings in the 2021/2022 monitoring period were discharged at an approximate solids content of between <2% and 46% by mass (Teck 2022a) but typically around 20% solids content, resulting in an approximate dry density of 1.07 t/m^3 (GHO 2022).

Approximately 500,000 to 600,000 m^3 of tailings solids is deposited annually. Slurry water is retained for sufficient time to allow solid particle settlement and then re-circulated by barge mounted pumps to the wash plant for reuse.

The TSF embankments have been routinely raised during the development of the mine. The facility is currently permitted to a maximum crest elevation of 1,740 m. During the 2021/2022 reporting period, the crest elevation was approximately 1,734 m with construction of an embankment raise to elevation 1,736 m completed in October 2022.

Based on the 2022 bathymetric survey (24 August 2022) and topographical data obtained from Skycatch real-time kinematic (RTK) positioning drone mapping (19 August 2022), it is estimated that a total struck level storage volume, without allowance for freeboard or beach angles, of approximately 6.1 million m^3 is available to elevation 1,740 m (as shown in Chart 1).

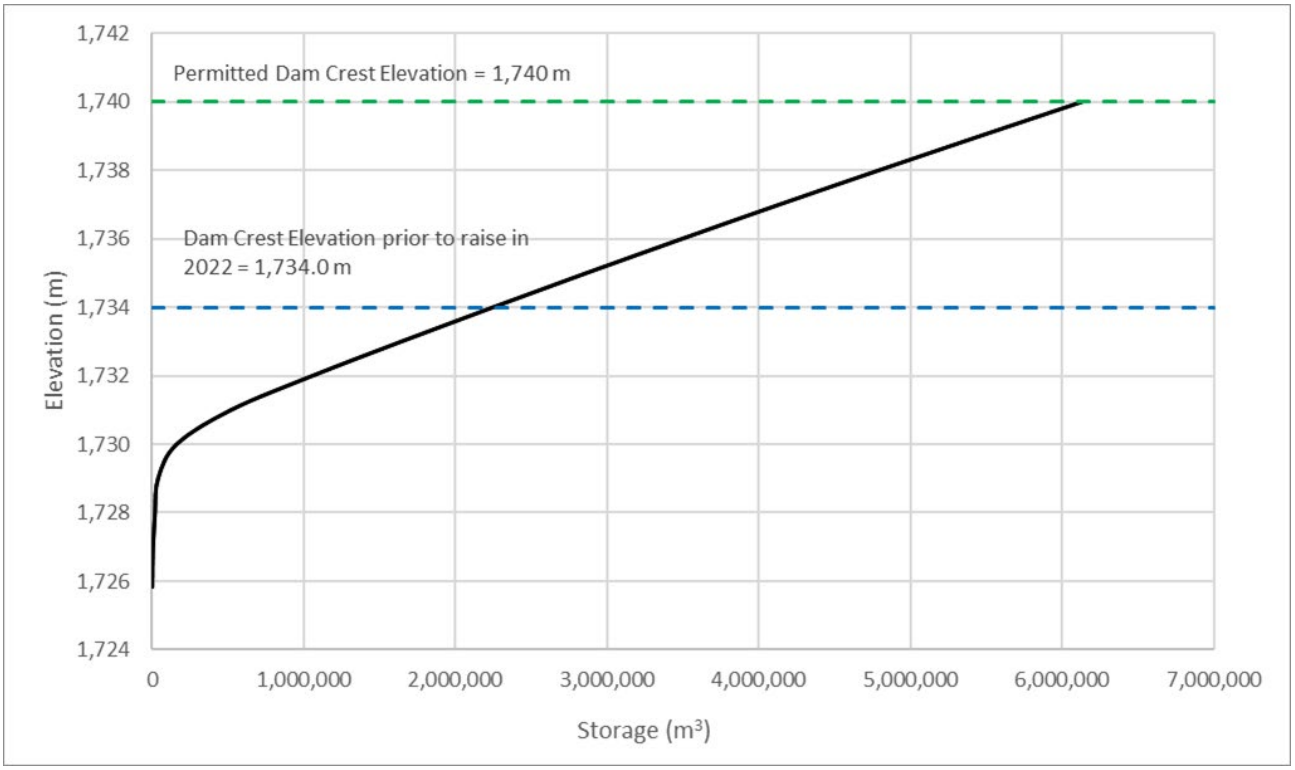


Chart 1: Storage Capacity Curve for Elevations Above 2022 Bathymetry Survey Surface

2.2.1 Main Tailings Dam

2.2.1.1 Overview of Design and Subsurface Conditions

The MTD is a zoned earthfill embankment with an approximate height of 52 m above original ground surface. The embankment shell is composed of compacted CCR material, with a 6 to 7 m wide zone of compacted clay till (clay blanket) on the upstream face. The CCR is filter compatible with the clay blanket. The design geometry of the MTD is outlined in the 1,740 m design report (Golder 2021e). The embankment was designed with an upstream slope of 2H:1V and downstream slope of 2.5H:1V; cross-sections are provided in Figure 4. The crest width will be 12 m at an elevation of 1,740 m.

CCR storage facilities Site C and D are located adjacent to the MTD. These storage facilities provide a buttressing effect that is favourable to embankment stability but is not required by design. The MTD was designed to meet stability criteria without the buttressing effect.

A design to raise the crest of the MTD and WTD to an elevation of 1,725 m was completed in January 1994 (Golder 1994) with a further design to raise the MTD and WTD to an elevation of 1,735 m completed in 2005 and 2014, respectively (Golder 2005, 2014a). The latest design, to raise the MTD and WTD to an elevation of 1,740 m (current permitted elevation), was completed by WSP in 2021 (Golder 2021e), in conjunction with design and permitting for the Site F Mixed Coal Refuse facility, due to be operational from Q4 2023.

A geotechnical investigation was conducted by Hardy Associates (1978) Ltd. (Hardy) in 1980 (Hardy 1980) to assess the subsurface conditions within the footprint of the MTD foundation. Embankment foundation materials generally comprise a surficial layer of colluvium overlying glacial till, which overlies shale bedrock. At the west end of the embankment footprint, muskeg was found overlying the colluvium. The muskeg was observed to be soft, highly compressible, and up to 3 m thick. The colluvium layer beneath the starter embankment was approximately 1.5 m thick, although it was assumed that up to 8 m of colluvium may be encountered on steep slopes. The colluvium comprises a mixture of clay, sand, and gravel. The consistency of colluvium comprising primarily clay materials was described as soft to stiff. The consistency of colluvium comprising primarily gravel or sand was described as very dense. Construction records are not available to confirm that soft materials were removed. However, a geotechnical drilling program (Golder 2017d) was conducted in 2016 to assess foundation conditions at the MTD and Site C CCR facilities with the objective of estimating the extent of any remaining unsuitable or soft materials. This investigation did not encounter soft colluvial clays. The design by Hardy (1980) also indicated that soft colluvial clay with an undrained shear strength (s_u) less than 35 kPa was to be stripped from the foundation during preparation. Anecdotal discussions confirm that weak materials (muskeg or soft colluvium) were removed during construction of the MTD including in the toe areas overlaid by the Site C and D CCR facilities.

Investigations in 2016 (Golder 2017d) found hard glacial till underlying the colluvium, and shale bedrock was encountered in two boreholes at depths of 12.5 and 12.2 m. The remaining 14 boreholes were terminated within the glacial till. Subsurface conditions generally consisted of a 3.1 to 56.8 m thick layer of cohesive glacial till underlain by fine-grained sedimentary rock. The fines content, by mass, of recovered glacial till samples ranged from 31% to 74%, with an average of 54%. The gravimetric water content of recovered glacial till samples ranged from 5.3% to 29.9%, with an average of 14%. Large capacity direct shear tests were performed on combined samples of glacial till. Results indicated a drained peak friction angle of 22° and a drained peak apparent cohesion intercept of 142 kPa. One multistage triaxial test, conducted on a Shelby tube sample of glacial till, resulted in an approximate drained peak friction angle of 32° and apparent peak cohesion intercept of 50 kPa.

A geotechnical investigation comprising three boreholes was completed at the Site C CCR facility in 2021 (Golder 2021b). Standard penetration tests (SPTs) were completed through the CCR and within the glacial till. Results indicated:

- CCR was loose to very dense with SPT N60 values ranging between 6 and 64 (with higher values at increasing depths)
- glacial till was dense to very dense with SPT N60 values varying between 37 and 115.

Subsequent design work (Golder 2021e), based on the findings of the 2021 investigation, concluded that placed CCR materials were not susceptible to undrained behaviour or liquefaction.

A preliminary geohazard assessment was completed in March 2021 (Golder 2021d) which identified a historical landslide underlying the lowest bench of the Site C CCR facility as well as an active landslide along the slope east of the historic slide. WSP recommended that new water drainage systems be installed to mitigate the active erosion processes responsible for the onset of the small-scale landslides at the toe of the historic landslide as well as increased inspections and establishment of a monitoring system.

2.2.1.2 Construction History

The construction of the MTD began in 1982, and deposition of tailings into the TSF began in 1983. The original design of the MTD, to crest elevation 1,706 m, was provided by Hardy for the former mine owner Westar Mining Ltd. (Hardy 1980). The MTD has been raised in stages since 1983, as summarized in Table 1.

Table 1: Main Tailings Dam Construction Summary

Year	Construction	Dam Crest Elevation (m)	References
1982–1983	Starter embankment, piezometers installed.	1,687.00	Hardy 1984
1984–1985	Raise	1,695.00	No documentation
1986	Raise, piezometers damage, 10 pneumatic piezometers installed.	1,699.00	Hardy 1987
1987	Coarse refuse shell raised, French drains installed beneath shell.	1,700.00	Hardy 1988
1988	Rock drains (French drain) below CCR.	No change	Westar 1988
1989	Raise	1,702.00	Golder 1989
1990	Raise	1,704.00	Golder 1990
1991	Raise	1,707.00	Golder 1992
1994	Coarse refuse shell raised	1,710.00	Golder 1995
1995	Raise, three standpipe piezometers installed.	1,712.00	Golder 1996
1996	Coarse refuse shell raised.	1,718.00	Golder 1997
1997	Blanket to elevation 1,718 m, CCR shell raise, rock drains extended beneath Site C and Site D CCR storage facilities.	1,720.00	Golder 1998
2003	Raise	1,720.10	Golder 2004
2009	Raise	1,723.00	Golder 2010a
2010	Raise	1,724.60	Golder 2010b
2011	Five vibrating wire (VW) piezometer locations (two sensors in each location).	No change	Golder 2012
2014	Raise	1,727.45	Golder 2015
2015	Raise	1,727.58	Golder 2016a
2017	Raise	1,728.85	Golder 2017e
2018	Raise; additional instrumentation installed.	1,731.14	Golder 2019
2020	Raise	1,732.50	Golder 2020b
2021	Three VW piezometers and three slope inclinometer casings installed at three locations within Site C and Site D (one piezometer and inclinometer casing at each location).	No change	Golder 2021e
2021	Raise	1,734.00	Golder 2022b
2022	Raise	1,736.00	Reporting in progress

CCR = coarse coal refuse; VW = vibrating wire.

Geotechnical instrumentation installed to monitor the MTD that was operational during the 2021/2022 reporting period is summarized in Table 2. Locations are shown in Figure 3.

Table 2: Summary of Main Tailings Dam Instrumentation

Instrumentation Type	Number	Comments
VW Piezometers	21	Each VW piezometer location (Figure 3) has two VW piezometers except for SD-16-04 and the BH21 series VW piezometers, which have one.
GPS units[(a)]	6	Two GPS units (319 and 320) are located on the downstream slope of Site C. Four units are positioned along the crest of the MTD (MD_ROVER series). MD-5 GPS was relocated from the crest of the MTD to the toe of Site C CCR facility in June 2022 and renamed 'Site C Toe GPS'.
Survey prisms	8	Prisms A to H are located on the centreline of MTD crest.
V-notch weir	1	One V-notch weir is located at the toe of Site C CCR facility. The weir comprises an automated system with a pressure transducer.
Inclinometer casing	5	Five inclinometers are installed in boreholes on the Site C and D CCR facilities. Three are anchored in bedrock with the remaining two anchored in stiff glacial till. Inclinometers were re-baselined by Teck in early 2023.

(a) An additional GPS (313) is located on the pond reclaim barge to record tailings pond elevation.

VW = vibrating wire piezometer; MTD = Main Tailings Dam; CCR = coarse coal refuse.

2.2.1.3 Previous Operations

As part of operations, regrading and resloping of the Site C CCR facility lower bench, as well as improved surface water drainage measures has been completed in response to observed movements/cracking in the area of the historic landslide at the toe of the Site C CCR facility.

2.2.2 West Tailings Dam

2.2.2.1 Overview of Design and Subsurface Conditions

A design for the WTD was completed by Golder (1993) and construction of the embankment began the same year. The WTD is a zoned earthfill embankment similar in design to the MTD. The downstream shell is constructed from CCR and has a 6 m wide clay blanket on the upstream face. The WTD has a maximum height of approximately 27 m above original ground. The main mine access road is located to the west of the WTD.

A design to raise the crest of the MTD and WTD to an elevation of 1,725 m was completed in January 1994 (Golder 1994) with a further design to raise the MTD and WTD to an elevation of 1,735 m completed in 2005 and 2014, respectively (Golder 2005, 2014a). The latest design, to raise the MTD and WTD to an elevation of 1,740 m (current permitted elevation), was completed by WSP in 2021 (Golder 2021e), in conjunction with design and permitting for the Site F Mixed Coal Refuse facility (due to be operational from Q4 2023).

The WTD has an upstream slope of 2H:1V and a downstream slope of 2.5H:1V; cross-sections are provided in Figure 5. The original design had included a 40 m crest width to provide access for haul trucks to the adjacent CCR storage facilities. This criterion was revised as part of the 2020 embankment raise construction (Golder 2020b) to reduce the minimum crest width to 12 m.

Initial foundation investigations were carried out by Golder in March 1992 and July 1993 (Golder 1993). Prior to construction, a mine access road was present within the current WTD footprint. The road embankment fill material was up to 8.8 m thick and comprised dense sand and gravel with zones of loose to compact clayey silt. It was assumed that the embankment was initially constructed with locally excavated colluvium and till and later raised with sand and gravel. During investigations, boreholes were drilled to the east of the access road and encountered moist to wet, soft to firm clayey silt with zones of rootlets and wooded debris up to 1.8 and 4.9 m below surface. Dense to very dense glacial till consisting of a clayey silt with gravel and cobbles was found underlying the colluvium. Three of the investigation locations terminated in siltstone bedrock at depths of between 0.6 m (at the south abutment) and 11.3 m (at the road embankment).

Additional site investigations were carried out in 2013 (Golder 2014a) as part of designs for raising the WTD to an elevation of 1,735 m. Topsoil was encountered in some locations with a thickness between 0.2 m and 0.5 m and consisted of organic root materials and organic silt or fine sand. Colluvial deposits were of variable thickness and included sandy silty clays and gravelly silty sands with gravimetric water contents ranging from 1% to 26%. Glacial till was encountered in varying thicknesses between 0.8 and 2.8 m below ground surface. The glacial till was highly variable, ranging from silty clay to gravelly sand and sandy silty clay; the consistency was described as hard with gravimetric water content ranging from 9% to 21%. Weathered claystone and siltstone were encountered below the glacial till.

The peat and buried wood debris was excavated as part of initial embankment construction to expose the stiff clay till and bedrock. These excavation areas were backfilled with 1.0 to 1.5 m of selected rock fill to promote drainage, as shown in cross-section in Figure 5 (Golder 1999).

Early embankment construction data indicate that surfaces receiving embankment fill were stripped of deleterious materials and that the upstream clay blanket was keyed into natural ground. Reports also indicate embankment abutments were prepared by excavating to dense till at the north abutment and to weathered siltstone at the south abutment. Unsuitable materials were removed from the footprint of the downstream shell of the embankment during embankment raise construction in 2014 to expose dense till.

2.2.2.2 Construction History

The construction history of the WTD is summarized in Table 3.

Table 3: West Tailings Dam Construction Summary

Year	Construction	Elevation (m)	References
1993	Raise as till key trench and cut-off blanket on mine road.	1,711.00	Golder 1993
1996	Raise as till key trench and cut-off blanket on mine road.	1,714.30	Golder 1997
1998	Foundation preparation of till and bedrock for embankment footprint to elev. 1,725 m.	No change	Golder 1999
1999	Raise, mine road relocated to west.	1,719.10	Golder 2000
2004	Raise	1,721.60	No documentation
2010	Raise	1,724.80	Golder 2010b
2011	Five VW piezometers (two sensors in each of three locations) installed.	No change	Golder 2012
2014	Raise, mine road relocated to west, foundation materials stripped to the footprint of the elev. 1,735 m shell.	1,726.60	Golder 2015
2015	Raise	1,728.07	Golder 2016a

Table 3: West Tailings Dam Construction Summary

Year	Construction	Elevation (m)	References
2016	Extension of the downstream portion of the WTD.	No change	Golder 2017b
2017	Raise	1,728.73	Golder 2017e
2018	Raise; additional instrumentation installed	1,731.14	Golder 2019
2020	Raise	1,732.50	Golder 2020b
2021	Raise	1,734.00	Golder 2022b
2022	Raise	1,736.00	Reporting in progress

VW = vibrating wire; WTD = West Tailings Dam.

Geotechnical instrumentation, installed to monitor the WTD and operational during the 2021/2022 monitoring period, is summarized in Table 4. Locations are shown in Figure 3.

Table 4: Summary of West Tailings Dam Instrumentation

Instrumentation Type	Number	Comments
VW piezometers	6	Each location has two VW piezometers (Figure 3).
GPS units	2	Two GPS monitoring units are located on the crest of the WTD (WD_ROVER series).
Survey prisms	5	Prisms I to M are located on the centreline of the WTD crest.
V-notch weir	1	One V-notch weir is located at the toe of WTD. The weir comprises an automated system with a pressure transducer.

VW = vibrating wire; WTD = West Tailings Dam.

2.3 Site Seismicity

WSP developed a seismic hazard model for GHO based on historical seismicity and a review of geologic and paleoseismological features (Golder 2016b). The model incorporates data from the 5th Generation Seismic Hazard Model, including nine faults and fault segments mapped in northwest Montana. The 5th Generation Seismic Hazard Model was developed by Natural Resources Canada for use in the 2015 National Building Code of Canada (NBCC; NRCC 2015). The results of the seismic probabilistic analysis from the site hazard model are presented in Table 5.

Table 5: Seismic Hazard Values

Exceedance Probability	Return Period (years)	2015 Peak Ground Acceleration (g)
40% in 50 years	100	0.020
10% in 50 years	475	0.063
5% in 50 years	1,000	0.097
2% in 50 years	2,475	0.158
0.5% in 50 years	10,000	0.300

Notes: For firm ground site class “C,” very dense soil and soft rock foundation, as defined by 2015 National Building Code of Canada (NRCC 2015). Return periods are not exact representations of annual exceedance probabilities; rounding per the Canadian Dam Association (CDA 2013, 2019) is shown.

The stability of the GHO TSF embankments has been checked against and is stable under loading for the maximum credible earthquake (assumed to be represented by a return period of 10,000 years) of 0.3 g.

The NBCC seismic hazard values were updated in 2020 (NRCC 2022) based on data from the 6th Generation Seismic Hazard Model developed by Natural Resources Canada (NRC). The potential impact to calculated peak ground accelerations determined during the Golder (2016b) have not been determined based on the revised NBCC (2022) seismic hazard values.

2.4 Key Operational Components

Key operational components of the GHO TSF are as follows:

- visual inspections
- geotechnical instrumentation, including NavStar GeoExplorer software program
- process water reclaim and circulation
- embankment raise construction

Visual inspections are carried out monthly by GHO, and observations are recorded and communicated to the EoR team. The EoR and GHO teams review the observations and instrumentation data regularly and collaboratively identify deficiencies and determine action plans.

Geotechnical instrumentation is routinely monitored and assessed using the NavStar GeoExplorer software or Teck internal calculation spreadsheets/tools.

The GHO team monitors the pond water elevation using a GPS unit located on the process water reclaim barge as well as a pan, tilt, zoom camera located at the process plant, which can view the pond level. The elevation of the tailings pond is recorded remotely and monitored in real time using GeoExplorer and aligned with an automatic alert system based on established limits (See Section 2.6).

2.5 Key Personnel

The following key personnel were associated with the GHO TSF during the 2021/2022 operating period:

- Teck Coal:
  - Qualified Person (QP): Patrick Green, P.Eng.
  - Tailings Engineer: David Walker, P.Eng. (to end May 2022)
  - Tailings Engineer: Patrick Lea, P.Eng. (from start June 2022)
  - Tailings Engineer: Siddhant Kar (from start Oct 2021 to end Sep 2022)
- the EoR team (WSP)
  - EoR: Andy Haynes, P.Eng.
  - Deputy EoR: Martyn Willan, P.Eng.

2.6 Quantifiable Performance Objectives

A geotechnical instrumentation and monitoring program is in place to monitor the stability of the TSF, including survey prisms, GPS units, and inclinometer surveys to monitor for displacement and VW piezometers to monitor piezometric levels within the embankments and groundwater elevations in the foundations.

Quantifiable performance objectives (QPOs) have been developed for select instruments. The intention of the QPOs is to provide indications of changing conditions that may affect the safe and effective management of the TSF. These are linked to management actions though a Trigger Action Response Plan (TARP)

QPOs were reviewed and, where required, updated in 2021 based on recommendations from the EoR (Golder 2021a) and to align with Teck's emergency response protocol categories. QPOs were further updated as part of the 2022 OMS manual update (Teck 2022b). The 2021 QPOs are presented in this report and used as the basis for assessing performance in the 2021/2022 reporting period.

QPOs for the VW piezometers are set based on deviations from historical measurements that may be indicative of changing conditions within the embankment or specified phreatic surface elevations assessed during stability analyses. QPOs for the survey prisms are set based on cumulative relative displacement (CRD), that is, the total three-dimensional displacement from the initial location when the prism was first surveyed within the reporting period. QPOs for V-notch weirs are set based on historical data and predictions from seepage analyses. Freeboard QPOs are set based on operational considerations for the storage of the 72-hour probable maximum flood (PMF).

The QPOs are provided in Sections 2.6.1 to 2.6.3. A comparison between observed conditions during the reporting period and the QPOs are presented in the following sections:

- **Section 5.5.1: Instability**—prisms and VW piezometers
- **Section 5.5.2: Overtopping**—freeboard
- **Section 5.5.3: Internal Erosion**—V-notch weirs

2.6.1 Instability Monitoring

2.6.1.1 Surface Displacement Monitoring

Surface displacement monitoring of the embankments relative to QPOs at the GHO TSF consist of survey prisms (locations presented in Figure 3). Data in this AFPR are focused on the comparison of long-term trends in data.

Survey prisms were installed during September 2015 to monitor for deformation and establish displacement trends. Prisms are spaced at approximately 100 m intervals along the centreline of the main and west tailings embankment crests and are relocated/reset following each embankment raise. Prism QPOs were established in 2017 (Golder 2017a) and updated in 2021 (Golder 2021a). QPOs for the survey prisms during the reporting period are summarized in Table 6.

Table 6: Survey Prism Quantifiable Performance Objectives

Instrument / Measurement Cumulative Relative Displacement (m per year)	Grey Investigate
Main Tailings Dam survey prisms	>0.15
West Tailings Dam survey prisms	>0.10

GPS units are also used and were installed at the Site C CCR spoil in October 2012 and additional GPS units were installed on the MTD and WTD during August 2017. Data from the GPS units are recorded hourly and remotely uploaded to GeoExplorer software. QPOs for the GPS units have not been used since 2020 due to high variability in short-term measurements but continue to be monitored for the purpose of establishing and comparing long-term trends in data for use in determining potential indicators of instability.

Two GPS units were relocated during the reporting period to monitor movements at the Site C CCR facility:

- MD-5 Rover GPS: unit relocated from the downstream slope of the MTD to the toe of Site C and renamed ‘Site C Toe GPS’.
- GPS 320: relocated to the immediate intermediate bench above its existing location.

2.6.1.2 Inclinometers

Inclinometer casings (SD-16-04 and SD-16-05) were installed in the MTD during the 2016 geotechnical investigation (Golder 2017d). Three additional inclinometer casings (BH21-05, BH21-06, and BH21-07) were installed at Site C and D CCR facilities in May 2021.

Based on a February 2020 data review, the EoR recommended that the frequency of routine inclinometer surveys be revised to a minimum of one survey per year (Golder 2020a). Additional surveys were also recommended as follows:

- following Yellow Notification exceedance by survey prisms or VW piezometers
- before and after embankment construction
- if visual observations indicated signs of slope movement or deformation

Inclinometer survey data is used as part of an overall assessment of potential conditions at the MTD, and as such do not have QPOs. Inclinometers were re-baselined by Teck in early 2023.

2.6.1.3 Vibrating Wire Piezometers

VW piezometers were installed during 2011 in the MTD and WTD (MD and WD series, respectively). Additional VW piezometers were installed in the MTD and Site C and D CCR storage facilities in 2016 (SD series). The VW piezometer locations are presented in Figure 3.

Data from the piezometers is currently recorded in spreadsheets, copies of which are provided to the EoR team.

QPOs were updated for all the VW piezometers in 2021 (Golder 2021a). The Blue Caution levels were set based on deviations from historical averages. The Yellow Notifications levels are set based on phreatic surfaces that would decrease the factor of safety below the minimum criteria (Golder 2017a). VW piezometer data during the reporting period are summarized in Table 7.

Table 7: Vibrating Wire Piezometer Quantifiable Performance Objectives

Embankment	Vibrating Wire Piezometer	Blue Caution		Yellow Notification
		Minimum Phreatic Surface Elevation (m)	Maximum Phreatic Surface Elevation (m)	Maximum Phreatic Surface Elevation (m)
Main Tailings Dam	VW11-MD-2A	1,691.40	1,695.40	1,724.0
	VW11-MD-3A	1,686.28	1,690.28	
	VW11-MD-3B	1,687.61	1,691.61	
	VW11-MD-4A	1,686.02	1,690.02	
	VW11-MD-5A	1,682.23	1,686.23	
	VW11-MD-5B	1,682.71	1,686.71	
	SD-16-01A	1,683.58	1,687.58	1,713.5
	SD-16-02A	1,683.54	1,687.47	1,708.0
	SD-16-03A	1,689.82	1,693.82	1,713.5
	SD-16-04	1,674.37	1,678.37	1,710.0
	SD-16-05A	1,680.99	1,684.99	1,710.5
	SD-16-06A	n/a[(a)]	1,685.55	1,710.0
	SD-16-07A	1,649.56	1,653.56	1,686.5
	SD-16-08A	1,666.12	1,670.12	1,686.5
West Tailings Dam	VW11-WD-1A	1,711.39	1,714.86	n/a[(a)]
	VW11-WD-1B	n/a[(a)]	1,714.39	
	VW11-WD-2A	n/a[(a)]	1,713.59	
	VW11-WD-2B	n/a[(a)]	1,716.52	
	VW11-WD-3A	n/a[(a)]	1,716.11	
	VW11-WD-3B	n/a[(a)]	1,716.91	

(a) No lower QPO set - average phreatic surface was recorded as 'dry' in 2020/2021 reporting period.

(b) No data or anomalous data triggers the Grey Investigate level.

(c) No orange warning or red alarm level is defined; the EoR and GHO's TSF RTFE will be notified when the Blue Caution level is triggered. The situation would be then evaluated prior to any evacuation or subsequent actions.

(d) No QPO set as no credible phreatic surface results in minimum FOS criterion for stability.

2.6.2 Tailings Pond Level

The elevation of the tailings pond is controlled by the reclaim barge, which recirculates water from the facility to the wash plant for use in processing. The tailings pond elevation is monitored by GPS unit 313, which is mounted on the reclaim barge. QPOs were updated based on revised storm analysis completed as part of the 1,740 m raise design (Golder 2021e). Pond level QPOs are summarized in Table 8.

Table 8: Freeboard Quantifiable Performance Objectives

Instrument / Measurement	Blue Caution	Yellow Notification	Orange Warning	Red Alarm
GPS 313 and Visual Gauge / Freeboard (m)	2.4<Freeboard<1.2	1.2<Freeboard<0.8	0.8<Freeboard<0.4	Freeboard<0.4

Freeboard QPOs were developed, where required, to be used progressively during a storm event, as follows:

- **Blue Caution**—Freeboard is lower than normal operating level.
- **Yellow Notification**—During a 72-hour PMF event, approximately 2 days of freeboard is available.
- **Orange Warning**—During a 72-hour PMF event, approximately 1 day of freeboard is available.
- **Red Alarm**—During a 72-hour PMF event, approximately 0.5 day of freeboard is available.

2.6.3 Seepage

V-notch weirs are located downstream of the MTD at the toe of Site C (Site C Weir) and downstream of the WTD (West Dam Weir). Weir locations are shown in Figure 3. Manual measurements were taken monthly, when accessible, until 20 April 2021 and data uploaded to GeoExplorer for notification and tracking. The weirs were upgraded in May 2021 to an automated system, which records measurements using a pressure transducer. Seepage weir flow data is downloaded from the data logger and collated in spreadsheets, copies of which are made available to the EoR team.

Seepage from the MTD is collected by rock drains that were installed through the Site C and D CCR facility footprints in 1996. These rock drains consist of geotextile-wrapped crushed limestone (Golder 2019). Seepage at the toe of the Site C is collected in a seepage collection channel at the end of which the Site C Weir monitors discharge.

The West Dam Weir monitors discharge through a seepage ditch downstream from the embankment toe.

QPOs for the weirs were updated in 2021 based on historical data (Golder 2021a) and are summarized in Table 9.

Table 9: Seepage Weir Quantifiable Performance Objectives

Threshold	Grey Investigate	
Site C Weir/flow (L/s)	<0.2	>5.0
West Dam Weir/flow (L/s)	n/a	>2.0

3.0 OPERATIONS, MAINTENANCE, AND CONSTRUCTION DURING 2021/2022

During the reporting period, GHO staff carried out monthly visual inspections of the TSF including quarterly visual inspections of the Site C and D CCR facilities. Observations during the inspection were recorded and reviewed by GHO and the EoR team on a regular basis.

3.1 Tailings Storage Facility and Operations

GHO tracks in-place tailings volume through bathymetric surveys. These bathymetric surveys, in conjunction with topographic survey data, are used to estimate the volume of tailings deposited in the TSF. The volume of placed material was completed based on the 2022 bathymetry data (24 August 2022), in conjunction with available Skycatch RTK positioning drone mapping survey data (19 August 2022), and 2021 bathymetric survey (24 August 2021), in conjunction with 2021 LiDAR data (25 to 26 August 2021). Data indicates that approximately 470,000 m^3 of tailings were deposited in the 12-month period between August 2021 and 2022.

3.2 Maintenance

Maintenance and repair of instrumentation during the reporting period was routine and consisted of rectifying minor deficiencies, which are typical for the normal operation of tailings embankments.

Erosion rills, gullies, and minor localized depressions, noted on the MTD and WTD during monthly inspections during the operational period, were repaired during the 2022 embankment raise construction.

A 12 m section of the secondary containment berm on the MTD was repaired on 1 April 2022 following identification of damage from earthmoving equipment In Q2 2022.

Erosion of CCR material at the WTD south abutment occurred in June 2022 and damaged the WTD seepage weir. The eroded area was repaired, and the weir reinstalled in July 2022.

