2022 ANNUAL FACILITY PERFORMANCE REPORT

BEAVERDELL TAILINGS STORAGE FACILITIES

TECK RESOURCES LIMITED

PROJECT NO.: VE52701D1

DATE: MARCH 2023

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WSP File #: Project # VE52701D1
28 March 2023

Mr. Jason McBain, P.Eng.
Teck Resources Limited
601 Knighton Road
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Canada

Re: 2022 Annual Facility Performance Report, Beaverdell Mine Tailings Storage Facilities, Beaverdell, BC

Dear Jason,

WSP E&I Canada Limited is pleased to submit the 2022 Annual Facility Performance Report for the Beaverdell Mine Tailings Storage Facilities. The embankments of the North and South Tailings Storage Facilities were reviewed and are performing satisfactorily.

Should you have any questions or comments, please contact us.

Sincerely,

WSP E&I Canada Limited

Dixie Ann Simon, P.Eng.
Principal Geotechnical Engineer
Engineer of Record

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EXECUTIVE SUMMARY

This Annual Facility Performance Report (AFPR) summarizes the performance of the tailings storage facilities (TSFs) at Teck Legacy Properties' Beaverdell Mine. WSP E&I Canada Limited (WSP) prepared this AFPR report, in accordance with the requirements of the Health, Safety and Reclamation Code for Mines in British Columbia (HRSC), Ministry of Energy, Mines and Low Carbon Innovation (EMLI).

Based on Teck's operational and monitoring information and the on-site facility review, WSP considers that the performance of the tailings impoundment and water management facilities continues to be satisfactory. The following list provides the information to be included in the executive summary for facilities as required by the Health Safety and Reclamation Code Guidance Document (EMLI, 2016).

a) Summary of Facility Description

The Beaverdell Mine is an underground operation developed adjacent to the community of Beaverdell, BC, which is located 87 kilometers (km) from Kelowna via BC Highway 33. The mine adits are located on the mountainside on Wallace Mountain to the east of Beaverdell, the mine mill facilities and tailings storage facilities (TSFs) are located approximately 0.5 km west of the town of Beaverdell which is located on the east side of the West Kettle River. The TSFs are located in the valley of the West Kettle River with Cranberry Ridge to the west and the river to the east.

The TSF infrastructure is divided into the South TSF area consisting of five cells (Cells 1 through 5), and the North TSF area consisting of two cells (Cells 6 and 7). The TSF cells were constructed through use of embankments and natural topographic features (e.g., bedrock outcropping) to contain tailings generated at the mill facility. No information is available on the operation of the TSF prior to 1970. The South TSF was in operation until 1980. The North TSF was in operation from 1988 through to decommissioning of the mill in 1991.

b) Summary of Key Hazards

A formal assessment of credible modes of failure was carried out in April 2022. The assessment of the identified credible hazards was completed based on observations during the site reconnaissance and data provided by Teck. Subsequent AFPRs will summarize the credible failure modes based on the results of the formal assessment. TSFs can experience failure by one of three failure mechanisms – instability, internal erosion, and overtopping.

Failure by internal erosion has been determined to be close to non-credible for the North TSF and South TSF. This is primarily because the embankments are unsaturated based on the piezometric and cone penetration data.

Failure by overtopping is also considered to be close to non-credible. The spillway for Cell 3 was upgraded to pass the 24-hour IDF which is 1/3 between the 1:000-year return period flood and the probable maximum flood. Cells 6 and 7 have the storage capacity to store the IDF. In the event of a precipitation event greater than the IDF, the Cell 7 spillway will become active.

Failure by instability is also considered to be close to non-credible (static drained condition) to unlikely (seismic loading condition) for both the North and South TSFs.

While not a failure mode for the entire facility, the proximity of the West Kettle River to the South TSF poses a potentially credible erosion mechanism. This is primarily based on observed flooding that occurred in 2018. While no erosion from the facilities occurred, the potential was present. Following the 2018 flooding, riprap was installed to protect the TSF up to and including a 1/200-year event. At the time of the annual site reconnaissance, the riprap was in good condition though the peak flow during the reporting period was significantly less than 1/200-year event. The North TSF is well above the West Kettle River and the risk posed to it is considered to be negligible.

c) Classification of Failure

Teck has advised that they are aligned with the most conservative interpretation of the Global Industry Standard for Tailings Management (GISTM) and will adopt the extreme consequence case design loading for any facility with a credible flow failure mode. This is consistent with Teck's safety culture.

d) Summary of Significant Changes

There have not been significant changes at or around the Beaverdell TSFs.

e) Significant Changes in Instrumentation and/or Visual Monitoring Records

Twelve vibrating wire piezometers (VWPs) were installed at the Beaverdell TSFs in 2020. The limited data available to date suggest that piezometric levels are generally at or below the original ground surface. The data also suggest that the water levels beneath the TSFs fluctuate with the seasons which is expected.

f) Significant Changes to Embankment Stability and/or Surface Water Control

There have been no changes to embankment stability or surface water control during the reporting period.

g) Summary of review of Operation, Maintenance and Surveillance Manual

The operations, maintenance, and surveillance (OMS) manual for the TSFs was updated by Teck in November 2021 (Teck, 2021). The OMS manual was revised by the RTFE to reflect changes in roles and responsibilities, and to include the flood response protocol and updates based on the 2020 site investigation, the consolidated hydrological report, and the West Kettle River armoring.

h) Summary of Review of Emergency Preparedness and Response Plan

The mine emergency preparedness and response plan (MERP) was last updated in February 2018. Dam safety and MERP training was provided to the EOR as well as the deputy EOR via a PowerPoint presentation provided by Teck. Teck has indicated that the MERP was recently updated but has not been finalized. A tabletop exercise of the MERP was held in May 2022.

i) Scheduled date for formal Dam Safety Review

A dam safety review DSR as required by the HSRC is currently underway. The site visit portion was completed in September 2021. A draft report has been submitted to Teck and is expected to be finalized in early 2023.

j) Summary of AFPR Conclusions and Recommendations

The Beaverdell Mine TSFs are in good condition and well maintained. Stewardship is appropriate to the level of risk. Recommendations from previous annual performance reports and their status are provided in Table 8-1. Recommendations that were closed in 2022 are indicated by gray shading. There is one new recommendation based on observations from the 2022 annual site reconnaissance. Surficial erosion possibly resulting from surface

water runoff concentrated in areas disturbed by animal activity was observed at several locations on the embankment crests. These areas should be marked in the field by flagging or other means and monitored for continued or increased erosion. The recommendation is further described with timelines provided in Table ES-1.

Table ES-1 Summary of Status of Previous Recommendations

Structure	ID Number	Deficiency or Non-conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Status as of March 2023	Actions and Recommended Deadline
South TSF	2018-03 a, b	Existing riprap along the toe of Cells 4 and 5 may not be sufficient to prevent erosion of embankment fill during a large river freshet flood event, based on observed changes in river alignment and adjacent riverbank conditions.	HRSC §10.1.8	Document long-term plan for riprap along West Kettle River, considering larger flood events, to mitigate risk of erosion along the toe of Cells 4 and 5.	3	In process	Q4 2024 To be addressed in the closure plan, closure strategy is to be submitted to COIs in June 2023, updated (final) closure plan will be developed considering COI input, date TBD
	2019-01	The location and alignment of the Cell 5 decant pipe are unknown.	OMS §5.5	Determine the location and alignment of the outlet of Cell 5 decant	3	Not started	Q4 2024 To be addressed in the closure plan, closure strategy is to be submitted to COIs in June 2023, updated (final) closure plan will be developed considering COI input, date TBD
	2020-02	Results of Phase 1 investigation indicated the presence of tailings downstream of toe of Cell 3. As such, the South TSF may be founded on tailings in the area of Cell 3.	HSRC §10.1.4	Additional investigation should be planned to further delineate the extent of tailings downstream of South TSF	3	Not Started	Area to be addressed as part of the closure planning process. Q4 2024 (as above)
	2020-03	Results from the Phase 1 geotechnical site investigation indicate that tailings in Cell 4 are finer than then what was used in filter compatibility and internal stability assessment (Golder Associates Ltd., 2013)	HSRC §10.1.4	Update filter compatibility and internal stability for embankment fill and foundations based on Phase 1 geotechnical investigation laboratory test results	3	Partially complete	Stability and liquefaction assessment completed by Golder. Filter compatibility assessment on hold pending updated closure plan.
North TSF	2019-04	The outlet structure of the Cell 6 decant accumulates a small quality of water behind a metal weir, which may affect water chemistry when sampled.	OMS §5.5	Review collected water quality data to determine source of the accumulated water. Assess opportunity for maintaining the collection point to inform ongoing geochemistry studies. Consider upgrading to remove steel as a potential source of water contamination. Decommission the outlet if deemed of no value.	3	Partially complete	Sampling has been discontinued because the results were considered unreliable because of undocumented decant construction. Final decommissioning of Cell 6 and 7 decants will be addressed in the closure plan, closure strategy is to be submitted to COIs in June 2023, updated (final) closure plan will be developed considering COI input, date TBD

Structure	ID Number	Deficiency or Non-conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Status as of March 2023	Actions and Recommended Deadline
North and South TSFs	2016-05	Closure plan not updated	HSRC §10.4.1	Update the closure plan	4	In process	Closure visioning workshops in progress; Reclamation Research Program including end land use planning in progress. Closure strategy to be submitted to COIs June 2023; updated (final) closure plan will be developed considering COI input, date TBD.
	2021-01	Remote monitoring system not addressed in OMS		Remote monitoring system should be checked at a minimum during routine inspections. Information for accessing the remote monitoring system should be outlined in the OMS. Process for responding to loss of data transmission should be outlined.	4	Completed	No further action
	2021-02	Precipitation is based on historical data and a correction factor to adjust more current precipitation data available from surrounding weather stations.		Install an automated weather station at the site. Connect to existing remote monitoring network.	4	Partially completed	Q3 2023 If required for detailed closure planning.
	2021-03	Broken perimeter fence posts and wires. Possibly insufficient signage along West Kettle River.		Repair perimeter fence and assess need for additional signage	4	In process	Q3 2023
	2021-04	The embankments and tailings surface are not monitored for deformation and/or subsidence.		Initiate deformation monitoring using InSAR or similar.	4	Completed	InSAR monitoring to be completed yearly

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1 INTRODUCTION

WSP E&I Canada Limited (WSP), formerly Wood[1], has prepared this 2022 Annual Facility Performance Reviews (AFPR) report for the tailings storage facilities at the closed Beaverdell Mine, owned by Teck Resources Limited (Teck).

1.1 SCOPE OF REPORT

Teck requires all of its tailings facilities, whether active or legacy, to have a minimum level of governance that includes an Engineer of Record (EoR). One of the key responsibilities for that EoR is to have that individual create an annual report summarizing the performance of the facility over the reporting period along with recommendations for the following period in terms of continual improvement opportunities based upon observations made. Teck's requirements are mirrored in some jurisdictions, such as British Columbia, by regulatory reporting requirements for Annual Facility Performance Reports (AFPR). In British Columbia, the regulations require that the AFPR addresses the reporting period and be submitted no later than 31 March of the following year. The scope of this report addresses the period spanning September 2021 through August 2022, which is referred to as the "reporting period". Information presented is based on observations made during site visits, analysis of instrumentation and monitoring data, and correspondence. The report generally does not address changes or conditions after the end of the reporting period unless a specific remarkable event occurred.

1.2 ANNUAL REPORTING REQUIREMENTS

This report was prepared in accordance with the requirements of the British Columbia Ministry of Energy, Mines and Low-Carbon Innovation (EMLI) presented in the November 2022 "Health Safety and Reclamation Code for Mines in BC" (HSRC) and the July 2016 "Guidance Document – Health, Safety and Reclamation Code (HSRC) for Mines in British Columbia" (HSRC Guidance Document).

The numbered items required for the AFPR (formerly known as Dam Safety Inspections, or DSIs) by Section 4.2 of the HSRC Guidance Document are found in the following sections of this report.

- Executive Summary – precedes the Table of Contents
- Facility Description – Section 2 and Appendix A
- Identification of Engineer of Record (EOR) and TSF Qualified Person – Section 1.3
- Plan and Cross-sections ((Golder Associates Ltd., 2021) – Appendix B
- Site reconnaissance and site photographs – Section 4 and Appendices C and D

[1] Effective September 21, 2022, Wood Environment & Infrastructure Solutions Canada Limited is now operating as WSP E&I Canada Limited. No other aspects of our legal entity, contractual terms or capabilities have changed in relation to this report submission.

- Review of Climate Data – Section 3
- Water balance review and reconciliation – Section 3
- Freeboard and storage availability (in excess of the design flood) – Section 3
- Water Discharge System, volumes, and quality – Section 3
- Surface water control and surface erosion – Section 3
- Instrumentation review – Section 5 and Appendix E
- Recommendations – Section 9.

1.3 ROLES AND RESPONSIBILITIES

The Beaverdell Mine TSFs are regulated by the HRSC. The TSF embankments meet the definition of mining dams as defined in the HSRC. As required by the HRSC, the Beaverdell TSFs are required to have a Responsible Tailings Facility Engineer (Tailings Storage Facility Qualified Person) and an Engineer of Record.

1.3.1 RESPONSIBLE TAILINGS FACILITY ENGINEER

The Responsible Tailings Facility Engineer (RTFE) for the Beaverdell TSF is Jason McBain, P.Eng. of Teck Resources Ltd. The RTFE is responsible for the integrity of the TSF, and the scope of work and budget requirements for the tailings facility, including risk management.

1.3.2 ENGINEER OF RECORD

The Engineer of Record (EOR) for the Beaverdell TSF is Dixie Ann Simon, P.Eng. on behalf of WSP E&I Canada Limited. The EOR is responsible for confirming that the tailings facility is designed, constructed, and decommissioned with appropriate concern for integrity of the facility, and that it aligns with and meets applicable regulations, statutes, guidelines, codes, and standards. Jason Chen, P.Eng. serves as deputy or alternative EOR also on behalf of WSP.

1.3.3 THIRD-PARTY OVERSIGHT

Per the requirements of the February 2017 update to the HSRC, Teck convened an Independent Technical Review Board (ITRB) to provide on-going independent review of the Beaverdell TSF. The Beaverdell ITRB has met yearly since it was first convened in January 2018. The ITRB board members currently are Randy Knapp, Howard Plewes, and Rick Rodman.

The last ITRB meeting was completed in in December 2022.

1.4 AUTHORIZATIONS

The Beaverdell TSF is operated under the following permits:

- British Columbia Ministry of Energy, Mines and Petroleum Resources (currently Energy, Mines and Low Carbon Innovation) Permit No. M-17, last amended 11 June 2021

- British Columbia Ministry of Environment Effluent Permit No. PE-444, last amended 22 April 2021

2 BACKGROUND

2.1 ELEVATION DATUM AND COORDINATE SYSTEM

The current global coordinate system used for surface works at the mine is the North American Datum of 1983 (NAD 83) with coordinates projected to Universal Transverse Mercator (UTM) Zone 11 and the geodetic datum is Canadian Geodetic Vertical Datum (CGVD) 2013.

2.2 TAILINGS STORAGE FACILITY DESCRIPTION AND DEVELOPMENT

The Beaverdell Mine is an underground operation developed adjacent to the community of Beaverdell, BC, which is located 87 kilometers (km) from Kelowna via BC Highway 33. The location of the Beaverdell Mine is shown in Figure 1. Silver was the main ore extracted from the mine, with appreciable quantities of lead, zinc, gold, and cadmium. The Beaverdell Mine was acquired by Teck Corporation Limited in 1969 or 1970 and continued production until 1991, when the mine and ancillary operations were permanently closed. The Beaverdell Mine is now a closed facility under active care and maintenance, with no current or future planned mining activities.

While the mine adits are located in the mountainside on Wallace Mountain to the east of Beaverdell, the mine mill facilities and tailings storage facility (TSF) are located approximately 0.5 km west of the town of Beaverdell which is located on the east side of the West Kettle River. The TSFs are located in the valley of the West Kettle River with Cranberry Ridge to the west and the river to the east. The locations of the North and South TSFs relative to surrounding physical features are shown in Figure 2.

