



REPORT

2022 Annual Facility Performance Review
Swift South Spoil Co-Management Facilities

Submitted to:

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Executive Summary

This report presents the 2022 annual facility performance review of the Swift South Spoil co-management facilities (CMFs) at the Teck Coal Limited, Fording River Operations mine site.

Construction and operation of the Swift South Spoil CMFs began on 15 April 2021 at elevation 1,660 m and was completed on 23 June 2022 at elevation 1,785 m. Following completion of construction to 1,785 m on 23 June 2022, the Swift South Spoil CMFs became dormant and are being progressively encapsulated within the waste rock of the Swift South Spoil.

Review of Key Hazards

A risk assessment of the Swift South Spoil CMFs was completed as part of the design process, which confirmed that there are no credible catastrophic modes of flow failure if the facilities are constructed as designed. The construction and performance of the Swift South Spoil CMFs aligns with recommendations from the design reports. No potential catastrophic failure modes have been identified based on the construction and operation activities.

Non-catastrophic non-flow hazards (external erosion, single bench failure modes, and fines migration) exist and are controlled through mitigation measures and standard operating procedures.

Consequences of Failure

The design approach selected for the Swift South Spoil CMFs meets or exceeds standards in the Global Industry Standard on Tailings Management and the Health, Safety and Reclamation Code. This included use of “Extreme” loading and engineering design such that there are no catastrophic credible failure modes for the Swift South Spoil CMFs. Using this design philosophy, inclusion of the CMFs within the Swift South Spoil will not change the overall stability of the Swift South Spoil evaluated in previous reports (Golder 2018b, 2021b).

Operations, Maintenance, and Surveillance Manual and Emergency Response Preparedness Plan

WSP has reviewed a draft revision of the operations, maintenance, and surveillance (OMS) manual (Teck 2021a). The OMS manual should be updated to reflect the current conditions.

The emergency response plan for the Swift South Spoil CMFs is covered under the same plans as the Swift South Spoil, which are the Fording River Operations Emergency Response Procedure (Teck 2022) and the Fording River Operations Dumping Procedures (Teck 2021b).

Recommendations

There are no outstanding recommendations from the 2021 annual report and no priority 1 or 2 recommended actions from the 2022 AFPR. Recommendations with lesser priorities are presented in the report.

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1.0 INTRODUCTION

1.1 Purpose, Scope of Work, and Method

WSP Canada Inc. (WSP) has completed this annual facility performance review (AFPR) for the co-management facilities (CMFs) within the existing Swift South Spoil at Teck Coal Limited's (Teck) Fording River Operations (FRO) site. The CMFs are tailings storage facilities (TSFs) that do not retain water or slurry tailings and do not change the overall strength behaviour of the spoils.

The reporting period for the data review is from 1 September 2021 through 31 August 2022. During the 2021/2022 reporting period, the CMFs were in construction. Construction and tailings placement (i.e., operation) of the CMFs began on 15 April 2021 and material placement was completed to elevation 1,785 m within the Swift South Spoil on 23 June 2022.

The 2022 annual inspection report was prepared based on a site visit carried out by WSP (previously known as Golder Associated Ltd.) on 29 September 2022, discussion with Teck staff, review of data provided by Teck, and a construction supervision site visit undertaken by the engineer of record (EoR) in June 2022 (detailed in Section 5.4).

Photographs of the Swift South Spoil CMFs from the site inspection are presented in Appendix A, and a summary of the observations is included in Appendix B.

All coordinates presented in this report are in Universal Transverse Mercator (UTM) with elevations referenced to the Elk Valley Elevation Datum unless otherwise noted.

This report is to be read in conjunction with the Study Limitations provided at the end of the report.

1.2 Regulatory Requirements

Although the Swift South Spoil CMFs are better described as a spoil than a traditional impounding TSF, Teck requested that this annual inspection report be prepared in consideration of Part 10.5.3 of the Health, Safety and Reclamation Code (HSRC) for Mines in British Columbia (EMLI 2022), which specifies the minimum inspection frequency for TSFs. It is understood that this report will be submitted by Teck to the Chief Inspector of Mines.

The guidelines for annual inspection reports provided in the HSRC Guidance Document (Ministry of Energy and Mines 2016, Section 4.2) were followed where applicable during the preparation of this report.

2.0 BACKGROUND

2.1 Site History

The FRO site is an active open pit metallurgical coal mine located near Elkford, BC. Teck operates and maintains tailings storage and settling pond facilities at the site. The facilities under assessment are the Swift South Spoil CMFs. The locations of these facilities at the FRO site are shown in Figure 1.