3.3 Construction

An extension of the MTD tailings pipeline and secondary containment berm installation were completed in November 2021 following completion of the 2021 raise construction to 1,734 m. Tailings discharge at Spigot #1 (Figure 3) on the MTD line commenced on 24 February 2022 to develop tailings beach on the upstream face of the MTD. Spigot #2 was also used to deposit tailings into the TSF during the reporting period. Discharge returned to the legacy discharge point (Spigot A) on the northeast side of the TSF (Figure 2) in July 2022 prior to the start of the 2022 raise construction. The legacy discharge line was also extended during the 2022 embankment raise construction for future deposition (Spigot B) near the north abutment of the WTD. This extension was completed outside of the reporting period in October 2022 and details will be included in the 2022 TSF construction record reporting, ongoing at the time of this report.

Construction of an embankment raise, for both MTD and WTD, to an elevation of approximately 1,736 m was completed between June and October 2022 which included the placement of additional CCR material at the Site C, D and E CCR facilities for the development of a new Process Plant light vehicle access road. Reporting was ongoing at the time of this report.

4.0 REVIEW OF CLIMATE DATA AND WATER BALANCE

4.1 Climatic Review

Precipitation data collected at the GHO Office climate station were provided by GHO for the 2021/2022 hydrologic reporting period (i.e., August 2021 to July 2022). The data was compared to the long-term synthetic precipitation dataset for the period from 1970 to July 2021, and a summary of the recorded monthly total precipitation for the hydrologic reporting period (1 August 2021 to 31 July 2022) and the historical monthly averages at the GHO Office station location are presented in Chart 2. Precipitation records from the Fording River Cominco climate station adjusted to GHO Office station elevation are presented for comparison purposes.

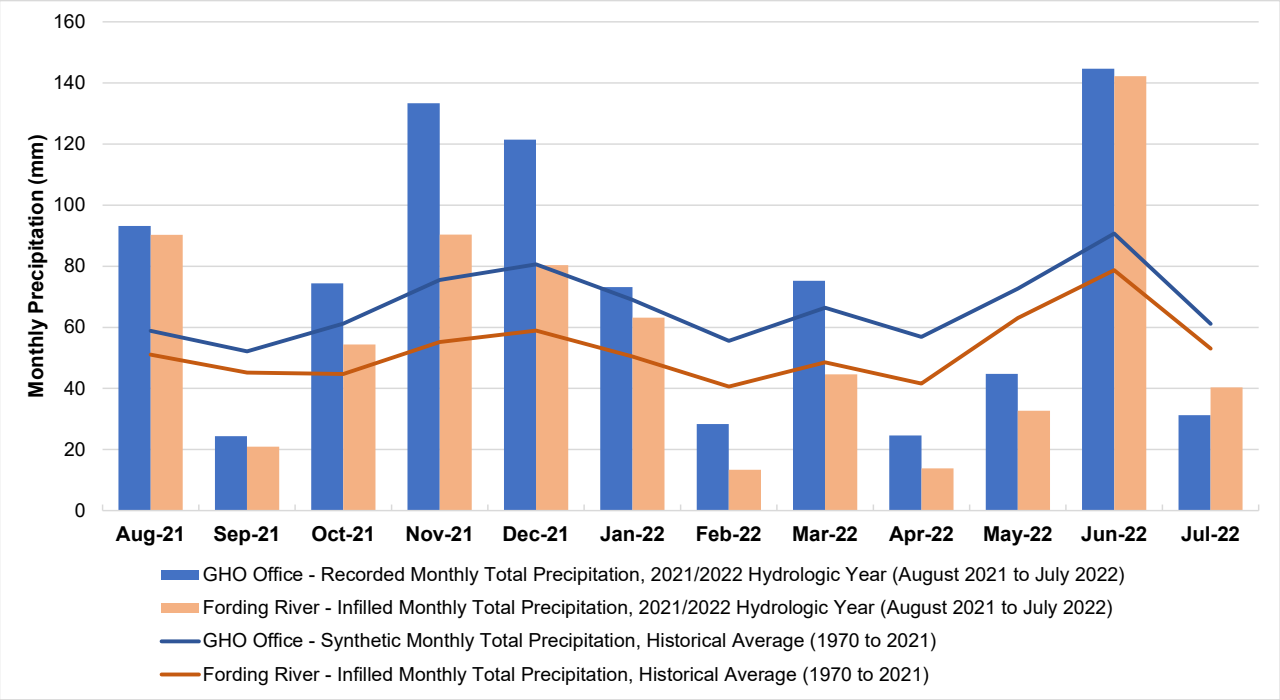


Chart 2: Comparison Between 2021/2022 Total Precipitation and Historical Average for Greenhills Operations

The precipitation data for the reporting period (1 August 2021 to 31 July 2022) indicate the following:

- Total precipitation was approximately 9% higher than the GHO Office synthetic historical average for the same period (1 August to 31 July).
- Seasonal variations in total monthly precipitation were sporadic with no distinct seasonal trend:
  - Average monthly precipitation in late summer (August 2021 to September 2021) was comparable to the historical monthly average. However, average monthly precipitation in August 2021 was 58% higher, while September 2021 was 53% lower compared to the historical monthly average.
  - Average monthly precipitation in fall and winter (October 2021 to February 2022) was 21% higher compared to the historical monthly average. Differences in the fall/winter monthly precipitation vary from 77% higher to 50% lower compared to the historical monthly average.

- Average monthly precipitation from late winter to early summer (March 2020 to July 2021) was 14% lower compared to the historical monthly average. Differences in the monthly precipitation vary from 59% higher to 57% lower compared to the historical monthly average.

4.2 Water Balance and Reclaim Water

A water balance for the GHO TSF was completed using a spreadsheet-based water balance model for the reporting period of 1 August 2021 to 31 July 2022, with inputs from the site wide water balance (Teck Coal Limited 2022) and site measured flow data. Data missing from the Teck provided flow data were infilled based on linear interpolations of the data immediately prior and after.

Table 10 provides a summary of the TSF water balance for the reporting period and the results indicate an overall increase in total water volume within the TSF, which is consistent with other site-recorded data and observations.

Table 10: Greenhills Tailings Storage Facility Water Balance for 1 August 2021 to 31 July 2022

INFLOW	Volume (m^3)	OUTFLOW	Volume (m^3)	Total Inventory Change (m^3)
Direct precipitation[(a)]	265,330	Direct Evaporation[(a)]	187,130	
Surface runoff[(a)]	303,730	Seepage[(a)]	144,540	
Water discharge with tailings[(b)]	3,542,270	Reclaim Water to Plant[(b)]	3,911,120	
Transfer from Phase 3 and Phase 6 pits[(b)]	546,780	Water Retained in Tailings[(c)]	231,110	
SUM	**4,658,110**		**4,473,900**	**184,210**

Note: GHO = Greenhills Operations

(a) Obtained from the GHO site-wide water balance model (GoldSim) with update climate data up to August 2022.

(b) Measured flow data from GHO provided by Teck Coal on 9 November 2022.

(c) Water retained in the pore space of tailings is estimated by multiplying the annual tailings dry tonnage by an estimated gravimetric water content of the consolidated tailings of 39% (Golder 2020c).

4.3 Water Quality

Water quality monitoring of the GHO TSF including seepage and discharge is completed and reported in accordance with permit requirements and WSP was not informed of any changes that may be indicative of a potential embankment safety concern.

5.0 GREENHILLS OPERATION TAILINGS STORAGE FACILITY SAFETY ASSESSMENT

This section presents an assessment of the safety of the embankments based on a review of instrumentation data and an assessment of field observations and background information.

5.1 Site Visit

An inspection of the TSF and Site C and D CCR facilities was carried out during the week of 29 August 2022 by the EoR, Mr. Andy Haynes, P.Eng., and Mr. Martyn Willan, P.Eng., both of WSP. The visit was accompanied by the TSF QP Mr. Patrick Green, P.Eng., and Mr. Patrick Lea, P.Eng., both of Teck Coal. A close-out meeting was also held after the inspection.

The 1,736 m embankment raise construction was in progress at the time of the site visit and placement of embankment fill was observed. Appendix A presents a summary of photographs taken during the August 2022 inspection. Photograph locations and directions are presented in Figure 2. A summary of observations made during the August 2022 visit is included in Appendix B.

No deficiencies that required immediate action were identified.

5.2 Review of Background Information

GHO provided the following information for this annual facility inspection:

- survey data
  - Skycatch RTK positioning drone mapping survey (19 August 2022)
  - tailings pond bathymetric survey data (24 August 2022)
- site climate data recorded at the GHO Office station for the reporting period (Section 4.1)
- tailings deposition data – August 2022 Streamline workbook (Teck 2022a)
- instrumentation data for the reporting period were provided directly by GHO
  - survey prism data
  - VW piezometer data
  - seepage weir data
  - GPS data
  - pond level data
  - inclinometer survey data
- inspection records, including photographs, visual observations, and manually read instrument data
  - monthly inspection records of TSF
  - quarterly inspection records of Site C and D CCR facilities

5.3 Consequence of Failure

Teck no longer adopts a classification system that has levels of potential human loss of life and instead aims to eliminate any credible risk of loss of life and reduce all other credible catastrophic risks to As Low As Reasonably Practicable. Adopting this approach meets or exceeds regulatory requirements and aligns with Teck's goal to eliminate any risk for loss of life, which is consistent with industry best practices.

As such, the past Canadian Dam Association (CDA) classification (High) and the confirmation of such is provided in this document solely for consistency with previous work. The potential consequence of failure is unchanged from prior reporting.

5.4 Review of Operational Documentation

5.4.1 Operation, Maintenance, and Surveillance Manual

The operation, maintenance, and surveillance manual was updated on 6 July 2022 (GHO 2022a), with further updates to the 'Figures and Appendices' in November 2022. This update closes Recommendation 2019-07.

5.4.2 Emergency Preparedness and Response Plans

The Emergency Preparedness and Response Plan (EPRP) and Trigger Action Response Plan (TARP) for the TSF were reviewed on 24 June 2021 (GHO 2021b).

The TARP was finalized by Teck and included in the GHO TSF OMS manual in July 2022. Finalization of the EPRP by Teck was in progress at the time of this report.

5.4.3 Dam Safety Review

A dam safety review (DSR) was completed by Klohn Crippen Berger Ltd. in 2017 (KCB 2017). The DSR concluded that the condition and integrity of the TSF met current safety standards. The HSRC (EMLI 2021) specifies that a DSR is to be completed once every five years and the 2022 DSR was commenced in Q3 2022 with a target deadline for completion by 31 March 2023.

5.5 Assessment of Facility Safety Relative to Potential Failure Modes

A component of the AFPR is a review of key hazards associated with similar structures in the mining industry, after excluding failure modes that are not relevant or physically possible for the facility.

The performance is assessed by comparing the design basis (Golder 2021e) against observed performance and available data during the monitoring period for each of the following failure modes/hazards:

- **Instability**—A mechanism involving movement of a part of the embankment (either entirely within the embankment or including portions of the foundation materials) as a result of unbalanced forces, which may have potential to compromise the integrity of the embankment to the extent that contents of the impoundment are released.
- **Overtopping**—A mechanism where the pond level rises above the embankment crest level, resulting in flow over the embankment that may cause progressive erosion of the embankment and loss of the pond and tailings.

- **Internal erosion**—Internal instability of an embankment can be caused by materials migrating out of the embankment via seepage and leaving voids within the embankment. This generally happens with materials that do not have filter compatibility; that is, the fines fraction of one material can migrate into or through the voids of the adjacent material under a sufficient hydraulic gradient. Under such conditions, internal erosion (piping) can occur by regressive erosion of particles from within the embankment forming a continuous pipe or void within the embankment.

5.5.1 Instability

5.5.1.1 Design Basis

The MTD and WTD were designed to provide minimum factors of safety that meet or exceed the adopted design criteria, in consideration of the HSRC guidance document (MEM 2016).

WSP assessed the stability of the MTD as part of the detailed design for raising of the MTD and WTS to a crest elevation of 1,740 m (Golder 2021e). Results indicated the following:

- Factors of safety exceed design criteria for both the MTD and WTD in the static condition.
- Pseudo-static factor of safety for the MTD and WTD is around 0.9 to 1.0 for the loading based on a 1-in-10,000-year seismic event. As such deformations under such loadings are considered below.
- Deformation analyses suggest that vertical deformations resulting from consolidation/settlement of embankment fills under static conditions are less than 0.2 m, with total horizontal deformations of approximately 50% of the vertical deformations (approximately 0.1 m). These deformations would be distributed along the crest broadly proportionally to the height of the embankment, i.e., not at a single location.
- Analysis of seismic deformations suggests an approximately 50% probability of embankment displacements up to approximately 0.6 m (1% of embankment height) if the MTD is subjected to a 1-in-10,000-year return period earthquake. Based on the analysis, these deformations do not pose a credible risk to the facility with respect to embankment overtopping or cracking across the upstream clay till blanket.
- The development of excess pore pressures in the foundation materials is considered unlikely as geotechnical investigations since 2016 (Golder 2017d) indicate soft materials such as muskeg and clay colluvium were removed from the embankment footprints.
- Glacial till, present in the foundation, was dense to very dense with low liquidity index values.
- The density of CCR at the toe of Site C was assessed, based on investigations completed in May 2021 (Golder 2021c), to evaluate the potential for contractive behaviour in saturated portions of uncompacted CCR material. Results indicated that saturated portions of the CCR stockpiles are not susceptible to contractive behaviour.

5.5.1.2 Observed Performance

A review of the performance relative to the risk of instability is summarized below. Reviewed data and observations did not indicate a concern to facility safety. General observations at the time of the 2022 site visit, in relation to instability and not related to the construction work in progress at the time of the site visit, indicated no conditions of concerns.

Observations during the 2022 site visit included the ponding of surface water on the Site C CCR facility bench immediately above where cracking was observed (Photograph 35). WSP recommends that the area is graded to prevent ponding and reduce potential infiltration to the lower bench.

As part of routine data reviews approximately 40 mm of settlement was recorded at GPS 319 (location on the lower bench of Site C) between 1 February and 6 June 2022 with cracking observed at the same location in May 2022. The location of this deformation was consistent with the known location of a historic landslide which underlies the toe of the Site C CCR facility (Golder 2021d). Following a data review of all MTD instruments, by the EoR and Teck Coal teams, a site visit of the area was also completed by Martyn Willan, P.Eng. on 23 June 2022 and no issues of concern to the MTD were identified. Following discussions with Teck Coal, existing GPS monitoring systems were relocated to monitor for movements above and below the area of observed instability:

- MD-5 Rover (renamed ‘Site C Toe GPS’): relocated to the toe of the Site C CCR facility.
- GPS 320 relocated to the bench above where the cracking was observed.

Relocation of these GPS instruments resulted in horizontal displacements that are not indicative of a facility concern, as such horizontal data are not presented in Appendix C3. Vertical displacements for these instruments are presented in Appendix C (Figures C3-7 to C3-9) and do indicate vertical deformations, above or below the area of observed cracking, that are indicative of a safety concern. In addition, data from VWPs and prims were not of concern. Data also indicates that movements had stabilized from June 2022 through the end of the reporting period.

Following subsequent review WSP (2022c) concluded that:

- Movement of an active landslide area (on natural ground to the east of the Site C CCR facility) is likely unloading the toe of the historic landslide underlying the toe of the Site C CCR facility.
- The extent of the historic landslide was inferred from historic photographs and does not extend to the MTD footprint.
- Potential for a bench-scale failure of the lower bench of Site C is possible, however retrogressive failure impacting the MTD or a significant portion of the Site C CCR facility is considered non-credible.

WSP (2022c) recommended:

- Establishing a restricted access zone downstream of the Site C CCR facility.
- Diverting surface water inflows away from the historic landslide areas.
- Performing InSAR or similar photogrammetry surveys to analyze surface displacements over time.
- Extending surface water conveyance pipes from the Process Plant to a point further away from the active landslide area.

- Placing rockfill to regrade existing erosion features.
- Consider the installation of an inclinometer at the downstream toe of Site C to monitor the location of any potential development slip surface.

Monitoring and inspection of the area was ongoing throughout the monitoring period and a plan for remediation of the active landslide area, to minimize further movement, was in development at the time of this report and is planned for spring 2023.

Surface Displacement Monitoring

The survey prisms were removed from the MTD and WTD as part of preparation prior to the 2021, and 2022 embankment raises. Consequently, prism data for the 2021/2022 reporting period was only available between 12 October 2021 and 30 March 2022 and is presented in Appendix C (Figures C1-1 to C1-13). Instruments were re-established following the 2022 construction period.

GPS data for instruments on the MTD and WTD were available from 1 August 2021 to 10 May 2022 and is presented in Appendix C (Figures C3-1 to C3-6). Data trends during the reporting period were consistent with historic trends and did not indicate a concern to facility safety.

Inclinometers

Inclinometer surveys for instruments SD-16-04, BH21-05, BH21-06, and BH21-07 were completed in October 2021 with subsequent survey of instruments SD-16-04 and BH21-06 completed in March 2022. Assessment of the available data did not indicate any movements of concern to facility safety. Inclinometers were re-baselined by Teck in early 2023.

Vibrating Wire Piezometers

Checking and recalibration of the VW piezometers was carried out in early 2023 and plots of pressure elevation against time are presented in Appendix C (Figures C2-1 to C2-5) for data between August 2020 and September 2022.

Available data were indicative of expected conditions. There were no exceedances of piezometric levels at or above the established Yellow Notification QPO level, which are set based on phreatic surfaces that would decrease the factor of safety below established minimum design criteria, as described in Section 2.6.

VW piezometers BH21-05, BH21-06, and BH21-07B were installed in the till foundation below Site C in 2021 BH21-06 reported negative pressures, indicating the phreatic surface within the till was below the tip elevation. BH21-07B reported negative pressures between 7 July 2021 and 17 June 2022, with a maximum recorded phreatic surface of 0.3 m above the instrument tip. BH21-05 recorded positive pressure, with a maximum phreatic surface within the till of 1.5 m above the instrument tip. Site C VW piezometer data is presented in Appendix C (Figure C2-5). Assessment of the available data did not indicate any movements of concern relative to facility safety.

5.5.2 Overtopping

5.5.2.1 Design Basis

The TSF does not have an operational or emergency overflow structure (i.e., spillway) and is therefore designed to contain the 72-hour PMF (Golder 2021e). Freeboard details are presented in Table 11.

Table 11: Operational Freeboard Details

Item	Value (m)
Lowest crest elevation on Main Tailings Dam or West Tailings Dam during 2021/2022 reporting period.	1,734 (raised to 1,736 in Oct 2022)
Allowance for 72-hour PMF including climate change allowance.	2.0
Allowance for wave run-up due to 1-in-2-year wind.	0.35
Standard operating pond level (distance below embankment crest).	2.4

PMF= probable maximum flood.

5.5.2.2 Observed Performance

The pond elevation recorded from 1 September 2020 to 27 September 2022 is presented in Chart 3 relative to the normal operating freeboard.

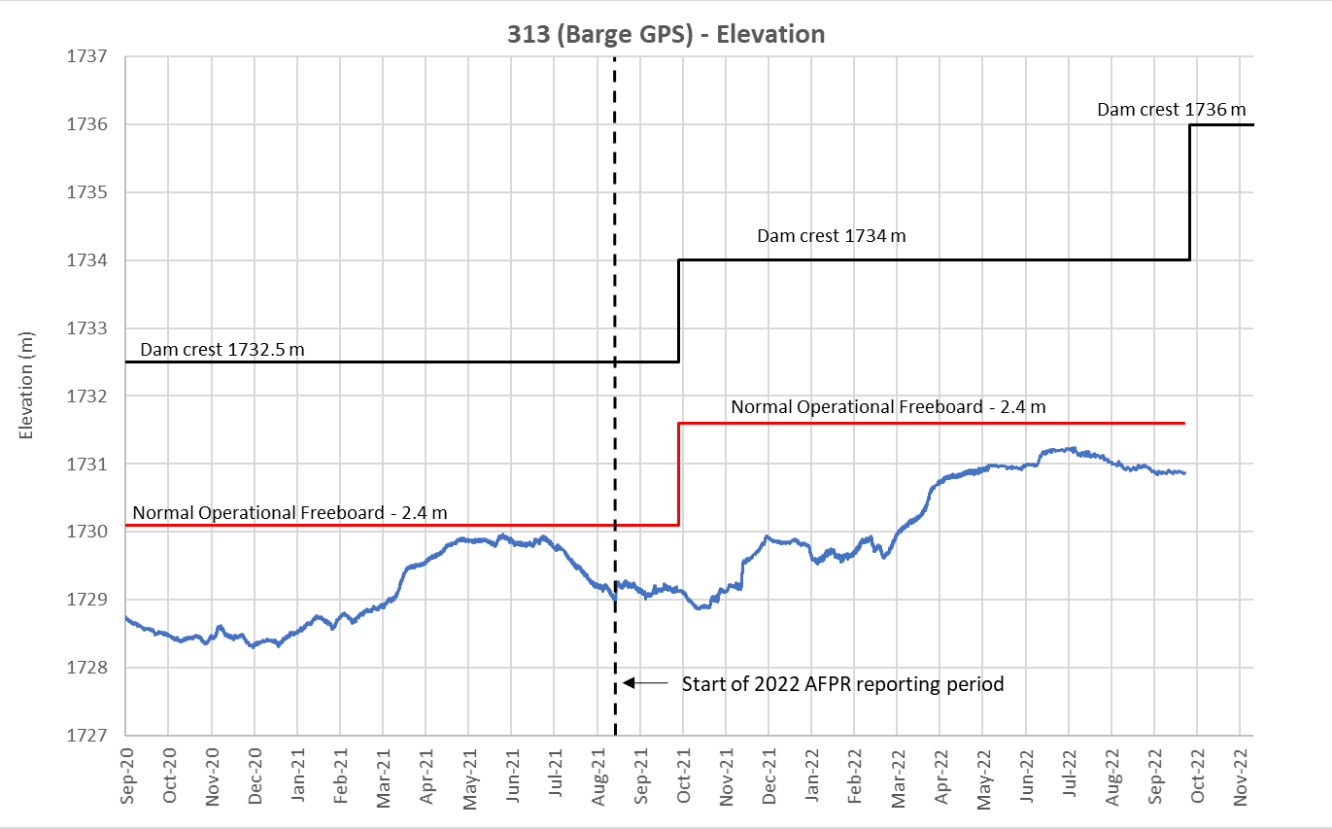


Chart 3: Tailings Pond Elevation Relative to Standard Operating Freeboard Level

Data indicates that the pond elevation varied between 1,728.9 m and approximately 1,731.3 m during the 2021/2022 reporting period. The minimum freeboard during the reporting period was approximately 2.7 m; therefore, the normal operating freeboard of 2.4 m was maintained during the 2021/2022 reporting period.

A target operational pond volume of between 200,000 and 400,000 m^3 was developed in 2020, in conjunction with the EoR and Teck/GHO staff to help support active water management at the facility. However, provided minimum freeboard levels are achieved the stored volume of water is not a facility safety concern. The pond volume at the time of the 2022 bathymetric survey (24 August 2022) was approximately 450,000 m^3 which is slightly outside of the target range but within the range of reasonable seasonal variability.

5.5.3 Internal Erosion

5.5.3.1 Design Basis

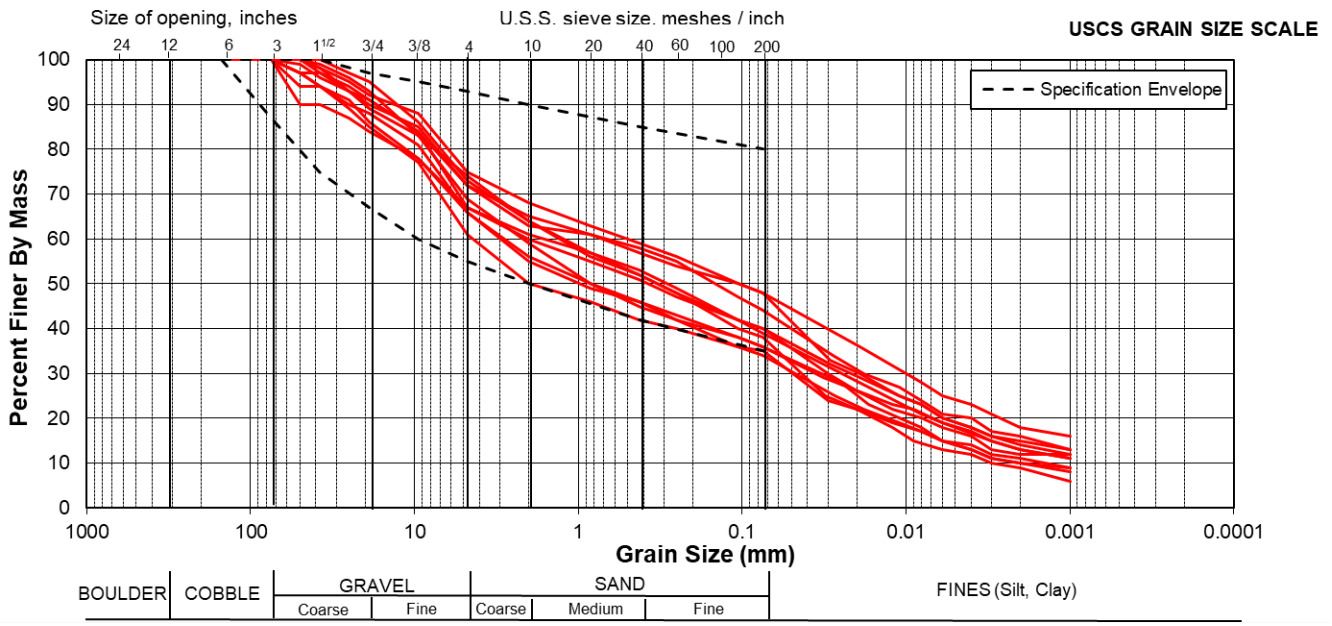
As part of operations in 2022 tailings have been deposited from Spigots #1 and #2 on the MTD, resulting in the formation of a dry beach against portions of the MTD. However, the hydraulic head at the upstream face of the WTD and select locations of the MTD is equal to the pond elevation and the hydraulic head downstream of the till blanket is near the foundation. As such, the hydraulic gradient is sufficient that the potential for internal erosion to occur must be considered.

The till blanket on the upstream face of the embankments and the CCR material specification have been designed to meet internal stability criteria (Li et al. 2009) and filter compatibility (Sherard et al. 1984; Sherard and Dunnigan 1989), as recommend by CDA (2007).

WSP tested samples of tailings collected on 10 May 2016 at the tailings discharge. The particle size distribution of the tailings was determined using mechanical sieving (ASTM D6913) and a Fritsch laser particle size analyzer (ASTM D4464). The results are documented in Golder (2017c) and indicate that filter compatibility exists between the tested tailings and clay blanket (till) samples. Recent tailings testing (Golder 2020f and 2021b) confirmed that the gradation of the tailings remains consistent with that assumed in the filter compatibility assessment.

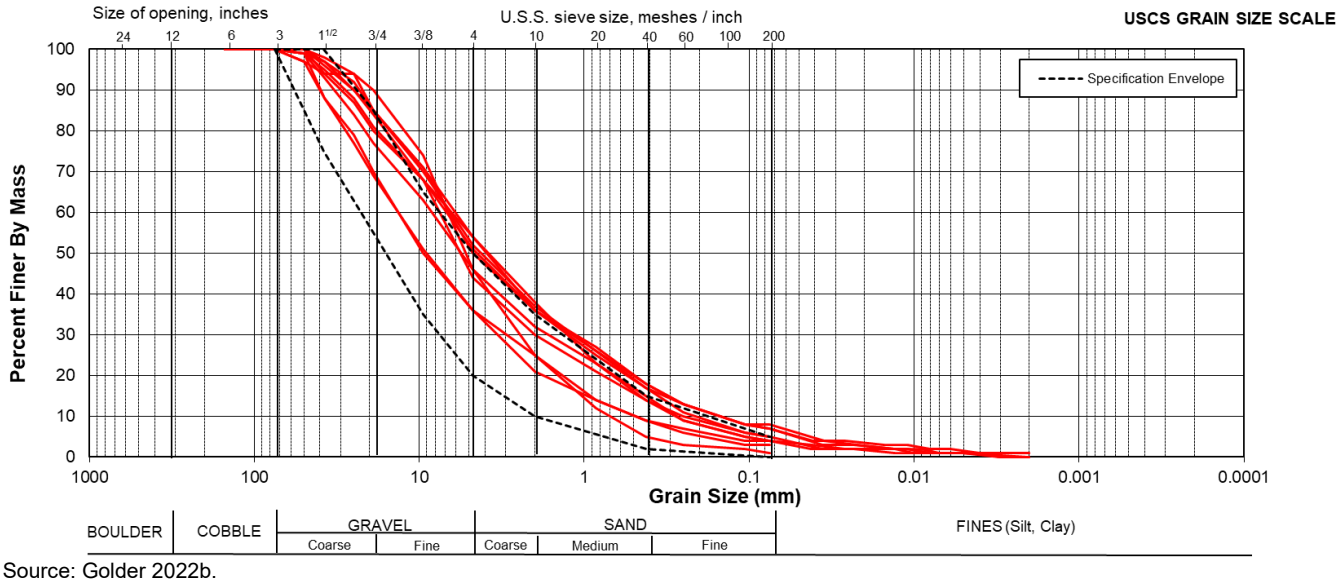
The CCR has been tested throughout construction of the embankments and, with occasional exception, found to meet filter criteria. Results from construction in 2022 were pending at the time of this AFPR and will be reported as part of the 2023 AFPR. As CCR is used for the downstream shell, the entire downstream shell acts as a filter to the till blanket.

Grain size distribution tests were performed on 11 clay blanket (till) and 10 CCR samples (including pre-construction samples) as part of the 2021 embankment raise (Golder 2022b). Results are presented in Chart 4 (till samples) and Chart 5 (CCR samples) along with the construction specification envelopes.



Source: Golder 2022b.

Chart 4: Grain Size Distribution and Specification Envelopes for Till



Source: Golder 2022b.

Chart 5: Grain Size Distribution and Specification Envelopes for Coarse Coal Refuse

Tested till samples were within the specified envelope. Four of the ten CCR samples were slightly finer than the specification. Based on the results, the placed CCR fill is considered to meet design intent in relation to providing filter compatibility to prevent the migration of fines from the clay/till layer.

In summary, results indicate that filter criteria are met between the clay blanket (till) and the CCR (with occasional exception) and between the tailings and clay blanket (till). The constructed conditions are considered to be consistent with the design intent.

5.5.3.2 Observed Performance

During construction of the embankment raise and light vehicle access road in 2022 a small (less than 2 m high) temporary containment berm for construction surface water management in the vicinity of the north abutment area of the WTD was washed away following a period of heavy rainfall in June 2022. This resulted in the WTD weir being damaged. The weir was repaired in July 2022.

Recorded flow rates at the Site C Weir and WTD Weir in the 2021/2022 reporting period are presented in Chart 6 and Chart 7, respectively. Flow rates during the reporting period were recorded by pressure transducer. Data was assessed and a number of erroneous points identified where large variations between 2 readings were observed. Such erroneous data were removed from the data set.

The flows in both weirs were generally low and within the expected range for normal operation. The peaks observed in the WTD and MTD weir data in March and April 2022 are indicative of runoff in freshet and are not considered representative of seepage from the West or Main Tailings Dams.