The TSF infrastructure is divided into the South TSF area consisting of five cells (Cells 1 through 5), and the North TSF area consisting of two cells (Cells 6 and 7). The TSF cells were constructed through use of embankments and natural topographic features (e.g., bedrock outcropping), to contain tailings generated at the mill facility. No information is available on the operation of the TSF prior to 1970. The South TSF was in operation until 1980. The North TSF was in operation from 1988 through to decommissioning of the mill in 1991.

Detailed descriptions of the North and South TSFs are provided in Sections 2.2.1 and 2.2.2. The primary source for this information is the 2020 Annual Facility Inspection (Golder Associates Ltd., 2021) and will be confirmed by the current EOR during subsequent inspections and investigations. Facility data sheets are provided in Appendix A. As-built information is not available; however, cross-sections have been developed based on current topography and historical design reports (Golder Associates Ltd., 2021). Copies are included in Appendix B.

2.2.1 DETAILED DESCRIPTION OF SOUTH TAILINGS STORAGE FACILITY

The South TSF consists of five cells (Cells 1 through 5). The South TSF is bounded by natural topography on the north and west sides. Embankments on east and south sides contain the tailings; specifically, the eastern embankments of Cells 3, 4, and 5, southern embankments of Cells 1 and 5 and western embankment of Cell 1.

Information on the design and construction of Cells 1 through 4 is not available. A design report is available for Cell 5 (R. F. Binnie Associates Ltd., 1973); however, construction records are not available. Cell 5 embankment, if

constructed as designed, likely was formed using local materials excavated from the interior of the cell and the downstream method of construction. Though no records are available for Cell 4, it is likely that it also was constructed in a manner similar to Cell 5 based on observations.

There is a decommissioned decant tower in Cell 5. The decant tower was decommissioned by filling it with expandable foam based on observations. The location of the decant tower is shown in Figure 2. The decant tower reportedly discharged to a supernatant pond that historically existed downstream of the southwest corner of Cell 5; however, evidence or remnants of the decant discharge pipe is not visible on the downstream Cell 5 slope.

2.2.1.1 DIMENSIONS OF SOUTH TSF PERIMETER EMBANKMENTS.

The dimensions of the South TSF perimeter embankments as determined by Golder Associates Ltd. (Golder) are provided in Table 2-1 (Golder Associates Ltd., 2021). Golder estimated the dimensions based on the 2018 LiDAR survey and their observations. The maximum height is about 10 m, located on the Cell 1 embankment. The total length of the perimeter embankments is about 1,010 m. The upstream slopes of Cell 1 could not be observed as they are covered with tailings. Cell 2 does not have a containment embankment or a divider dyke between it and Cell 4. Cell 2 appears essentially continuous with Cell 4.

Table 2-1 Dimensions of South TSF Perimeter Embankments

Cell	Downstream Slope (H:V)	Upstream Slope (H:V)	Exterior Crest Length[1] (m)	Crest Width (m)	Embankment Height (m)	Approximate Minimum Crest Elevation[2] (m)
1	2.0:1 to 4:1	Not known	110	1 to 3	3 to 10	785.5
2	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]
3	1.5:1 to 2.4:1	1.5:1 to 3:1	360	1 to 5	2 to 3	781.1
4	1.2:1 to 1.4:1	1.5:1[4]	240	3 to 3.5	7 to 8	785
5	1.3:1 to 2.5:1	1.5:1[4]	300	3 to 6	7 to 9	785

1. Crest length includes only that portion of the embankment that forms the TSF perimeter
2. Elevations are in CGVD2013
3. Does not form a portion of the TSF perimeter; does not appear to have a containment embankment or a dyke between it and Cell 4
4. Based on original design drawings

2.2.1.2 SOUTH TSF SPILLWAYS

Golder determined the dimensions of the South TSF internal spillways based on the 2018 LiDAR survey and their observations during site inspections (Golder Associates Ltd., 2021). There is a spillway through the divider dyke between Cell 3 and Cell 4 that allows water to flow from Cell 4 to Cell 3. This spillway has a base width of 3 m, a minimum depth of 1 m and side slopes of 2H:1V. The invert elevation is approximately 784.5 m. It is trapezoidal in shape and partially armored with riprap.

There is a small, partially armored spillway through the divider dyke between Cell 4 and Cell 5 that allows water to flow from Cell 5 to Cell 4. The invert elevation is approximately 785.0 m.

The Cell 3 external spillway was upgraded in 2019 (Golder Associates Ltd, 2019c). The Cell 3 spillway is trapezoidal in shape with a minimum base width of 13.6 m at the invert and a longitudinal slope of 5H:1V. The invert elevation is 780.4 m. It is armored with a 0.66 m thick layer of Class 50 riprap. The spillway is capable of passing the 24-hour probable maximum flood. Construction records are available for the Cell 3 spillway upgrade (Golder Associates Ltd., 2019)

2.2.1.3 SOUTH TSF TAILINGS STORAGE AND WATER STORAGE CAPACITY

Golder estimated the current storage capacity of the South TSF cells based on the LiDAR survey completed in July 2018 and the as-built survey for the Cell 3 spillway (Golder Associates Ltd., 2019a). The storage capacity is the volume of water that could be stored above the tailings and below the lowest spillway elevation. Cells 1, 2 and 3 essentially cannot store water. The volume of the stored tailings was based on the 2018 cone penetration testing program (Golder Associates Ltd., 2019b). The storage and tailings volumes calculated by Golder are provided in Table 2-2.

Table 2-2 South TSF Tailings and Water Storage

Cell	Storage Volume (m^3)	Storage Elevation[1] (m)	Overflow Discharged to	Estimated Volume of Stored Tailings (m^3)
1	0	N/A	Cell 5	27,000
2	0	N/A	Cell 4	18,000
3	0	N/A	Downstream via external spillway	192,000
4	7,400	784.5	Cell 3	165,000
5	14,500	785.0	Cell 4	142,000
Total	21,900	N/A	N/A	544,000

1. Elevations are in CGVD2013

2.2.2 DETAILED DESCRIPTION OF NORTH TAILINGS STORAGE FACILITY

The North TSF consists of two cells (Cells 6 and 7). The North TSF is bound by natural topography to the west. Embankments provide containment on the north, east and south sides contain the tailings. Design reports are available for Cells 6 and 7 (R.F. Binnie and Associates Ltd., 1980a, 1980b and 1988). Construction reports are not available. Based on observations, it appears that the Cell 6 and 7 embankments were constructed in accordance with the design reports. Material for construction of Cells 6 and 7 was the natural sand and gravel materials obtained from excavation within the cell area.

There are two decommissioned decant towers present in the North TSF, one in Cell 6 and one in Cell 7. The decant towers have been decommissioned by sealing with foam based on observations. The locations of the decant towers are shown in Figure 2. The discharge pipes for both decants are present and appear to be unsealed. The

Cell 6 decant tower reportedly discharged to a supernatant pond that historically existed near the southeast corner of Cell 6. A supernatant pond specific to the Cell 7 decant is not shown on the available historical drawings.

2.2.2.1 DIMENSION OF NORTH TSF PERIMETER EMBANKMENTS

The dimensions of the North TSF perimeter embankments as determined by Golder are provided in Table 2-3 (Golder Associates Ltd., 2021). Golder estimated the geometry based on the 2018 LiDAR survey and their observations. The maximum height is about 12 m. The total length of the perimeter embankments is about 840 m. This length does not include the divider dyke between the two North TSF cells.

Table 2-3 Dimensions of North TSF Perimeter Embankments

Cell	Downstream Slope (H:V)	Upstream Slope (H:V)	Exterior Crest Length[1] (m)	Crest Width (m)	Embankment Height (m)	Approximate Minimum Crest Elevation[2] (m)
1	1.4:1 to 1.9:1	1.5:1[3]	510	3 to 4	10 to 12	797.5
2	1.6:1 to 2.6:1	1.5:1	330	3 to 4	8 to 10	798.0

1. Crest length includes only that portion of the embankment that forms the TSF perimeter
2. Elevations are in CGVD2013
3. Based on original design drawings

2.2.2.2 NORTH TSF SPILLWAYS

Golder determined the dimensions of the North TSF based on the 2018 LiDAR survey and their observations during site inspections (Golder Associates Ltd., 2021). The spillway is located on the west side of Cell 7 in natural ground. It is trapezoidal in cross-section with a base width of approximately 2m and 4H:1V side slopes. The spillway is approximately 2 m below the surrounding natural ground. The invert elevation is approximately 797.0 m which is about 0.5 m below the crest of Cell 6 and 1.0 m below the crest of Cell 7.

The crest elevation of the divider dyke between Cells 6 and 7 is about the same elevation as the invert of the spillway.

2.2.2.3 TSF TAILINGS STORAGE AND WATER STORAGE CAPACITY

The current storage capacity of the North TSF cells was estimated based on the LiDAR survey completed in July 2018 (Golder Associates Ltd., 2019a). The storage capacity is the volume of water that could be stored above the tailings and below the lowest spillway elevation. The volume of the stored tailings was based on the 2018 cone penetration testing program (Golder Associates Ltd., 2019b). The storage and tailings volumes calculated by Golder are provided in Table 2-4.

Table 2-4 South TSF Tailings and Water Storage

Cell	Storage Volume (m^3)	Storage Elevation (m)	Overflow Discharged to	Estimated Volume of Stored Tailings (m^3)
6	22,500	797.0	Cell 7	271.000

7	162,100	797.0	Downstream via spillway	113,000
Total	184,600	N/A	N/A	384,000

1. Elevations are in CGVD2013

2.3 LOADING CRITERIA

The Beaverdell Mine TSFs are in Closure – Active Care which is often referred to as 'Care and Maintenance'. The HRSC loading criteria for active care are provided in Table 2 5. For comparison purposes, the loading criteria recommended in the Global Industry Standard for Tailings Management (GISTM) (ICMM, UNEP, PRI, 2020) also are provided.

Teck has advised that they are aligned with the most conservative interpretation of the GISTM which, in turn, is consistent with their safety culture. Commensurately, Teck has advised that consequence classification is not a part of their tailings management governance and has asked that it not be reported in this AFPR. Instead, they will adopt the extreme consequence case design loading for any facility with a credible flow failure mode. For facilities without a credible failure mode in terms of a life safety issue, Teck will manage credible risks to As Low As Reasonably Practicable (ALARP). This consequence case applies for both earthquake and flood scenarios for all tailings facilities, consistent with the GISTM. The TSF meets current industry standards and will be reviewed against extreme loading scenarios. Adopting this approach meets or exceeds any regulatory requirements, aligns with Teck's goal to eliminate any risk for loss of life, and is consistent with the new GISTM which supports evolving beyond the conventional consequence classification system. This approach is consistent with industry-leading best practices and has an added benefit of providing accurate narratives to communities about the safety of tailings facilities that could impact them and who share Teck's approach of one life is one too many to be at risk.

Table 2-5 Beaverdell Mine TSF Loading Criteria

Aspect	HRSC Guidance Document and CDA (Active Care)	GISTM Operations and Closure (Active Care)	GISTM Passive-Closure (Passive Care) and Teck for Active/Passive Care or Operations
Inflow Design Flood (IDF)	1/3 between 1/975 and PMF	1/1,000	1/10,000
Environmental Design Flood	1/50 to 1/200	Not specified	Site-Specific
Earthquake	Between 1/100 and 1/1000	1/1,000	1/10,000
Embankment Integrity Measure	Limit-Equilibrium Factors of Safety irrespective of material type: 1.5 – Static; 1.2 – Post Seismic; 1.0 – Pseudo Static	Performance Based	Performance Based

Aspect	HRSC Guidance Document and CDA (Active Care)	GISTM Operations and Closure (Active Care)	GISTM Passive-Closure (Passive Care) and Teck for Active/Passive Care or Operations
Downstream Slope	2(horizontal):1(vertical) or flatter	Performance Based	Performance Based

Teck's use of Performance Based criteria for embankment integrity is aligned with current best practice (ICMM, 2021).

3 WATER MANAGEMENT

3.1 CLIMATE

A weather station is no longer present at the mine site nor in the nearby community of Beaverdell. The nearest weather stations are located in Kelowna and Penticton, about 60 km and 37 km distant from the site and 430 m and 344 m in elevation, respectively. For comparison, the Beaverdell TSFs are generally at elevation 790 m.

Historical average monthly precipitation (rainfall and snowfall) was developed using historical data from the Beaverdell stations and the historical climate normals from the surrounding weather stations (Golder Associates Ltd., 2021). Composite correlation factors for daily precipitation (rainfall plus snowfall) were developed by Golder to estimate precipitation at the Beaverdell mine site from the data from the nearby weather stations. Currently, the measured precipitation at Kelowna (62 km distant from the site) is multiplied by a correlation factor of 1.264 to estimate the precipitation at the Beaverdell Mine TSFs.

The estimated monthly and precipitation at the Beaverdell Mine TSFs are shown in Plate 3-1. The composite historical monthly average (Golder Associates Ltd., 2021) and the uncorrected Kelowna station (1123939) data also are shown in Plate 3-1 .

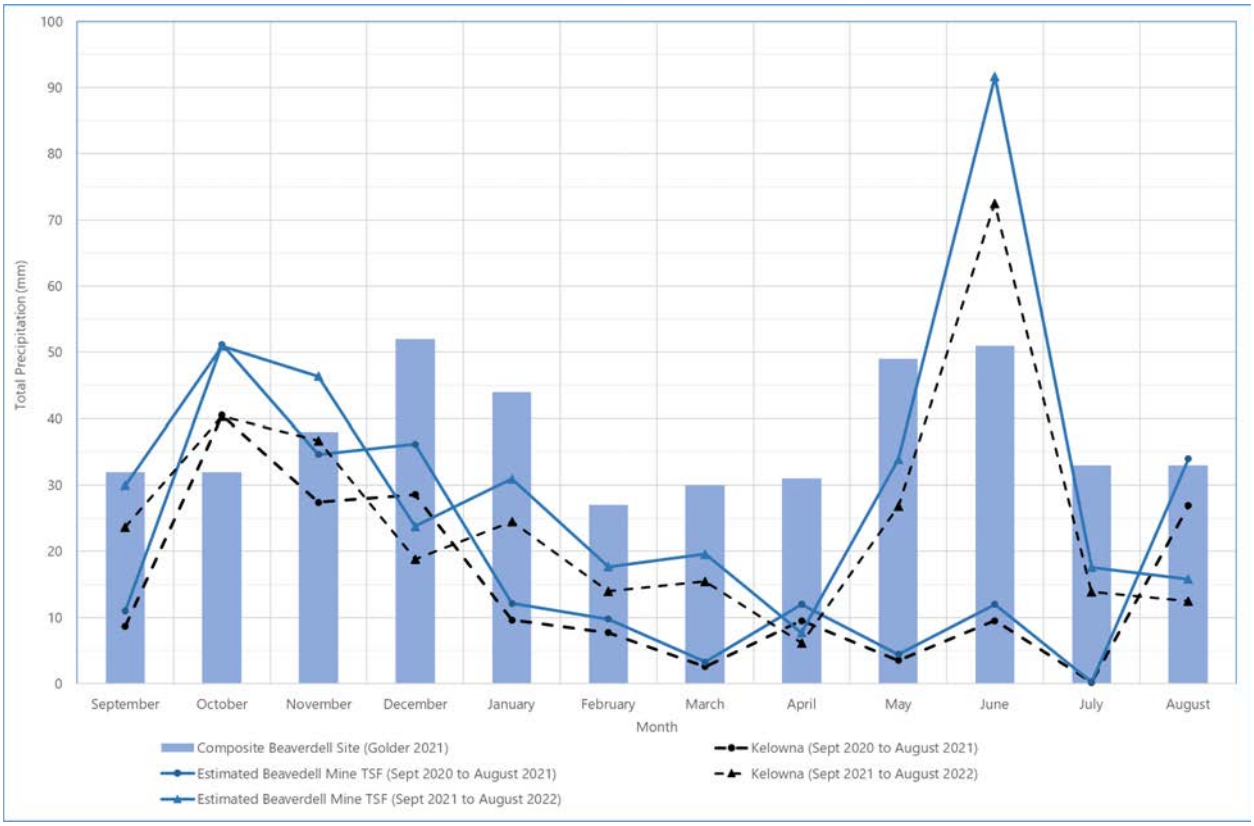

Plate 3-1 Estimated Monthly Precipitation at Beaverdell Mine TSFs

The estimated total precipitation at Beaverdell for 2022 is 386 mm. The estimated total when compared to the composite historical Beaverdell precipitation of 452 mm suggests a relatively dry year, but wetter than an exceptionally dry year in 2021 (total precipitation of 221 mm).