2.2 Swift South Spoil Co-management Facilities Design

As part of Swift Pit mining (Figure 1), historical tailings placed within the existing 2 Pit 3 Pit (2P 3P) Tailings Storage Area were required to be removed as part of re-mining activities. Excavated tailings from 3 Pit North (3PN), sometimes referred to as legacy tailings, were required to be relocated from 3PN within Swift Pit to the permitted Swift South Spoil on the west side of the Fording River, approximately 3 km southwest of the FRO Processing Plant (Figure 1).

Materials mined from 3PN and transported to the Swift South Spoil CMFs were a combination of tailings and tailings intermingled with waste rock. The 3PN tailings are mostly non-plastic to low plastic, sandy silt- to silt-sized coal fines (also described as subaerial tailings in situ). Some tailings in 3PN migrated into the void spaces of the waste rock, forming a mixture defined by a waste rock matrix (also described as sub-terrestrial intermingled waste rock and tailings).

Subaerial tailings were blended with waste rock prior to transportation to the Swift South Spoil CMFs, in a ratio that allows clast to clast interaction of the waste rock, which dictates the strength characteristics of the facility. The process for blending the tailings and waste rock was to mine tailings from 3PN and free dump them onto freshly blasted waste rock from the Swift Pit. Tailings and waste rock were then mined together and transported to the Swift South Spoil CMFs. Mixing occurs at three points in the process: when the tailings are excavated at the face, during transportation, and during dumping at the CMFs. Sub-terrestrial materials were transported directly to the Swift South Spoil CMFs and placed. All transported material was placed in the spoils in lifts up to 15 m high in a bottom up construction sequence. The CMFs were progressively encapsulated by waste rock spoil during construction and fully encapsulated with waste rock following construction.

2.2.1 Design Documentation

The design for the Swift South Spoil CMFs is documented in the following design reports:

- **Basis of design and design criteria for new South Spoil CMFs (Golder 2021a)**—presents the basis of design and design criteria, regulations, standards and guidelines, and consequences of failure assessment for the Swift South Spoil CMFs.
- **South Spoil CMFs design report (Golder 2021b)**—presents the detailed design, site and material characterization, design assessments, geotechnical risk review, design controls, construction requirements, and design drawings for the Swift South Spoil CMFs. Revision 2 of the design drawings are provided in Appendix C.
- **Design amendment 1 (Golder 2021c)**—presents an adjustment to the northern Swift South Spoil CMF layout limits.
- **Design amendment 2 (Golder 2021f)**—presents additional design modifications to the Swift South Spoil CMFs including raising the maximum crest elevation of both of the northern and southern CMFs.

- **Design amendment 3 (Golder 2021g)**—presents additional design modifications to tie in the northern and southern CMFs at the 1,770 to 1,785 m lift.

The design approach for the Swift South Spoil CMFs meets or exceeds standards in the Global Industry Standard on Tailings Management (GISTM; Global Tailings Review 2020) and the HSRC. The design approach included use of “Extreme” loading and engineering design, irrespective of considerations of the minor failure consequences possible, such that there are no catastrophic credible flow failure modes for the Swift South Spoil CMFs. Using this design philosophy, inclusion of the CMFs within the Swift South Spoil will not change the overall stability of the spoil (Golder 2018b, 2021b).

2.2.2 Facility Geometries

The Swift South Spoil CMFs were constructed in two areas within the existing Swift South Spoil: a northern area near the Swift Settlement Ponds at a base elevation of 1,660 m, and a southern area near the Cataract Settlement Ponds at a base elevation of 1,740 m (Appendix C, Drawing 4). At the final lift elevation of 1,770 to 1,785 m, the northern and southern areas tie in to form one continuous area. The Swift South Spoil CMFs were designed to integrate with the Swift South Spoil as it develops and be immediately covered by waste rock spoil once completed.

At its ultimate configuration, the Swift South Spoil CMF is 2.4 km long as measured along the centreline, and the width is 0.5 km. The minimum elevation is 1,660 m and the maximum elevation is 1,785 m. The final footprint of is approximately 1,100,000 m². Two typical sections are shown in Appendix C, Drawing 4 (northern area) and Drawing 5 (southern area).

2.2.3 Description of Material Types

The materials used in the Swift South Spoil CMFs are further detailed in this section.

2.2.3.1 Waste Rock

Waste rock includes freshly blasted rock from the Swift Pit or rehandled waste rock from the vicinity of 3PN. Waste rock gradation varies from large boulders to sand-sized particles, with minor components of finer particles. Waste rock does not include waste rock that has tailings infiltration, also known as sub-terrestrial tailings.

The Swift South Spoil is comprised of waste rock and this material is not restricted to within the CMFs. Generally, waste rock was used as a mixing material for the tailings or as spot fill to improve geotechnical conditions or trafficability.