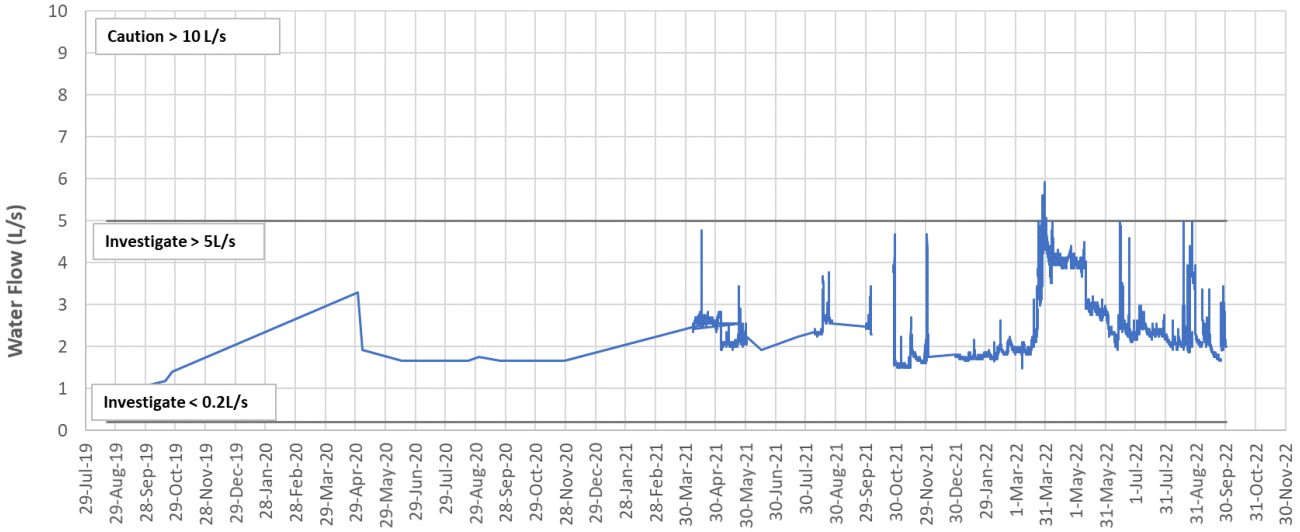


Chart 6: Main Tailings Dam (Site C) Weir Discharge

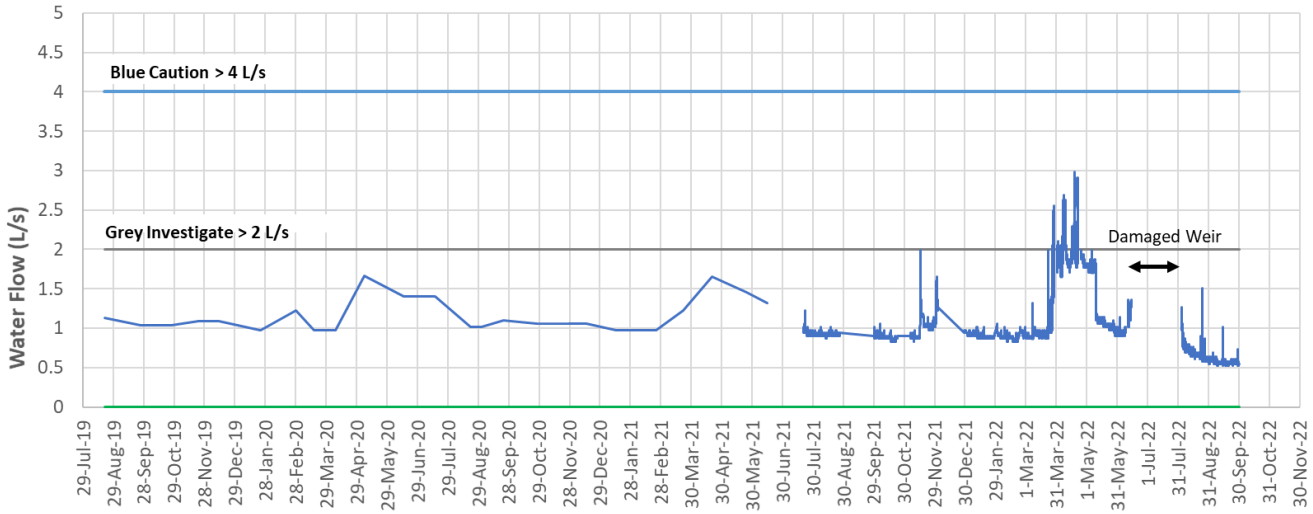


Chart 7: West Tailings Dam Weir Discharge

During the 2022 site visit, it was observed that flow in the WTD seepage collection channel and seepage from the MTD was clear and free of visible suspended solids. Seepage rates during the reporting period were within normal operating conditions, and visual observations were not indicative of conditions attributable to internal erosion.

A high-density polyethylene pipe collects surface water from the lower bench at Site C and conveys the water to the seepage collection channel at the toe of the Site C CCR stockpile (Photo 28 and Photo 29, Appendix A). This flow reports to the Site C Weir and is not measured separately. It is therefore not possible to distinguish whether flow at the Site C Weir is due to increased seepage or surface runoff from the lower bench at Site C. It would be preferable to convey the flow from the high-density polyethylene pipe away from the seepage collection channel to allow for more accurate monitoring of seepage from the MTD.

6.0 SUMMARY AND RECOMMENDATIONS

6.1 Summary of Activities

The following activities were completed during the reporting period:

- monthly (TSF) and quarterly (CCR facilities) inspections by Teck
- monthly Tailings Management Committee meetings
- internal tailings governance review in October 2022
- credible catastrophic failure mode assessment of GHO TSF and Site C and D CCR facilities
- independent Tailings Review Board meetings in August and November 2021 and May 2022
- OMS manual finalized, 6 July 2022.
- MTD tailings pipeline commissioned in February 2022.
- embankment raise construction to elevation 1,736 m completed in October 2022

6.2 Summary of Climate and Water Balance

Lower rainfall and higher snowfall during the monitoring period relative to typical years were observed but are within the historical trends and hence not significant to facility performance.

TSF water balance results for the reporting period indicate an overall increase in TSF water volume for the reporting period, which is consistent with other site recorded data and observations.

6.3 Summary of Performance and Changes

There were no significant changes in the performance of the TSF during the reporting period. Records indicate that the discharge of tailings into the GHO TSF was consistent with the normal operating conditions. There were no significant changes in surface water management and the facility had sufficient capacity to store the 72-hour probable maximum flood throughout the 2021/2022 reporting period.

A tailings beach was developed against a portion of the upstream face of the Main Tailings Dam during the reporting period.

The Main and West Tailings Dams were raised to an approximate elevation of 1,736 m, with construction completed in October 2022.

Changes to stability of the Site C or integrity during the reporting period included observation of cracking on the lowest bench of the Site C CCR facility, as a result of movement of the historic landslide at the toe. Monitoring and planned remediation was ongoing at the time of this report and does not present a safety concern to the Main Tailings Dam.

6.4 Consequence of Failure

Teck no longer adopts a classification system that has levels of potential human loss of life and instead aims to eliminate any credible risk of loss of life and reduce all other credible catastrophic risks to As Low As Reasonably Practicable. Adopting this approach meets or exceeds regulatory requirements and aligns with Teck's goal to eliminate any risk for loss of life, which is consistent with industry best practices.

6.5 Current Deficiencies and Non-conformances

Previous deficiencies and recommendations from the 2021 annual inspection report (Golder 2022a) are presented in Table 12. Closed items are shown with grey shading.

Table 12: 2022 Recommended Actions for Greenhills Tailings Storage Facility

ID Number	Deficiency	Potential Dam Safety Hazard	Priority Level	Recommended Action	Target Date	Status
2019-07	▪ OMS manual does not reflect: ▪ Current geotechnical instrumentation details including revised QPOs. ▪ Revised MAC and Teck guidance documents. ▪ Multiple coordinate grid systems appear to be used in the OMS manual.	Potential to ineffectively respond to alerts and warnings from geotechnical instrumentation.	3	Update OMS manual to: 2019-07a: remove non-functioning geotechnical instrumentation and update QPOs. 2019-07b: update based on MAC (2019) and Teck Resources (2019). 2019-07c: use a single coordinate grid system.	Q2 2022	**Completed**—OMS manual was updated in July 2022.

MTD = Main Tailings Dam; OMS = operation, maintenance, and surveillance; QPO = quantifiable performance objective; MAC = Mining Association of Canada; EPRP = Emergency Preparedness and Response Plan; CCR = coarse coal refuse; TSF = tailings storage facility.

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

7.0 CLOSING

The reader is referred to the Study Limitations section, which follows the text and forms an integral part of this report.

We trust that this report meets your present requirements. If you have any questions or requirements, please contact the undersigned.

WSP Canada

Martyn Willan, P.Eng.
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Principal Geotechnical Engineer

MW/AH/ar

https://golderassociates.sharepoint.com/sites/158994/project files/6 deliverables/issued/2022-137-r-rev0-2000-annual facility performance report_gho tsf/22516234-2022-137-r-rev0-2000-annual facility performance report_gho tsf 01mar_23.docx

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STUDY LIMITATIONS

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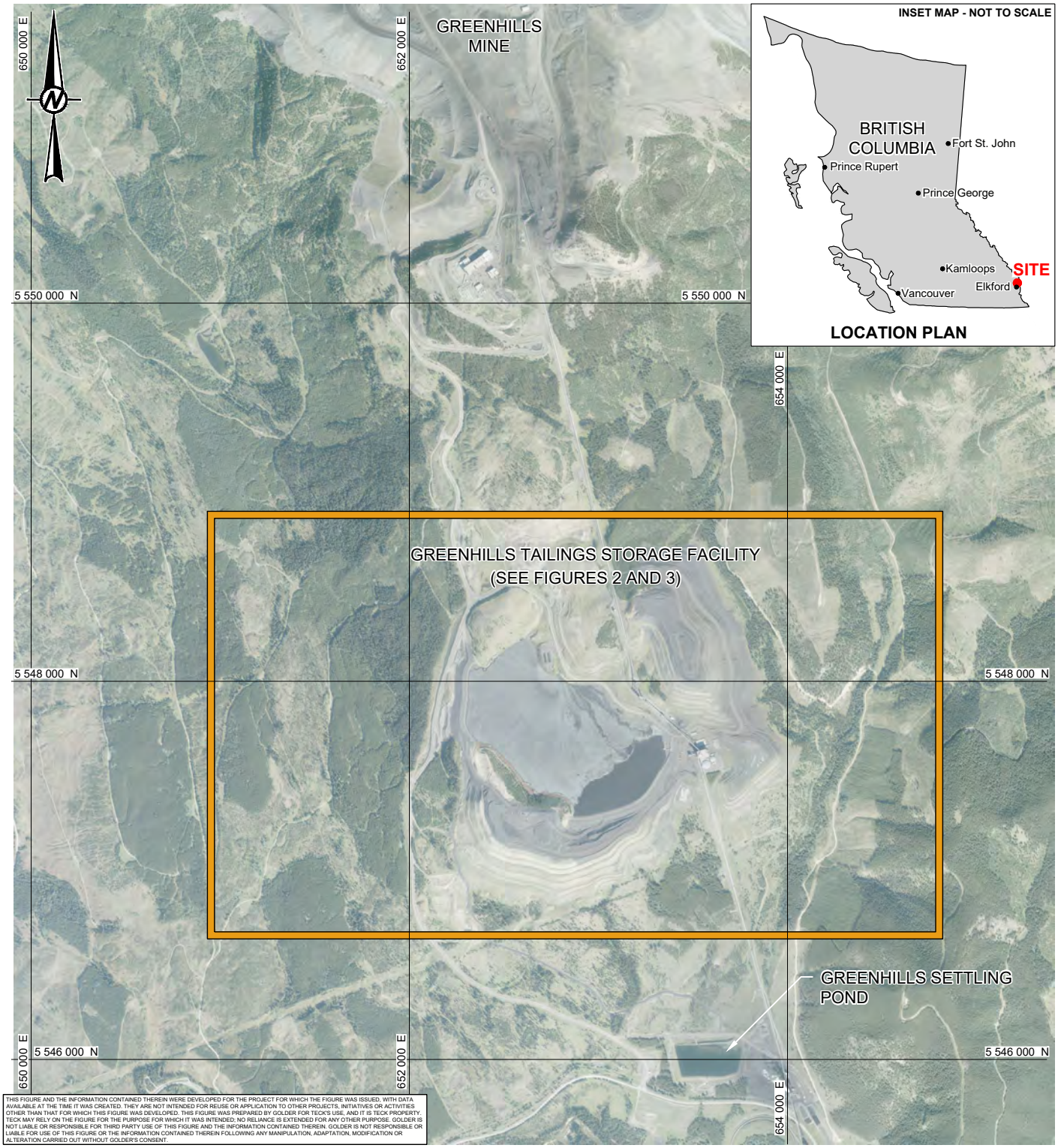
FIGURES



NOTES

1. ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATES ARE IN UTM NAD83 ZONE 11.

REFERENCE

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TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, B.C.

CONSULTANT
wsp

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DESIGNED	KA
PREPARED	EA/AW
REVIEWED	MBW
APPROVED	AJH

PROJECT
GREENHILLS TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
GREENHILLS OPERATIONS SITE PLAN

PROJECT NO.	PHASE/TASK/DOC	REV.	FIGURE
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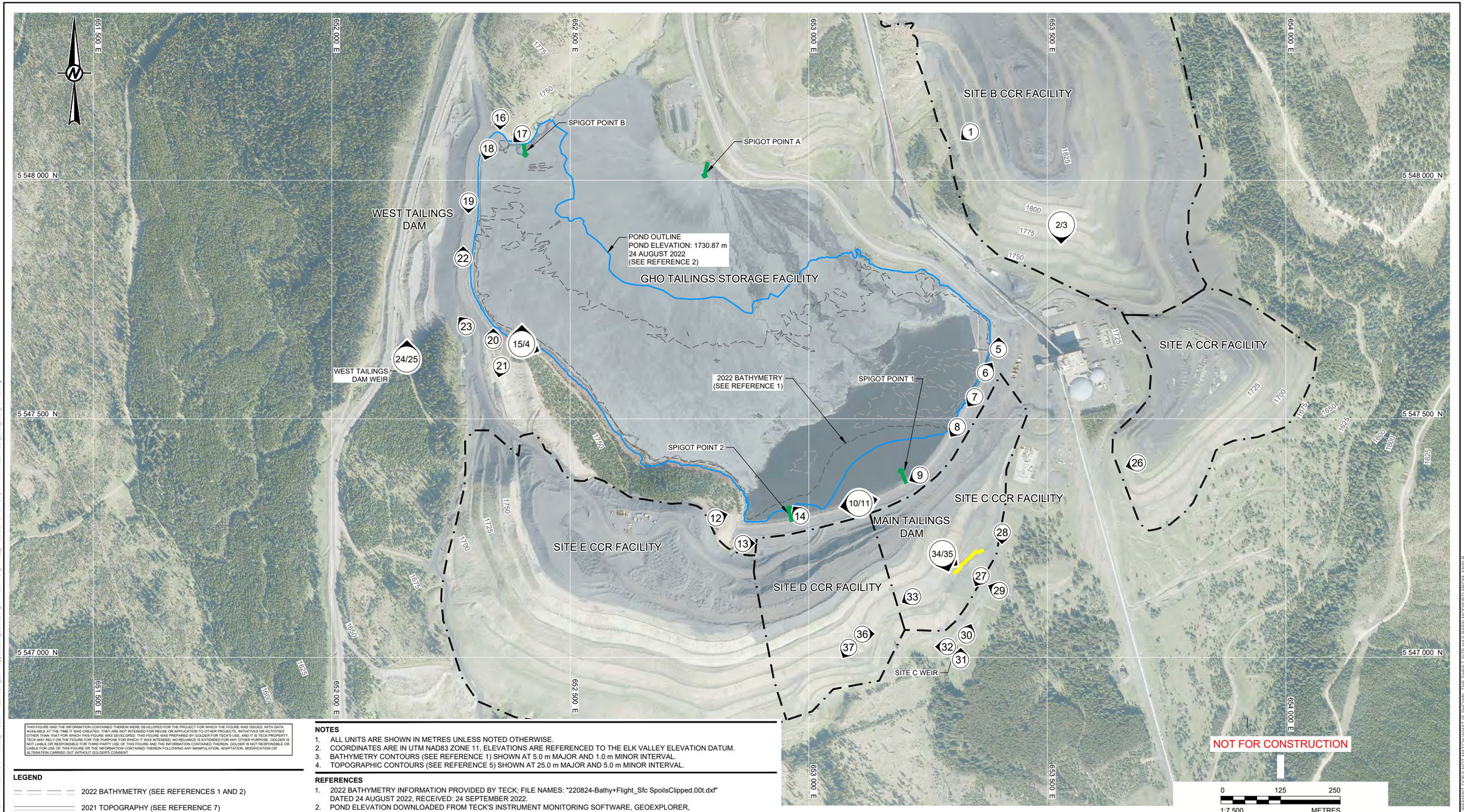


LEGEND

- 2022 BATHYMETRY (SEE REFERENCES 1 AND 2)
- 2021 TOPOGRAPHY (SEE REFERENCE 7)
- # 2022 SITE VISIT PHOTO LOCATION
- 2012 SCARP SITE C (SEE REFERENCE 6)
- COARSE COAL REFUSE (CCR) SITE BOUNDARIES
- TAILINGS DISCHARGE LOCATION
- POND OUTLINE

NOTES

1. ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATES ARE IN UTM NAD83 ZONE 11, ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.
3. BATHYMETRY CONTOURS (SEE REFERENCE 1) SHOWN AT 5.0 m MAJOR AND 1.0 m MINOR INTERVAL.
4. TOPOGRAPHIC CONTOURS (SEE REFERENCE 5) SHOWN AT 25.0 m MAJOR AND 5.0 m MINOR INTERVAL.

REFERENCES

1. 2022 BATHYMETRY INFORMATION PROVIDED BY TECK; FILE NAMES: "220824-Bathy+Flight_Sfc SpoilsClipped.00t.dxf" DATED 24 AUGUST 2022, RECEIVED: 24 SEPTEMBER 2022.
2. POND ELEVATION DOWNLOADED FROM TECK'S INSTRUMENT MONITORING SOFTWARE, GEOEXPLORER, FOR GREENHILLS OPERATIONS; FILENAME: "220927-GHO TSF Volumes.xlsm", DATED 24 AUGUST 2022, RECEIVED: 24 SEPTEMBER 2022.
3. 2021 AERIAL PHOTOGRAPHY PROVIDED BY TECK; FILES : "082J02C14.TIF", "082J02F04.tif", "082J02E01.tif", "082J02C14.tif", "082J02C13.TIF", "082J02D16.tif", "082J02C11.tif", "082J02C12.tif", "082J02D09.tif". DATES FLOWN: 22 JULY, 25 AND 26 AUGUST 2021, RECEIVED : 21 SEPTEMBER 2021.
4. VIBRATING WIRE PIEZOMETER LOCATIONS PROVIDED BY TECK; FILENAME: "01) GHO VWP - TSF.XLSM" RECEIVED: SEPTEMBER 2022.
5. PRISM AND GPS LOCATIONS PROVIDED BY TECK; FILENAMES : "221024 GHO TSF PRISM.csv" AND "221024 PRISM GPS.csv" RECEIVED: 24 OCTOBER 2022.
6. 2022 CRACKING EXTENT PROVIDED BY TECK; FILE NAME "2022-09-15_jc[1].csv", RECEIVED 27 SEPTEMBER 2022.
7. 2021 LIDAR TOPOGRAPHY GENERATED FROM DATA PROVIDED BY TECK. FILES : "082J02C14.xyz", "082J02F04.xyz", "082J02E01.xyz", "082J02C14.xyz", "082J02C13.xyz", "082J02D16.xyz", "082J02C11.xyz", 082J02C12.xyz", "082J02D09.xyz". DATES FLOWN: 22 JULY, 25 AND 26 AUGUST 2021,RECEIVED : 21 SEPTEMBER 2021.
8. 2021 VIBRATING WIRE PIEZOMETER AND INCLINOMETER LOCATIONS FROM GEOTECHNICAL INVESTIGATION AT SITE C CCR FACILITY; REPORT NO.: 21455774-2021-157-R-Rev0-1200, ISSUED: 28 OCTOBER 2021.

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, B.C.

CONSULTANT
wsp

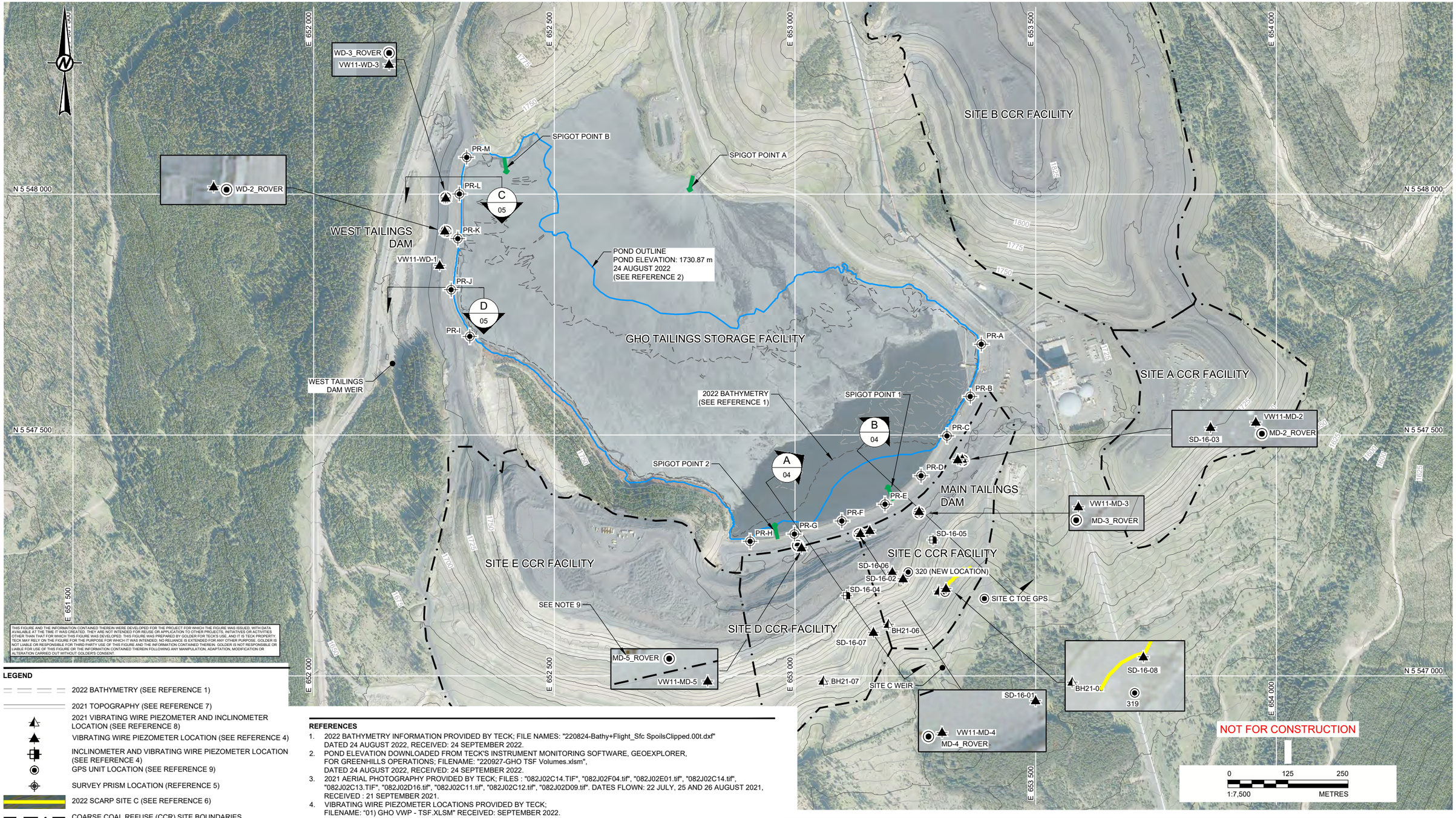
YYYY-MM-DD	2023-02-07
DESIGNED	KA
PREPARED	EA/AW
REVIEWED	MBW
APPROVED	AJH

PROJECT
GREENHILLS TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
2022 SITE VISIT PHOTOGRAPH LOCATIONS

PROJECT NO.	PHASE/TASK/DOC	REV.	FIGURE
22516234	2000/2001/137	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- 2022 BATHYMETRY (SEE REFERENCE 1)
- 2021 TOPOGRAPHY (SEE REFERENCE 7)
- 2021 VIBRATING WIRE PIEZOMETER AND INCLINOMETER LOCATION (SEE REFERENCE 8)
- VIBRATING WIRE PIEZOMETER LOCATION (SEE REFERENCE 4)
- INCLINOMETER AND VIBRATING WIRE PIEZOMETER LOCATION (SEE REFERENCE 4)
- GPS UNIT LOCATION (SEE REFERENCE 9)
- SURVEY PRISM LOCATION (REFERENCE 5)
- 2022 SCARP SITE C (SEE REFERENCE 6)
- COARSE COAL REFUSE (CCR) SITE BOUNDARIES
- TAILINGS DISCHARGE LOCATION
- POND OUTLINE

NOTES

1. ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATES ARE IN UTM NAD83 ZONE 11, ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.
3. BATHYMETRY CONTOURS (SEE REFERENCE 1) SHOWN AT 5.0 m MAJOR AND 1.0 m MINOR INTERVAL.
4. TOPOGRAPHIC CONTOURS (SEE REFERENCE 7) SHOWN AT 25.0 m MAJOR AND 5.0 m MINOR INTERVAL.

REFERENCES

1. 2022 BATHYMETRY INFORMATION PROVIDED BY TECK; FILE NAMES: "220824-Bathy+Flight_Sfc SpoilsClipped.00t.dxf" DATED 24 AUGUST 2022, RECEIVED: 24 SEPTEMBER 2022.
2. POND ELEVATION DOWNLOADED FROM TECK'S INSTRUMENT MONITORING SOFTWARE, GEOEXPLORER, FOR GREENHILLS OPERATIONS; FILENAME: "220927-GHO TSF Volumes.xlsm", DATED 24 AUGUST 2022, RECEIVED: 24 SEPTEMBER 2022.
3. 2021 AERIAL PHOTOGRAPHY PROVIDED BY TECK; FILES : "082J02C14.TIF", "082J02F04.tif", "082J02E01.tif", "082J02C14.tif", "082J02C13.TIF", "082J02D16.tif", "082J02C11.tif", "082J02C12.tif", "082J02D09.tif". DATES FLOWN: 22 JULY, 25 AND 26 AUGUST 2021, RECEIVED : 21 SEPTEMBER 2021.
4. VIBRATING WIRE PIEZOMETER LOCATIONS PROVIDED BY TECK; FILENAME: "01) GHO VWP - TSF.XLSM" RECEIVED: SEPTEMBER 2022.
5. PRISM AND GPS LOCATIONS PROVIDED BY TECK; FILENAMES : "221024 GHO TSF PRISM.csv" AND "221024 PRISM GPS.csv" RECEIVED: 24 OCTOBER 2022.
6. 2022 CRACKING EXTENT PROVIDED BY TECK; FILE NAME "2022-09-15_jc[1].csv", RECEIVED 27 SEPTEMBER 2022.
7. 2021 LIDAR TOPOGRAPHY GENERATED FROM DATA PROVIDED BY TECK; FILES : "082J02C14.xyz", "082J02F04.xyz", "082J02E01.xyz", "082J02C14.xyz", "082J02C13.xyz", "082J02D16.xyz", "082J02C11.xyz", 082J02C12.xyz", "082J02D09.xyz". DATES FLOWN: 22 JULY, 25 AND 26 AUGUST 2021,RECEIVED : 21 SEPTEMBER 2021.
8. 2021 VIBRATING WIRE PIEZOMETER AND INCLINOMETER LOCATIONS FROM GEOTECHNICAL INVESTIGATION AT SITE C CCR FACILITY; REPORT NO.: 21455774-2021-157-R-Rev0-1200, ISSUED: 28 OCTOBER 2021.
9. SITE C TOE GPS : MD-5 ROVER GPS INSTRUMENT RELOCATED FROM THE MAIN TAILINGS DAM TO THE TOE OF SITE C CCR FACILITY, IN JUNE 2022
   GPS 320 INSTRUMENT WAS RELOCATED TO THE INTERMEDIATE BENCH ABOVE THE BENCH WHERE THE CRAKING WAS OBSERVED AT SITE C CCR FACILITY IN MAY 2022.

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, B.C.