Peak freshet flow in the West Kettle River occurred on 06 June 2022. The estimate flow at the Westbridge Station (approximately 35km downstream from the Beaverdell TSF) on the West Kettle River 112 was m^3/sec. This flow rate is estimated to be an event with an approximate 1-year return period.

3.2 WATER DIVERSION SYSTEM

A ditch along Beaverdell Station Road directs surface water runoff from Cranberry ridge away from the South TSF. The ditching is sufficient to convey the IDF (Golder Associates Ltd., 2019d). The catchment area for the South TSF is limited to the surface area of the tailings and upstream slopes of the embankments.

Ditching along the north side of the North TSF directs water around and away from the North TSF. A portion of the ditching is not sufficient to convey the IDF and water could enter Cell 7 during an IDF (Golder Associates Ltd., 2019d). The available reporting does not include an assessment of the annual exceedance probability (AEP) of the event at which the ditch becomes insufficient and water enters the North TSF. Further assessment will be completed, if required, as the closure planning progresses.

3.3 WATER BALANCE

A yearly water balance for the Beaverdell TSFs is not particularly informative or useful as the inflows and outflows are not measured. A precipitation event exceeding the capacity of the North TSF diversion ditch (which could direct surface water runoff from Cranberry Ridge into the North TSF) did not occur during the reporting period. Inflows to the TSFs during the reporting period were limited to direct precipitation. A weather station is not present at the site and direct precipitation either in the form of snow or rainfall is not measured.

During the reporting period, the North and South TSFs spillways reportedly did not become active. Ponded water was not observed on the surface of the tailings at the time of the spring inspection by Teck as well as during the June annual inspection except in Cells 4 and 6, where small ponding was observed. There were no observable signs of seepage on the downstream slopes of the TSF embankments, except runoff ponding at the downstream toe of Cell 3.

As the spillways did not become active and there was no apparent seepage though the TSF embankments, outflows during the reporting period were limited to evapotranspiration, infiltration, and sublimation of the snow cover during the winter months. The distribution of the inflow (direct precipitation) to these outflows was not assessed.

The estimated annual lake evaporation is between 600 and 700 mm/year (Golder Associates Ltd., 2021). Considering the estimated total annual 2022 precipitation of 386 mm, the site has an overall water deficit.

3.4 FLOOD STORAGE AND FREEBOARD

Freeboard is not measured directly; however, quantitative performance objectives (QPOs) and a trigger action response plan (TARP) have been developed based on the distance of the seasonal ponds from the upstream crest of the perimeter embankments (Teck , 2021).

The surface of the Beaverdell TSFs is generally dry; however, small seasonal ponds historically have formed on the surface of tailings in Ponds 3, 4 and 6. During the reporting period small ponding was observed in Cells 4 and 6 during the spring inspection by Teck as well as during the June annual inspection. No ponding was observed in the other cells. The inspections indicated that flood storage and freeboard remained within the acceptable or 'green' threshold criteria.

3.5 SEEPAGE AND WATER DISCHARGE MANAGEMENT

Active seepage or evidence that seepage has occurred in the past was not observed on the downstream slopes of the TSF embankments at the time of the spring, fall or annual inspections. It is anticipated that infiltrating precipitation reaches the groundwater table beneath the TSFs and ultimately discharges to the West Kettle River.

Water was not discharged from the TSFs via the spillways during the reporting period based on observations during the spring, fall and annual inspections.

3.6 WATER QUALITY MONITORING

Water quality results are submitted to the Ministry of Environment and Climate Change Strategy (ENV) by Teck in accordance with the requirements of Permit PE-444.

4 SITE RECONNAISSANCE

The site reconnaissance was completed on 22 June 2022 by Dixie Ann Simon (EOR) and Jason Chen of WSP. They were accompanied by Jason McBain (RTFE). The weather at the time of the site reconnaissance was partly cloudy. The temperature ranged between 22° and 26° C. Photographs are provided in Appendix C. Inspection forms are provided in Appendix D.

The site reconnaissance included a visual inspection (on foot) of the North and South TSFs. General observations of the 2022 annual site reconnaissance are as follows:

- The embankments and spillways are in generally good condition.
- Cracking, settlement or lateral deformation of the crests and side slopes was not observed.
- Seepage or evidence of seepage was not observed on the downstream slopes of the embankments. Ponding was observed in the Cell 3 downstream toe area, which appeared to be sourced from local runoff.
- Several preferential erosional pathways have developed on the downstream slopes of the North TSF embankments that are likely the result of animal activity and/or surface runoff.
- Some perimeter fence posts are broken at the ground surface.
- Water was observed in the areas of the known seasonal ponds at the time of the site reconnaissance, such as Cell 4 and Cell 6. The surface of the tailings is partially vegetated with grasses, shrubs, and small trees.
- Sinkholes or subsidence of the tailings surface was not noted, though the entire tailings surface was not observed.
- The outlet pipe for the Cell 6 decant was dry, and some ponding was present in the metal container/weir.
- The protective casings for the newly installed instrumentation as well as the repeater stations and cellular gateways were in excellent condition.

In summary, there have been no significant changes in the TSFs. The riprap installed in 2019 and 2020 was in good condition at the time of the 2022 site visit. A reserve stockpile of riprap was present at the southeast corner of the South TSF. At the time of the site reconnaissance, the water level in the West Kettle River was recovering from the 2022 freshet peak flow and was lower than the bottom of the upper staff gauge according to Teck's observations.

5 INSTRUMENTATION AND MONITORING

5.1 GEOTECHNICAL INSTRUMENTATION MONITORING

Geotechnical instrumentation consists of 12 vibrating wire piezometers (VWPs) installed in March 2020. The historical standpipe piezometers are undocumented, considered unreliable and not monitored. During installation, the VWPs were connected to 8-channel VWP interfaces by cable. An interface was installed at each borehole location. The interfaces act as dataloggers. Data is recorded at user specified frequencies and transmitted wirelessly to an on-site cellular gateway. The gateway transmits data from the site to a remote PC via a cellular uplink. The locations of the VWPs, repeater stations and cellular gateways are shown in Figure 2. A summary of the VWP installations is provided in Table 5-1.

Table 5-1 Summary of Vibrating wire Piezometers

Borehole ID	Teck ID	Serial Number	Sensor Depth (m)	Sensor Elevation (m)	Sensor Location
BH20-01	BEA-VWP-2020-01A	VW65308	6.62	778.50	Tailings
	BEA-VWP-2020-01B	VW65315	10.25	774.87	Foundation
BH20-02	BEA-VWP-2020-02A	VW65307	6.16	778.42	Tailings
	BEA-VWP-2020-02B	VW65316	10.00	774.58	Foundation
BH20-03	BEA-VWP-2020-03A	VW65305	6.64	779.43	Embankment Fill
	BEA-VWP-2020-03B	VW65317	10.13	775.94	Foundation
BH20-04	BEA-VWP-2020-04A	VW65306	7.23	778.13	Embankment Fill
	BEA-VWP-2020-04B	VW65318	9.89	775.47	Foundation
BH20-06	BEA-VWP-2020-06A	VW65310	9.36	788.92	Embankment Fill
	BEA-VWP-2020-06B	VW65314	19.90	778.38	Foundation
BH20-07	BEA-VWP-2020-07A	VW65311	6.32	791.82	Embankment Fill

	BEA-VWP-2020-07B	VW65312	16.61	781.53	Foundation

The available VWP data of 2021 and 2022 is presented in Appendix E. Values of negative pressure head which generally correspond to piezometric levels below the instrument are plotted; however, the reader should use judgement when interpreting negative pressure heads. The data have been corrected for atmospheric pressure. A barometer is installed in MW18-06. Readings from BH20-06 have not been available since June 2021.

The data available to date suggest that piezometric levels are generally at or below the original ground surface. The data also suggest that the water levels beneath the TSFs fluctuate with the seasons which is expected.

5.2 INSAR GROUND DISPLACEMENT MONITORING

Ground displacement is being monitored by Teck using Interferometric Synthetic Aperture Radar (InSAR) techniques. Displacement data between April 2018 and November 2021 were available for review during this AFPR reporting period. The data showed the settlement areas were generally within tailings in Cell 4, Cell 6, and Cell 7, mostly in and around old decants and seasonal ponds, with about 2 to 3 cm of vertical settlement over a three-year period. Minor displacement was also noted for Cell 6 east embankments, which is likely related to surface runoff erosion or animal activities. Settlement of the surface of the tailings at the locations and at the observed magnitude is not unanticipated. It is also not of concern.

6 REVIEW OF OPERATIONAL DOCUMENTS

6.1 OPERATIONS, MAINTENANCE AND SURVEILLANCE MANUAL

The operations, maintenance, and surveillance (OMS) manual for the TSFs available to the EOR was last updated by Teck in November 2021 (Teck, 2021). At that time, the OMS manual was revised by the RTFE to reflect changes in roles and responsibilities, and to include the flood response protocol and updates based on the 2020 site investigation, the consolidated hydrological report, and the West Kettle River armoring.

Based on recent discussions with the RTFE, the OMS manual has been updated to include the remote monitoring system as recommended after the 2021 annual inspection; however, the updated OMS manual has not yet been published.

6.2 MINE EMERGENCY AND RESPONSE PLAN

The mine emergency preparedness and response plan (MERP) was last updated in February 2018. Dam safety and MERP training was provided to the EOR as well as the deputy EOR via a PowerPoint presentation provided by Teck. Teck has indicated that the MERP was recently updated but has not been finalized. A tabletop exercise of the MERP was held in May 2022.

6.3 DAM SAFETY REVIEW

A dam safety review (DSR) of the Beaverdell TSFs was completed in 2012 when Golder assumed the role of EOR (Golder Associates Ltd., 2013). Golder recommended completing a follow-up DSR within 10 years which is in accordance with current CDA guidance for dams with consequence classifications of Significant.

Paragraph 10.5.4 of the Code now requires a DSR at a minimum every five years regardless of potential consequence. A DSR as required by the Code is currently underway. The site visit was completed in September 2021. WSP understands that the draft DSR has been submitted to Teck.

7 CREDIBLE FAILURE MODES ASSESSMENT

The annual review of the Beaverdell Mine TSF risk register was completed by Teck and the EOR in April 2022. Only minor edits were required. No new risks were identified.

WSP understands and supports Teck's long-term goal of reaching landform status for the TSF(s) in which failure modes with catastrophic consequences would be considered non-credible. For the purpose of this and subsequent AFPRs, the term non-credible will apply to a scenario where the likelihood of a failure mechanism resulting in a catastrophic consequence is considered negligible.

A formal assessment of credible modes of failure was partially completed in Q2 2022 and is currently under review. TSFs can experience failure by one of three failure mechanisms – instability, internal erosion, and overtopping.

Failure by internal erosion has been determined to be close to non-credible[2] or non-credible for the North TSF and South TSF. This is primarily because the embankments are unsaturated based on the piezometric and cone penetration data. There has been occasional ponding on the surface of the tailings; however, the extent and depth is not expected to provide the hydraulic gradient required to mobilize finer soil particles through the embankment fill materials.

Failure by overtopping is also considered to be close to non-credible[3]. The spillway for Cell 3 was upgraded to pass the 24-hour IDF which is 1/3 between the 1:1,0000 year return period flood and the probable maximum flood (PMF) (Golder Associates Ltd., 2018) and (Golder Associates Ltd., 2019). Cells 6 and 7 have the storage capacity to store the IDF. In the event of a precipitation event greater than the IDF, the Cell 7 spillway will become active.

Currently, failure by instability is also considered to be close to non-credible (static drained condition) to unlikely[4] (seismic loading condition) for both the North and South TSFs. Additional investigations as recommended in the 2020 DSI have been completed. Liquefaction and stability assessment has been completed in 2022 (Golder Associates Ltd., 2022), which indicated that the embankment fill and foundation materials are not susceptible to liquefaction under a 1-in-10,000-year return period seismic event, and slope stability factors of safety meet the design criteria under the measured pore pressure conditions.

The analysis has essentially confirmed the current failure mode assessment.

Teck defines a catastrophic failure as a failure that results in uncontrolled loss of contents that will have an intolerable downstream impact. An intolerable downstream impact is further defined as a life safety impact, significant and lasting environmental impacts, significant and lasting social impacts, or significant business

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[2] Close to non-credible likelihood – For a natural hazard (earthquake, flood, windstorm, etc.) the predicted return period for an event of this strength/magnitude is greater than 1/10,000 years. For failure modes such as instability and internal erosion that are close to non-credible.

[3] Very rare likelihood - For a natural hazard (earthquake, flood, windstorm, etc.) the predicted return period for an event of this strength/magnitude is between 1/1,000 years and 1/10,000 years. For failure modes such as instability and internal erosion that are very rare.

[4] Unlikely - For a natural hazard (earthquake, flood, windstorm, etc.) the predicted return period for an event of this strength/magnitude is between 1/10 years and 1/100 years.

interruption. A failure mechanism that would result in a catastrophic failure has not been identified for the Beaverdell TSFs.

8 WEST KETTLE RIVER EROSION POTENTIAL

The proximity of the West Kettle River (WKR) to the South TSF does pose a concern because of the potential for erosion of the South TSF embankment toes, specifically Cells 4 and 5. This is primarily based on observed flooding that occurred in 2018 that did not cause any erosion but had the potential to do so. In 2020, riprap was installed along the WKR where it is in close proximity to the South TSF. The riprap was designed to protect the TSF up to and including a 1/200-year event. Greater protection is not required by regulation but as the WKR poses the greatest risk to the South TSF, Teck could elect to install additional riprap or modify the geometry of the structure to provide additional erosion protection. Teck currently is assessing closure opportunities that will reduce the risk to the TSF posed by the WKR, including relocating tailings from the South TSF. The North TSF is well above the West Kettle River and the flood erosion risk posed to it is considered to be negligible.

9 CONCLUSIONS AND RECOMMENDATIONS

The Beaverdell Mine TSFs are in good condition and well maintained. Stewardship is appropriate to the level of risk. Recommendations from previous annual performance reports and their status are provided in Table 9-1. Recommendations that were closed in 2022 are indicated by gray shading. Recommendations based on observations from the 2022 annual site reconnaissance and the information made available by Teck are provided in Table 9-2. Descriptions of priorities and risk levels are provided Table 9-3 .