2.2.3.2 In Situ Blended Waste Rock and Tailings (sub-terrestrial tailings)

The in situ intermingled waste rock and tailings (sub-terrestrial tailings) are from the 3PN area and were developed by tailings migrating into the void space within the waste rock during tailings deposition in 3 Pit South (3PS).

2.2.3.3 Tailings (subaerial tailings)

Tailings from 3PN were relocated to the Swift South Spoil CMFs. The tailings are sometimes referred to as subaerial tailings. Tailings are comprised of sand, silt, and clay-sized particles generally less than 1 mm in diameter. Tailings were blended with waste rock (Section 2.2.3.4) prior to placement in the CMFs; the facilities generally do not store unblended tailings.

2.2.3.4 Mixed Waste Rock and Tailings

Tailings were mixed with waste rock within the Swift Pit to achieve a ratio where there is clast to clast interaction of the waste rock, creating a material that is very similar to the sub-terrestrial.

2.2.3.5 Domestic Waste

A portion of the rehandled waste rock (approximately 360,000 m³) containing approximately 5% to 15% domestic waste (approximately 18,000 to 54,000 m³) was placed within the CMFs during the 2021 reporting period. The volume of domestic waste placed is approximately 0.1% of the total volume placed within the Swift South Spoil CMFs. Section 3.3 includes additional volume details; domestic waste was not placed during the 2022 reporting period. Domestic waste was not an approved material to be placed within the CMF boundaries in the geotechnical design report, however, it is approved to be placed within the Swift South Spoil under the Fording River Operations Waste Management Plan (Teck 2014).

2.2.4 Foundation Conditions

The CMFs are constructed within the Swift South Spoil on top of existing waste rock spoil. Thus, the foundation of the CMFs are entirely bottom up constructed waste rock of the Swift South Spoil. The waste rock from FRO mining typically consists of blasted sandstone, siltstone, and mudstone with some coal fragments. The material particle size consists predominantly of boulders and cobbles with some gravel and sand.

The foundations beneath the Swift South Spoil have been characterized through the following investigations:

- A geotechnical investigation was carried out in 2011 including test pits and Becker boreholes (Golder 2013).
- A test pit investigation program was carried out by Teck personnel in October 2014 to support the design and construction of the Swift Settlement Ponds (Teck 2015). Golder personnel were not present during this investigation, but soil samples were sent to Golder's laboratory for geotechnical testing.
- A test pit investigation was conducted by Amec Foster Wheeler in 2015 to support the water management plan for the Swift Project (Amec Foster Wheeler 2015).
- A geotechnical investigation was conducted in 2017 on the west side of the Fording River, approximately 1 km north of the Swift South Spoil CMFs. The investigation included test pits, boreholes, and laboratory testing to support the proposed widening of the Fording River floodplain west of the South Tailings Pond (Golder 2018a).

Materials beneath the Swift South Spoil at the sites of the CMFs and/or the properties governing their behaviour are expected to vary spatially. In general, the foundation soil below the Swift South Spoil consists of a topsoil layer (largely stripped) over till that is a clay silt sand gravel mixture with cobbles and boulders. Fractured sedimentary bedrock underlies the till. The foundation stratigraphy in the Swift South Spoil is summarized in Table 1.

Table 1: Generalized Foundation Stratigraphy

Layer	Description	Typical Depth to Top of Layer (mbgl)	Thickness (m)
Topsoil	Silty sandy topsoil	0	0 to 0.6
Till	Gravelly sandy silty clay with some cobbles and boulders	0.1 to 0.6	0.3 to >6.3
Bedrock	Fractured sedimentary rocks	0.5 to >6.5	to depth

mbgl = metres below ground level.

Prior to Swift South Spoil development, Teck stripped foundation topsoil within footprints of the spoil on all ground surfaces with slope angles less than 26°. These areas comprise the toe of the Swift South Spoil and control the overall stability. Soft deposits within the former Swift settling pond were also removed prior to placement of waste rock. The excavation of these materials exceeded the foundation improvement requirements outlined in the Swift South Spoil geotechnical assessment (Golder 2018b).

2.2.5 Water Management

Due to the CMFs encapsulation within the Swift South Spoil, the catchment of the CMFs will be the surface footprint of the CMFs and will receive infiltration through the waste rock of the Swift South Spoil. Water management including surface water diversions and rock drains have been designed by others for the Swift South Spoil.

Surface water in the catchment upstream of the mining area is managed by the Swift Clean Water Diversion, which diverts the non-contact water. This diversion system conveys non-contact surface water across the Swift South Spoil in an HDPE pipeline to a small energy dissipation pond adjacent to the Swift Creek Sediment Ponds.