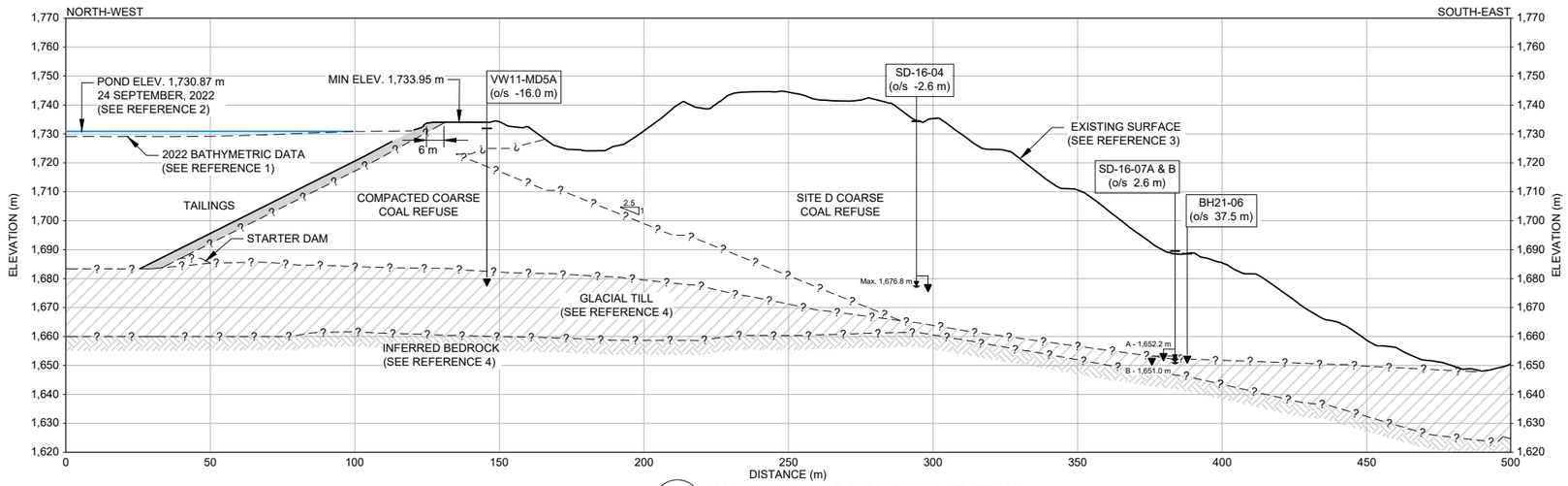
CONSULTANT
wsp

YYYY-MM-DD	2023-02-07
DESIGNED	KA
PREPARED	EA/AW
REVIEWED	MBW
APPROVED	AJH

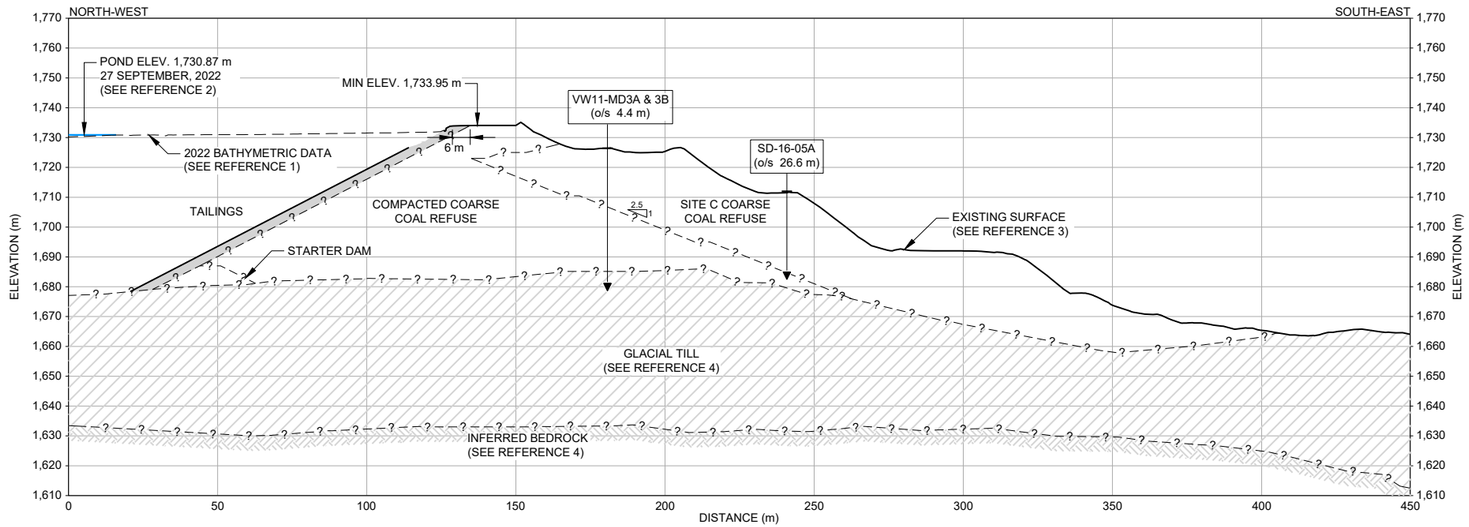
PROJECT
GREENHILLS TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
TAILINGS STORAGE FACILITY INSTRUMENTATION LOCATIONS

PROJECT NO.	PHASE/TASK/DOC	REV.	FIGURE
22516234	2000/2001/137	0	3



SCALE 1:2,000 m — A / 03 — MAIN TAILINGS DAM CROSS-SECTION



SCALE 1:2,000 m — B / 03 — MAIN TAILINGS DAM CROSS-SECTION

LEGEND

- 2022 BATHYMETRY (SEE REFERENCE 1)
- 2021 LIDAR SURVEY (SEE REFERENCE 3)
- POND WATER LEVEL (SEE REFERENCE 2)
- INFERRED CONTACT
- CLAY BLANKET
- GLACIAL TILL
- BEDROCK
- ▼ VIBRATING WIRE PIEZOMETER TIP ELEVATION (SEE REFERENCE 5)

NOTES

1. ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
2. MATERIAL BOUNDARIES ARE APPROXIMATE.
3. ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.

REFERENCES

1. 2022 BATHYMETRY INFORMATION PROVIDED BY TECK;
   FILE NAMES: "220824-Bathy+Flight_Sfc SpoilsClipped.00t.dxf",
   DATED 24 AUGUST 2022, RECEIVED: 24 SEPTEMBER 2022.
2. POND ELEVATION DOWNLOADED FROM TECK'S INSTRUMENT MONITORING SOFTWARE, GEOEXPLORER, FOR GREENHILLS OPERATIONS:
   FILENAME: "220927-GHO TSF Volumes.xlsm", OBSERVED: 24 SEPTEMBER 2022.
3. 2021 LIDAR TOPOGRAPHY GENERATED FROM DATA PROVIDED BY TECK;
   FILES : "082J02C14.xyz", "082J02F04.xyz", "082J02E01.xyz", "082J02C14.xyz", "082J02C13.xyz", "082J02D16.xyz", "082J02C11.xyz", "082J02C12.xyz", "082J02D09.xyz".
   DATES FLOWN: 22 JULY, 25 AND 26 AUGUST 2021,RECEIVED : 21 SEPTEMBER 2021.
4. MAIN DAM SECTION INFERRED GLACIAL TILL AND INFERRED BEDROCK BASED ON HARDY (1980) REPORT ON TAILINGS DAM GREENHILLS SURFACE COAL MINING PROJECT AND GOLDER 2016 MAIN TAILINGS DAM INVESTIGATION.
   GOLDER REFERENCE NUMBER: 1658561-2017-021-R-REV0-3000
5. VIBRATING WIRE PIEZOMETER MAXIMUM OBSERVATIONS FROM DATA BETWEEN 1 SEPTEMBER 2021 TO 31 AUGUST 2022 (WHERE CONFIRMED).

NOT FOR CONSTRUCTION

0 50 100
1:2,000 METRES

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, B.C.

CONSULTANT
wsp

YYYY-MM-DD	2023-02-07
DESIGNED	KA
PREPARED	EA/AW
REVIEWED	MBW
APPROVED	AJH

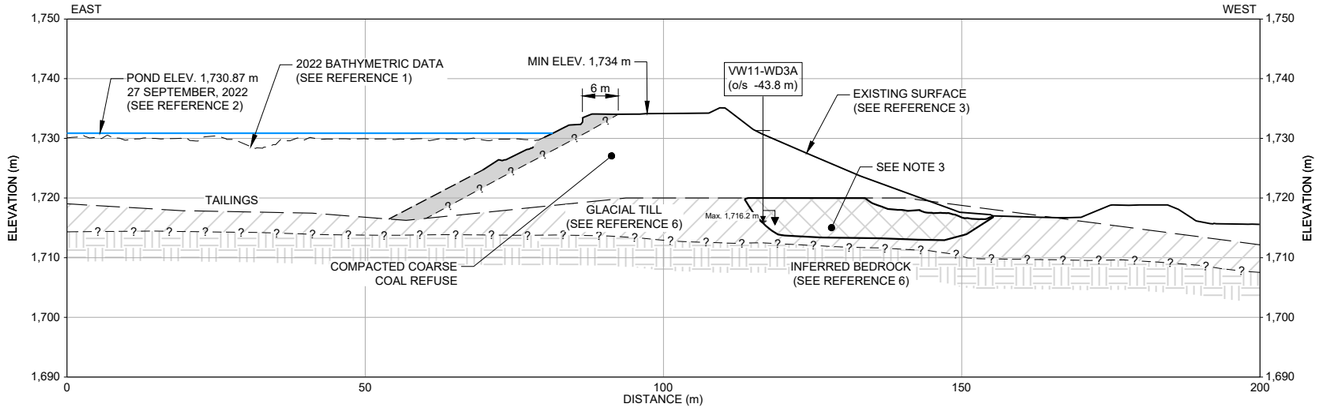
PROJECT
GREENHILLS TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
MAIN TAILINGS DAM - CROSS-SECTIONS A AND B

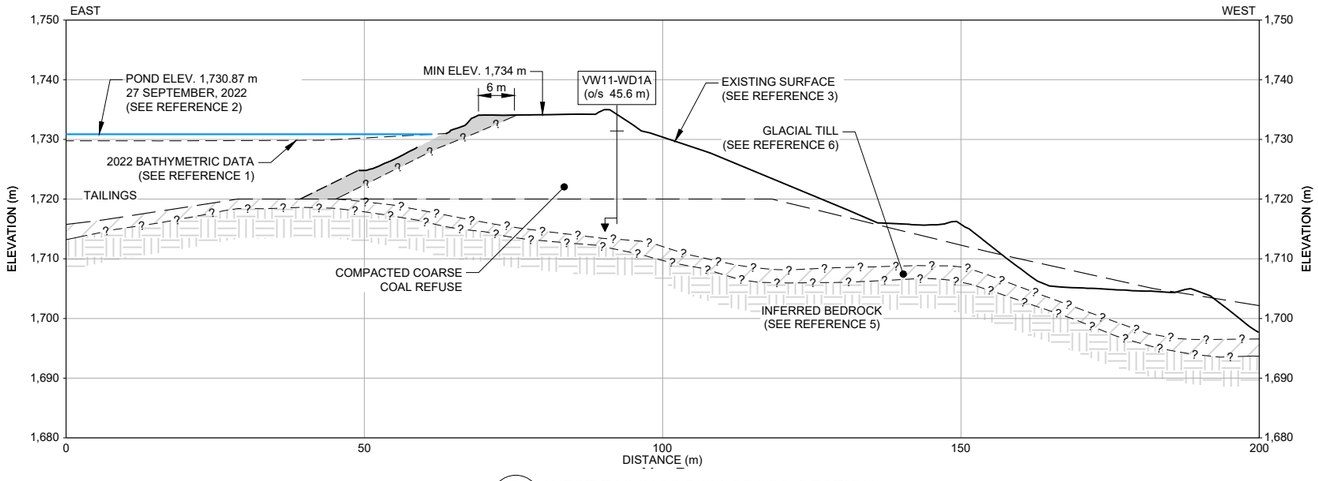
PROJECT NO.	PHASE/TASK/DOC	REV.	FIGURE
22516234	2000/2001/137	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm



SCALE 1:1,000 m — C 03 — WEST TAILINGS DAM CROSS-SECTION



SCALE 1:1,000 m — D 03 — WEST TAILINGS DAM CROSS-SECTION

LEGEND

- 2022 BATHYMETRY (SEE REFERENCE 1)
- 2021 LIDAR SURVEY (SEE REFERENCE 3)
- APPROXIMATE ORIGINAL GROUND SURFACE (SEE REFERENCE 5)
- INFERRED CONTACT
- POND WATER LEVEL (SEE REFERENCE 2)
- CLAY BLANKET
- WASTE ROCK
- GLACIAL TILL
- BEDROCK
- ▼ VIBRATING WIRE PIEZOMETER TIP ELEVATION (SEE REFERENCE 6)

NOTES

1. ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
2. MATERIAL BOUNDARIES ARE APPROXIMATE.
3. LOOSE MATERIAL STRIPPED FROM FOUNDATION AND BACKFILLED WITH WASTE ROCK BASED ON GOLDER 2016 *GREENHILLS OPERATIONS MAIN AND WEST TAILINGS DAMS*. REPORT PREPARED FOR TECK COAL LIMITED, GHO. REPORT NO. 1313960014.3000. SUBMITTED 26 JANUARY 2016.
4. ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.

REFERENCES

1. 2022 BATHYMETRY INFORMATION PROVIDED BY TECK;
FILE NAMES: "220824-Bathy+Flight_Sfc SpoilsClipped.00t.dxf",
DATED 24 AUGUST 2022, RECEIVED: 24 SEPTEMBER 2022.
2. POND ELEVATION DOWNLOADED FROM TECK'S INSTRUMENT MONITORING SOFTWARE, GEOEXPLORER, FOR GREENHILLS OPERATIONS:
FILENAME: "220927-GHO TSF Volumes.xlsm", RECEIVED: 24 SEPTEMBER 2022.
3. 2021 LIDAR TOPOGRAPHY GENERATED FROM DATA PROVIDED BY TECK;
FILES : "082J02C14.xyz", "082J02F04.xyz", "082J02E01.xyz", "082J02C14.xyz", "082J02C13.xyz", "082J02D16.xyz", "082J02C11.xyz", "082J02C12.xyz", "082J02D09.xyz".
DATES FLOWN: 22 JULY, 25 AND 26 AUGUST 2021,RECEIVED : 21 SEPTEMBER 2021.
4. 2018 AS-BUILT INFORMATION PROVIDED BY TECK;
FILE NAME: "2018-10-02 GHO DAM - VOLUME CALC.dxf", DATED: 02 OCTOBER 2018.
5. SEPTEMBER 2014 GROUND SURFACE PROVIDED BY TECK;
RECEIVED: 23 SEPTEMBER 2014.
6. WEST DAM SECTION TYPICAL STRATIGRAPHY OBTAINED FROM GOLDER. 2014. *GREENHILLS OPERATIONS WEST TAILING DAM RAISE TO ELEVATION 1,735 m.* REPORT PREPARED FOR TECK GHO. REPORT NO. 13-1321-0018. SUBMITTED 11 FEBRUARY 2014.
7. VIBRATING WIRE PIEZOMETER MAXIMUM OBSERVATIONS FROM DATA BETWEEN 1 SEPTEMBER 2021 TO 31 AUGUST 2022 (WHERE CONFIRMED).

NOT FOR CONSTRUCTION

0 25 50
1:1,000 METRES

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, B.C.

CONSULTANT
wsp

YYYY-MM-DD	2023-02-07
DESIGNED	KA
PREPARED	EA/AW
REVIEWED	MBW
APPROVED	AJH

PROJECT
GREENHILLS TAILINGS STORAGE FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
WEST TAILINGS DAM - CROSS-SECTIONS C AND D

PROJECT NO.	PHASE/TASK/DOC	REV.	FIGURE
22516234	2000/2001/137	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25 mm

APPENDIX A

2022 Site Inspection Photographs

Photograph 1: Tailings Storage Facility – Overview, Looking Southwest, 30 August 2022

Photograph 2: Main Tailings Dam – Overview, Looking Southwest, 30 August 2022

Photograph 3: Main Tailings Dam and Process Plant – Overview, Looking South, 30 August 2022

Photograph 4: Main Tailings Dam – Overview; Looking Southeast, 30 August 2022

Photograph 5: Main Tailings Dam, North Abutment – Looking North, 30 August 2022

Photograph 6: Main Tailings Dam – Upstream Slope and Crest, Looking North, 30 August 2022

Photograph 7: Main Tailings Dam – Upstream Slope and Crest, Looking Southwest, 30 August 2022

Photograph 8: Main Tailings Dam – Upstream Slope and Crest, Looking Southwest, 30 August 2022

Photograph 9: Main Tailings Dam – Upstream Slope and Beach, Looking Southwest, 30 August 2022

Photograph 10: Main Tailings Dam – Upstream Slope, Crest and Beach, looking Southwest, 30 August 2022

Photograph 11: Main Tailings Dam – Upstream Slope; Looking Northeast, 30 August 2022

Photograph 12: Main Tailings Dam – Upstream Slope and Crest, Looking Northeast, 30 August 2022

Photograph 13: Main Tailings Dam – Downstream Slope and Toe Area, Looking East, 30 August 2022

Photograph 14: West Tailings Dam – Pond, Looking West, 30 August 2022

Photograph 15: West Tailings Dam – Overview; Looking North, 30 August 2022

Photograph 16: West Tailings Dam – Upstream Slope and Crest; Looking South, 30 August 2022

Photograph 17: West Tailings Dam – Upstream Slope and Crest; Looking Southwest, 30 August 2022

Photograph 18: West Tailings Dam – Upstream Slope and Crest; Looking Southwest, 30 August 2022

Photograph 19: West Tailings Dam – Upstream Slope, Looking South, 30 August 2022

Photograph 20: West Tailings Dam – South Abutment; Looking North, 30 August 2022

Photograph 21: Construction of Process Plant Light Vehicle Access Road, Looking Southwest, 30 August 2022

Photograph 22: West Tailings Dam – Downstream Slope and Vibrating Wire Piezometer; Looking North, 30 August 2022

Photograph 23: West Tailings Dam – Downstream Slope; Looking Northwest, 30 August 2022

Photograph 24: West Tailings Dam – Seepage Weir, Looking North, 30 August 2022

Photograph 25: West Tailings Dam – Seepage Weir, Looking North, 30 August 2022

Photograph 26: Site C CCR Facility – Downstream Slope, Looking Southwest, 30 August 2022

Photograph 27: Site C CCR Facility – Smart Drain at Toe, Looking Southwest, 30 August 2022

Photograph 28: Site C CCR Facility – Toe area and surface water pipe, Looking South, 30 August 2022

Photograph 29: Site C CCR Facility – Underdrain Seepage Flow, Looking Northwest, 30 August 2022

Photograph 30: Site C CCR Facility – Smart Drain at Toe, Looking Northeast, 30 August 2022

Photograph 31: Site C CCR Facility – Partial sloughing into Smart Drain at Weir Inlet, Looking North, 30 August 2022

Photograph 32: Site C CCR Facility – Toe Area and Weir Discharge, Looking west, 30 August 2022

Photograph 33: Site C/D CCR Facility – Downstream Slopes, Looking southwest, 30 August 2022

Photograph 34: Site C CCR Facility – Surface Water Ponding on Intermediate Bench Above Bench with Observed Cracking, Looking south, 30 August 2022

Photograph 35: Site C CCR Facility – Surface Water Ponding on Intermediate Bench Above Bench with Observed Cracking, Looking southeast, 30 August 2022

Photograph 36: Site D CCR Facility – Downstream Slope and Toe Area, Looking southeast, 30 August 2022

Photograph 37: Site D CCR Facility – Downstream Slope and Toe Area, Looking southwest, 30 August 2022

APPENDIX B

2022 Site Visit Inspection Reports

Client:	**Teck Coal Limited**	**By:**	**Andy Haynes, P.Eng. and Martyn Willan, P.Eng.**
Project:	**GHO 2022 Annual Facility Performance Review**	**Date:**	**30 August 2022**
Location:	**Main Tailings Dam**		

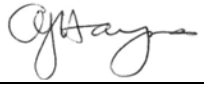
GENERAL INFORMATION

Dam Type: Compacted CCR Shell with Upstream Till Blanket

Weather Conditions:	Sunny	**Temp:**	20°C

INSPECTION ITEM	OBSERVATIONS/DATA	PHOTOGRAPH	COMMENTS & OTHER DATA
1. DAM CREST			
1.1 Crest Elevation (Till)	1,734 m	2,3,5,6,7,8,9,10,11,13	Crest elevation from construction record report (Golder 2022b). 1,736 m dam raise construction in progress.
1.2 Reservoir Level / Freeboard	1,731 m Approximately 3.5 m freeboard.		Pond level from GHO GPS 313 reading on 30 August 2022.
1.3 Distance to Tailings Pond (if applicable)	Approximately 20 to 90 m long beach.	8,9,10,11,13	Beach against upstream slope near MTD spigot points 2 and 3. Water against upstream slope near reclaim barge.
1.4 Surface Cracking	None observed.		
1.5 Unexpected Settlement	None observed.		
1.6 Lateral Movement	None observed.		
1.7 Other Unusual Conditions	None observed.		
2. UPSTREAM SLOPE			
2.1 Slope Angle	2:1	5,6,7, 8, 9, 10, 11,13	
2.2 Signs of Erosion	None observed.		
2.3 Signs of Movement (Deformation)	None observed.		
2.4 Cracks	None observed.		
2.5 Face Liner Condition (if applicable)	Good Condition where observed.		Riprap protection placed on portions following construction.

INSPECTION ITEM	OBSERVATIONS/DATA	PHOTOGRAPH	COMMENTS & OTHER DATA
2.5 Other Unusual Conditions	None observed.		
3. DOWNSTREAM SLOPE			
3.1 Slope Angle	2.5:1	14,26,33,36,37	
3.2 Signs of Erosion	None observed.		
3.3 Signs of Movement (Deformation)	None observed.		
3.4 Cracks	Yes (in CCR spoil that abuts the dam).		Cracking was observed on the lower bench of Site C spoil that abuts the Main Dam.
3.5 Seepage or Wet Areas	Ponded water observed on the bench above location of cracking at Site C.	34,35	
3.6 Vegetation Growth	Not of concern.		
3.7 Other Unusual Conditions	None observed.		
4. DOWNSTREAM TOE AREA		27, 28, 29, 30, 31, 32, 37	
4.1 Seepage from Dam	Seepage/surface water runoff observed from Site C rockdrain and in Smart Ditch channel.	29, 30, 31	
4.2 Signs of Erosion	Erosion of natural ground downstream of Site C from surface water runoff reactivating movement of active landslide on natural ground east of Site C.		
4.3 Signs of Turbidity in Seepage Water	None observed.		
4.4 Discoloration/Staining	Iron staining in seepage.	29, 30, 31	
4.5 Outlet Operating Problem (if applicable)	Sloughing into Smart Ditch.	31	Remove sediment from collection channel as part of routine maintenance.
4.6 Other Unusual Conditions	None		
5. ABUTMENTS		5,10	
5.1 Seepage at Contact Zone (abutment/embankment)	None observed.		
5.2 Signs of Erosion	None observed.		
5.3 Excessive Vegetation	None observed.		
5.4 Presence of Animal Burrows	None observed.		
5.5 Other Unusual Conditions	None observed.		
6. RESERVOIR			
6.1 Stability of Slopes	Satisfactory.	5, 6, 7, 8, 9, 10, 11, 13	
6.2 Floating Debris	None observed.		
6.3 Other Unusual Conditions	None observed.		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	n/a		

INSPECTION ITEM	OBSERVATIONS/DATA	PHOTOGRAPH	COMMENTS & OTHER DATA
8. INSTRUMENTATION			
8.1 Piezometers	Yes		27 installed
8.2 Settlement Cells	None		
8.3 Thermistors	None		
8.4 Survey Monuments / GPS Units	Yes		6 GPS and 8 Survey Prisms installed. Removed at the time of the 2022 site visit for construction.
8.5 Accelerograph	None		
8.6 Inclinometer	Yes		5 installed
8.7 Weirs and Flow Monitors	Site C weir (2.5 L/s)		Weir reading on 30 August 2022.
8.8 Data Logger(s)	Yes		Installed for various instruments.
8.9 Other			GPS 313 on barge to monitor pond level. Visual freeboard indicator removed during 2021 dam raise construction and not reinstated.
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Manual 9.1.1 OMS Manual exists	Yes		GHO SP&P No. 1543 (GHO 2022)
9.1.2 OMS Plan reflects current dam conditions	Yes		GHO SP&P No. 1543 (GHO 2022)
9.1.3 Date of last revision	6 July 2022		-
9.2 Emergency Preparedness and Response Plan (EPRP) 9.2.1 EPRP Exists	Yes		GHO SP&P No. 1583 (GHO 2021b)
9.2.2 EPRP Reflects Current Conditions	No		Update in progress.
9.2.3 Date of Last Revision	24 June 2021		-
9.2 Tailings and Water Retaining Structures (TWRS) Management Plan 9.2.1 TWRS Management Plan Exists	Yes		Draft issued May 2020. Finalization of this document was on hold at the time of this report.
10. NOTES Dam raise construction to 1,736 m was ongoing during this site visit.			
Inspector's Signature		**Date:**	1 March 2023

Client:	**Teck Coal Limited**	**By:**	**Andy Haynes, P.Eng. and Martyn Willan, P.Eng.**
Project:	**GHO 2022 Annual Facility Performance Review**	**Date:**	**30 August 2022**
Location:	**West Tailings Dam**		

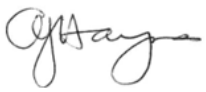
GENERAL INFORMATION

Dam Type: Compacted CCR shell with upstream till blanket

Weather Conditions:	Sunny	**Temp:**	20°C

INSPECTION ITEM	OBSERVATIONS/DATA	PHOTO	COMMENTS & OTHER DATA
1. DAM CREST			
1.1 Crest Elevation (Till)	1,734 m	15,16,18,19,20	Crest elevation from construction record report (Golder 2022b). 1,736 m dam raise construction in progress.
1.2 Reservoir Level / Freeboard	1,731 m Approximately 3.5 m freeboard.		Pond level from GHO GPS 313 reading on 30 August 2022.
1.3 Distance to Tailings Pond (if applicable)	Water against upstream slope.		
1.4 Surface Cracking	None observed.		
1.5 Unexpected Settlement	None observed.		
1.6 Lateral Movement	None observed.		
1.7 Other Unusual Conditions	None observed.		
2. UPSTREAM SLOPE			
2.1 Slope Angle	2:1	15,16,18,19	
2.2 Signs of Erosion	None observed.		
2.3 Signs of Movement (Deformation)	None observed.		
2.4 Cracks	None observed.		
2.5 Face Liner Condition (if applicable)	Good Condition where observed.		Riprap protection placed on portions following construction.
2.6 Other Unusual Conditions	None.		

INSPECTION ITEM	OBSERVATIONS/DATA	PHOTO	COMMENTS & OTHER DATA
3. DOWNSTREAM SLOPE			
3.1 Slope Angle	2.5:1	22,23	
3.2 Signs of Erosion	None observed.		
3.3 Signs of Movement (Deformation)	None observed.		
3.4 Cracks	None observed.		
3.5 Seepage or Wet Areas	None observed.		
3.6 Vegetation Growth	Not of concern.		
3.7 Other Unusual Conditions	Construction of Process Plant Light Vehicle Access Road in progress.	21	
4. DOWNSTREAM TOE AREA			
4.1 Seepage from Dam	Seepage observed in West Dam Weir.	24,25	
4.2 Signs of Erosion	None observed.		
4.3 Signs of Turbidity in Seepage Water	None observed.		
4.4 Discoloration/Staining	None observed.		
4.5 Outlet Operating Problem (if applicable)	n/a		
4.6 Other Unusual Conditions	None observed.		
5. ABUTMENTS		15,16,20	
5.1 Seepage at Contact Zone (abutment/embankment)	None observed.		
5.2 Signs of Erosion	None observed.		
5.3 Excessive Vegetation	None observed.		
5.4 Presence of Animal Burrows	None observed.		
5.5 Other Unusual Conditions	Incomplete fill area.	20	CCR placement at the south abutment area to original ground to be completed as part of construction.
6. RESERVOIR			
6.1 Stability of Slopes	Satisfactory.	15,16,18,19	
6.2 Floating Debris	None observed.		
6.3 Other Unusual Conditions	None observed.		
7. EMERGENCY SPILLWAY/ OUTLET STRUCTURE	n/a		
8. INSTRUMENTATION			
8.1 Piezometers	Yes	22	6 installed.
8.2 Settlement Cells	None		
8.3 Thermistors	None		
8.4 Survey Monuments / GPS Units	Yes	18,19	2 GPS units and 5 survey prisms installed. Removed at the time of the 2022 site visit for construction.

INSPECTION ITEM	OBSERVATIONS/DATA	PHOTO	COMMENTS & OTHER DATA
8.5 Accelerograph	None		
8.6 Inclinometer	None		
8.7 Weirs and Flow Monitors	West Dam Weir (0.6 L/s)	24,25	Weir reading on 30 August 2022.
8.8 Data Logger(s)	Yes		Installed for various instruments.
8.9 Other	None		
9. DOCUMENTATION			
9.1 Operation, Maintenance and Surveillance (OMS) Manual 9.1.1 OMS Manual exists	Yes		GHO SP&P No. 1543 (GHO 2022)
9.1.2 OMS Plan reflects current dam conditions	Yes		GHO SP&P No. 1543 (GHO 2022)
9.1.3 Date of last revision	6 July 2022		-
9.2 Emergency Preparedness and Response Plan (EPRP) 9.2.1 EPRP Exists	Yes		GHO SP&P No. 1583 (GHO 2021b)
9.2.2 EPRP Reflects Current Conditions	No		Update in progress.
9.2.3 Date of Last Revision	24 June 2021		-
9.3 Tailings and Water Retaining Structures (TWRS) Management Plan 9.3.1 TWRS Management Plan Exists	Yes		Draft issued May 2020. Finalization of this document was on hold at the time of this report.
10. NOTES 1,736 m dam raise construction in progress.			
Inspector's Signature		**Date:**	1 March 2023

APPENDIX C

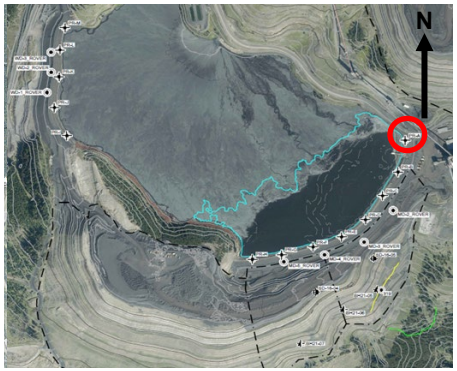
Instrumentation Data

C1: Prism Data

C2: Vibrating Wire Piezometer Data

C3: GPS Data

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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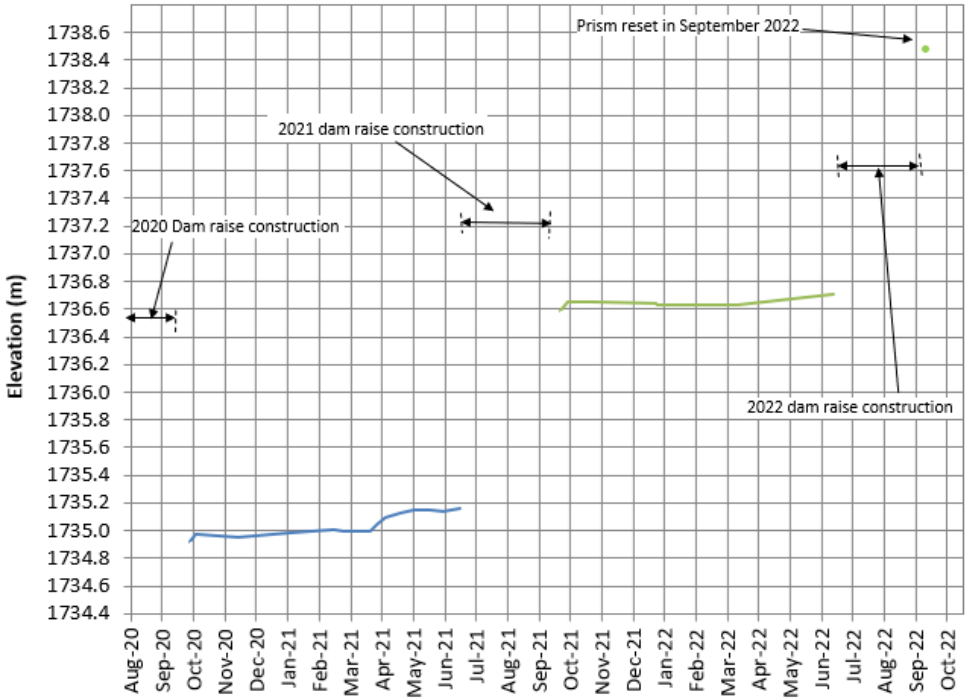