Table 9-1 Summary of the Status of Previous Recommendations

Structure	ID Number	Deficiency or Non-conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Status as of March 2023	Actions and Recommended Deadline
South TSF	2018-03 a, b	Existing riprap along the toe of Cells 4 and 5 may not be sufficient to prevent erosion of embankment fill during a large river freshet flood event, based on observed changes in river alignment and adjacent riverbank conditions.	HRSC §10.1.8	Document long-term plan for riprap along West Kettle River, considering larger flood events, to mitigate risk of erosion along the toe of Cells 4 and 5.	3	In process	Q4 2024 To be addressed in the closure plan, closure strategy is to be submitted to COIs in June 2023, updated (final) closure plan will be developed considering COI input, date TBD
	2019-01	The location and alignment of the Cell 5 decant pipe are unknown.	OMS §5.5	Determine the location and alignment of the outlet of Cell 5 decant	3	Not started	Q4 2024 To be addressed in the closure plan, closure strategy is to be submitted to COIs in June 2023, updated (final) closure plan will be developed considering COI input, date TBD
	2020-02	Results of Phase 1 investigation indicated the presence of tailings downstream of toe of Cell 3. As such, the South TSF may be founded on tailings in the area of Cell 3.	HSRC §10.1.4	Additional investigation should be planned to further delineate the extent of tailings downstream of South TSF	3	Not Started	Area to be addressed as part of the closure planning process. Q4 2024 (as above)
	2020-03	Results from the Phase 1 geotechnical site investigation indicate that tailings in Cell 4 are finer than then what was used in filter compatibility and internal stability assessment (Golder Associates Ltd., 2013)	HSRC §10.1.4	Update filter compatibility and internal stability for embankment fill and foundations based on Phase 1 geotechnical investigation laboratory test results	3	Partially complete	Stability and liquefaction assessment completed by Golder. Filter compatibility assessment on hold pending updated closure plan.
North TSF	2019-04	The outlet structure of the Cell 6 decant accumulates a small quality of water behind a metal weir, which may affect water chemistry when sampled.	OMS §5.5	Review collected water quality data to determine source of the accumulated water. Assess opportunity for maintaining the collection point to inform ongoing geochemistry studies. Consider upgrading to remove steel as a potential source of water contamination. Decommission the outlet if deemed of no value.	3	Partially complete	Sampling has been discontinued because the results were considered unreliable because of undocumented decant construction. Final decommissioning of Cell 6 and 7 decants will be addressed in the closure plan, closure strategy is to be submitted to COIs in June 2023, updated (final) closure plan will be developed considering COI input, date TBD

Structure	ID Number	Deficiency or Non-conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Status as of March 2023	Actions and Recommended Deadline
North and South TSFs	2016-05	Closure plan not updated	HSRC §10.4.1	Update the closure plan	4	In process	Closure visioning workshops in progress; Reclamation Research Program including end land use planning in progress. Closure strategy to be submitted to COIs June 2023; updated (final) closure plan will be developed considering COI input, date TBD.
	2021-01	Remote monitoring system not addressed in OMS		Remote monitoring system should be checked at a minimum during routine inspections. Information for accessing the remote monitoring system should be outlined in the OMS. Process for responding to loss of data transmission should be outlined.	4	Completed	No further action
	2021-02	Precipitation is based on historical data and a correction factor to adjust more current precipitation data available from surrounding weather stations.		Install an automated weather station at the site. Connect to existing remote monitoring network.	4	Partially completed	Q3 2023 If required for detailed closure planning.
	2021-03	Broken perimeter fence posts and wires. Possibly insufficient signage along West Kettle River.		Repair perimeter fence and assess need for additional signage	4	In process	Q3 2023
	2021-04	The embankments and tailings surface are not monitored for deformation and/or subsidence.		Initiate deformation monitoring using InSAR or similar.	4	Completed	InSAR monitoring to be completed yearly

Table 9-2 Summary of 2022 Recommendations

Structure	ID Number	Deficiency or Non-conformance	Applicable Regulation or OMS Manual Reference	Recommended Action	Priority	Status as of March 2023	Actions and Recommended Deadline
North and South TSFs	2022-01	Surficial erosion on downstream embankment crest from surface water runoff concentrated in areas disturbed by animal activity.		Mark areas of erosion in the field by flagging or similar means and monitor for changes.	3	Not started	Q3 2023

Table 9-3 Priorities and Level of Risks

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

10 LIMITATIONS AND CLOSING REMARKS

Recommendations presented herein are based on an evaluation of the observations made during the annual site reconnaissance and information provided by Teck. If additional information becomes available, WSP should be notified and provided the opportunity to review the additional information and revise the current recommendations as appropriate.

This annual facility performance report has been prepared for exclusive use of Teck in accordance with Teck tailings governance policies and the applicable British Columbia provincial regulations. It has been prepared in accordance with generally acceptable geotechnical and tailings facility engineering practices subject to the limitations stated in Section 10. No other warranty, express or implied, is made.

We trust this report meets your present requirements If you have questions or comments, please contact us.

Sincerely,

WSP E&I Canada Limited

Prepared by:

2023-03-29

Dixie Ann Simon, P.Eng.

Principal Geotechnical Engineer

Engineer of Record

Reviewed by:

Mickey Davachi, PhD, P.Eng.

Principal Geotechnical Engineer

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Figures

- Site Location
- Populated Place
- Highway
- Other Road
- International Boundary
- Provincial Boundary
- Watercourse
- Lake
- City Limit
- British Columbia
- Other Province (Canada)
- USA

0km 100 200 300

Scale: 1:8,000,000

Reference:

DataBC Data Distribution Service
Open Government License
(http://www.data.gov.bc.ca/)
Geogratis/Geobase
Open Government License - Canada
(http://data.gc.ca/eng/about-datagcca)

CLIENT: TECK Resources Limited

PROJECT: Beaverdell Tailings Storage Facilities
2022 Annual Facility Performance Report

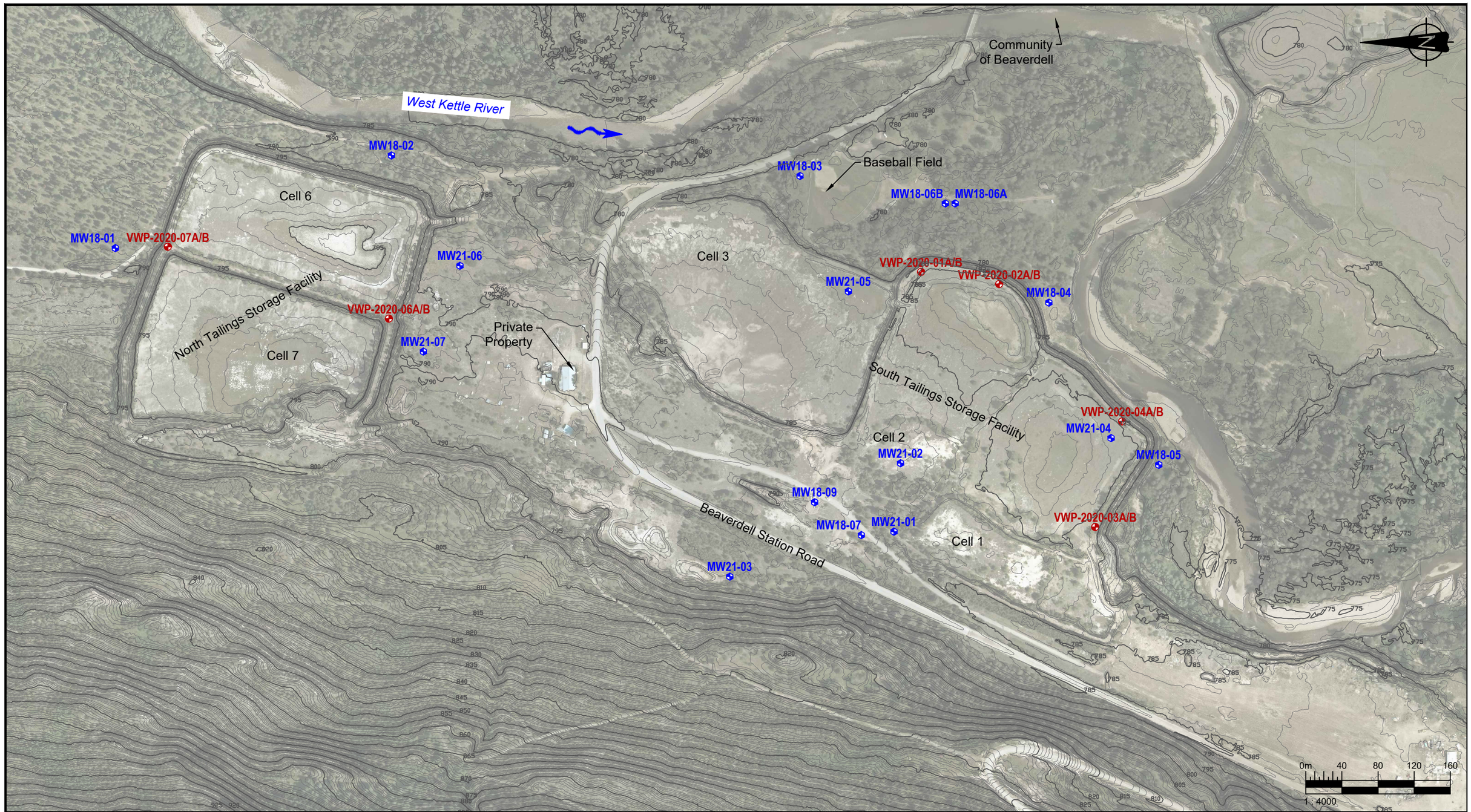
TITLE: Site Location Plan

DATE:	Figure 1
November, 2022	

GIS FILE: 03-01-002_Site_Location_Plan_2022.mxd

COORDINATE SYSTEM:	JOB No:	ANALYST:	QA/QC:
NAD 1983 UTM Zone 11N	VE52701D1	BB	DAS

Y:\Projects\VE\VE52700\VE52701_Teck_Beaverdell\Mapping\03_terrain-geology-soils\01_overview\03-01-002_Site_Location_Plan_2022.mxd Last updated by benjamin.brown2



Legend

- Borehole Location
- Monitoring Well Location

Notes:
1. Contours shown at 0.5 m Minor and 5 m Major interval.

wsp

CLIENT: TECK RESOURCES LIMITED

WSP E&I Canada Limited
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Vancouver, BC, CANADA V6B 5W3
Main: +1 604 664 4315

DWN BY:	BB
CHK'D BY:	DAS
DATUM:	NAD 83
PROJECTION:	UTM Zone 11
SCALE:	1:4 000

TITLE: SITE PLAN

DATE:	NOVEMBER 2022
PROJECT NO.:	VE52701D1
REV. NO.:	A

PROJECT: BEAVERDELL TAILINGS STORAGE FACILITIES
2022 ANNUAL FACILITY PERFORMANCE REPORT

FIGURE 2

S:\External\VE52701-Teck-Beaverdell-GIS\VE52701D1\VE52701D1-Fig2-SitePlan.dwg – 1 – Nov. 15, 2022 10:23am – benjamin.brown2

This drawing was originally produced in colour.

Appendix A

Facility Data Sheets

Table 1 - SOUTH TSF – FACILITY DATA SHEET		
Impoundment Area (tailings and embankment footprint area)	150,000 m^2	Measured from 2018 LiDAR Survey Data
Volume of Stored Tailings	544,000 m^3	Estimated Golder (2019a)
Reservoir Capacity	21,900 m^3 (in Cell 4 and 5 to internal spillway invert levels)	Calculated 2018 LiDAR Survey Data and 2019 Cell 3 spillway as-built survey
Consequence Classification	Significant	Ministry of Energy and Mines (2016) and CDA (2013)
Inflow Design Flood (IDF)	1/3 between the 1-in-975-year flood event and the PMF.	Ministry of Energy and Mines (2016)
Design Earthquake	1/2,475-year event	Ministry of Energy and Mines (2016)
Spillway Capacity	4.8 m^3/s considering a design storm calculated based on 24-hour probable maximum precipitation plus snow melt plus 10% climate change factor. Includes 0.3 m of freeboard.	Calculated Golder (2019e)
Catchment Area	188,000 m^2	Calculated Golder (2017a)
Embankment Type	Earthfill Embankment	Assumed from Binnie (1980a, 1988). No construction record reports available.
Maximum Embankment Height	2 to 10 m	Estimated from 2018 LiDAR Survey Data
Embankment Crest Width	1 to 5 m	Estimated from 2018 LiDAR Survey Data and 2019 spillway as-built survey
Access to Facility	Permanent wire fence installed around South TSF. Access via gate located on access road from west side of Cell 3, adjacent to Cell 2. Vehicle access to embankment crest not generally available.	-

Table 2 – NORTH - TSF – FACILITY DATA SHEET		
Impoundment Area (tailings and embankment footprint area)	90,000 m^2	Measured from 2018 LiDAR Survey Data
Volume of Stored Tailings	384,000 m^3	Estimated Golder (2019a)
Reservoir Capacity	184,600 m^3 (to Cell 7 spillway invert elevation of 797.0 m)	Calculated 2018 LiDAR Survey Data
Consequence Classification	Significant	Ministry of Energy and Mines (2016) and CDA (2013)
Inflow Design Flood (IDF)	1/3 between the 1-in-975-year flood event and the PMF. Available capacity to store the IDF with a duration of 72 hours.	Ministry of Energy and Mines (2016)
Design Earthquake	1-in-2,475-year event.	Ministry of Energy and Mines (2016)
Spillway Capacity	2 m^3/s considering a design storm calculated based on 24-hour probable maximum precipitation plus snow melt plus 10% climate change factor.	Calculated Golder (2019c)
Catchment Area	Internal catchment of Cell 6 and 7 during normal precipitation events: 81,000 m^2 Internal and external catchment of Cell 6 and 7 during IDF event: 171,000 m^2	Calculated Golder (2017a)
Embankment Type	Earthfill Embankment	Assumed from Binnie (1980a, 1988). No construction record reports available.
Maximum Embankment Height	8 to 12 m	Measured from 2018 LiDAR Survey Data
Embankment Crest Width	3 to 4 m	Measured from 2018 LiDAR Survey Data
Access to Facility	Permanent wire fence installed around North TSF. Access via gate located on access road from downstream toe area at southeast corner of facility to crest of Cell 6 embankment. Continuous narrow road around crest of North TSF perimeter, Accessible by all terrain vehicle	-

Appendix B

Cross Sections

COMMUNITY OF BEAVERDELL
KETTLE VALLEY TRAIL
WEST KETTLE RIVER
BEAVERDELL STATION ROAD
BASEBALL FIELD
CELL 6
DIVIDER DYKE
CELL 3
CELL 3 SPILLWAY
SPILLWAY (SEE REFERENCE 2)
NORTH TAILINGS STORAGE FACILITY
PRIVATE PROPERTY
CELL 7
CELL 7 DIVERSION AND SPILLWAY
NORTH TSF DIVERSION CHANNEL
CELL 3 DAM SURVEY (SEE REFERENCE 4)
CELLULAR GATEWAY (FLP100)
SOUTH TAILINGS STORAGE FACILITY
CELL 2
CELL 5
CELL 1
BEAVERDELL STATION ROAD
CRANBERRY RIDGE
MW18-01
MW18-02
MW18-03
MW18-04
MW18-05
MW18-06A
MW18-06B
MW18-07
MW18-09
BH20-01
BH20-02
BH20-03
BH20-04
BH20-06
BH20-07
E 5
D 5
F 5
C 4
B 4
A 4
5 478 500 N
5 478 000 N
5 477 500 N
5 478 000 N
5 477 500 N
348 000 E
347 500 E

LEGEND

- 2018 TOPOGRAPHIC CONTOURS (SEE REFERENCE 1)
- EXTENT OF RIPRAP ARMOURING INSTALLED IN 2019 (SEE REFERENCE 5)
- APPROXIMATE EXTENT OF ARMOURING
- APPROXIMATE DECANT TOWER LOCATION
- APPROXIMATE DECANT OUTLET LOCATION
- APPROXIMATE SIGNAL REPEATER LOCATION (SEE NOTE 5)
- FLOW DIRECTION
- APPROXIMATE M-71 PERMIT BOUNDARY
- APPROXIMATE PROPERTY BOUNDARY
- CRITICAL HABITAT OF SPECKLED DACE (SEE REFERENCE 2)
- GROUNDWATER MONITORING WELLS (BY WOOD PLC, COMPLETED JULY 2018)
- AS-BUILT BOREHOLE LOCATION WITH VIBRATING WIRE PIEZOMETERS
- INDICATIVE LOCATION OF EMERGENCY RIPRAP STOCKPILE

NOTES

1. ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATES ARE IN UTM ZONE 11 NAD83.
3. VERTICAL DATUM IS CGVD2013.
4. CONTOURS SHOWN AT 0.5 m MINOR AND 2.5 m MAJOR INTERVAL.
4. INTERFACES FOR BOREHOLES WITH VIBRATING WIRE PIEZOMETERS ARE WITHIN 2 m OF THE AS-BUILT LOCATION.
5. SIGNAL REPEATERS WERE INSTALLED IN OCTOBER 2020.