The Cataract Creek Rock Drain and Swift Creek Rock Drain currently concentrate flows within the catchment, each discharging into its own respective primary collection pond, as shown in Figure 1. Water is conveyed from each collection pond to the Swift Creek Sediment Ponds via high-density polyethylene (HDPE) pipelines. Engineered structure rock drains have been designed to pass the 1-in-200-year flood.

Historically all water from the Swift Creek Clean Water Diversion and the Swift Creek Sediment Ponds was combined downstream and was discharged into the Fording River via a saw-toothed weir (Teck 2020b). As of early 2022, water from the Swift Creek Sediment Ponds is conveyed to the Active Water Treatment Facility South (AWTF-S), treated, then discharged via the saw-toothed weir to the Fording River. Water quality is monitored and reported under separate cover. The water management structures are shown in Figure 1.

2.3 Site Seismicity

The site is located in an area of relatively low seismicity for BC. A site-specific seismic hazard model was developed for the FRO site based on historical seismicity and a review of geological and paleoseismological features (Golder 2016). The model includes four area sources from the 5th Generation Seismic Hazard Model and nine faults and fault segments mapped in northwest Montana. The 5th Generation Seismic Hazard Model was developed by Natural Resources Canada for use in the 2015 National Building Code of Canada.

Probabilistic analysis results from site-specific hazard model are listed in Table 2. All site-specific peak ground acceleration values were evaluated for a soil Site Class C as described in the 2010 National Building Code of Canada (NRCC 2010).

Table 2: Fording River Operations Site Seismic Hazard Values

Exceedance Probability	Return Period (years)	Peak Ground Acceleration (g)
40% in 50 years	100	0.020
10% in 50 years	475	0.063
5% in 50 years	1,000	0.097
2% in 50 years	2,475	0.158
1% in 50 years	5,000	0.222
½% in 50 years	10,000	0.300

Notes: For firm ground site class "C," very dense soil and soft rock foundation, as defined by 2010 National Building Code of Canada (NRCC 2010). Return periods are not exact representations of annual exceedance probabilities; rounding per Canadian Dam Association guidelines (CDA 2013, 2019) is shown. FRO site coordinates: 50.202°N, 114.876°W.

2.4 Key Operational Components

Operational components for the Swift South Spoils CMFs during construction include:

- Shift supervisor inspections each 12 h; records indicate that this was not strictly adhered to through construction.
- Weekly geotechnical inspection undertaken by Teck.
- WSP site visit at the end of construction and for the annual facility inspection on 29 September 2022.

Following construction, the Swift South Spoil CMFs were completely encapsulated within the Swift South Spoils and consequently managed by Teck's Standard Practices and Procedures (SP&P) EN.020.R6 for Waste Dump Management (Teck 2020a). The waste dump development SP&Ps include methods of dumping, rock rollout requirements, dumping different materials, stockpiling, water management, and remediation.

2.5 Key Personnel

The EoR for the Swift South Spoil CMFs, as of 15 April 2021 (the beginning of construction), is Julia Steele, P.Eng., an employee of WSP.

The Qualified Professional (QP) for the Swift South Spoil CMFs is James Campbell, P.Eng., who is an employee of Teck. James Campbell became the QP for the Swift South Spoil CMFs on 15 April 2021.

2.6 Quantifiable Performance Objectives

The design intent of the Swift South Spoil CMFs is that they do not change the geotechnical behaviour of the Swift South Spoil; therefore, the existing Swift South Spoil quantifiable performance objectives (Teck 2020a) are adequate.

3.0 CONSTRUCTION, OPERATIONS, AND MAINTENANCE

3.1 Operations

During the reporting period, the Swift South Spoil CMFs received tailings between 1 September 2021 and 23 June 2022. Following 23 June 2022, the Swift South Spoil CMFs were progressively encapsulated with waste rock and at the time of the site visit on 29 September 2022 were fully encapsulated with at least 15 m of waste rock.

3.2 Maintenance

The Swift South Spoil CMFs were encapsulated in waste rock spoils following completion of construction and therefore do not require maintenance activities.

3.3 Construction

Construction of the Swift South Spoil CMFs commenced on 15 April 2021 and was completed on 23 June 2022.

3.3.1 Inspections

The following inspections were completed during the reporting period:

- Supervisor inspections were undertaken by shift supervisors during each 12 h shift during construction. This was not strictly adhered to through construction.
- Weekly geotechnical inspection were undertaken by Teck throughout the reporting period from 1 September 2021 to the week ending 29 June 2022.
- WSP undertook a site visit to observe the end of construction on 9 June 2022.
- WSP undertook an annual facility inspection on 29 September 2022.