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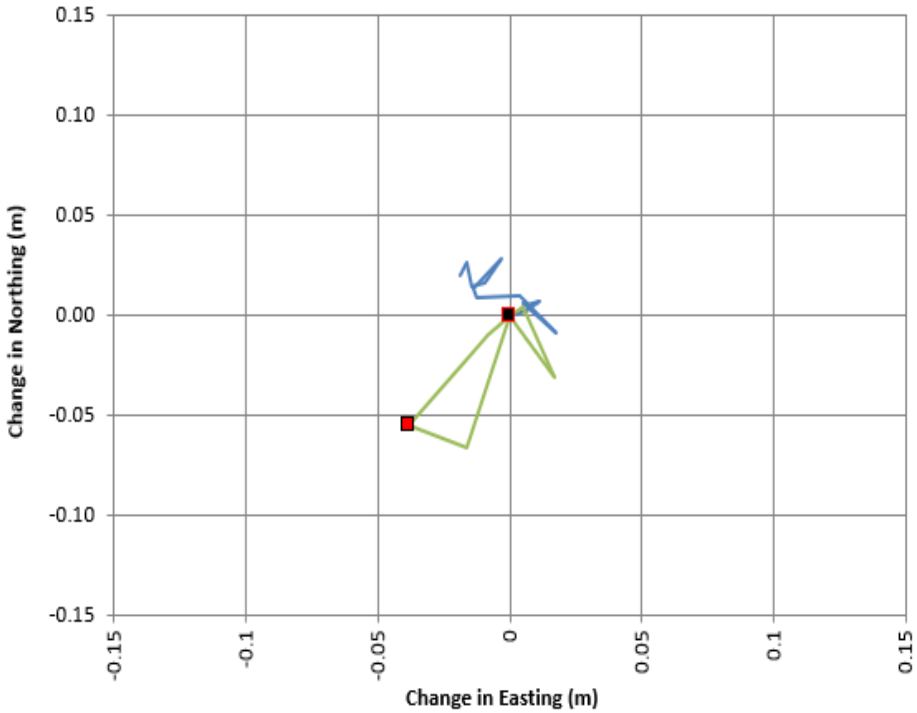

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CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

CONSULTANT
wsp

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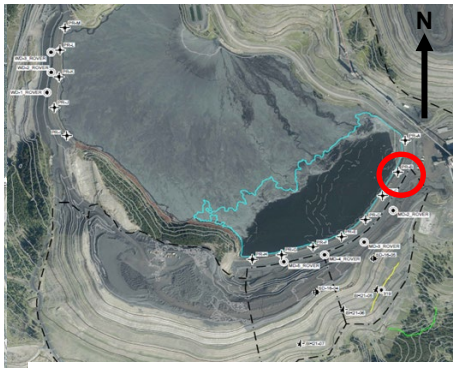
DESIGN	DM
REVIEW	KA/MBW
APPROVED	AJH

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
MAIN TAILINGS DAM - PRISM A
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001/137**	**0**	**C1-1**

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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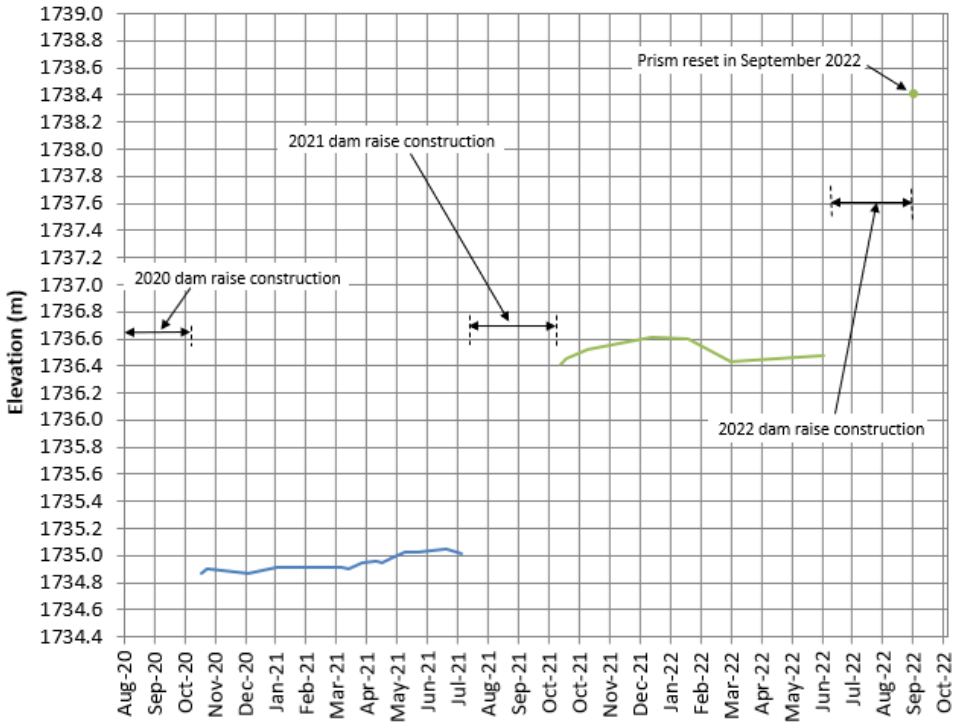

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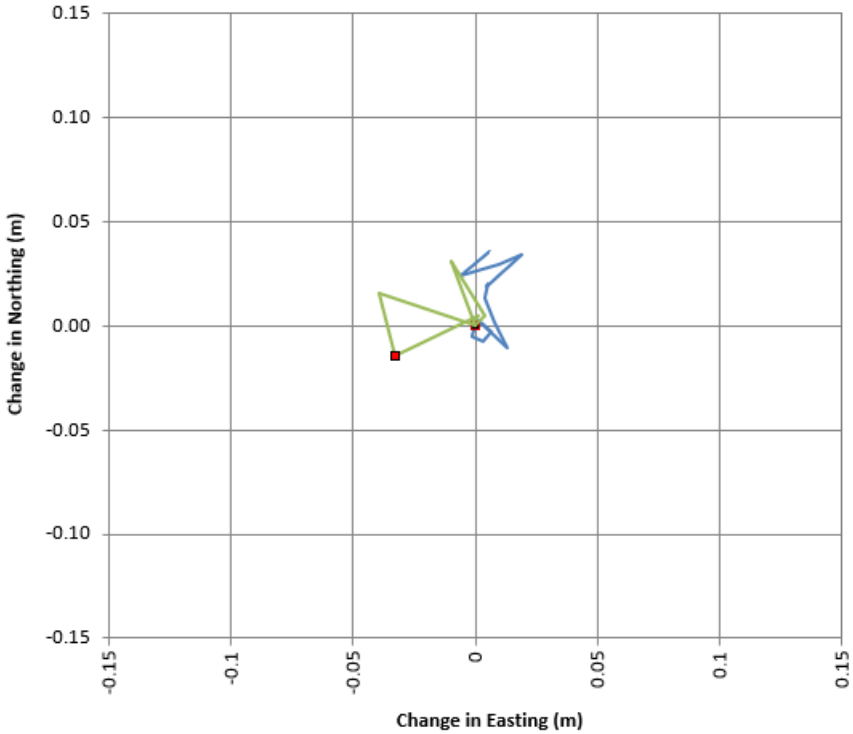

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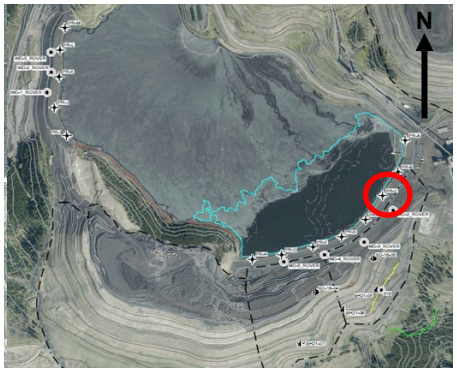
PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
MAIN TAILINGS DAM - PRISM B
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C1-2

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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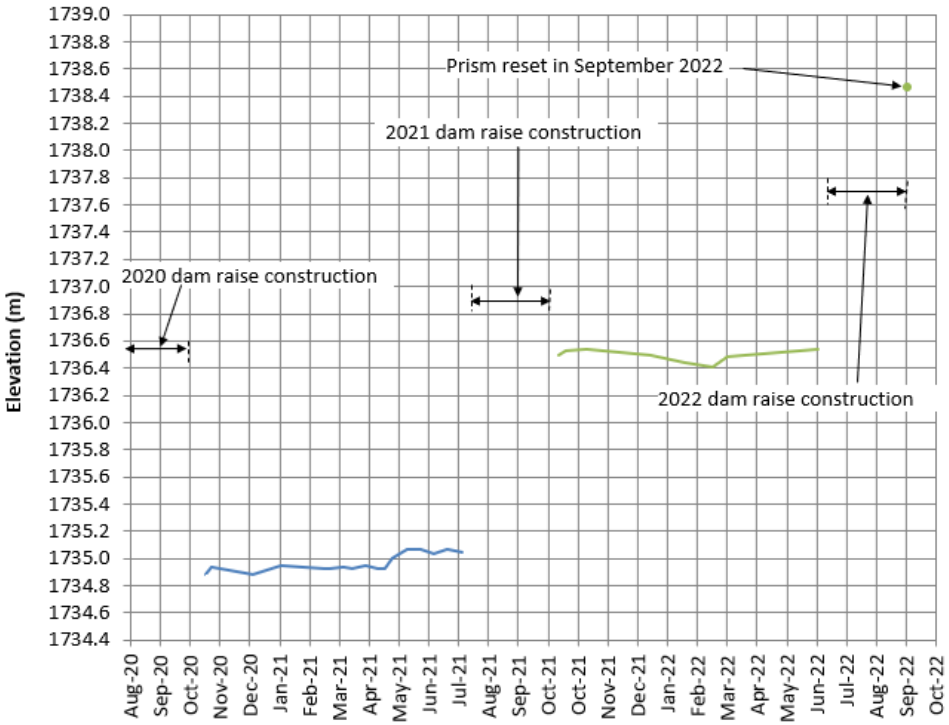

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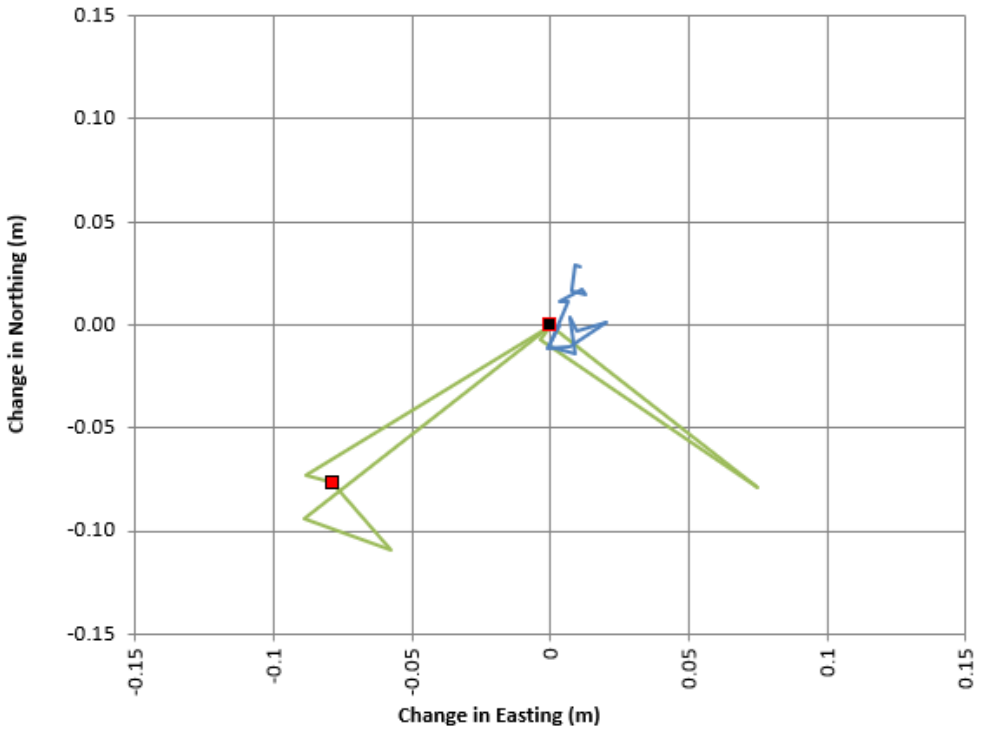

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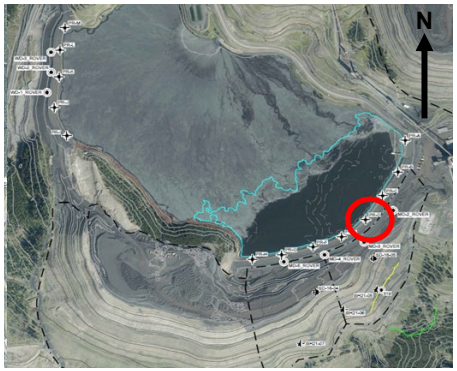
PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
MAIN TAILINGS DAM - PRISM C
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C1-3

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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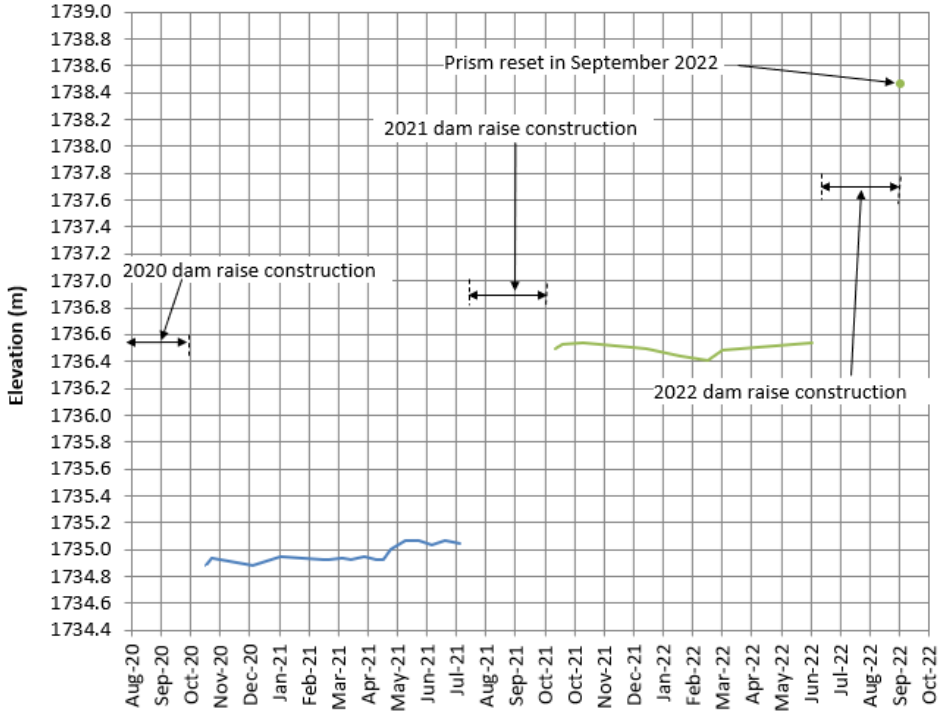

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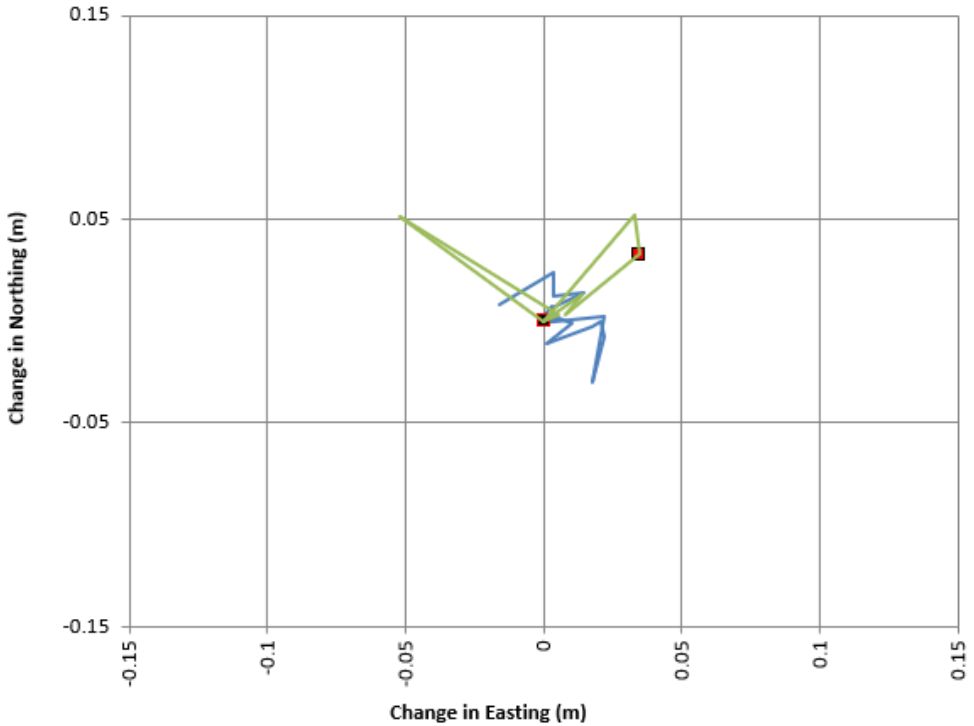

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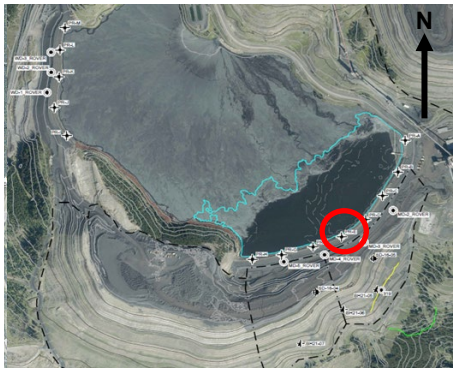
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
MAIN TAILINGS DAM - PRISM D
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C1-4

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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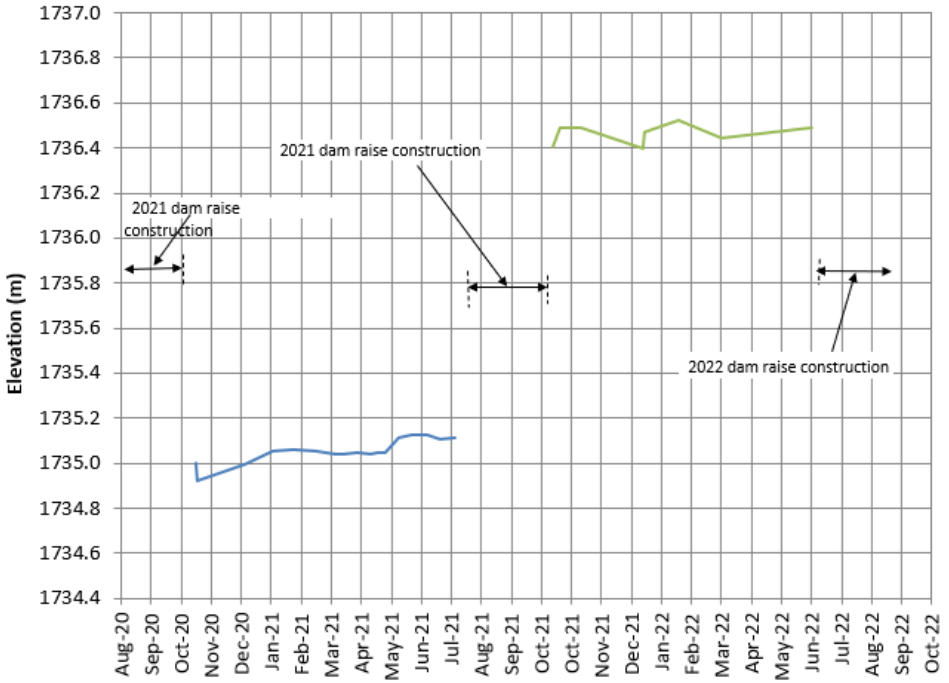

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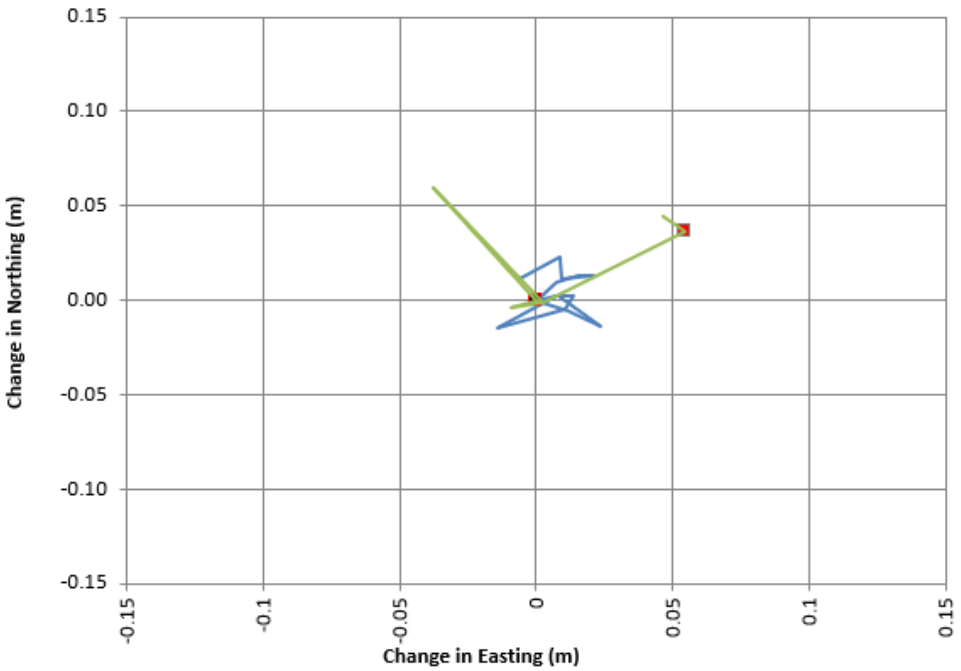

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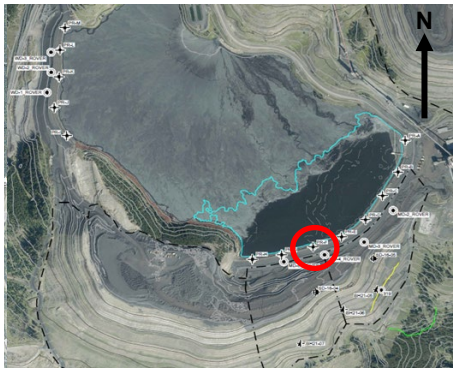
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
MAIN TAILINGS DAM - PRISM E
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C1-5

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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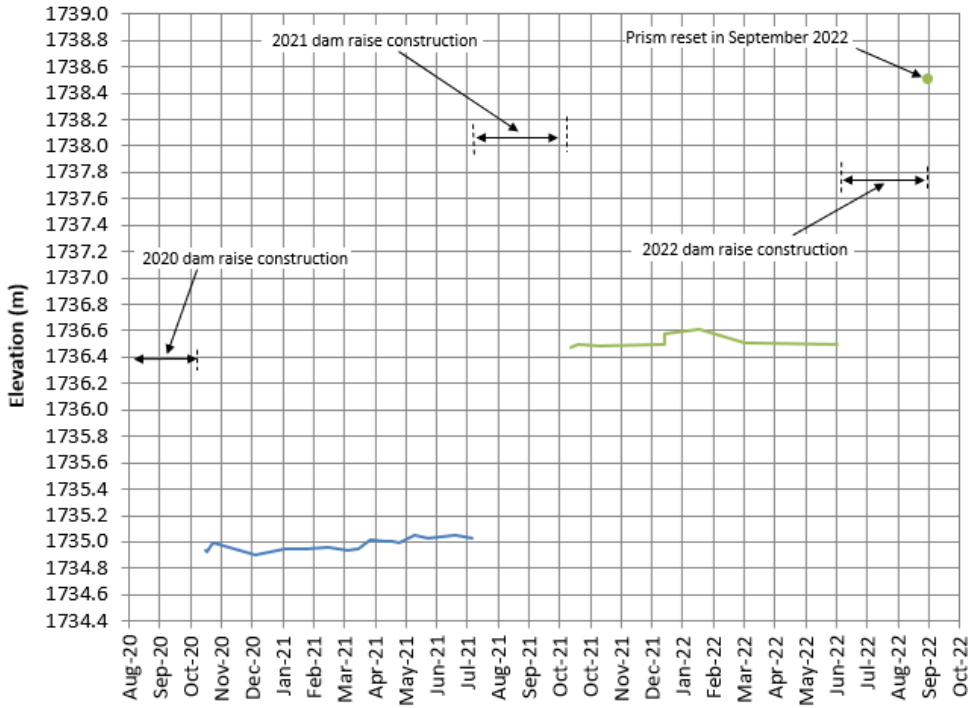

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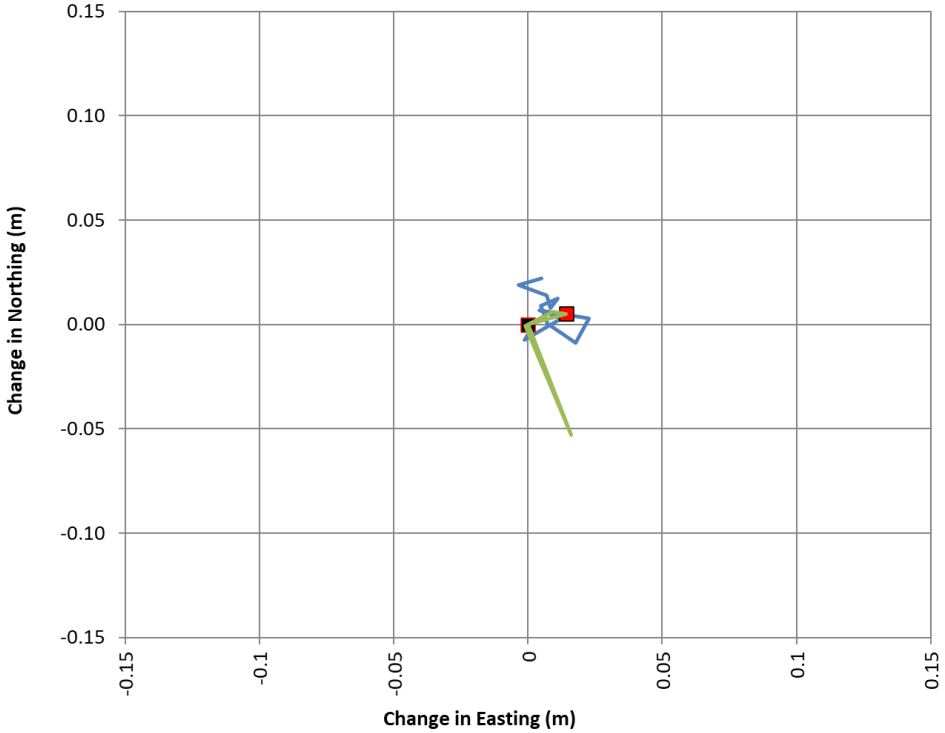

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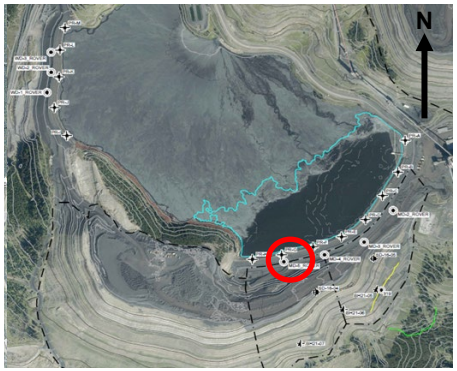
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
MAIN TAILINGS DAM - PRISM F
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C1-6

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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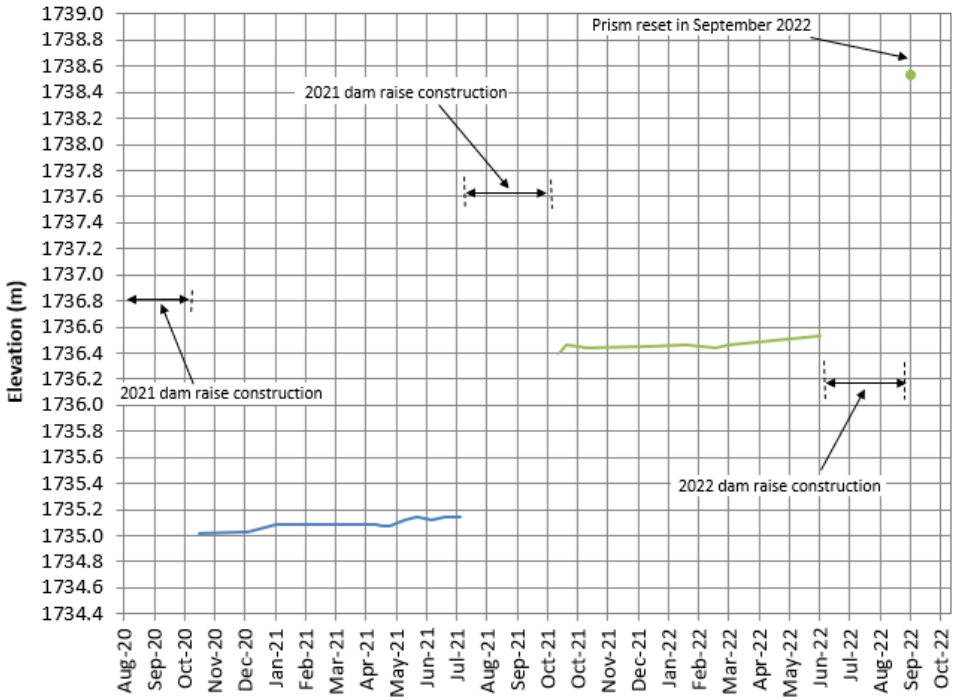

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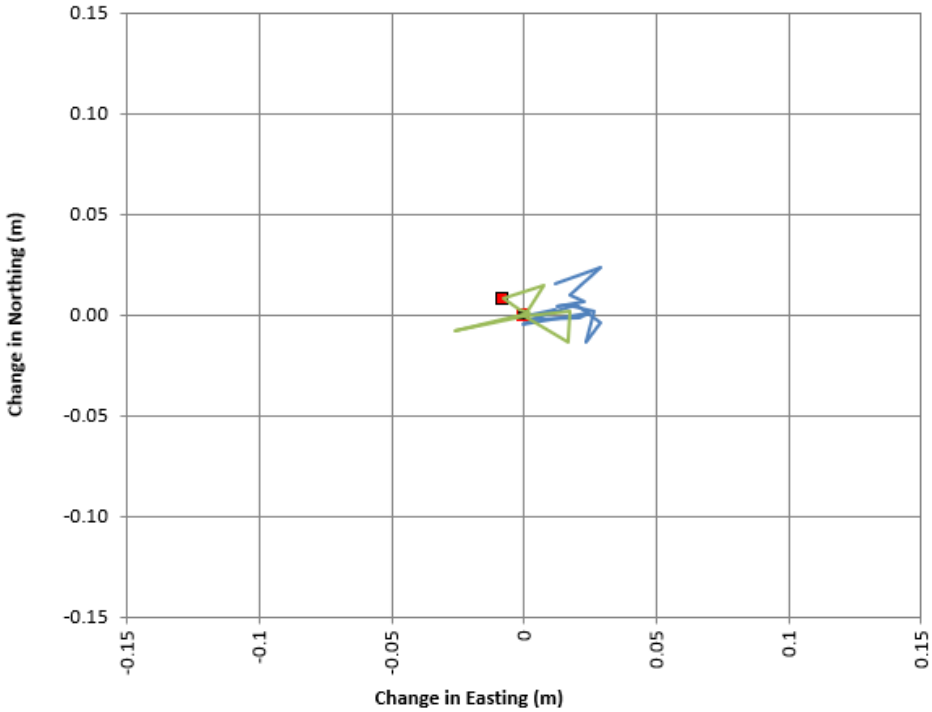

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2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
MAIN TAILINGS DAM - PRISM G
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C1-7