REFERENCES

1. 2018 EXISTING GROUND LIDAR SURVEY AND ORTHOPHOTO BY MCELHANNEY 19 JULY 2018, PROVIDED BY MCELHANNEY, RECEIVED: 24 AUGUST 2018, FILE NAME: 358400VLIDARCONTOURS.DWG.
2. FISHERIES AND OCEANS CANADA. 2018. RECOVERY STRATEGY FOR THE SPECKLED DACE (*RHINICHTHYS OSCULUS*) IN CANADA. SPECIES AT RISK ACT RECOVERY STRATEGY SERIES. FISHERIES AND OCEANS CANADA, OTTAWA. v + 31 pp.
3. 2019 CONSTRUCTION: CELL 3 SPILLWAY AND BERM REPAIR WORKS SURVEY COMPLETED BY GOLDER; SURVEYED 3 JULY 2019, FILE: 1788497-1000-BEAVERDELL CELL 3 SPILLWAY 2019 CONSTRUCTION ASBUILT 2019-07-04.xml.
4. CELL 3 EAST DAM SURVEY PROVIDED BY WSP. CAD FILE: 181-08185-00-000-00-SRWCA001-R0.dwg. DATE: 23 TO 28 JULY 2018.
5. RECORD SURVEY PROVIDED BY LANDMARK SOLUTIONS, FILE NAME: "9062 - Jan 2020Combined asbuilt sent to Landmark 2020 01 23.dwg", RECEIVED: 24 JANUARY, 2020.

0 100 200
1:4,000 METRES

CLIENT
TECK RESOURCES LIMITED
BEAVERDELL MINE
BEAVERDELL, B.C.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-19
DESIGNED	N. CARRIERE
PREPARED	A. KIM
REVIEWED	M. WILLAN
APPROVED	J. CUNNING

PROJECT
BEAVERDELL TAILINGS STORAGE FACILITIES
2020 ANNUAL INSPECTION REPORT

TITLE
DETAIL PLAN

PROJECT NO.	PHASE/TASK/DOC	REV.	FIGURE
20140466	1000/1006/275	0	3

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

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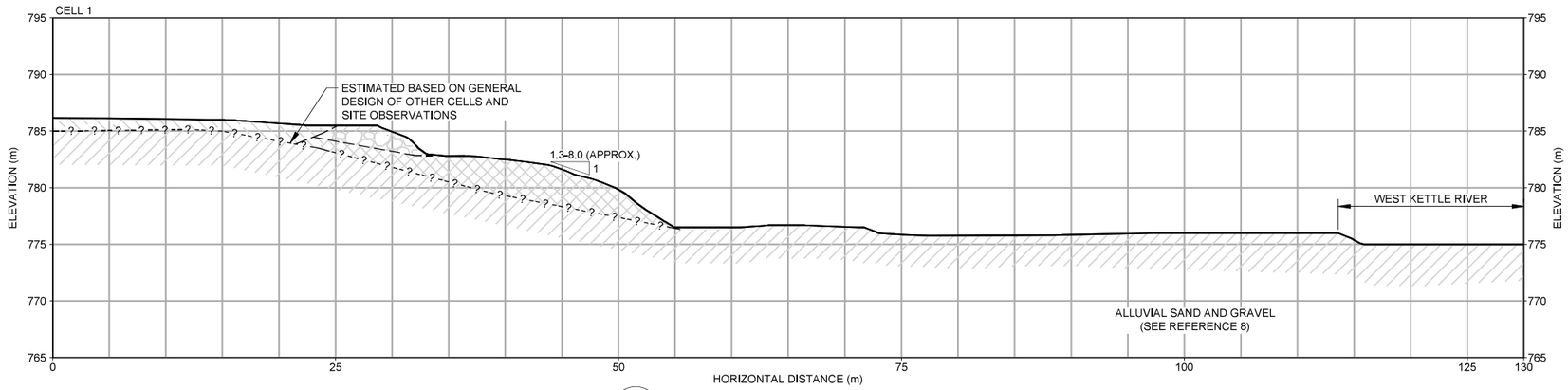

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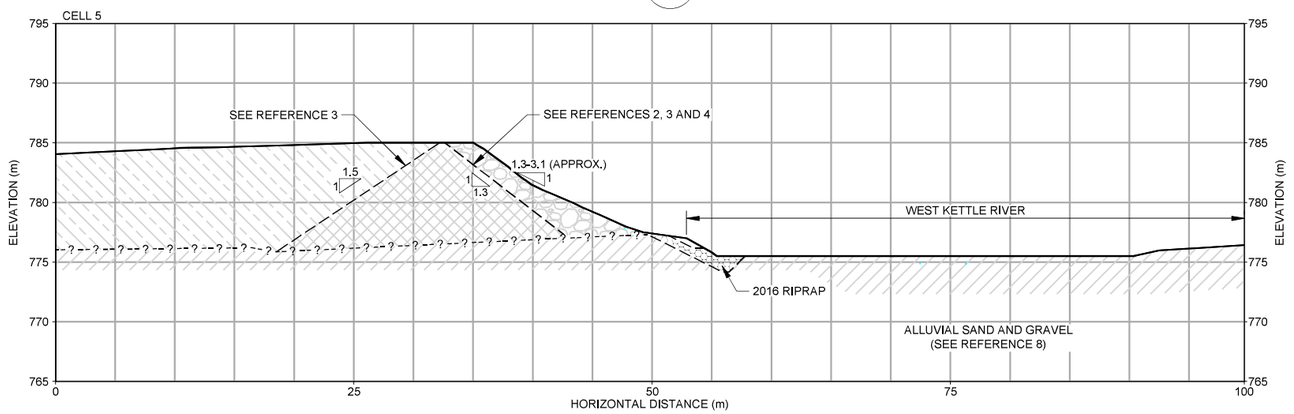

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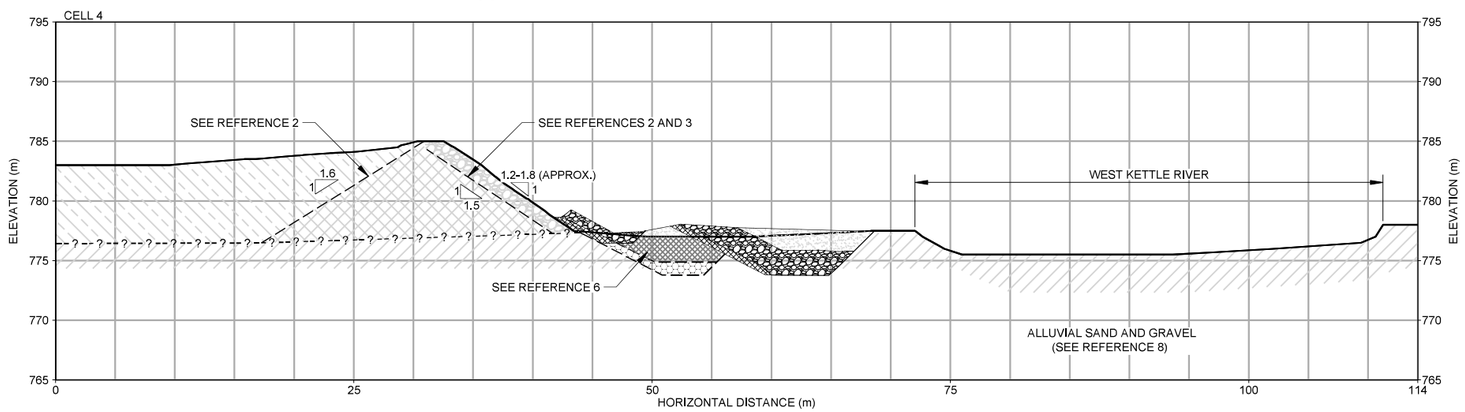


SCALE 1:500 m — C/3 — SECTION THROUGH CELL 4 EMBANKMENT

LEGEND

- EXISTING GROUND SURFACE (SEE REFERENCE 1)
- ESTIMATED ORIGINAL GROUND SURFACE
- INFERRED MATERIAL BOUNDARY
- TAILINGS
- EMBANKMENT FILL
- ALLUVIAL SAND AND GRAVEL
- ALLUVIAL COBBLE COVER
- WASTE ROCK/ALLUVIAL COBBLES
- 2016 RIPRAP MIXED WITH GRANULAR FILL
- BACKFILLED EXCAVATED MATERIAL
- 2019 RIPRAP (SEE REFERENCE 9)
- SALVAGED MATERIAL (ALLUVIAL SAND AND GRAVEL) (SEE REFERENCE 9)
- FILTER MATERIAL (SEE REFERENCE 9)

NOTES

1. ALL UNITS ARE SHOWN IN METRES UNLESS OTHERWISE NOTED.
2. STRATIGRAPHY BENEATH ALLUVIAL SAND AND GRAVEL IS UNKNOWN.
3. GROUND SURFACE UNDER TAILINGS BASED ON 2018 CPT INVESTIGATION. (SEE REFERENCE 7)
4. VERTICAL DATUM IS CGVD2013.

REFERENCES

1. 2018 EXISTING GROUND LIDAR SURVEY AND ORTHOPHOTO BY MCELHANNEY 19 JULY 2018, PROVIDED BY MCELHANNEY, RECEIVED: 24 AUGUST 2018, FILE NAME: 358400VLidarContours.dwg.
2. BINNIE (ROBERT F. BINNIE LTD.). 1971. *REPORT ON STABILITY OF TAILINGS DAM.* REPORT PREPARED FOR TECK CORPORATION LTD., BEAVERDELL, BC. SUBMITTED 8 JUNE 1971.
3. BINNIE. 1973. *REPORT ON PROPOSED NEW TAILINGS POND.* REPORT PREPARED FOR TECK CORPORATION LTD., BEAVERDELL, BC. SUBMITTED AUGUST 27, 1973.
4. BINNIE. 1980A. *REPORT ON TAILINGS DISPOSAL POND NO. 5 AND PROPOSED POND NO. 6.* REPORT PREPARED FOR TECK CORPORATION LTD., BEAVERDELL, BC. SUBMITTED 20 FEBRUARY 1980.
5. BINNIE. 1980C. *REPORT ON STABILITY OF ABANDONED POND NO. 5.* REPORT PREPARED FOR TECK CORPORATION LTD., BEAVERDELL, BC. SUBMITTED 9 DECEMBER 1980.
6. GOLDER. 2016. *2016 CONSTRUCTION COMPLETION REPORT BEAVERDELL MINE RIPRAP EROSION PROTECTION.* REPORT PREPARED FOR TECK RESOURCES LIMITED. REFERENCE NO. 1214280022-036-R-REV0-14000. SUBMITTED 9 DECEMBER 2016.
7. GOLDER. 2019. *INTERIM CONE PENETRATION TESTING SITE INVESTIGATION FACTUAL REPORT FOR BEAVERDELL TAILINGS STORAGE FACILITIES.* REFERENCE NO. 18104486-115-TM-REV1-2000. SUBMITTED 25 MARCH 2019.
8. GOLDER 2020b. BEAVERDELL TAILINGS STORAGE FACILITIES PHASE 1 SITE INVESTIGATION FACTUAL REPORT. REFERENCE NO.1811487-255-R-REV0-2000. SUBMITTED 15 OCTOBER 2020.
9. RECORD SURVEY PROVIDED BY LANDMARK SOLUTIONS, FILE NAME: "9062 asbuild.dwg", RECEIVED: 22 DECEMBER, 2019.

0 10 20
1:500 METRES

CLIENT
TECK RESOURCES LIMITED
BEAVERDELL MINE
BEAVERDELL, B.C.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-19
DESIGNED	N. CARRIERE
PREPARED	A. KIM
REVIEWED	M. WILLAN
APPROVED	J. CUNNING

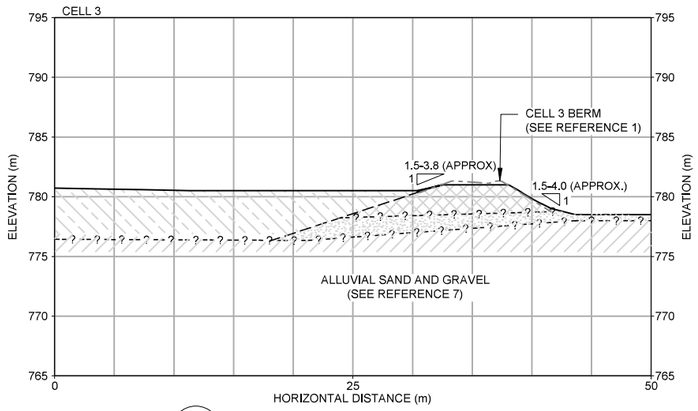
PROJECT
BEAVERDELL TAILINGS STORAGE FACILITIES
2020 ANNUAL INSPECTION REPORT

TITLE
CROSS SECTIONS (1 OF 2)

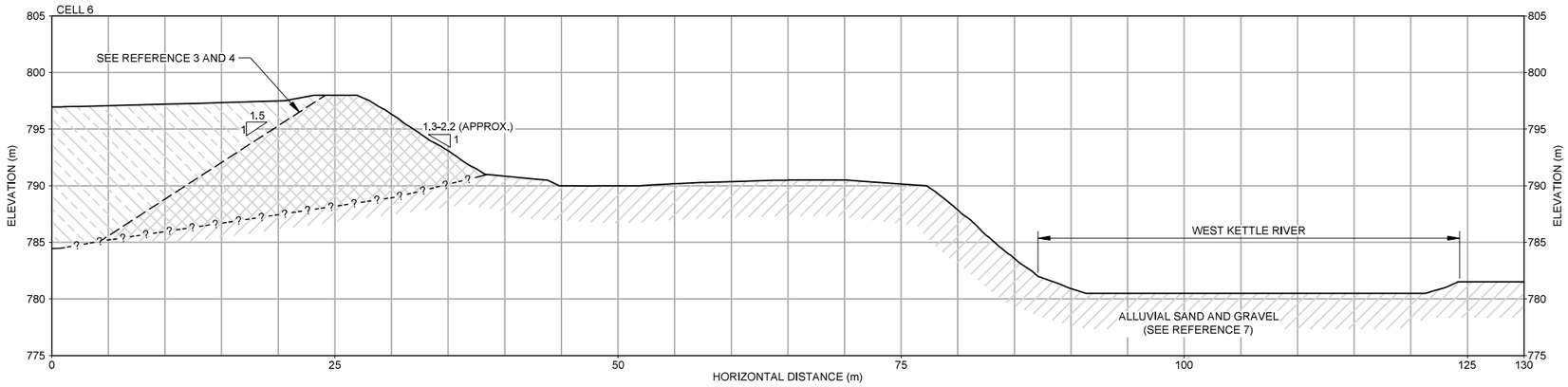
PROJECT NO.	PHASE/TASK/DOC	REV.	FIGURE
20140466	1000/1006/275	0	4

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

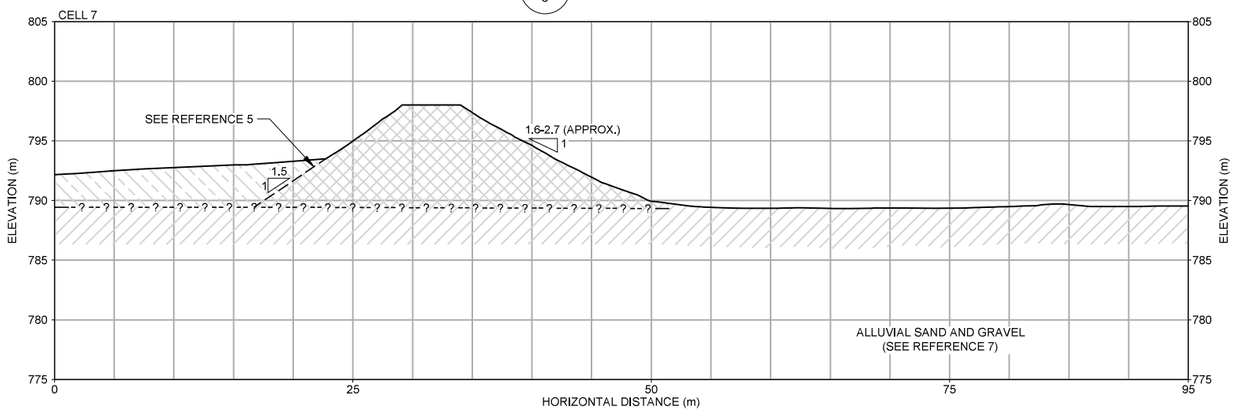
25 mm



SCALE 1:500 m — D/3 — SECTION THROUGH CELL 3 EMBANKMENT



SCALE 1:500 m — E/3 — SECTION TROUGH CELL 6 EMBANKMENT



SCALE 1:500 m — F/3 — SECTION THROUGH CELL 7 EMBANKMENT

LEGEND

- EXISTING GROUND SURFACE (SEE REFERENCE 2)
- ESTIMATED SURFACE
- INFERRED MATERIAL BOUNDARY
- CELL 3 BERM (SEE REFERENCE 1)
- TAILINGS
- EMBANKMENT FILL
- ALLUVIAL SAND AND GRAVEL
- TAILINGS AND ALLUVIAL SAND AND GRAVEL (EXTENT TO BE DEFINED) (SEE REFERENCE 7)

NOTES

1. ALL UNITS ARE SHOWN IN METRES UNLESS OTHERWISE NOTED.
2. STRATIGRAPHY BENEATH ALLUVIAL SAND AND GRAVEL IS UNKNOWN.
3. GROUND SURFACE UNDER TAILINGS BASED ON 2018 CPT INVESTIGATION. (SEE REFERENCE 6)
4. VERTICAL DATUM IS CGVD2013.