3.3.2 Design Deviations

Design deviations during construction have been documented by Teck and reviewed by WSP. Design deviations have not compromised the original design intent and have been approved by the EoR. These will be included in the construction record reporting and are summarized as follows:

- **Design amendment (one) for expansion one (Golder 2021c)**—presents updated stability analysis and facility layout limits for the northern CMF in the Swift South Spoil. This design amendment meets the design intent of the facility.
- **Design amendment (two) for miscoded tailings placed in Swift South Spoil CMFs (Golder 2021d)**—presents stability analysis and documentation for 70 loads of tailings (approximately 9,200 m³) that were not mixed with waste rock prior to placement within the Swift South Spoil CMFs on 20 June 2021. This design amendment meets the design intent of the facility.
- **Design amendment (three) for overdump at Swift South Spoil CMFs (Golder 2021e)**—presents additional stability analysis and documentation for 364 loads of mixed tailings and waste rock (approximately 88,000 m³) that were placed outside of the design limits on the 1,740 m lift at the northern Swift South Spoil CMF between 20 and 24 August 2021. This design amendment meets the design intent of the facility.

- **Design amendment (four) for expansion two (Golder 2021f)**—presents additional design modifications to the Swift South Spoil CMFs including raising the maximum crest elevation of both of the northern and southern CMFs. This design amendment meets the design intent of the facility.
- **Design amendment (five) for expansion three (Golder 2021g)**—presents additional design modifications to tie in the northern and southern CMFs at the 1,770 to 1,785 m lift. This design amendment meets the design intent of the facility.
- **Design amendment (six) for miscoded tailings placed outside of the Swift South Spoil CMF limits (Golder 2021h)**—on 5 December 2021, 44 miscoded loads of blended tailings and waste rock were placed outside of the CMF limits, within the 50 m offset zone from the edge of the Swift South Spoil crest. There are no geotechnical stability issues of concern arising from this deviation as the misplaced loads are a mixed material rather than unblended subaerial tailings. However, the misplaced loads are non-compliant with the design intent of being set back a minimum of 50 m from the outer edge of the Swift South Spoil. This design deviation is discussed with respect to performance in Section 5.5.1.
- **Design amendment (seven) for miscoded tailings placed in Swift South Spoil CMFs (Golder 2022b)**—presents additional stability analysis and documentation for approximately 29,000 m³ of unblended tailings that were placed within the Swift South Spoil CMF boundaries on the 1,770 to 1,785 m lift between 15 and 17 January 2022. This design amendment meets the design intent of the facility.

A portion of the rehandled waste rock containing approximately 5% to 15% domestic waste was placed within the Swift South Spoil CMFs. The volume of domestic waste placed is approximately 0.1% of the total volume placed within the Swift South Spoil CMFs within the reporting period. Domestic waste was not specified as an approved material to be placed within the CMF boundaries in the geotechnical design report. The areas used for placing this material are reported to have followed Teck FRO's process for domestic waste disposal areas under the Waste Management Plan framework (Teck 2014).

3.3.3 Volumes Placed

More than 35,000,000 m³ of material was placed in the Swift South Spoil CMFs during the reporting period, estimated from the weekly construction reports provided by Teck. Materials placed include: waste rock, in situ blended waste rock and tailings, tailings, mixed waste rock and tailings, and domestic waste. At the time of the report exact volumes of each material were not available.

4.0 REVIEW OF PRECIPITATION DATA

4.1 Climate Review

Increased precipitation, particularly over an extended period of time, will impact the degree of saturation of the Swift South Spoil CMFs. Saturation of the Swift South Spoil CMFs may result in mobilization of fines out of the facilities and into the downstream water management system.

Three local climate monitoring stations exist at FRO: waste water treatment plant, A Spoil, and Brownie Spoil. Records were available from the waste treatment plant and Brownie Spoil weather stations during the reporting period of 1 September 2021 to 31 August 2022. Only limited precipitation data were available for the A Spoil station; it has therefore been excluded from the climate data review.

The Fording River Cominco station is the closest regional Environment and Climate Change Canada station to the FRO site; however, the station has not published precipitation data since 2017. The waste water treatment plant station has been used as the main precipitation station for the Fording River Cominco infilling gap process since December 2013 and now makes up the majority of the dataset. As a result, a new combined dataset, hereafter referred to as the Fording River (infilled) dataset, has been used for the climate review. The waste water treatment plant station precipitation data were used over the entire the reporting period.