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1

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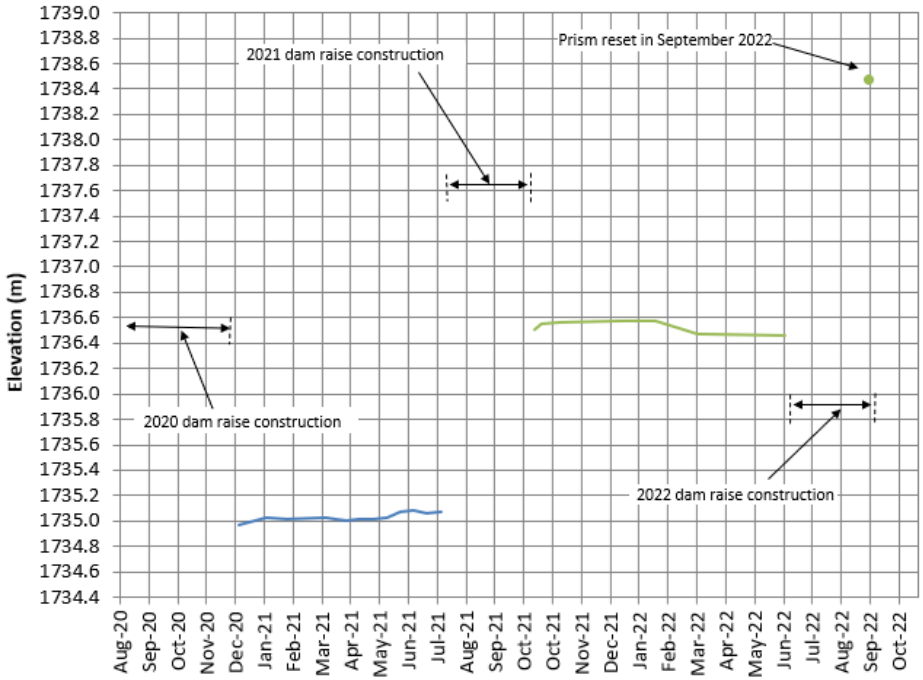

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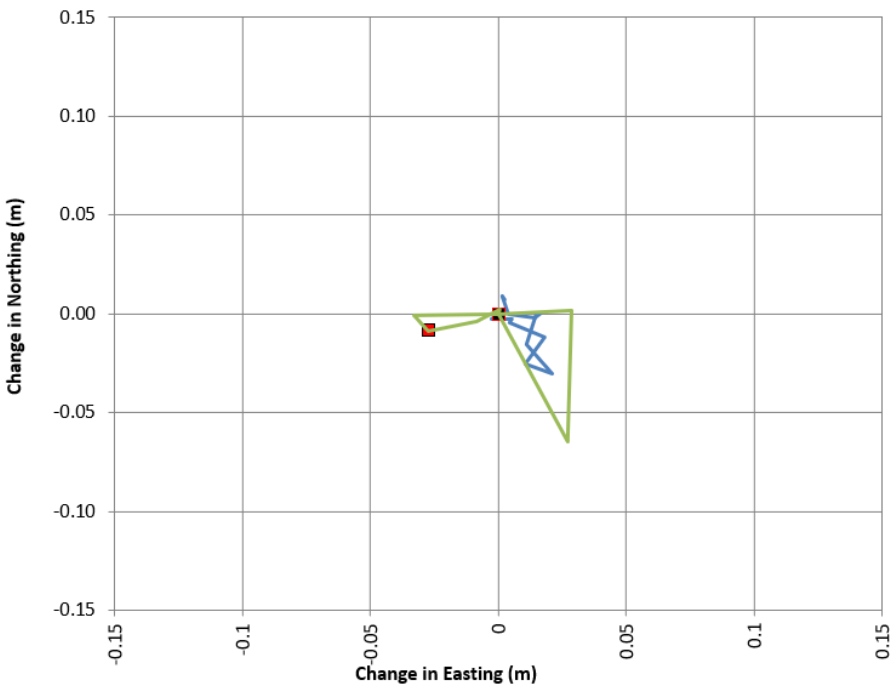

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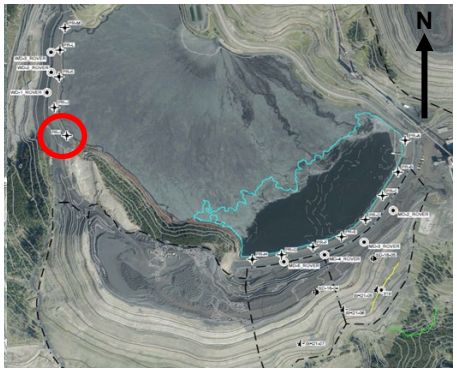
PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
MAIN TAILINGS DAM - PRISM H
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001/137**	**0**	**C1-8**

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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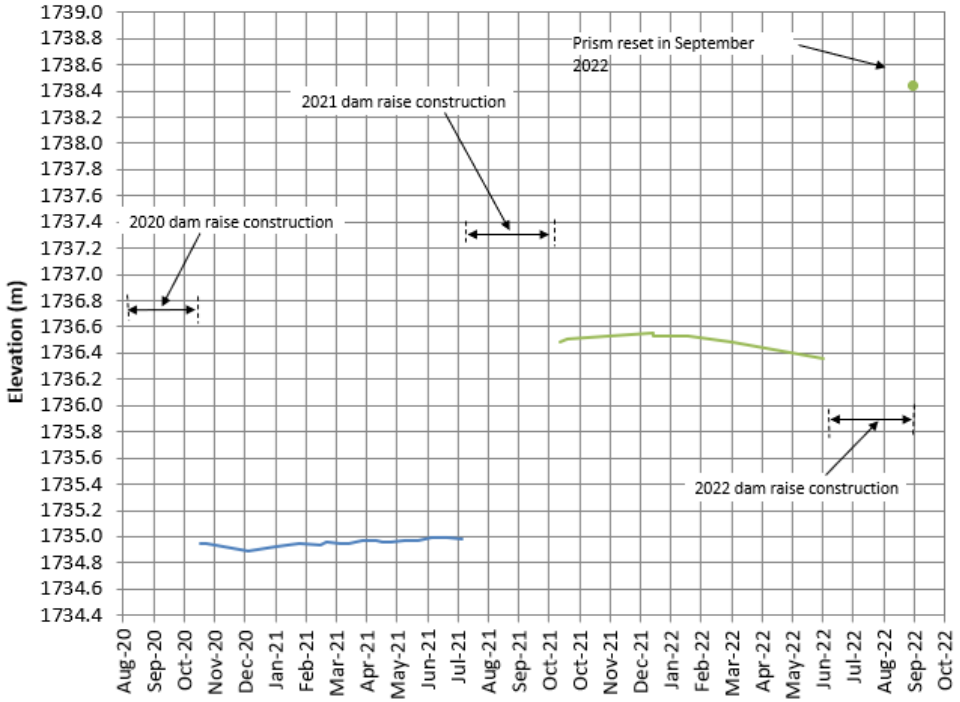

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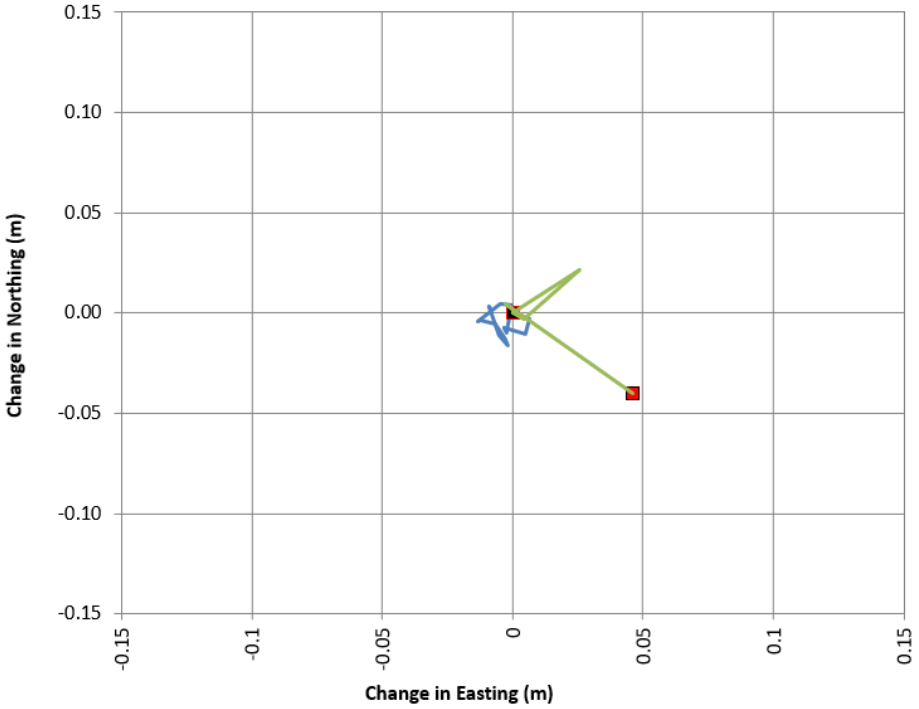

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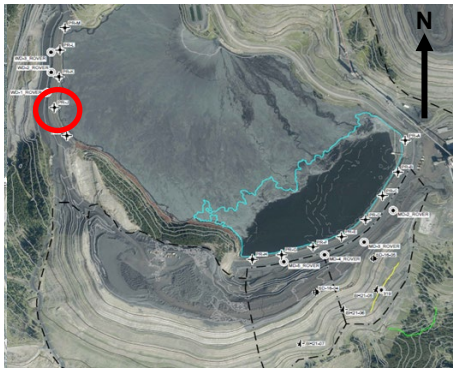
PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
WEST TAILINGS DAM - PRISM I
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001/137**	**0**	**C1-9**

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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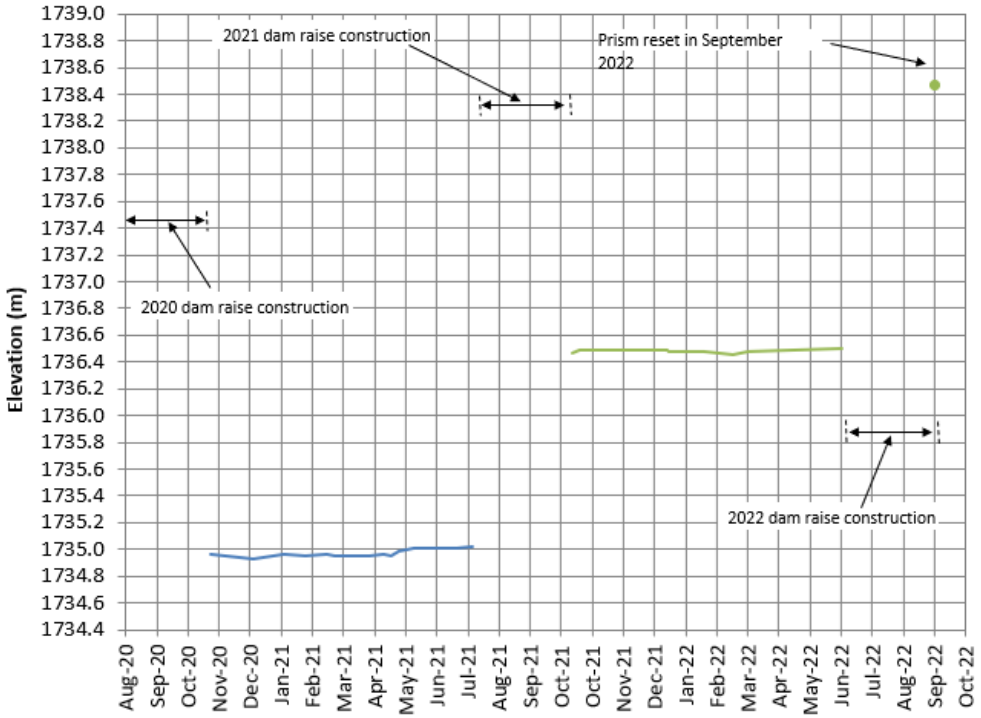

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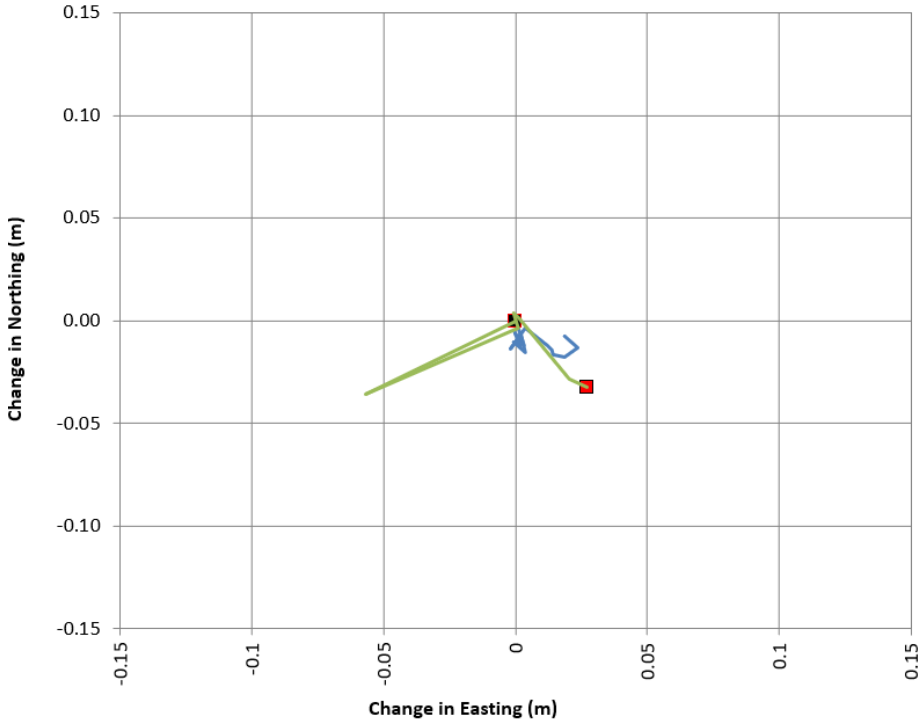

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GREENHILLS OPERATIONS
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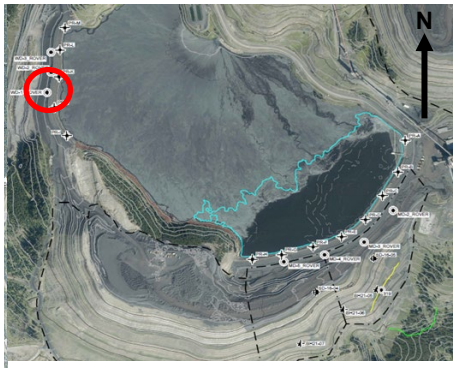
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
WEST TAILINGS DAM - PRISM J
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001/137**	**0**	**C1-10**

File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



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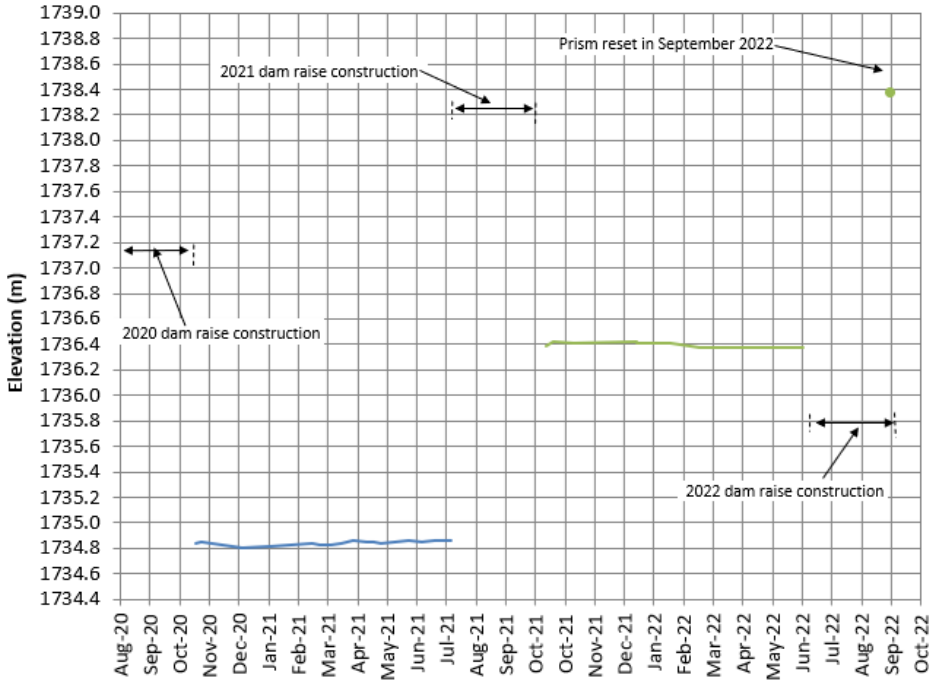

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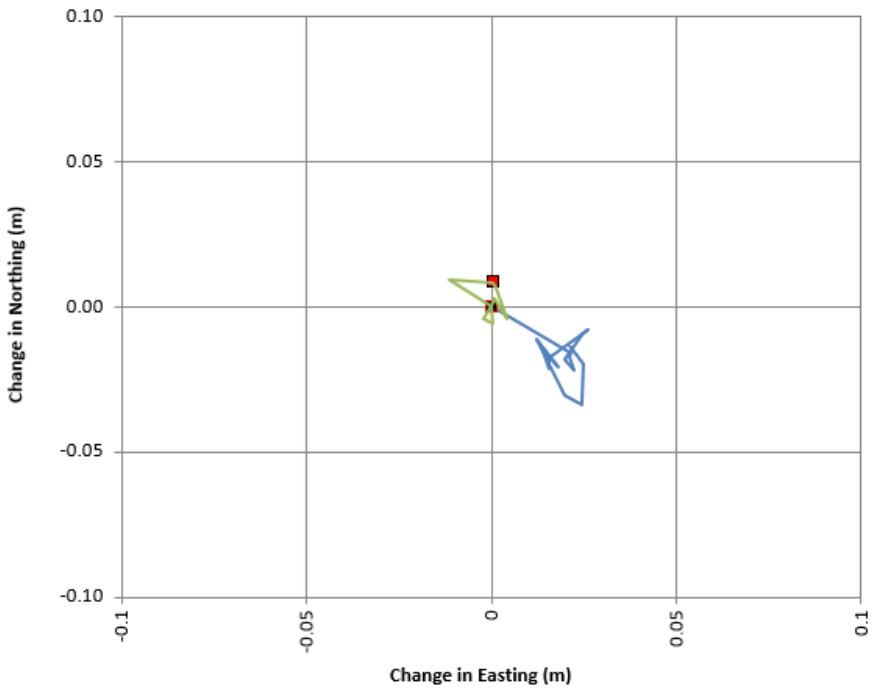

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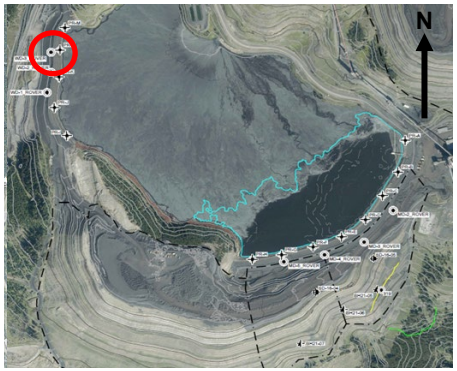
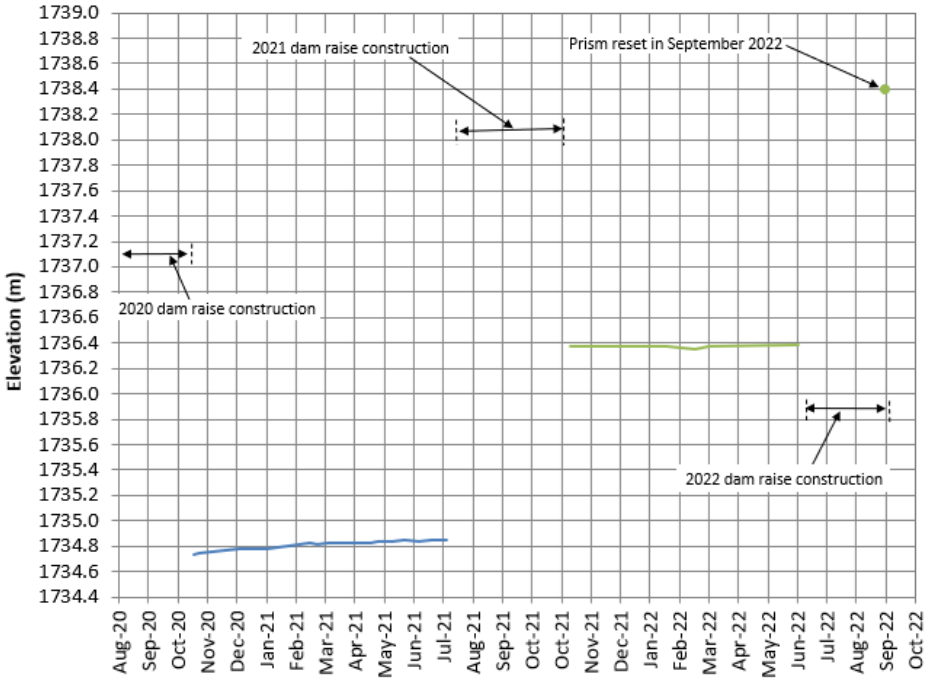
TITLE
WEST TAILINGS DAM - PRISM K DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C1-11

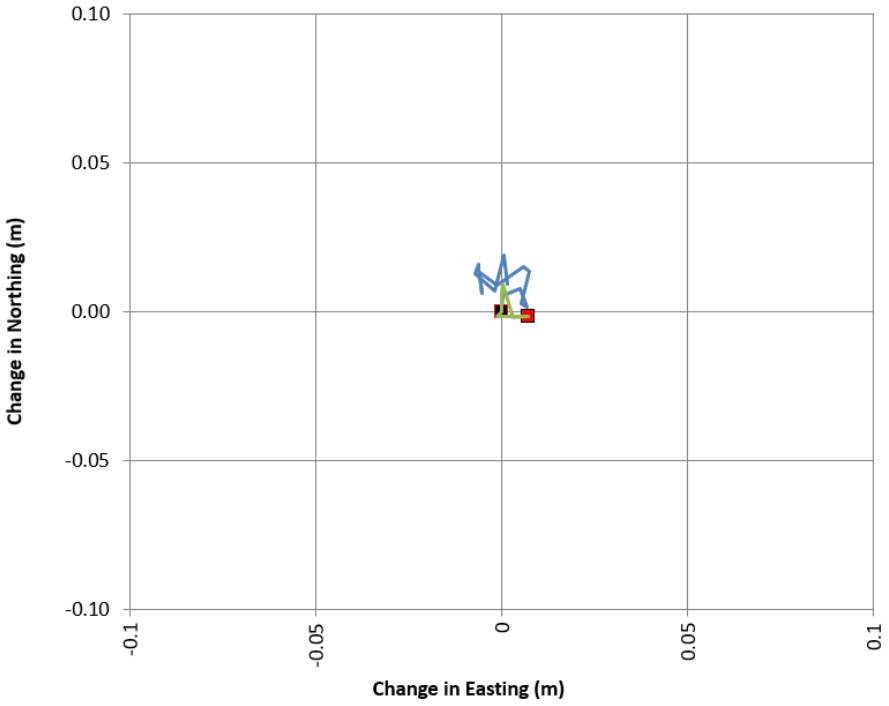
File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



Vertical Displacement



Horizontal Displacement



Initial Location
Final Location
2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)
2021/2022 AFPR data (1 August 2021 to 31 July 2022)
Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

CONSULTANT

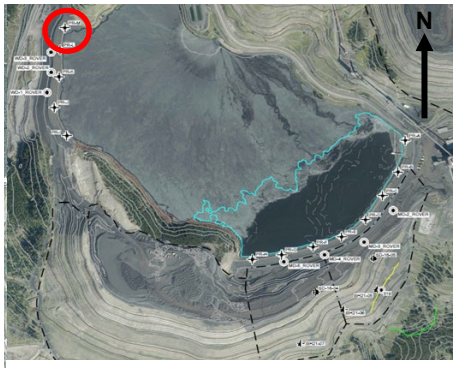
YYYY-MM-DD	2022-02-02
PREPARED	DM
DESIGN	DM
REVIEW	KA/MBW
APPROVED	AJH

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

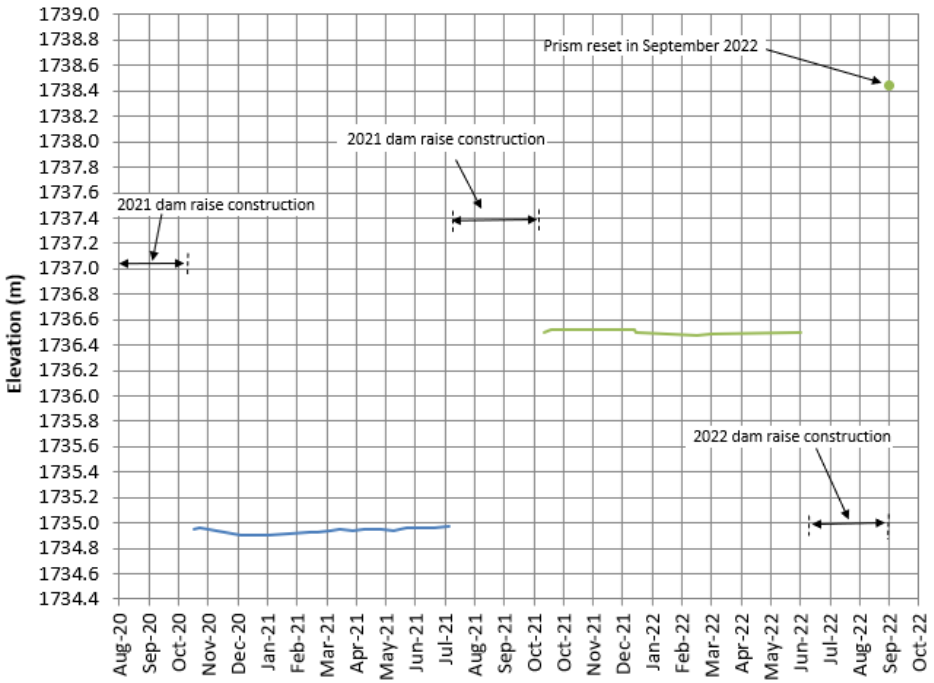
TITLE
WEST TAILINGS DAM - PRISM L
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001/137**	**0**	**C1-12**

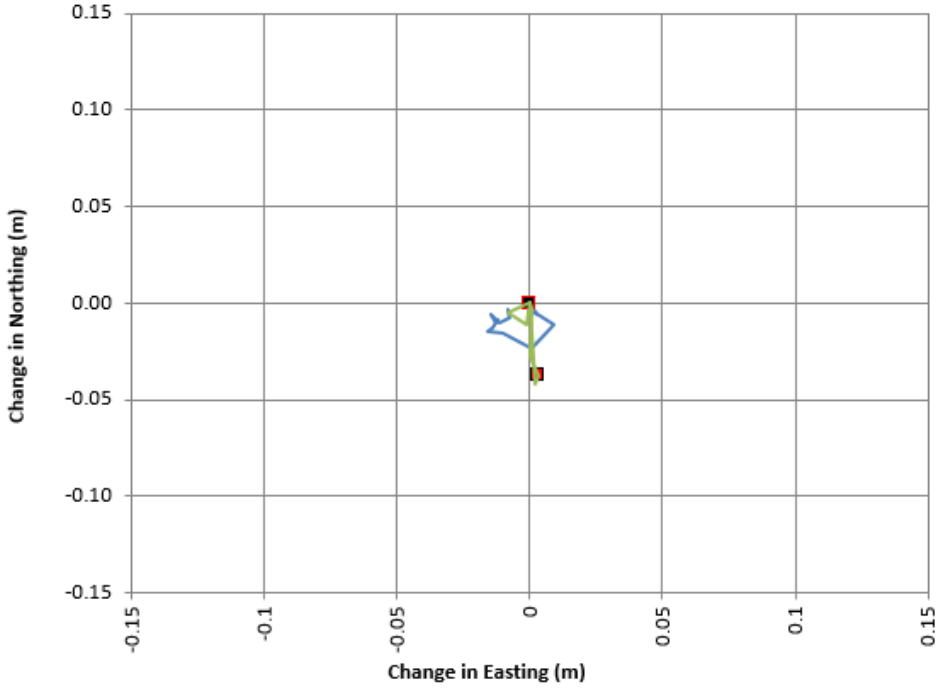
File Path: https://golderassociates.sharepoint.com/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/Prism_plots.xlsx?web=1



Vertical Displacement



Horizontal Displacement



Initial Location
Final Location
2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)
2021/2022 AFPR data (1 August 2021 to 31 July 2022)
Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

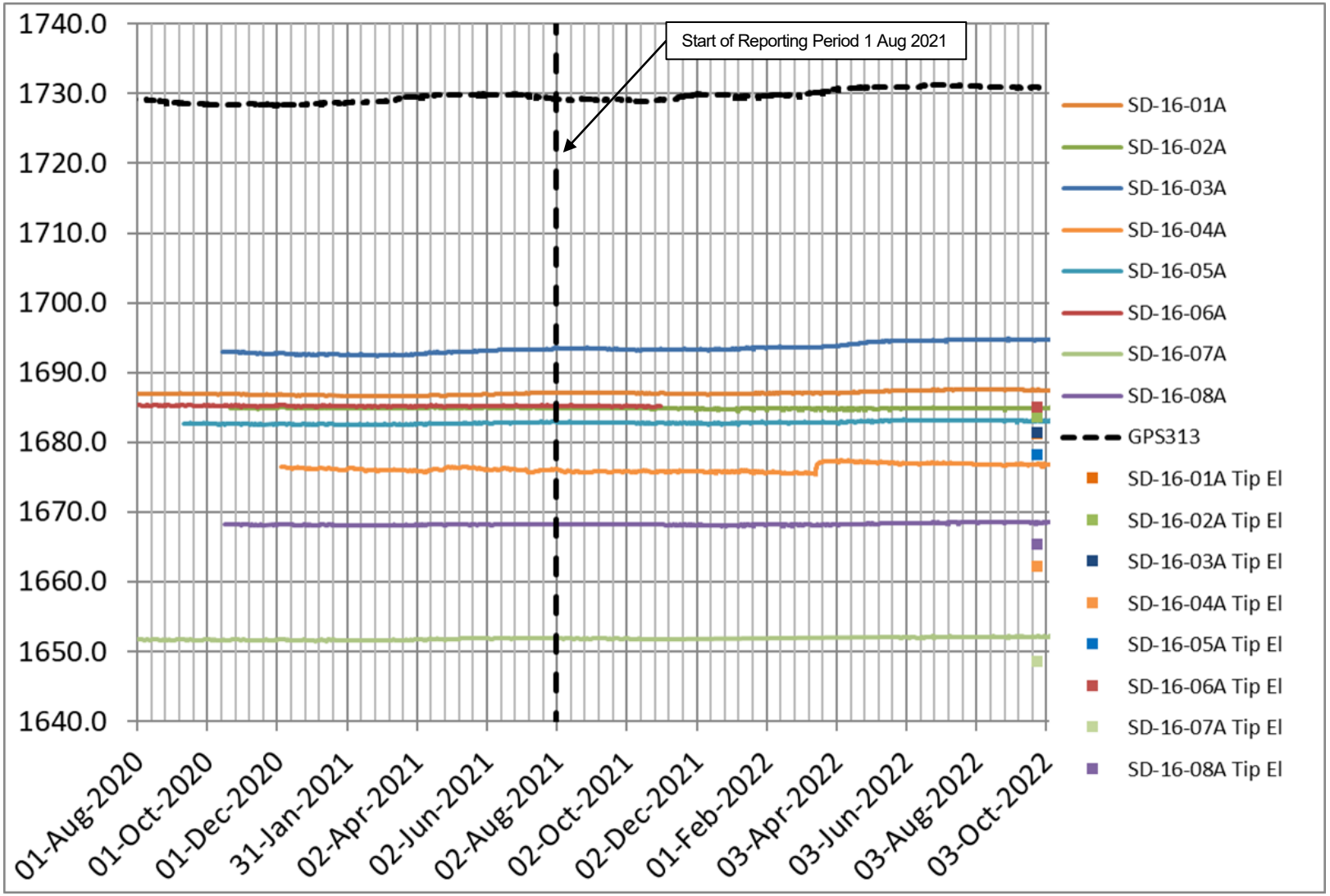
CONSULTANT

YYYY-MM-DD	2022-02-02
PREPARED	DM
DESIGN	DM
REVIEW	KA/MBW
APPROVED	AJH

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

TITLE
WEST TAILINGS DAM - PRISM M
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C1-13