REFERENCES

1. CELL 3 EAST DAM SURVEY PROVIDED BY WSP. CAD FILE: 181-08185-00-000-00-SRWCA001-R0.dwg, DATE: 23 TO 28 JULY 2018
2. 2018 EXISTING GROUND LIDAR SURVEY AND ORTHOPHOTO BY MCELHANNEY 19 JULY 2018, PROVIDED BY MCELHANNEY, RECEIVED: 24 AUGUST 2018, FILE NAME: 358400VLIDARCONTOURS.DWG.
3. BINNIE. 1980A. *REPORT ON TAILINGS DISPOSAL POND NO. 5 AND PROPOSED POND NO. 6.* REPORT PREPARED FOR TECK CORPORATION LTD., BEAVERDELL, BC. SUBMITTED 20 FEBRUARY 1980.
4. BINNIE. 1980B. *SUPPLEMENTARY REPORT ON PROPOSED POND NO. 6.* REPORT PREPARED FOR TECK CORPORATION LTD., BEAVERDELL, BC. SUBMITTED 31 MARCH 1980.
5. BINNIE (R.F. BINNIE & ASSOCIATES LTD.). 1988. *REPORT ON PROPOSED POND NO. 7.* REPORT PREPARED FOR TECK CORPORATION, BEAVERDELL, BC. SUBMITTED APRIL 1988.
6. GOLDER. 2019. *INTERIM CONE PENETRATION TESTING SITE INVESTIGATION FACTUAL REPORT FOR BEAVERDELL TAILINGS STORAGE FACILITIES.* REFERENCE NO.18104486-115-TM-REV1-2000. SUBMITTED 25 MARCH 2019.
7. GOLDER 2020b. BEAVERDELL TAILINGS STORAGE FACILITIES PHASE 1 SITE INVESTIGATION FACTUAL REPORT. REFERENCE NO.1811487-255-R-REV0-2000. SUBMITTED 15 OCTOBER 2020.

0 10 20
1:500 METRES

CLIENT
TECK RESOURCES LIMITED
BEAVERDELL MINE
BEAVERDELL, B.C.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-19
DESIGNED	N. CARRIERE
PREPARED	A. KIM
REVIEWED	M. WILLAN
APPROVED	J. CUNNING

PROJECT
BEAVERDELL TAILINGS STORAGE FACILITIES
2020 ANNUAL INSPECTION REPORT

TITLE
CROSS SECTIONS (2 OF 2)

PROJECT NO.	PHASE/TASK/DOC	REV.	FIGURE
20140466	1000/1006/275	0	5

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

Site Inspection Photographs

Photo 1: South TSF - Cells 4 and 5 Embankment Toe Erosion Protection Riprap, Looking North. Jun 22, 2022

Photo 2: South TSF –Cell 5 Southeast Corner Downstream Embankment Slope, Looking Northeast. Jun 22, 2022

Photo 3: South TSF –Cell 5 South Side Downstream Slope with Rockfill, Looking Northeast. Jun 22, 2022

Photo 4: South TSF –Cell 1 Crest and Downstream Slope, Looking Southwest. Jun 22, 2022

Photo 5: South TSF –Cell 1 Crest and Upstream Ditch to Cell 5, Looking Northeast. Jun 22, 2022

Photo 6: South TSF –Cell 1 West Embankment, Looking North. Jun 22, 2022

Photo 7: South TSF –Access Road at West Side of Cell 2, Looking South. Jun 22, 2022

Photo 8: South TSF –Spillway from Cell 5 to Cell 4, Looking Northwest at Cell 5. Jun 22, 2022

Photo 9: South TSF –Cell 5 Crest and Tailings, Looking North from Cell 1. Jun 22, 2022

Photo 10: South TSF –Cell 4 Tailings with Ponding, Looking West. Jun 22, 2022

Photo 11: South TSF –Cell 4 Embankment Crest and Tailings, Looking North. Jun 22, 2022

Photo 12: South TSF –View of Spillway Between Cell 3 and Cell 4, Looking South from Cell 3. Jun 22, 2022

Photo 13: South TSF – Cell 3 Embankment Crest, Downstream Slope and Toe Area, Looking South from Cell 4. Jun 22, 2022

Photo 14: South TSF –Ponding at Cell 3 Downstream Toe, Looking Northeast. Jun 22, 2022

Photo 15: South TSF –Cell 3 Spillway, Looking South. Jun 22, 2022

Photo 16: South TSF –Cell 3 Tailings, Looking West. Jun 22, 2022

Photo 17: South TSF –Cell 3 Tailings, Looking East. Jun 22, 2022

Photo 18: North TSF –Cell 6 Upstream Tailings with Ponding, Looking Northwest. Jun 22, 2022

Photo 19: North TSF –Cell 6 East Embankment Crest, Looking North. Jun 22, 2022

Photo 20: North TSF –Cell 6 East Embankment Downstream Slope Minor Surface Erosion, Jun 22, 2022

Photo 21: North TSF –Cell 6 East Embankment Crest and Upstream Tailings, Looking South. Jun 22, 2022

Photo 22: North TSF –Cell 6 Downstream Slope and Toe, Looking West. Jun 22, 2022

Photo 23: North TSF –Cell 6 Downstream Slope and Toe. Looking Southwest. Jun 22, 2022

Photo 24: North TSF –Cell 6 Decant Outlet. Jun 22, 2022

Photo 25: North TSF –Cell 7 South Embankment Downstream Slope near Signal Repeater, Looking East. Jun 22, 2022

Photo 26: North TSF –Cell 7 Southwest Corner Diversion and Spillway, Looking Northeast. Jun 22, 2022

Photo 27: North TSF –Cell 7 West Side Tailings and Backslope, Looking Northwest. Jun 22, 2022

Photo 28: North TSF –Cell 7 North Embankment Crest, Looking East. Jun 22, 2022

Photo 29: North TSF –Cell 7 North Embankment Downstream Slope and Toe, Looking East. August 19, 2021

Photo 30: North TSF –Cell 7 Tailings and Plugged Decant Tower. Looking East. Jun 22, 2022

Photo 31: North TSF – Cell 7 Tailings and North Embankment Upstream Face, Looking Northeast. Jun 22, 2022

Photo 32: North TSF –Divider Dyke Between Cell 6 and Cell 7, Looking North. Jun 22, 2022

Appendix D

Inspection Forms

Embankment Surveillance Record

Mine Site:	Beaverdell Mine
Structure:	South TSF Perimeter Embankments - Cells 1 through 5
Inspection Carried Out By:	Dixie Ann Simon, P.Eng., Jason Chen, P.Eng. /WSP
Date:	Wednesday, June 22, 2022
Inspection Type:	Walk-over
Weather Conditions:	Mostly sunny and warm
Reviewed By:	M. Davachi, P.Eng./Wood

Observed Features	Yes	No	Photo #	Comment / Note #
1.0 Upstream Embankment Slope - Photographs 6, 9, 18				
1.1 Concern with Water Level or with previous high water levels since the last inspection		x	10	Small Pond on Cell 4
1.2 Evidence of Wave or Other Erosion		N/A		
1.3 Unusual Accumulation of Debris/Logs		N/A		
1.4 Evidence of Sloughing/Sliding		x		
1.5 Evidence of Cracks		x		
1.6 Any Other Deformation		x		
1.7 Excessive Vegetation		x		
1.8 Other Unusual Conditions		x		
2.0 Embankment Crest - Photographs 4, 5, 6, 9, 11, 13				
2.1 Evidence of Shoulder Erosion		x		
2.2 Evidence of Cracking		x		
2.3 Other Deformation/Settlement		x		
2.4 Concerns with Low Areas on the Crest		x		
2.5 Other Unusual Conditions		x		
3.0 Downstream embankment Slope - Photographs 2, 3, 4, 13				
3.1 Evidence of Erosion		x		
3.2 Evidence of Sloughing/Sliding		x		
3.3 Evidence of Cracking		x		
3.4 Any Other Deformation		x		
3.5 Signs of Phreatic Surface/Seepage		x		
3.6 Seepages Observed		x		
3.7 Is Seepage (if any) Turbid		N/A		
3.8 Non-Uniform Slope		x		
3.9 Excessive Vegetation		x		
3.10 Other Unusual Conditions		x		
4.0 Embankment Abutments				
4.1 Seepages Observed		x		

Observed Features	Yes	No	Photo #	Comment / Note #
4.2 Is Seepage (if any) Turbid		x		
4.3 Evidence of Erosion		x		
4.4 Evidence of Cracks		x		
4.5 Other Deformation/Settlement		x		
4.6 Evidence of Repairs		x		
4.7 Concerns with Low areas at the Abutments		x		
4.8 Other Unusual Conditions		x		
5.0 Downstream Toe				
5.1 Seepages Observed		x		
5.2 Is Seepage (if any) Turbid		x		
5.3 Evidence of Soft Toe Condition		x		
5.4 Evidence of Boils		x		
5.5 Evidence of Contamination		x		
5.6 Excessive Vegetation	x			
5.7 Concern with Outlet of Decant Pipe		N/A		Not visible
5.7 Other Unusual Conditions		x	14	Ponded water at downstream toe of Cell 3
6.0 General				
6.1 Spillway at/next to this embankment	x		8, 13, 15	Cell 5 to 4, Cell 3 to 4, Cell 3
6.2 Pipelines at the embankment		x		
6.3 Evidence of ARD		x		
6.4 Crest accessible by truck	x			
6.5 Public access to embankment	x			
7.0 Other				
7.1 Other Unusual Site Conditions		x		Some perimeter fence posts are broken

Embankment Surveillance Record

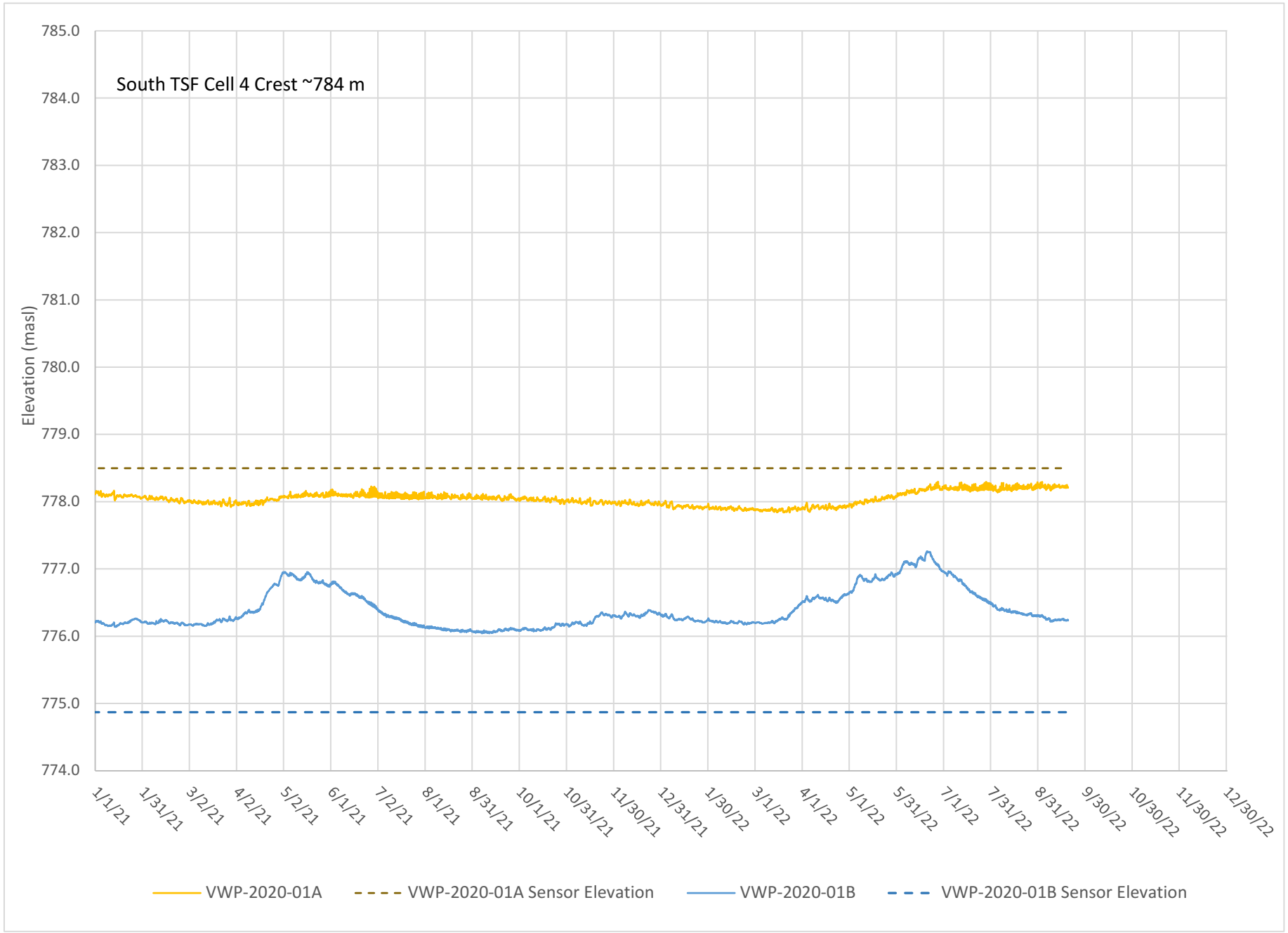
Mine Site:	Beaverdell Mine
Structure:	North TSF Perimeter Embankment - Cells 6 and 7
Inspection Carried Out By:	Dixie Ann Simon, P.Eng., Jason Chen, P.Eng./WSP
Date:	Wednesday, June 22, 2022
Inspection Type:	Walk Over
Weather Conditions:	Mostly sunny and warm
Reviewed By:	M. Davachi, P.Eng./Wood

Observed Features	Yes	No	Photo #	Comment / Note #
1.0 Upstream Embankment Slope - Photographs 21, 31				
1.1 Concern with Water Level or with previous high water levels since the last inspection		x	18	Ponded water in Cell 6
1.2 Evidence of Wave or Other Erosion		N/A		
1.3 Unusual Accumulation of Debris/Logs		N/A		
1.4 Evidence of Sloughing/Sliding		x		
1.5 Evidence of Cracks		x		
1.6 Any Other Deformation		x		
1.7 Excessive Vegetation		x		
1.8 Other Unusual Conditions		x		
2.0 Embankment Crest - Photographs 19, 21, 28, 32				
2.1 Evidence of Shoulder Erosion		x		
2.2 Evidence of Cracking		x		
2.3 Other Deformation/Settlement		x		
2.4 Concerns with Low Areas on the Crest		x		
2.5 Other Unusual Conditions		x		
3.0 Downstream Embankment Slope - Photographs 20, 22, 23, 25, 29				
3.1 Evidence of Erosion	x		20	Animal activity
3.2 Evidence of Sloughing/Sliding		x		
3.3 Evidence of Cracking		x		
3.4 Any Other Deformation		x		
3.5 Signs of Phreatic Surface/Seepage		x		
3.6 Seepages Observed		x		
3.7 Is Seepage Turbid		N/A		
3.8 Non-Uniform Slope		x		
3.9 Excessive Vegetation		x		
3.10 Other Unusual Conditions		x		
4.0 Embankment Abutments				
4.1 Seepages Observed		x		