The total precipitation recorded at the Fording River (infilled) and Brownie spoil stations over the reporting period is shown in Table 3 with their monthly total precipitation is presented in Chart 1. For comparison purposes, the long-term (1970 to 2021) average monthly precipitation at FRO (from the Fording River Cominco infilled dataset) is also presented in Chart 1. The long-term (1970 to 2021) average annual precipitation at the mine site is estimated to be 631 mm.

Note that data presented in Table 3 and Chart 1 for the Fording River (infilled) and Brownie Spoil stations are raw data; no adjustments for station elevation or undercatch were made.

Table 3: Total Precipitation from 1 September 2021 to 31 August 2022

Weather Station	Total Precipitation (mm)
Fording River (infilled)	669
Brownie Spoil	617

The total annual precipitation for both Fording River (infilled) and Brownie Spoil is less than the modelled synthetic average year precipitation used for the design of the Swift South Spoil CMFs of approximately 700 mm. Therefore, performance should be consistent with the design intent.

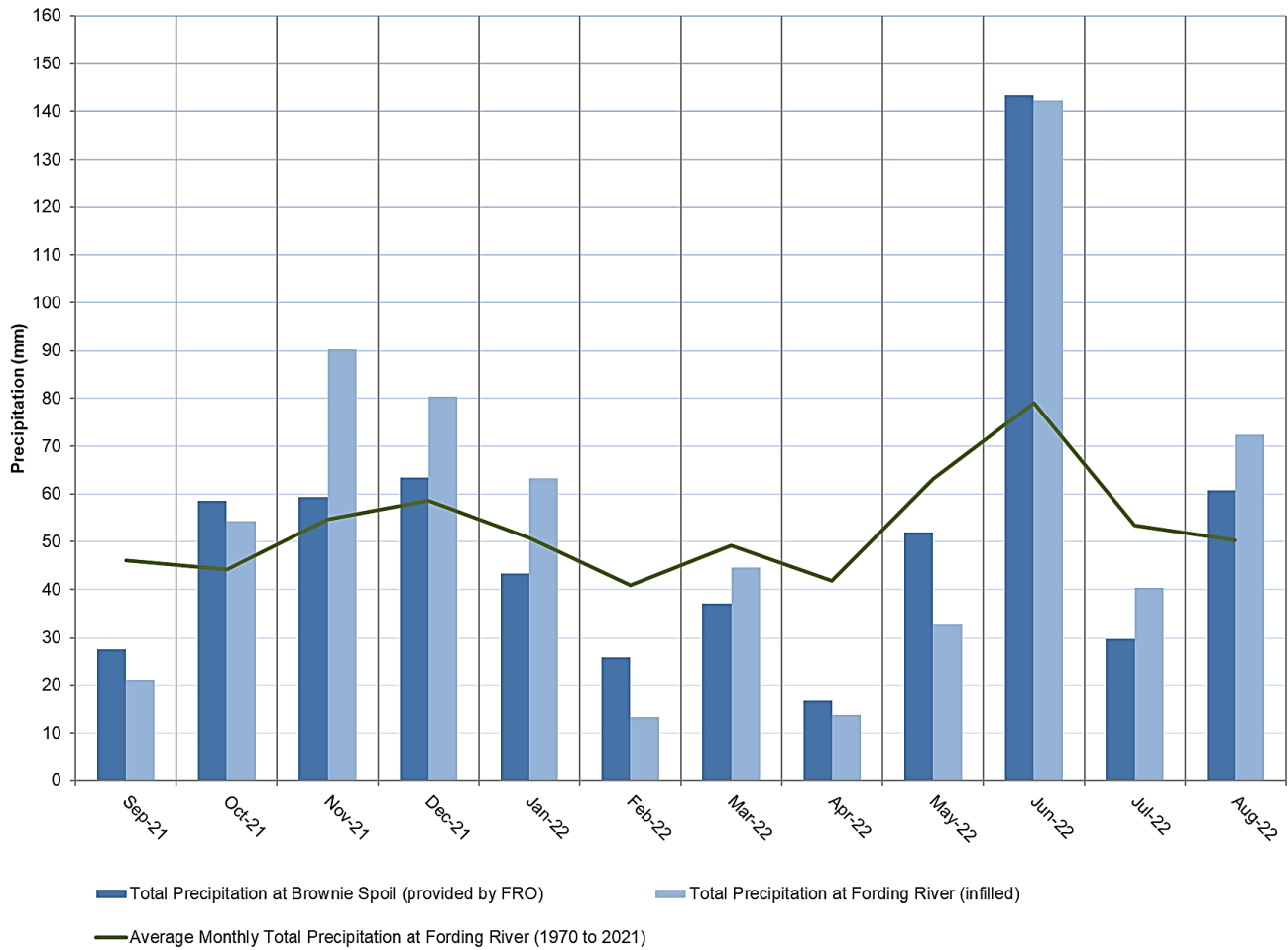


Chart 1: Monthly Precipitation Data from 1 September 2021 to 31 August 2022

The precipitation data in Table 3 indicate the annual precipitation at FRO was approximately average, with the Fording River (infilled) dataset from 1 September 2021 to 31 August 2022 being higher than the long-term average of 631 mm and the Brownie Spoil weather station dataset being slightly lower than the long-term annual average. A similar observation can be made from [Error! Reference source not found.](#)

No facility performance issues associated with precipitation during the reporting period were noted.