Notes:
- Data only presented for piezometers with verified data

Data gaps present due to:
- Data being considered erroneous
- Malfunctioning data loggers or instruments
- Intermittent data signal from instrument

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

CONSULTANT

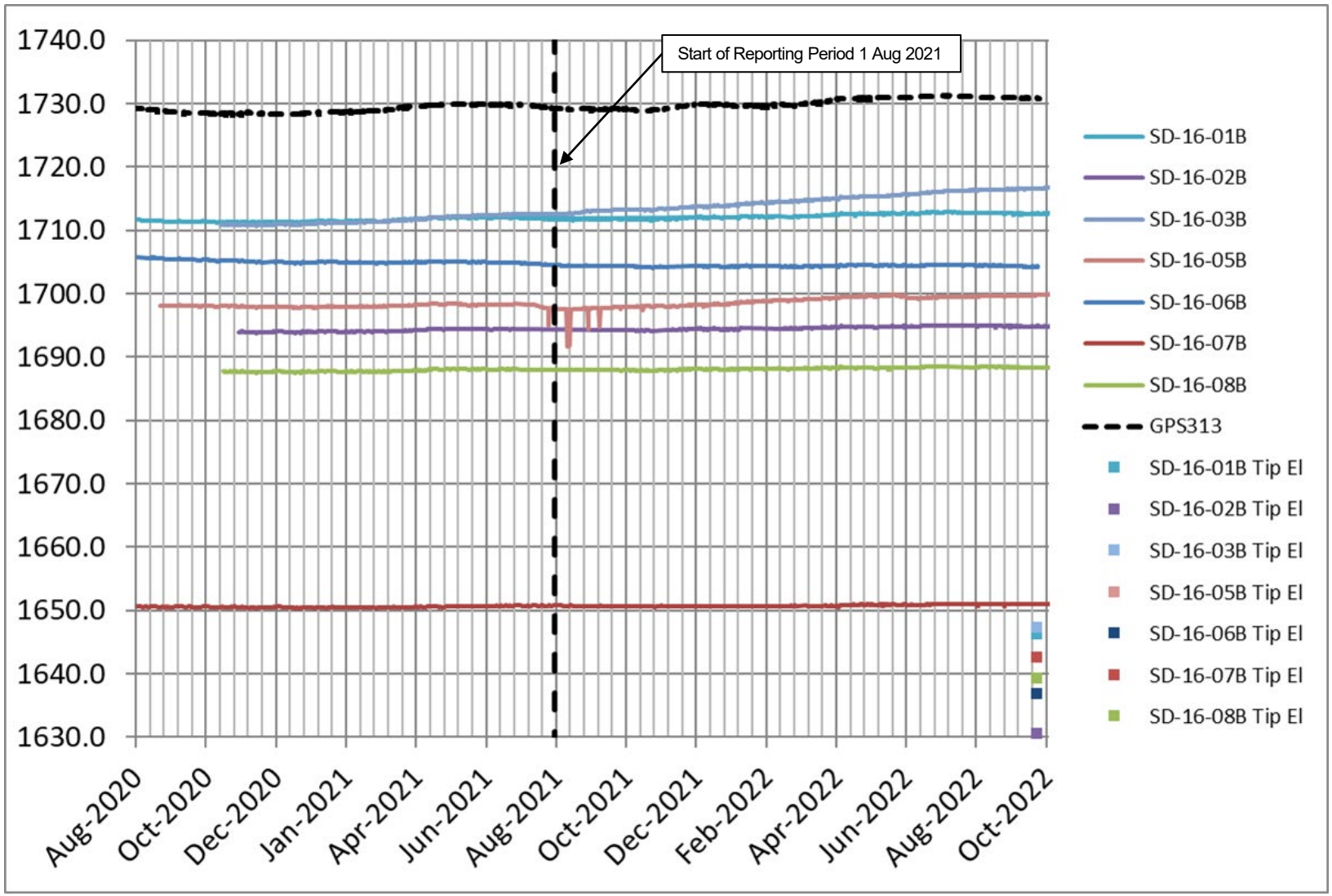
YYYY-MM-DD	2023-01-31
PREPARED	ZS
DESIGN	ZS
REVIEW	KA/MBW
APPROVED	AJH

PROJECT
GREENHILLS STORAGE TAILINGS FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
MAIN TAILINGS DAM
SD SERIES A (Upper) PIEZOMETERS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001**	**0**	**C2-1**

File Path: https://golderassociates.sharepoint.com/:x:/r/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/VWP%20data/01%20GHO%20VWP%20-%20TSF%20-%202023%20Update.xlsm?d=w4cbece3477f34ebd8901762c3ff0e3ee&csf=1&web=1&e=iS7y5x



Notes:
- "B" piezometers installed in bedrock or deep till on average have higher piezometric levels than shallow piezometers due to artesian conditions
- Data only presented for piezometers with verified data

Data gaps present due to:
- Data being considered erroneous
- Malfunctioning data loggers or instruments
- Intermittent data signal from instrument

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

CONSULTANT

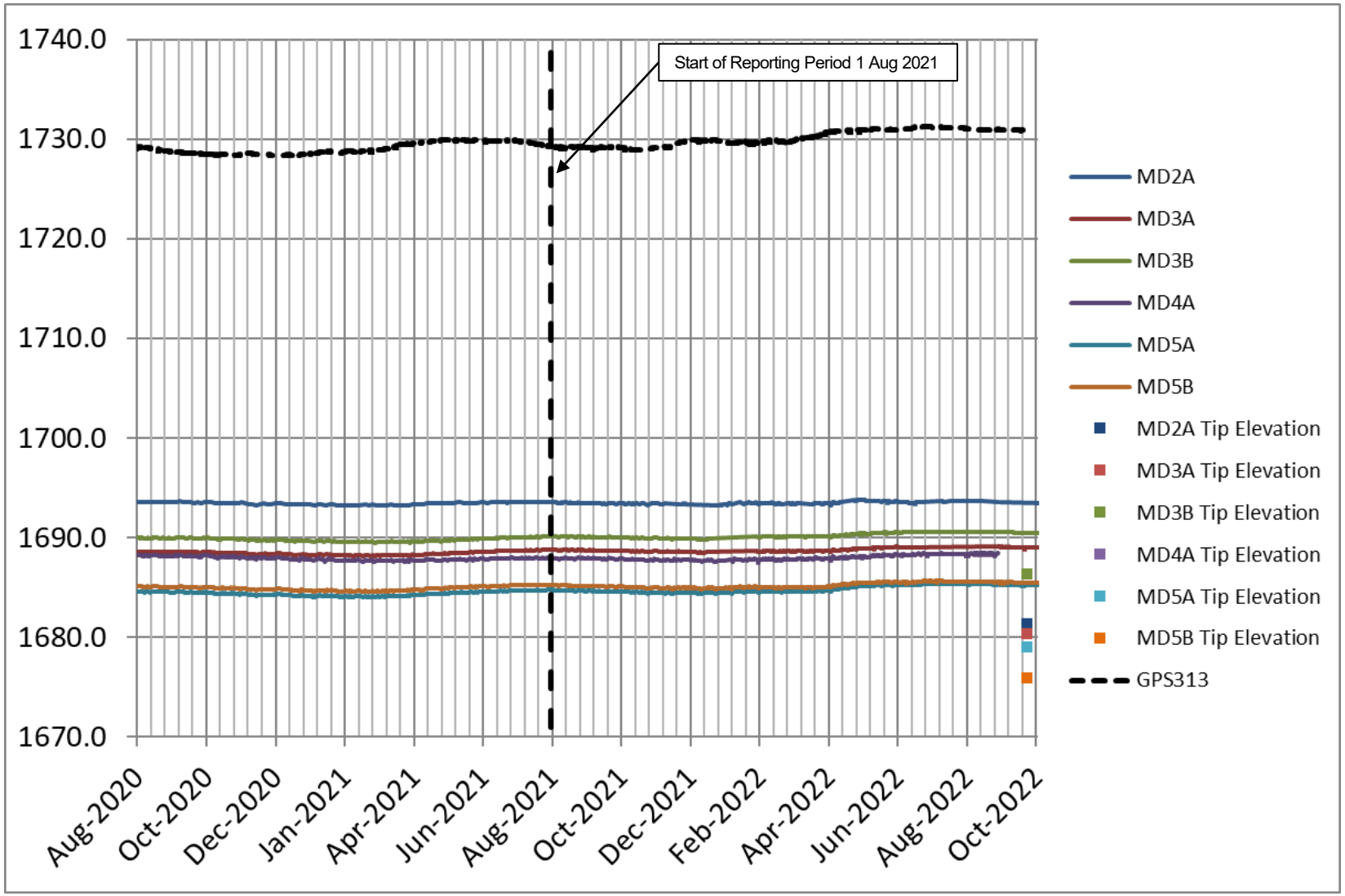
YYYY-MM-DD	2023-01-31
PREPARED	ZS
DESIGN	ZS
REVIEW	KA/MBW
APPROVED	AJH

PROJECT
GREENHILLS STORAGE TAILINGS FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
MAIN TAILINGS DAM
SD SERIES B (Lower) PIEZOMETERS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001**	**0**	**C2-2**

File Path: https://golderassociates.sharepoint.com/:x:/r/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/VWP%20data/01%20GHO%20VWP%20-%20TSF%20-%202023%20Update.xlsm?d=w4cbece3477f34ebd8901762c3ff0e3ee&csf=1&web=1&e=iS7y5x



Notes:
- Data only presented for piezometers with verified data

Data gaps present due to:
- Data being considered erroneous
- Malfunctioning data loggers or instruments
- Intermittent data signal from instrument

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

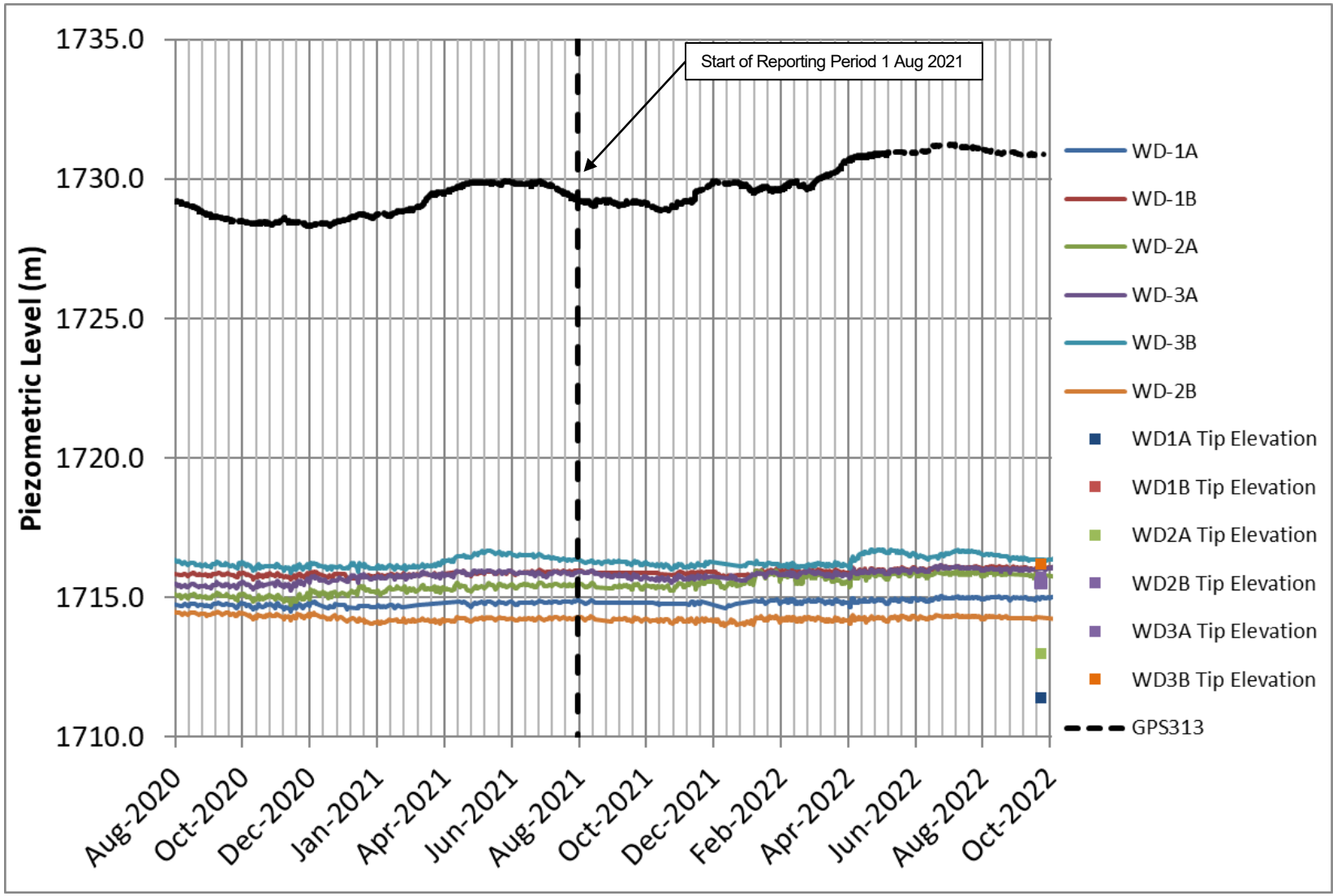
CONSULTANT

YYYY-MM-DD	2023-01-31
PREPARED	ZS
DESIGN	ZS
REVIEW	KA/MBW
APPROVED	AJH

PROJECT
GREENHILLS STORAGE TAILINGS FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
MAIN TAILINGS DAM – MD SERIES PIEZOMETERS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001**	**0**	**C2-3**



Notes:
- Data only presented for piezometers with verified data

Data gaps present due to:
- Data being considered erroneous
- Malfunctioning data loggers or instruments
- Intermittent data signal from instrument

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

CONSULTANT

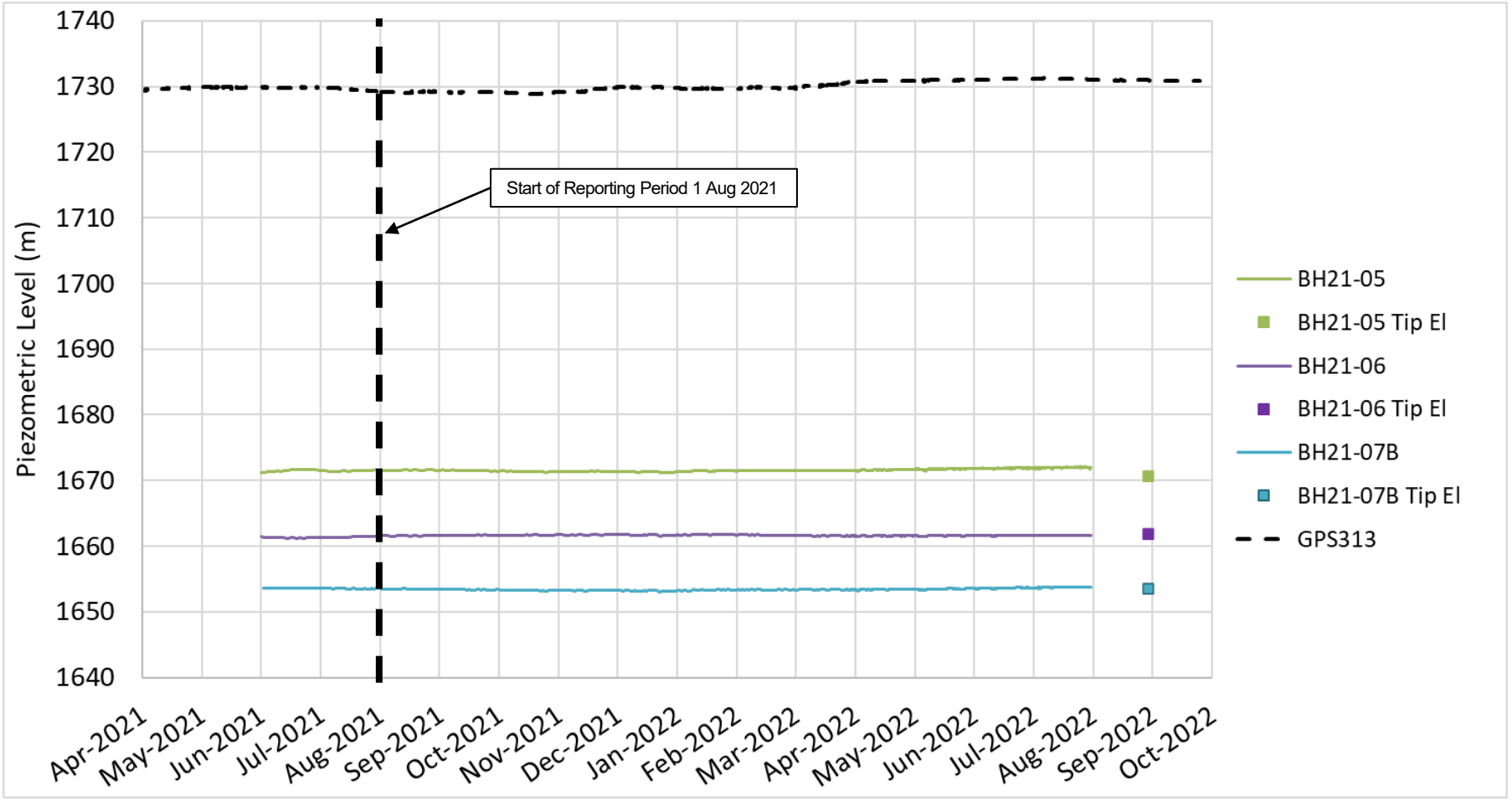
YYYY-MM-DD	2023-01-31
PREPARED	ZS
DESIGN	ZS
REVIEW	KA/MBW
APPROVED	AJH

PROJECT
GREENHILLS STORAGE TAILINGS FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

TITLE
WEST TAILINGS DAM – WD SERIES PIEZOMETERS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001**	**0**	**C2-4**

File Path: https://golderassociates.sharepoint.com/:x:/r/sites/158994/Project%20Files/5%20Technical%20Work/2000_EoR/2022%20AFPR/Instrumentation/VWP%20data/01%20GHO%20VWP%20-%20TSF%20-%202023%20Update.xlsm?d=w4cbece3477f34ebd8901762c3ff0e3ee&csf=1&web=1&e=iS7y5x



Notes:
- Site C BH21 series VW piezometers are installed in foundation till and do not measure phreatic surface within the CCR.
- Negative pressure readings recorded indicating piezometer tip is dry. Piezometric levels cannot be determined from negative pressures

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

CONSULTANT

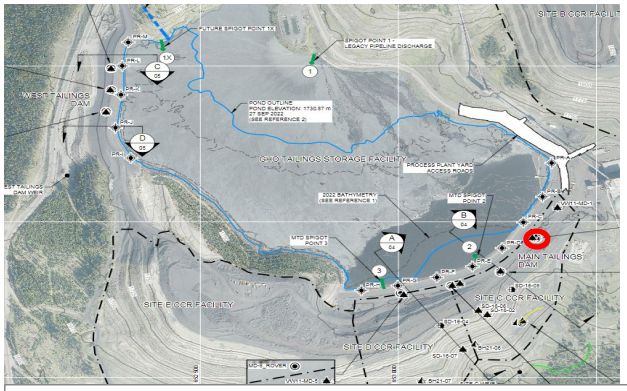
YYYY-MM-DD	2023-01-31
PREPARED	ZS
DESIGN	ZS
REVIEW	KA/MBW
APPROVED	AJH

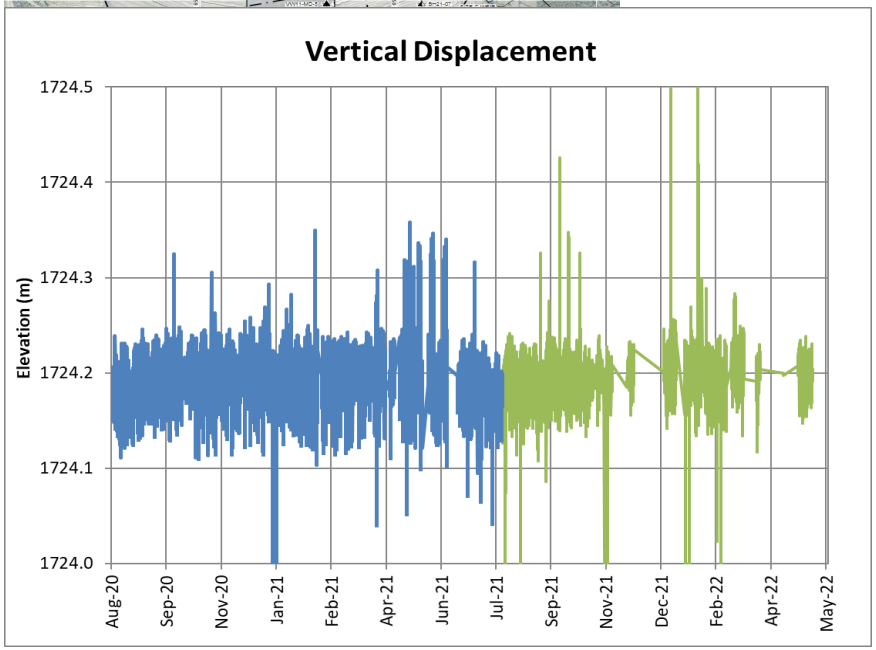
PROJECT
GREENHILLS STORAGE TAILINGS FACILITY
2022 ANNUAL FACILITY PERFORMANCE REPORT

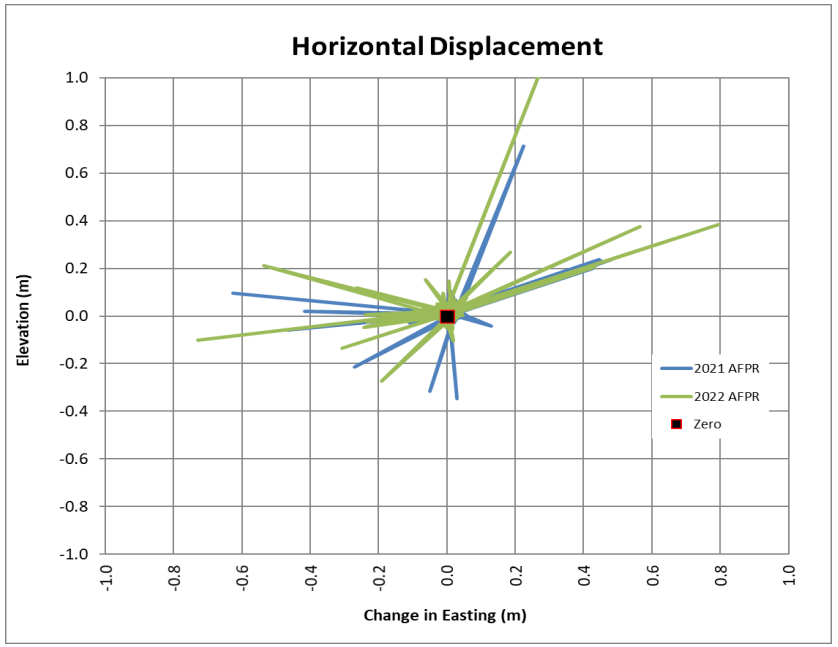
TITLE
SITE C CCR FACILITY – BH21 SERIES PIEZOMETERS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	**2000/2001**	**0**	**C2-5**

File Path: https://golderassociates.sharepoint.com/:f:/t/sites/118622/Project%20Files/5%20Technical%20Work/3000%20-%20DSI%20(Dams)/2020%20DSI%20Analysis%20Golder/2020%20DSI%20Reporting%20Period?csf=1&web=1&e=loUtsR







Zero

2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)

2021/2022 AFPR data (1 August 2021 to 31 July 2022)

Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

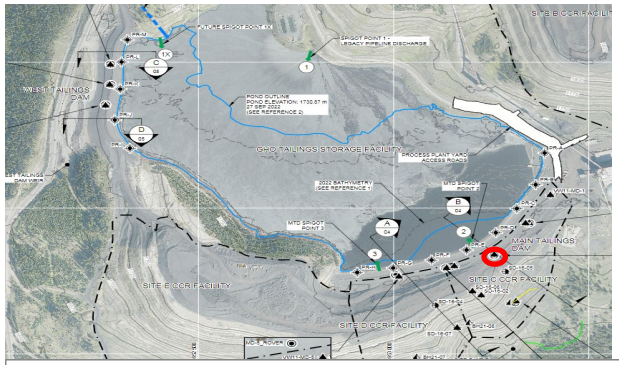
PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

CONSULTANT

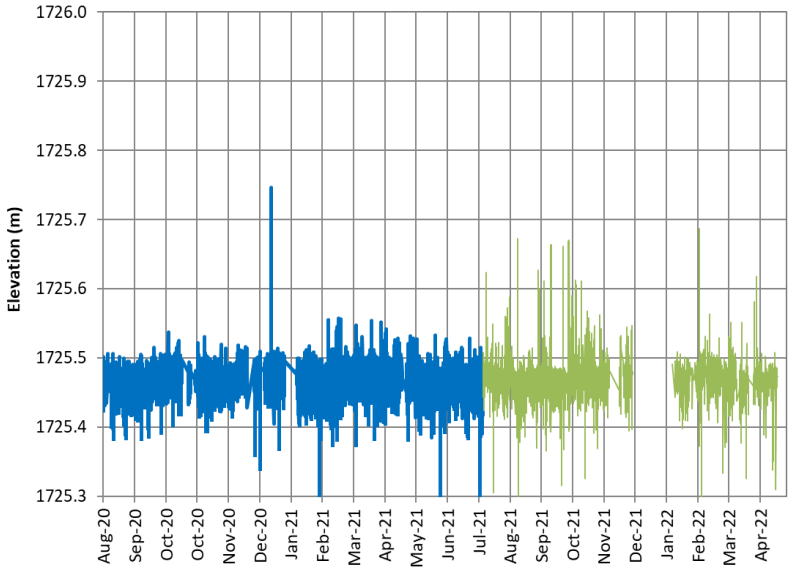
YYYY-MM-DD	2023-02-02
PREPARED	DM
DESIGN	KA
REVIEW	MBW
APPROVED	AJH

TITLE
MAIN TAILINGS DAM – GPS MD-2 Rover DISPLACEMENT PLOTS

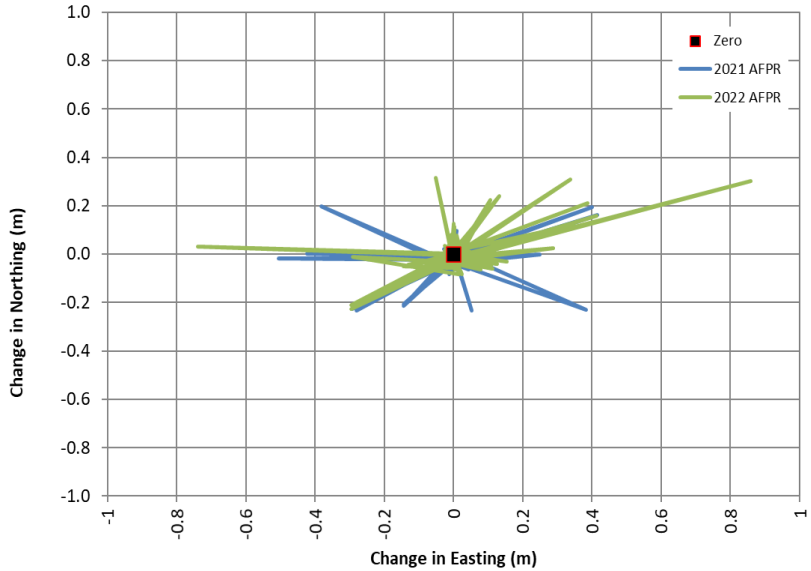
PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C3-1



Vertical Displacement



Horizontal Displacement



Zero

2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)

2021/2022 AFPR data (1 August 2021 to 31 July 2022)

Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

CONSULTANT

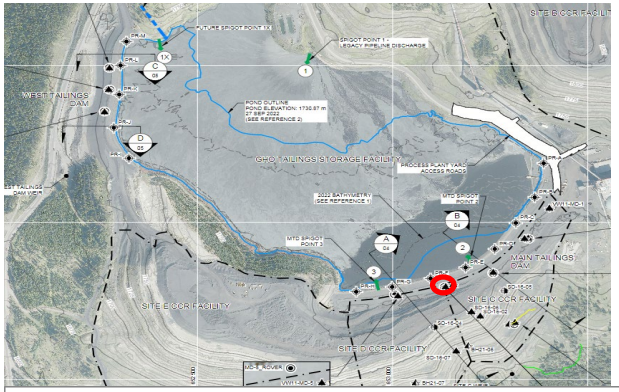
	YYYY-MM-DD	2023-02-02
PREPARED		DM
DESIGN		KA
REVIEW		MBW
APPROVED		AJH

TITLE

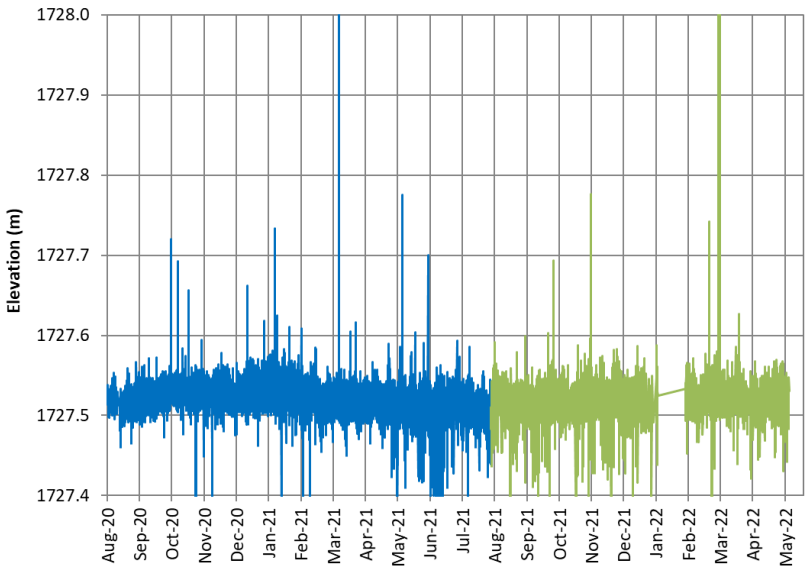
MAIN TAILINGS DAM – GPS MD-3 Rover
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC	Rev.	FIGURE
22516234	2000/2001/137	0	C3-2