Observed Features	Yes	No	Photo #	Comment / Note #
4.2 Is Seepage (if any) Turbid		N/A		
4.3 Evidence of Erosion		x		
4.4 Evidence of Cracks		x		
4.5 Other Deformation/Settlement		x		
4.6 Evidence of Repairs		x		
4.7 Concerns with Low areas at the Abutments		x		
4.8 Other Unusual Conditions		x		
5.0 Downstream Toe				
5.1 Seepages Observed		x		
5.2 Is Seepage (if any) Turbid		N/A		
5.3 Evidence of Soft Toe Condition		x		
5.4 Evidence of Boils		x		
5.5 Evidence of Contamination		x		
5.6 Excessive Vegetation		x		
5.7 Concern with Outlet of Decant Pipe		x	24	Cells 6 and 7 - dry but water present in metal weir below Cell 6 decant
5.7 Other Unusual Conditions		x		
6.0 General				
6.1 Spillway at/next to this embankment	x		26	Cell 7
6.2 Pipelines at the embankment		x		
6.3 Evidence of ARD		x		
6.4 Crest accessible by truck	x			
6.5 Public access to embankment	x			
7.0 Other - Photographs 22				
7.1 Other Unusual Site Conditions		x		
7.2 Diversion Ditch		x		Minor vegetation

Appendix E

VWP Data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783.0
782.0
781.0
780.0
779.0
778.0
777.0
776.0
775.0
774.0
1/1/21
1/31/21
3/2/21
4/2/21
5/2/21
6/1/21
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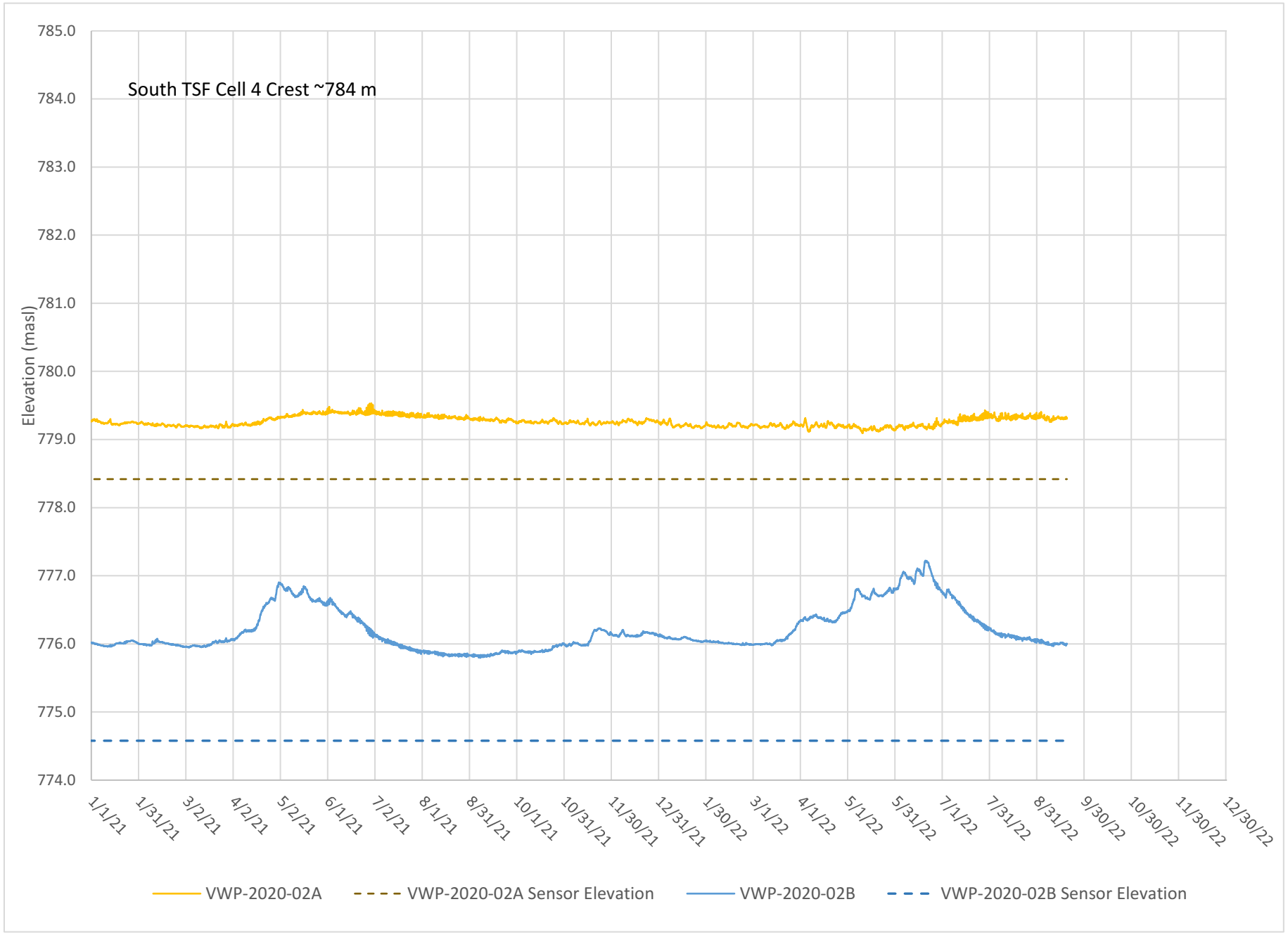
12/30/22
VWP-2020-01A
VWP-2020-01A Sensor Elevation
VWP-2020-01B
VWP-2020-01B Sensor Elevation


South TSF Cell 4 Crest ~784 m
Elevation (masl)
785.0
784.0
783.0
782.0
781.0
780.0
779.0
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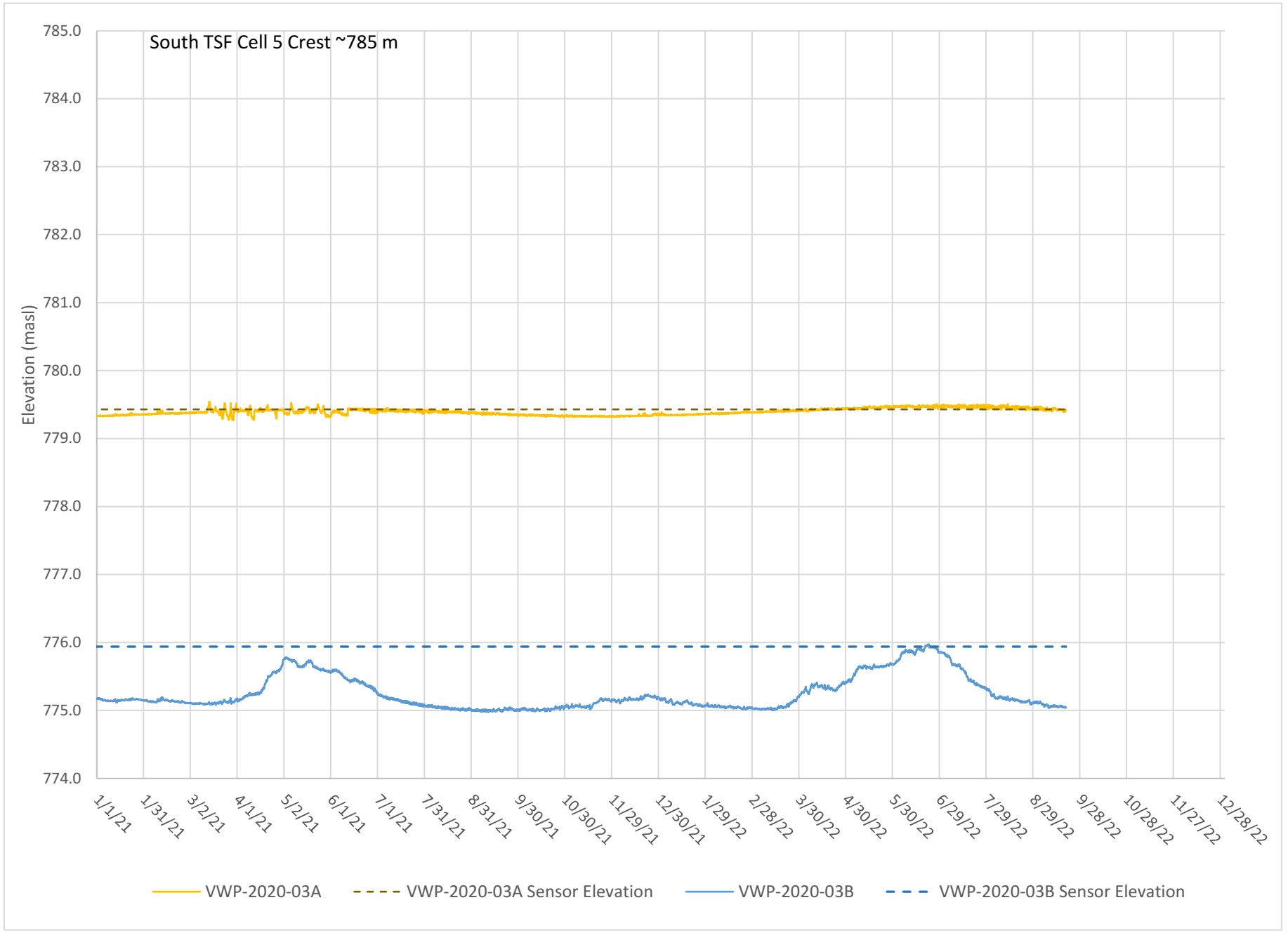
777.0
776.0
775.0
774.0
1/1/21
1/31/21
3/2/21
4/2/21
5/2/21
6/1/21
7/2/21
8/1/21
8/31/21
10/1/21
10/31/21
11/30/21
12/31/21
1/30/22
3/1/22
4/1/22
5/1/22
5/31/22
7/1/22
7/31/22
8/31/22
9/30/22
10/30/22
11/30/22
12/30/22
VWP-2020-02A
VWP-2020-02A Sensor Elevation
VWP-2020-02B
VWP-2020-02B Sensor Elevation


South TSF Cell 5 Crest ~785 m
Elevation (masl)
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784.0
783.0
782.0
781.0
780.0
779.0
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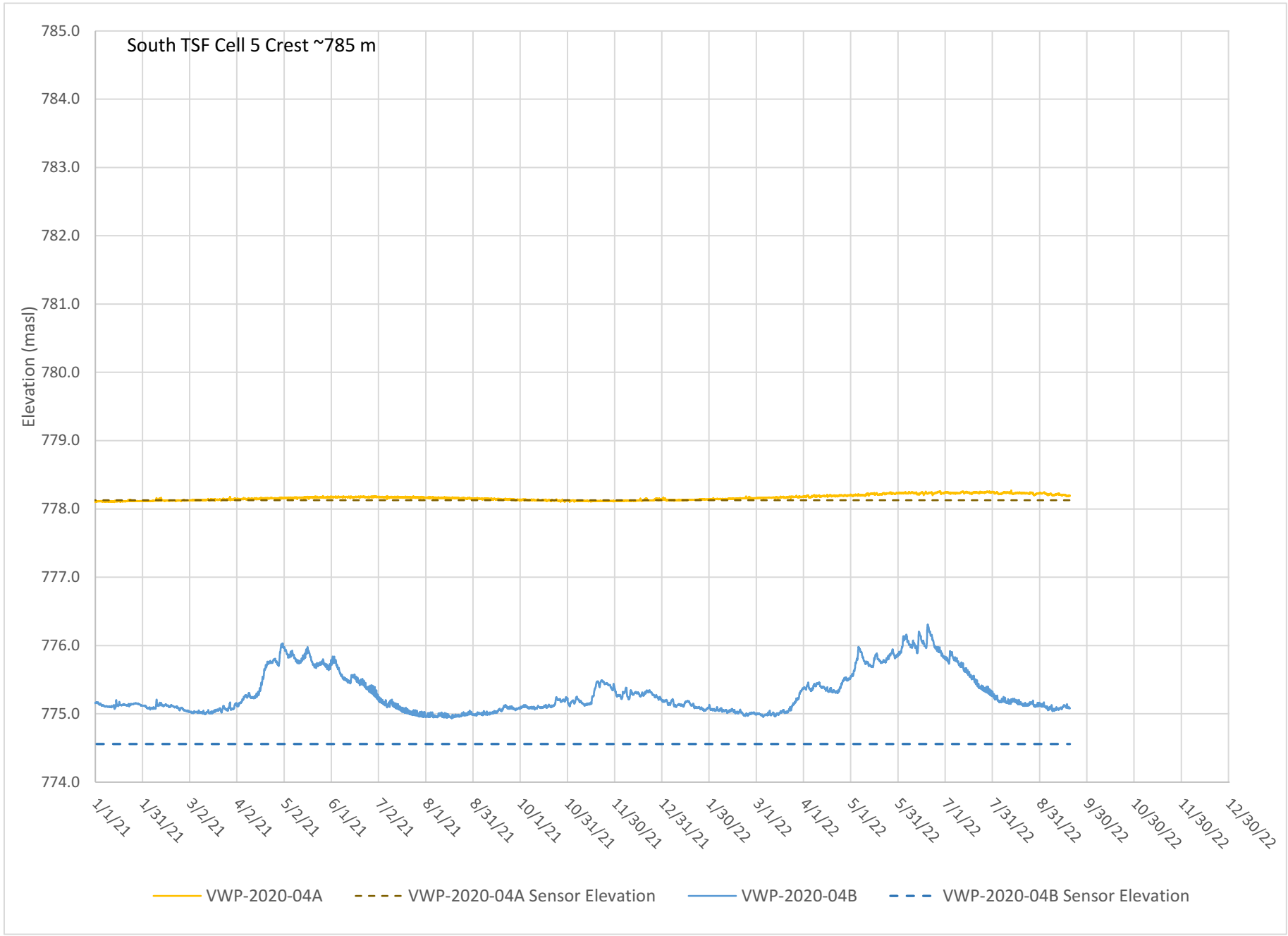
777.0
776.0
775.0
774.0
1/1/21
1/31/21
3/2/21
4/1/21
5/2/21
6/1/21
7/1/21
7/31/21
8/31/21
9/30/21
10/30/21
11/29/21
12/30/21
1/29/22
2/28/22
3/30/22
4/30/22
5/30/22
6/29/22
7/29/22
8/29/22
9/28/22
10/28/22
11/27/22
12/28/22
VWP-2020-03A
VWP-2020-03A Sensor Elevation
VWP-2020-03B
VWP-2020-03B Sensor Elevation