4.2 Water Quality

No water is retained in the Swift South Spoil CMFs, and water quality is not reviewed as part of this AFPR. Teck reported that there were no total suspended solids (TSS) non-conformances in the Swift and Cataract Settlement Ponds during the reporting period; TSS records have not been provided for this AFPR.

5.0 SWIFT SOUTH SPOIL CO-MANAGEMENT FACILITIES SAFETY ASSESSMENT

This section presents the safety assessment for the Swift South Spoil CMFs based on the observations and data review for each of the failure modes that are most relevant to this type of facility.

5.1 Site Visit

A site inspection was carried out on 29 September 2022 by Julia Steele, P.Eng., and Natasha Carrière, P.Eng., of WSP. Julia Steele and Natasha Carrière were accompanied by Ross Roseingrave, P.Eng., Senior Engineering Supervisor, of Teck.

Appendix A presents a summary of photographs of the Swift South Spoil CMFs from the site inspection. The location, direction, and number for each photograph are noted in Figure 2.

The following are items of note from the site visit:

- Construction of the Swift South Spoil CMFs was complete to elevation 1,785 m and the facilities were fully encapsulated by a minimum of 15 m of waste rock.
- Based on visual inspections, the Swift South Spoil CMFs appeared safe with no deficiencies that require immediate action (Photograph 1).
- The waste rock platform encapsulating the Swift South Spoil CMFs was in good condition with a relatively flat surface and no observed cracking or significant rutting (Photographs 2 and 3).

A summary of the observations from the site visit is included in the inspection report in Appendix B.

5.2 Review of Background Information

Teck provided the following information for this AFPR:

- 2021 FRO site LiDAR topographic data and orthophoto
- records of routine visual inspections by qualified Teck geotechnical personnel
- site climate data from 1 September 2021 to 31 August 2022

5.3 Consequences of Failure

Teck has advised that they are aligned with the most conservative interpretation of the GISTM (Global Tailings Review 2020) which, in turn, is consistent with their safety culture. This facility was designed adopting the maximum credible loads and therefore meets the loading criteria defined in GISTM as well as the HSRC. 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. This approach is consistent with industry-leading best practices.

5.4 Review of Operational Documentation

5.4.1 Operations, Maintenance, and Surveillance Manual

WSP has reviewed a draft revision of the operations, maintenance, and surveillance (OMS) manual (Teck 2021a). The OMS manual should be updated to reflect the current conditions.

5.4.2 Emergency Preparedness and Response Plans

The emergency response planning for the Swift South Spoil CMFs is covered under the same plans as the Swift South Spoil, which are as follows:

- **Fording River Operations Emergency Response Procedure (Teck 2022)**—provides Fording River Operation's staff with guidance in the preparation for and response to emergency situations. The procedure identified the responsibilities and duties of management.
- **Fording River Operations Dumping Procedures (Teck 2021b)**—identifies procedures for excessive berm or ground settlement and emergency signalling procedures.

5.4.3 Facility Safety Review

No facility safety review (i.e., dam safety review) has been completed for the Swift South Spoil CMFs. The HSRC states that a dam safety review should be completed every 5 years. The construction of the Swift South Spoil CMFs was initiated in 2021.

5.5 Assessment of Co-management Facility Safety Relative to Failure Modes and Facility Performance

Based on the risk assessment for the facility (Golder 2021b), there are no catastrophic credible hazards or failure modes for the Swift South Spoil CMFs. The assessments completed to support this conclusion are summarized in the design report (Golder 2021b).

The construction and performance of the Swift South Spoil CMFs aligns with recommendations from the design reports, except for the placement of domestic waste within the footprints. The domestic waste does not impact the stability of the structure and domestic waste was placed in accordance with the Fording River Operations Waste Management Plan (Teck 2014). No potential catastrophic failure modes have been identified based on the construction and operation activities.

Potential failure modes associated with the Swift South Spoil CMFs were identified during the risk analysis undertaken as part of the detailed design for the facility (Golder 2021b). Based on the risk assessment, the following non-catastrophic hazards are considered in the assessment of performance compared to the design expectations.