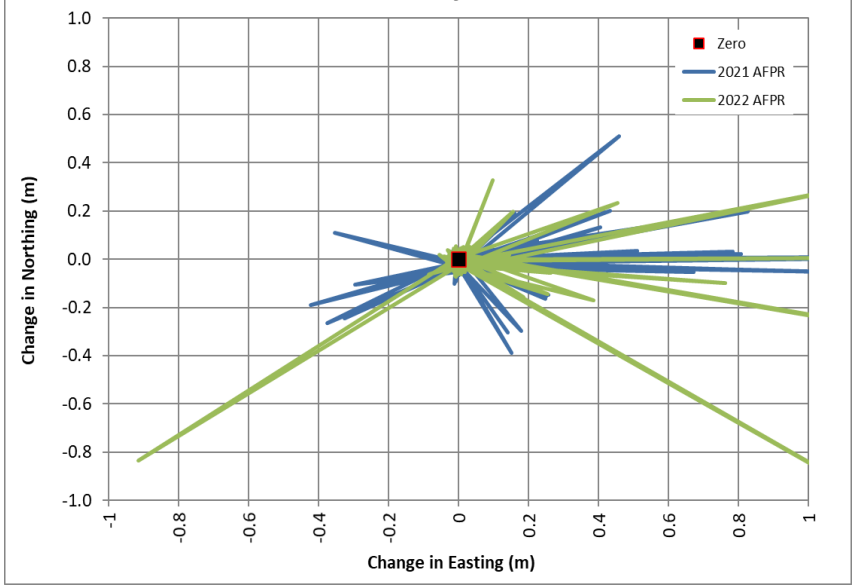
File Path: https://golderassociates.sharepoint.com/:f:/t/sites/118622/Project%20Files/5%20Technical%20Work/3000%20-%20DSR%20(Dams)/2020%20DSR%20Analysis%20Golder/2020%20DSR%20Reporting%20Period?csf=1&web=1&e=loUtsR



Vertical Displacement



Horizontal Displacement



Zero

2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)

2021/2022 AFPR data (1 August 2021 to 31 July 2022)

Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

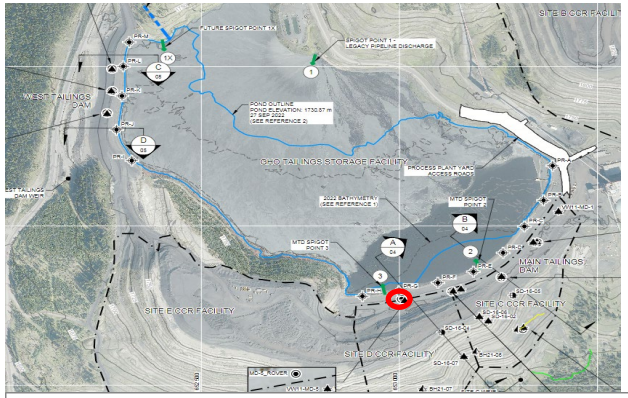
PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

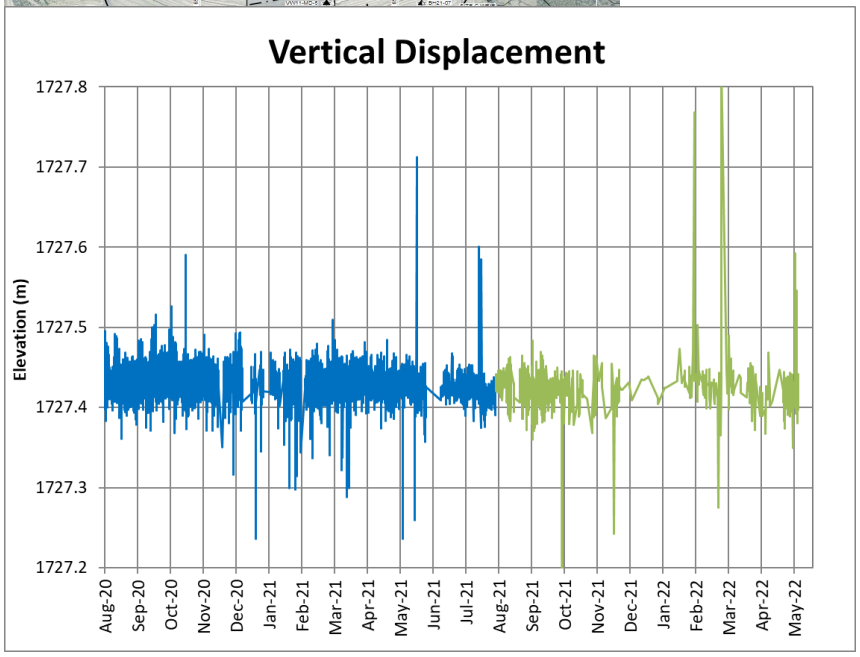
CONSULTANT

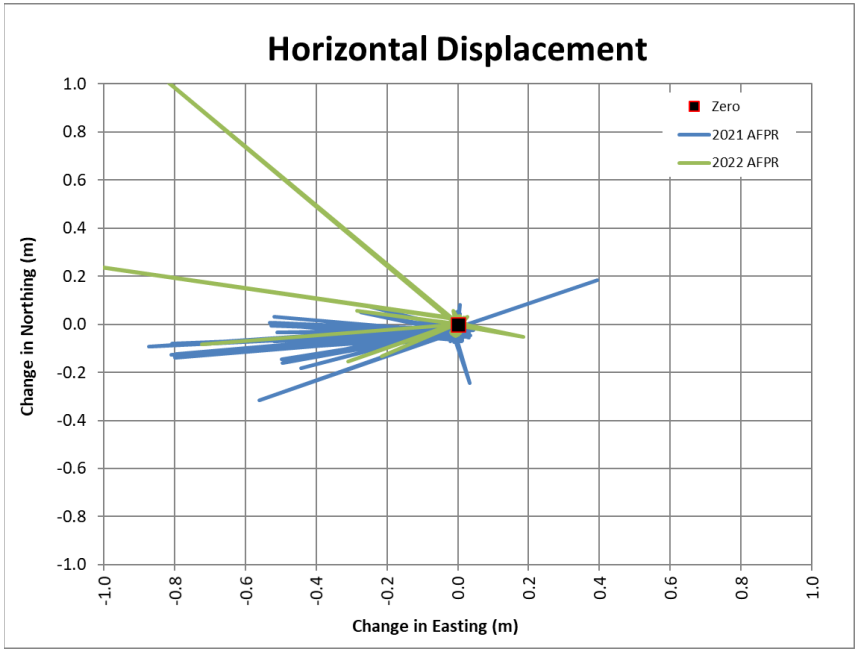
YYYY-MM-DD	2023-02-02
PREPARED	DM
DESIGN	KA
REVIEW	MBW
APPROVED	AJH

TITLE
MAIN TAILINGS DAM – GPS MD-4 Rover
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC	Rev.	FIGURE
22516234	2000/2001/137	0	C3-3







Note: Removed and placed as Site C Toe GPS.

- Zero
- 2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)
- 2021/2022 AFPR data (1 August 2021 to 31 July 2022)
- Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

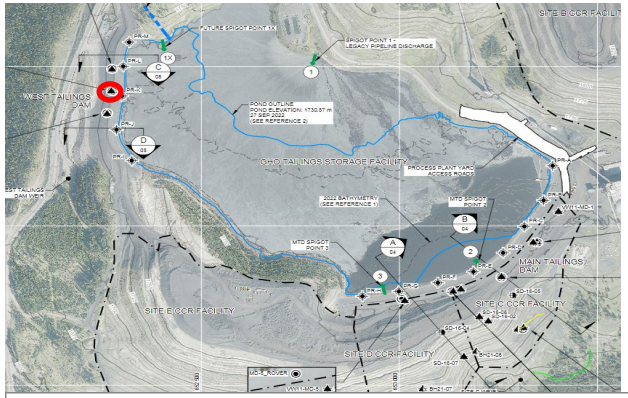
CONSULTANT
wsp

	YYYY-MM-DD
PREPARED	2023-02-02
DESIGN	DM
REVIEW	KA
APPROVED	MBW
	AJH

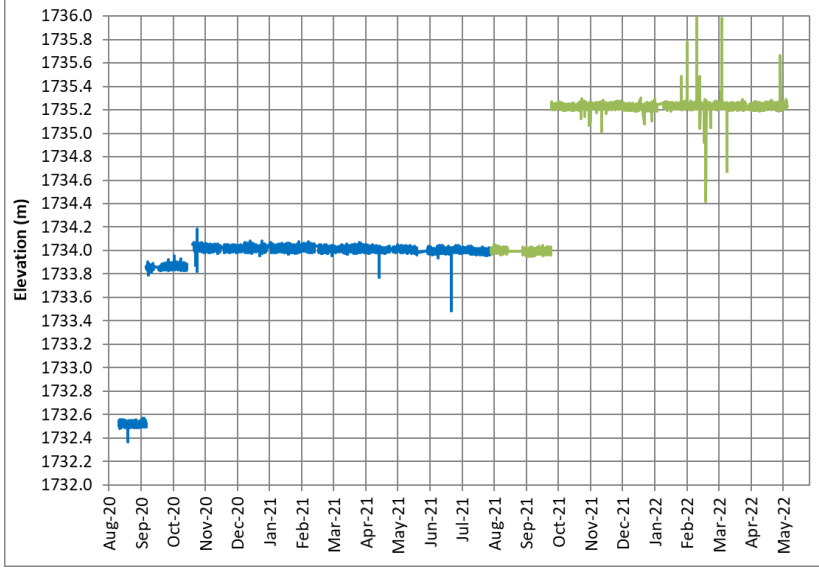
TITLE
MAIN TAILINGS DAM – GPS MD-5 Rover
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C3-4

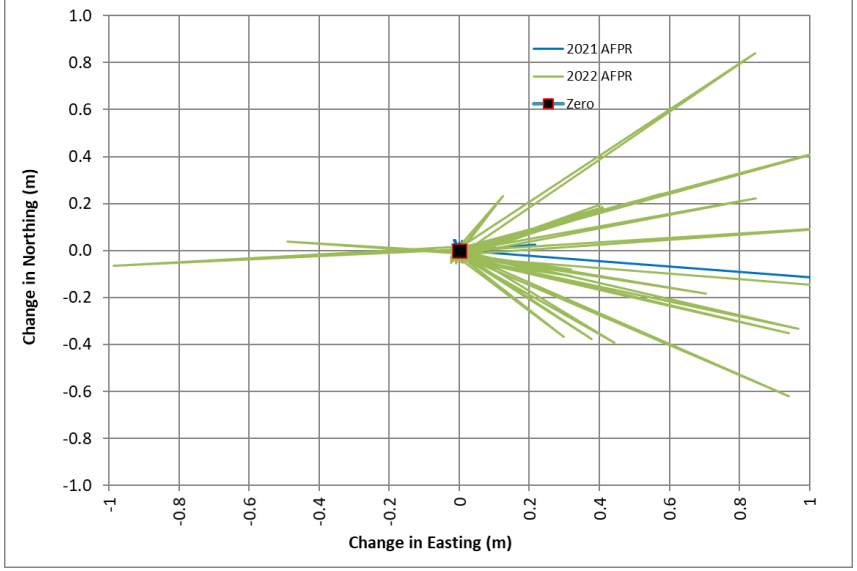
File Path: https://goldersassociates.sharepoint.com/:f:/t/sites/118622/Project%20Files/5%20Technical%20Work/3000%20-%20DSI%20(Dams)/2020%20DSI%20Analysis%20Golder/2020%20DSI%20Reporting%20Period/?csf=1&web=1&e=loUtsR



Vertical Displacement



Horizontal Displacement



Zero

2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)

2021/2022 AFPR data (1 August 2021 to 31 July 2022)

Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

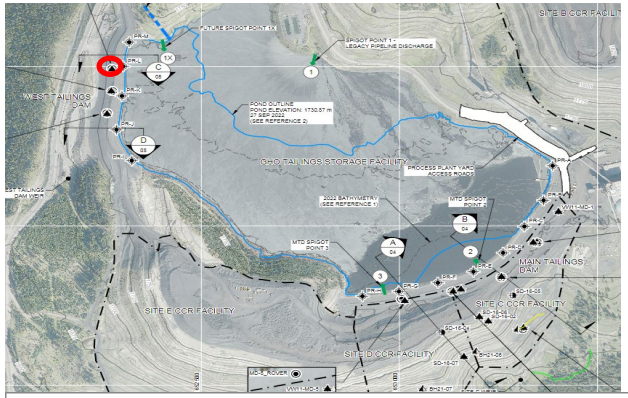
CONSULTANT

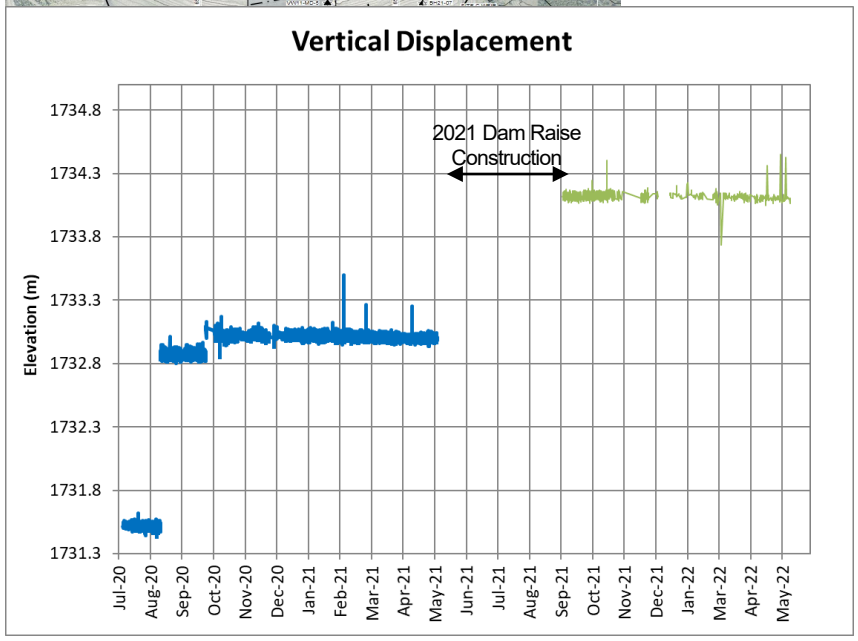
	YYYY-MM-DD
PREPARED	2023-02-02
DESIGN	DM
REVIEW	KA
APPROVED	MBW
	AJH

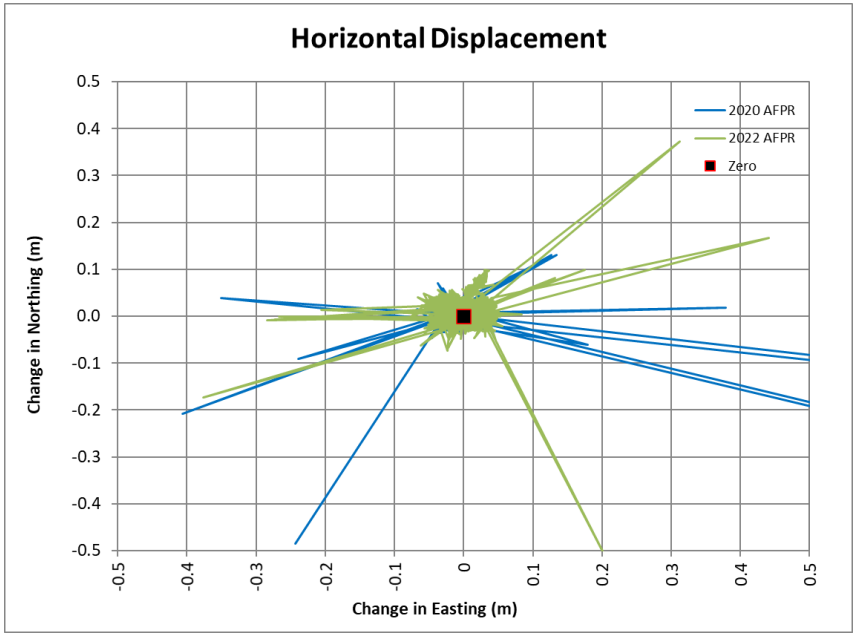
TITLE
MAIN TAILINGS DAM – GPS WD-2 Rover DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C3-5

File Path: https://golderassociates.sharepoint.com/:f:/t/sites/118622/Project%20Files/5%20Technical%20Work/3000%20-%20DSI%20(Dams)/2020%20DSI%20Analysis%20Golder/2020%20DSI%20Reporting%20Period/?csf=1&web=1&e=loUtsR







Zero

2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)

2021/2022 AFPR data (1 August 2021 to 31 July 2022)

Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

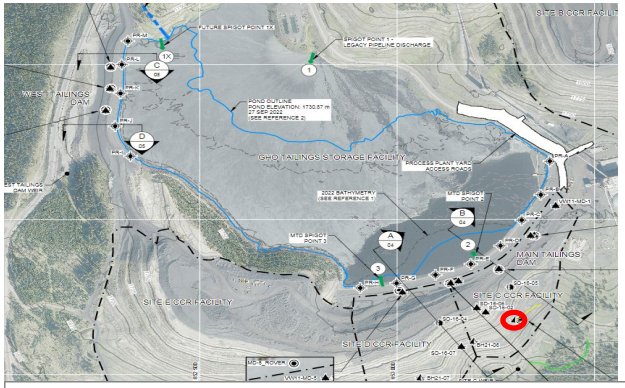
PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

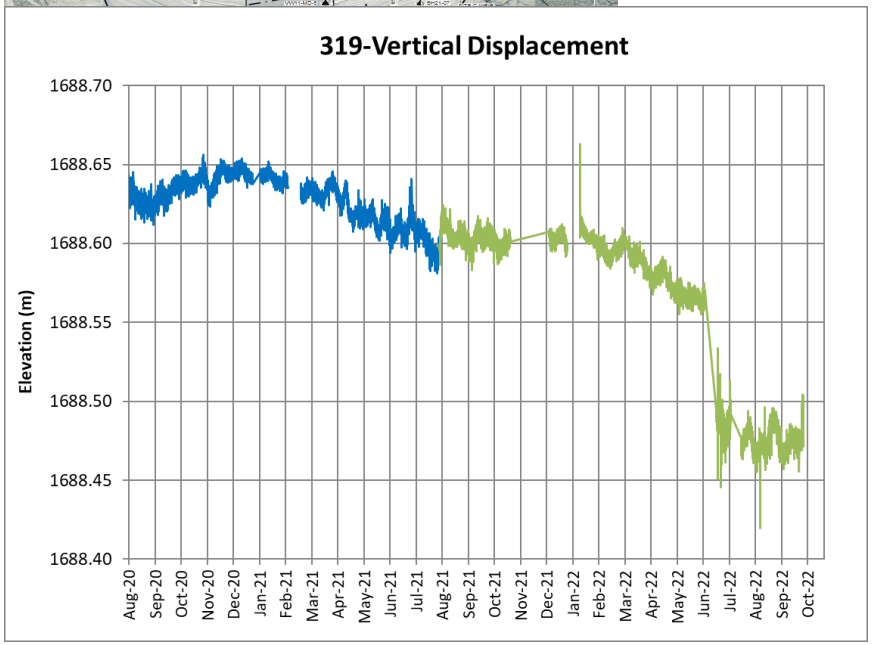
CONSULTANT

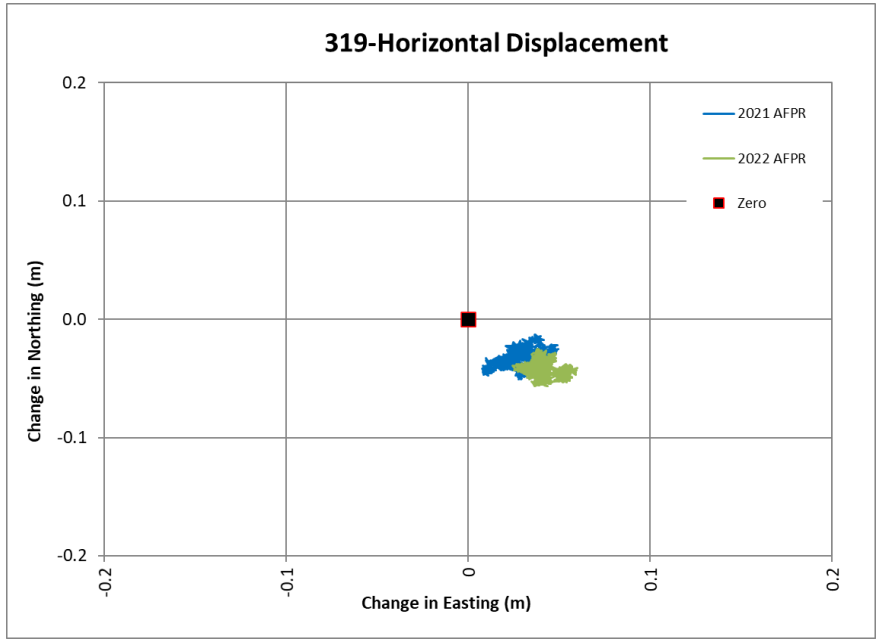
	YYYY-MM-DD
PREPARED	2023-02-02
DESIGN	DM
REVIEW	KA
APPROVED	MBW
	AJH

TITLE
MAIN TAILINGS DAM – GPS WD-3 Rover DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C3-6







Zero

2020/2021 Annual Inspection Data (1 August 2020 to 31 July 2021)

2021/2022 AFPR data (1 August 2021 to 31 July 2022)

Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

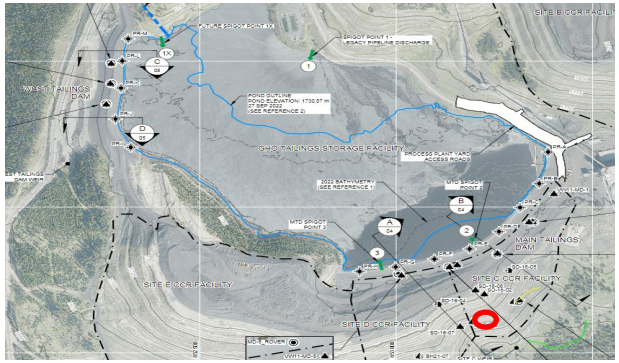
CONSULTANT

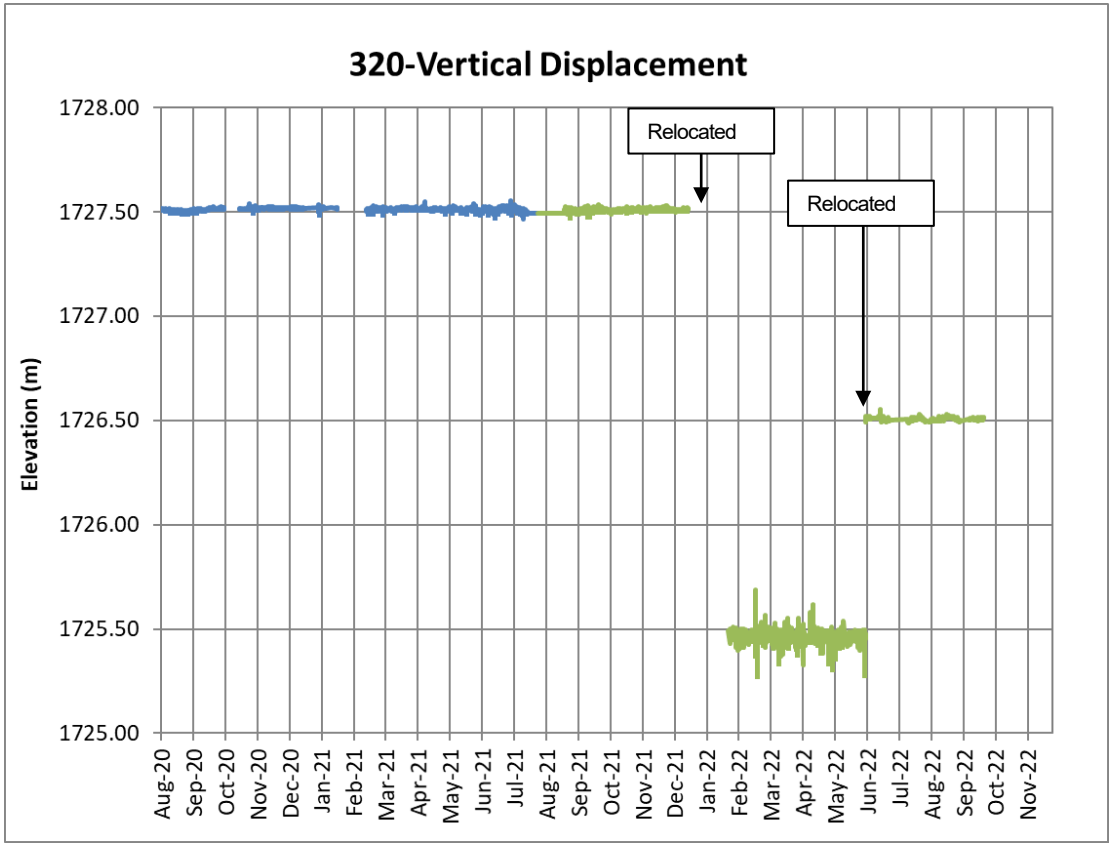
	YYYY-MM-DD
PREPARED	2023-02-02
DESIGN	DM
REVIEW	KA
APPROVED	MBW
	AJH

TITLE
MAIN TAILINGS DAM – GPS 319 (Site C)
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C3-7

File Path: https://golderassociates.sharepoint.com/:f:/t/sites/118622/Project%20Files/5%20Technical%20Work/3000%20-%20DSR%20(Dams)/2020%20DSR%20Analysis%20Golder/2020%20DSR%20Reporting%20Period?csf=1&web=1&e=loUtsR





*Note: GPS 320 relocated to the bench above where cracking was observed

Zero
2021/2022 AFPR data prior to relocation of instrument
2021/2022 AFPR data after relocation of instrument
Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

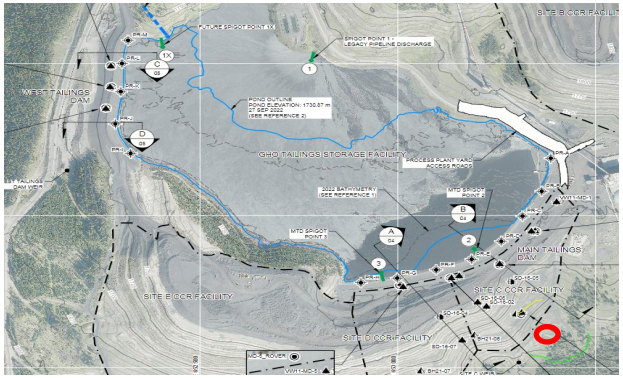
CONSULTANT

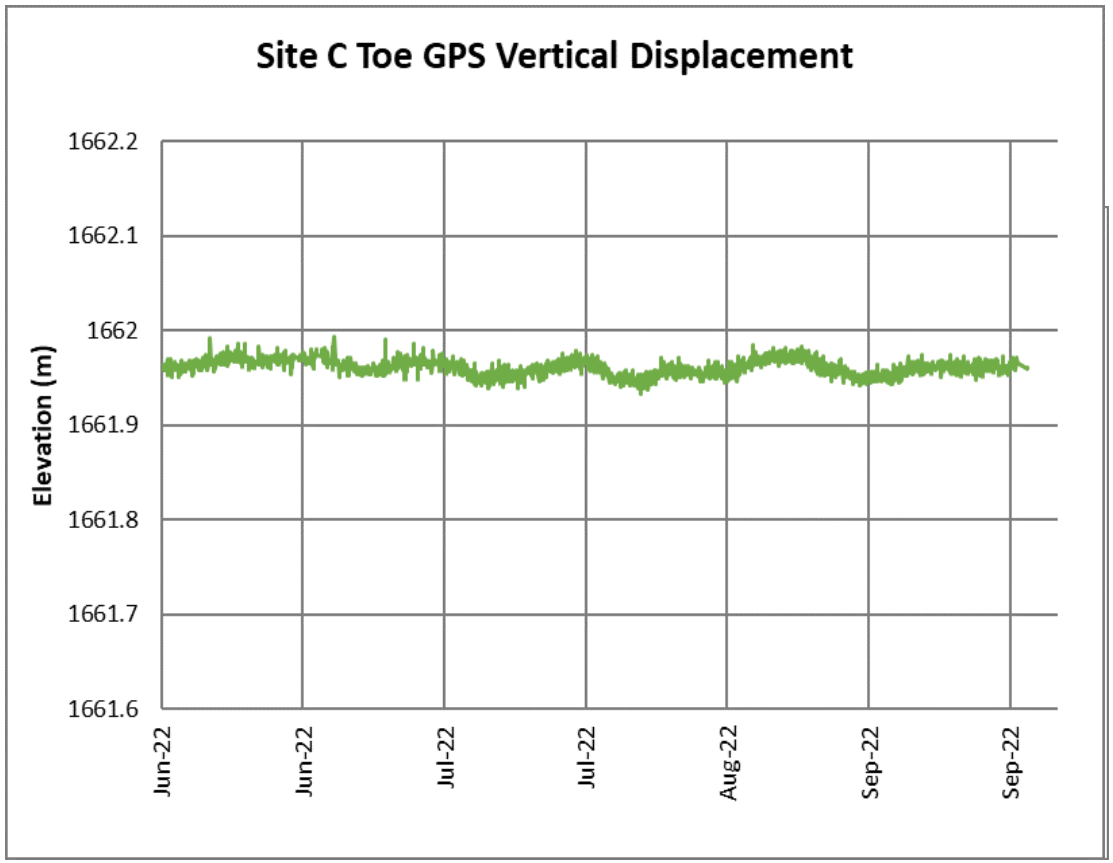
	YYYY-MM-DD	2023-02-02
PREPARED		DM
DESIGN		KA
REVIEW		MBW
APPROVED		AJH

TITLE
MAIN TAILINGS DAM – GPS 320 (Site C)
DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C3-8

File Path: https://golderassociates.sharepoint.com/:f:/t/sites/118622/Project%20Files/5%20Technical/%20Work/3000%20-%20DSR%20(Dams)/2020%20DSR%20Analysis%20Golder/2020%20DSR%20Reporting%20Period?csf=1&web=1&e=loUtsR





*Note: GPS MD-5 removed and placed as Site C Toe GPS instrument.

Zero

2021/2022 AFPR data

Instrument Location

CLIENT
TECK COAL LIMITED
GREENHILLS OPERATIONS
ELKFORD, BC

PROJECT
2022 ANNUAL FACILITY PERFORMANCE REPORT
GREENHILLS TAILINGS STORAGE FACILITY

CONSULTANT

	YYYY-MM-DD	2023-02-02
PREPARED		DM
DESIGN		KA
REVIEW		MBW
APPROVED		AJH

TITLE
MAIN TAILINGS DAM – Site C Toe GPS DISPLACEMENT PLOTS

PROJECT No.	Phase/Task/DOC.	Rev.	FIGURE
22516234	2000/2001/137	0	C3-9

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