South TSF Cell 5 Crest ~785 m
Elevation (masl)
785.0
784.0
783.0
782.0
781.0
780.0
779.0
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777.0
776.0
775.0
774.0
1/1/21
1/31/21
3/2/21
4/2/21
5/2/21
6/1/21
7/2/21
8/1/21
8/31/21
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5/31/22
7/1/22
7/31/22
8/31/22
9/30/22
10/30/22
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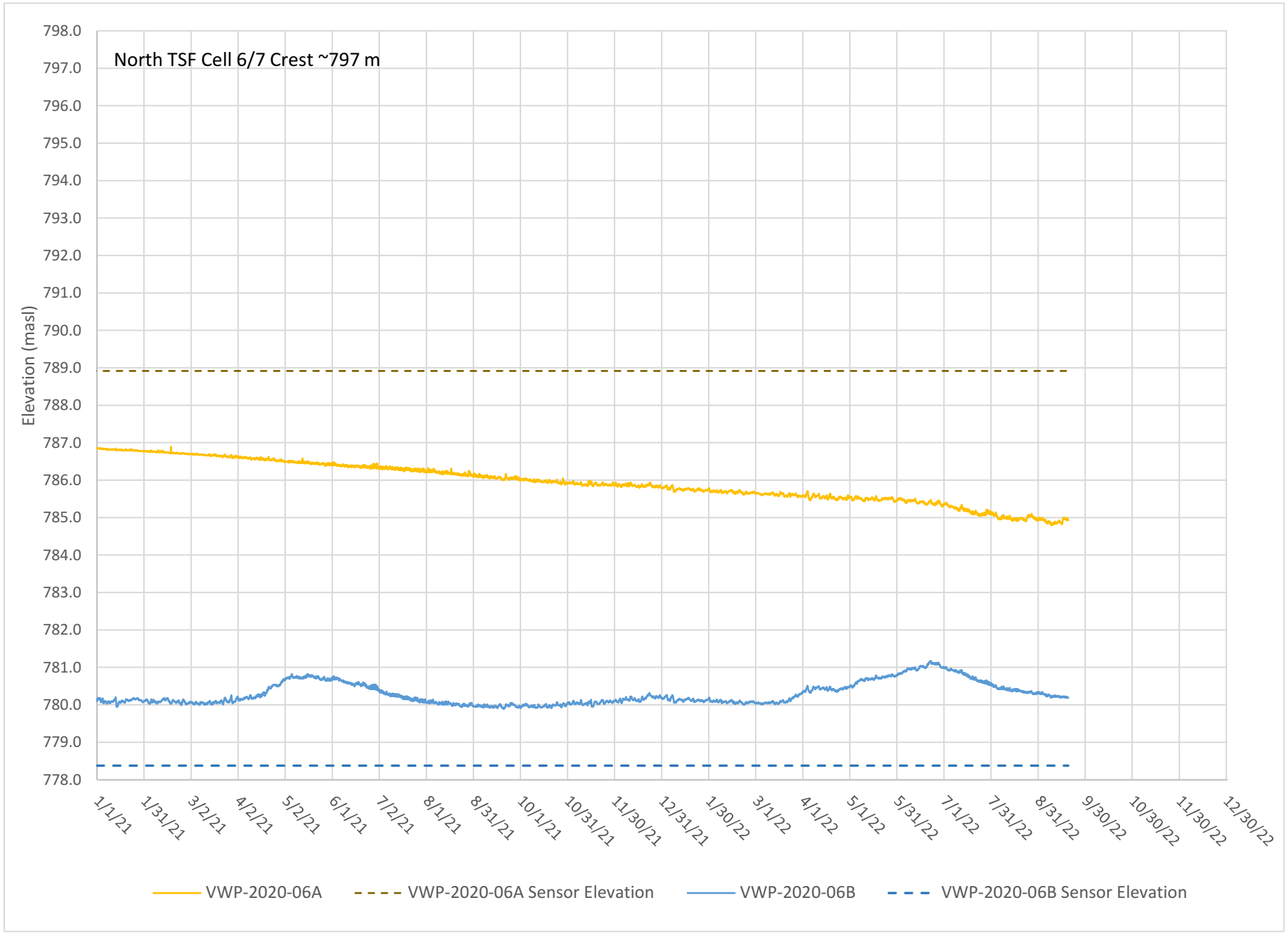
VWP-2020-04A
VWP-2020-04A Sensor Elevation
VWP-2020-04B
VWP-2020-04B Sensor Elevation


North TSF Cell 6/7 Crest ~797 m
Elevation (masl)
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797.0
796.0
795.0
794.0
793.0
792.0
791.0
790.0
789.0
788.0
787.0
786.0
785.0
784.0
783.0
782.0
781.0
780.0
779.0
778.0
1/1/21
1/31/21
3/2/21
4/2/21
5/2/21
6/1/21
7/2/21
8/1/21
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3/1/22
4/1/22
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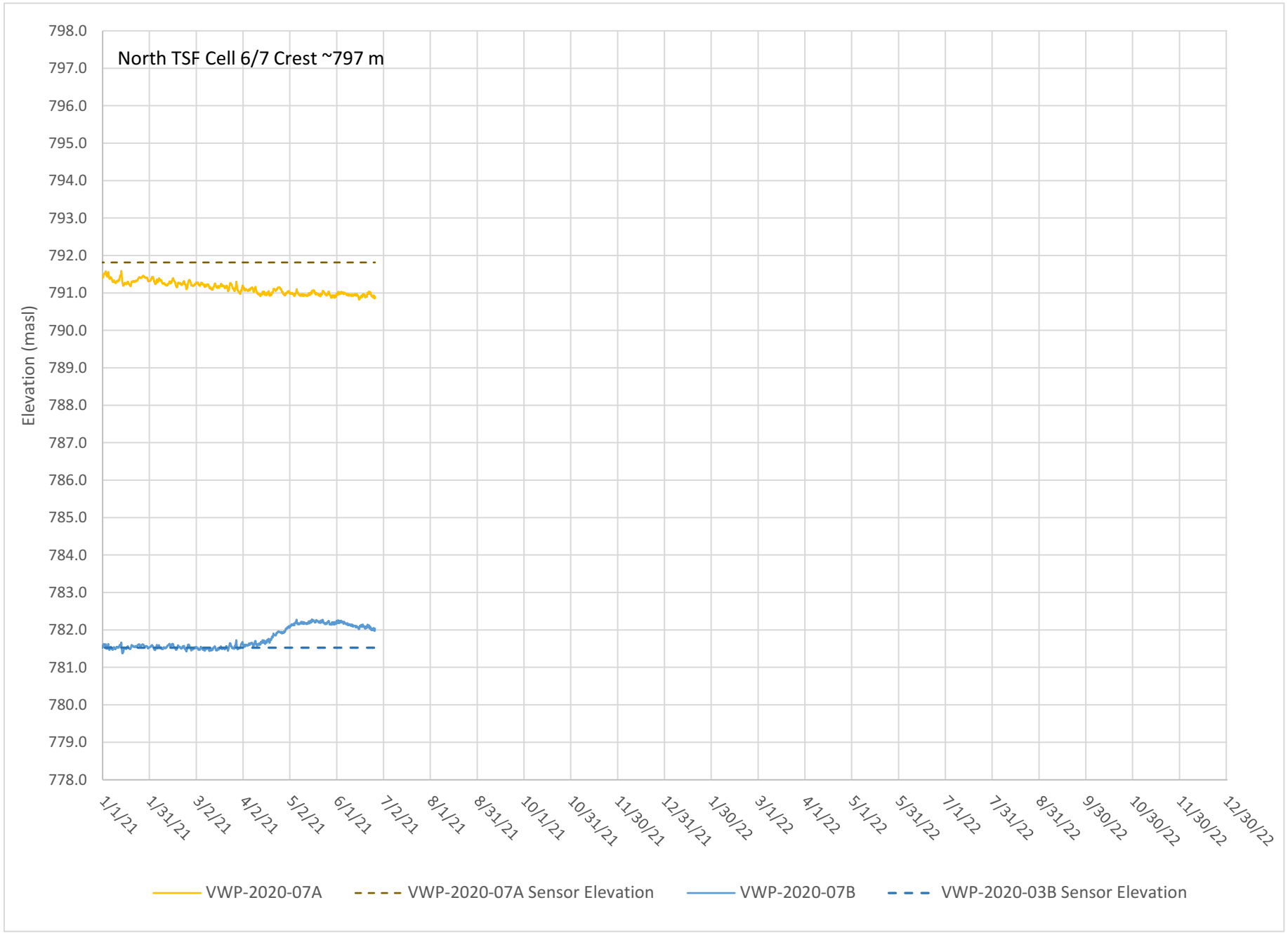
7/1/22
7/31/22
8/31/22
9/30/22
10/30/22
11/30/22
12/30/22
VWP-2020-06A
VWP-2020-06A Sensor Elevation
VWP-2020-06B
VWP-2020-06B Sensor Elevation


North TSF Cell 6/7 Crest ~797 m
Elevation (masl)
798.0
797.0
796.0
795.0
794.0
793.0
792.0
791.0
790.0
789.0
788.0
787.0
786.0
785.0
784.0
783.0
782.0
781.0
780.0
779.0
778.0
1/1/21
1/31/21
3/2/21
4/2/21
5/2/21
6/1/21
7/2/21
8/1/21
8/31/21
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3/1/22
4/1/22
5/1/22
5/31/22
7/1/22
7/31/22
8/31/22
9/30/22
10/30/22
11/30/22
12/30/22
VWP-2020-07A
VWP-2020-07A Sensor Elevation
VWP-2020-07B
VWP-2020-03B Sensor Elevation

Appendix F

Limitations

Limitations

The work performed in the preparation of this report and the conclusions presented herein are subject to the following:

1. The contract between WSP and the Client, including any subsequent written amendment or Change Order dully signed by the parties (hereinafter together referred as the "Contract").
2. Any and all time, budgetary, access and/or site disturbance, risk management preferences, constraints or restrictions as described in the contract, in this report, or in any subsequent communication sent by WSP to the Client in connection to the Contract; and
3. The limitations stated herein.

1. **Standard of care:** WSP has prepared this report in a manner consistent with the level of skill and are ordinarily exercised by reputable members of WSP's profession, practicing in the same or similar locality at the time of performance, and subject to the time limits and physical constraints applicable to the scope of work, and terms and conditions for this assignment. No other warranty, guarantee, or representation, express or implied, is made or intended in this report, or in any other communication (oral or written) related to this project. The same are specifically disclaimed, including the implied warranties of merchantability and fitness for a particular purpose.
2. **Limited locations:** The information contained in this report is restricted to the site and structures evaluated by WSP and to the topics specifically discussed in it, and is not applicable to any other aspects, areas, or locations.
3. **Information utilized:** The information, conclusions and estimates contained in this report are based exclusively on i) information available at the time of preparation, ii) the accuracy and completeness of data supplied by the Client or by third parties as instructed by the Client, and iii) the assumptions, conditions, and qualifications/limitations set forth in this report.
4. **Accuracy of information:** No attempt has been made to verify the accuracy of any information provided by the Client or third parties, except as specifically stated in this report (hereinafter "Supplied Data"). WSP cannot be held responsible for any loss or damage, of either contractual or extra-contractual nature, resulting from conclusions that are based upon reliance on the Supplied Data.
5. **Report interpretation:** This report must be read and interpreted in its entirety, as some sections could be inaccurately interpreted when taken individually or out-of-context. The contents of this report are based upon the conditions known and information provided as of the date of preparation. The text of the final version of this report supersedes any other previous versions produced by WSP.
6. **No legal representations:** WSP makes no representations whatsoever concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.
7. **Decrease in property value:** WSP shall not be responsible for any decrease, real or perceived, of the property or site's value or failure to complete a transaction, as a consequence of the information contained in this report.
8. **No third-party reliance:** This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or Contract. Any use or reproduction which any third party makes of the report, in whole or in part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. WSP does not represent or warrant the accuracy, completeness, merchantability, fitness for purpose or usefulness of this document, or any information contained in this document, for use or consideration by any third party. WSP accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions

taken or not taken or decisions made in reliance on this report or anything set out therein, including without limitation, any indirect, special, incidental, punitive, or consequential loss, liability or damage of any kind.

9. **Assumptions:** Where design recommendations are given in this report, they apply only if the project contemplated by the Client is constructed substantially in accordance with the details stated in this report. It is the sole responsibility of the Client to provide to WSP changes made in the project, including but not limited to, details in the design, conditions, engineering, or construction that could in any manner whatsoever impact the validity of the recommendations made in the report. WSP shall be entitled to additional compensation from Client to review and assess the effect of such changes to the project.

10. **Time dependence:** If the project contemplated by the Client is not undertaken within a period of 18 months following the submission of this report, or within the time frame understood by WSP to be contemplated by the Client at the commencement of WSP's assignment, and/or, if any changes are made, for example, to the elevation, design or nature of any development on the site, its size and configuration, the location of any development on the site and its orientation, the use of the site, performance criteria and the location of any physical infrastructure, the conclusions and recommendations presented herein should not be considered valid unless the impact of the said changes is evaluated by WSP, and the conclusions of the report are amended or are validated in writing accordingly.

    Advancements in the practice of geotechnical engineering, engineering geology and hydrogeology and changes in applicable regulations, standards, codes or criteria could impact the contents of the report, in which case, a supplementary report may be required. The requirements for such a review remain the sole responsibility of the Client or their agents.

    WSP will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

11. **Limitations of visual inspections:** Where conclusions and recommendations are given based on a visual inspection conducted by WSP, they relate only to the natural or man-made structures, slopes, etc. inspected at the time the site visit was performed. These conclusions cannot and are not extended to include those portions of the site or structures, which were not reasonably available, in WSP's opinion, for direct observation.

12. **Limitations of site investigations:** Site exploration identifies specific subsurface conditions only at those points from which samples have been taken and only at the time of the site investigation. Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions.

    The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behavior with regard to the proposed development. Despite this investigation, conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations and the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

    Final sub-surface/bore/profile logs are developed by geotechnical engineers based upon their interpretation of field logs and laboratory evaluation of field samples. Customarily, only the final bore/profile logs are included in geotechnical engineering reports.

    Bedrock, soil properties and groundwater conditions can be significantly altered by environmental remediation and/or construction activities such as the use of heavy equipment or machinery, excavation, blasting, pile-driving or draining or other activities conducted either directly on site or on adjacent terrain. These properties can also be indirectly affected by exposure to unfavorable natural events or weather conditions, including freezing, drought, precipitation and snowmelt.

During construction, excavation is frequently undertaken which exposes the actual subsurface and groundwater conditions between and beyond the test locations, which may differ from those encountered at the test locations. It is recommended that WSP be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered at the test locations, that construction work has no negative impact on the geotechnical aspects of the design, to adjust recommendations in accordance with conditions as additional site information is gained, and to deal quickly with geotechnical considerations if they arise.

Interpretations and recommendations presented herein may not be valid if an adequate level of review or inspection by WSP is not provided during construction.

13. **Factors that may affect construction methods, costs and scheduling:** The performance of rock and soil materials during construction is greatly influenced by the means and methods of construction. Where comments are made relating to possible methods of construction, construction costs, construction techniques, sequencing, equipment or scheduling, they are intended only for the guidance of the project design professionals, and those responsible for construction monitoring. The number of test holes may not be sufficient to determine the local underground conditions between test locations that may affect construction costs, construction techniques, sequencing, equipment, scheduling, operational planning, etc.

    Any contractors bidding on or undertaking the works should draw their own conclusions as to how the subsurface and groundwater conditions may affect their work, based on their own investigations and interpretations of the factual soil data, groundwater observations, and other factual information.

14. **Groundwater and Dewatering:** WSP will accept no responsibility for the effects of drainage and/or dewatering measures if WSP has not been specifically consulted and involved in the design and monitoring of the drainage and/or dewatering system.

15. **Environmental and Hazardous Materials Aspects**: Unless otherwise stated, the information contained in this report in no way reflects on the environmental aspects of this project, since this aspect is beyond the Scope of Work and the Contract. Unless expressly included in the Scope of Work, this report specifically excludes the identification or interpretation of environmental conditions such as contamination, hazardous materials, wildlife conditions, rare plants or archeology conditions that may affect use or design at the site. This report specifically excludes the investigation, detection, prevention or assessment of conditions that can contribute to moisture, mold or other microbial contaminant growth and/or other moisture related deterioration, such as corrosion, decay, rot in buildings or their surroundings. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes

16. **Sample Disposal:** WSP will dispose of all uncontaminated soil and rock samples after 30 days following the release of the final geotechnical report. Should the Client request that the samples be retained for a longer time, the Client will be billed for such storage at an agreed upon rate. Contaminated samples of soil, rock or groundwater are the property of the Client, and the Client will be responsible for the proper disposal of these samples, unless previously arranged for with WSP or a third party.

17. **Effect of iron minerals:** This report does not address issues related to the discovery or presence of iron minerals, such as pyrite, or the effects of iron minerals, if any, in the soil or to be used in concrete. Should specific information be required, additional testing may be requested by the Client for which WSP shall be entitled to additional compensation.