5.5.1 Local Instability

The risk review for the Swift South Spoil CMFs (Golder 2021b) identified a potential non-catastrophic instability scenario occurring as a result of single bench failure through Swift South Spoil's waste rock material leading to exposure of CMF material and erosion of material.

5.5.1.1 Design Basis and Existing Controls

Design limits were developed for the Swift South Spoil CMFs (Golder 2021b) that locate the CMFs far enough back from the spoil face (50 m) to avoid the potential for the CMF to be exposed in the event of a single bench failure of the Swift South Spoil. These design limits are used in the Carlson Grade system so that individual loads are tracked with respect to placement boundaries.

5.5.1.2 Observed Performance

Weekly construction reporting by Teck that reconciles load material type and placement location shows that placement within the development limits has been mostly in compliance with the design limits (Golder 2021b). The construction deviations from design were checked by WSP and in all but one case, met the overall design intent.

On 5 December 2021, 44 miscoded loads of blended tailings and waste rock were placed outside of the CMF limits, within the 50 m offset zone from the edge of the Swift South Spoil crest. There are no geotechnical stability issues of concern arising from this deviation as the misplaced loads are blended waste rock and tailings rather than only tailings. However, the misplaced loads are non-compliant with the design intent of being set back a minimum of 50 m from the outer edge of the Swift South Spoil. These misplaced loads will need to be considered in an updated risk review for the CMFs.

5.5.2 Internal Erosion / Fines Migration

Internal erosion does not present a catastrophic hazard to facility safety. The intermingled waste rock and tailings material (sub-terrestrial) excavated from 3PN was created by tailings migrating through the void space of in situ waste rock. This observed behaviour of fines migration through the waste rock confirms tailings are not filter compatible with waste rock and there is potential for the tailings of the CMFs to migrate under sufficient gradient.

5.5.2.1 Design Basis and Existing Controls

One of the design considerations for the Swift South Spoil CMFs is to mitigate the loss of fines to prevent potential impact to any vulnerable receiving body. Analysis was undertaken to assess the potential for fines migration from the Swift South Spoil CMFs under the anticipated as constructed conditions (Golder 2021b). The design infiltration loading was based on the 1:100 steady-state wet year, as recommended by WSP (then Golder).

The results of the fines migration assessment for the Swift South Spoil CMFs indicate the following:

- There will be an initial fines migration when material is first placed.
- For a homogenous block of mixed tailings and waste rock fines migration is expected to be minor.

Fines are expected to be captured in the Swift and Cataract Settlement Ponds located at the toe of the Swift South Spoil.

5.5.2.2 Observed Performance

No seepage was observed at the time of inspection. The generated total suspended solids are expected to be captured in the Swift and Cataract Settlement Ponds. Teck reported that there were no TSS non-conformances in the Swift and Cataract Settlement Ponds during the reporting period.

6.0 SUMMARY AND RECOMMENDATIONS

6.1 Summary of Activities During Reporting Period

Activities completed during the reporting period include the following:

- Completion of construction to elevation 1,785 m on 23 June 2022; the construction window was approximately ten months of the annual reporting period.
- More than 35,000,000 m³ of waste rock, in situ blended waste rock and tailings, tailings, mixed waste rock and tailings, and domestic waste were placed in Swift South Spoil CMFs during the reporting period.
- Development of five additional design amendments (Golder 2021e, f, g, h; Golder 2022b) to the detailed design for the Swift South Spoil CMFs (Golder 2021a).
- An inspection program consisting of weekly geotechnical inspections, supervisor inspections undertaken each shift, and three WSP construction supervision inspections; weekly construction reports were produced by Teck and reconciled with survey data.
- Documentation of design changes and deficiencies.

6.2 Summary of Precipitation

The climate data during the reporting period indicate the annual precipitation used for the Fording River (infilled) dataset was lower than the long-term annual average, whereas the annual precipitation received at the Brownie Spoil weather station was higher than the long-term annual average. Both were lower than the modelled annual precipitation for the Swift South Spoil CMFs detailed design (Golder 2021b). No facility performance issues associated with precipitation were noted during the reporting period.

6.3 Summary of Performance and Changes

The Swift South Spoil CMFs at FRO were observed to be fully encapsulated within the Swift South Spoils at the time of the 2022 AFPR site inspection and construction and performance throughout the reporting period were consistent with the design intent.

6.4 Consequence of Failure

The design adopts the maximum credible loads and therefore meets or exceeds the criteria for minimum design loadings specified by the GISTM and HSRC.

6.5 Recommendations

Based on the information by Teck (including construction reporting), WSP's site visit in September 2022, and a construction supervision site visit in June 2022, the construction of the Swift South Spoil CMFs appears to align with the design intent and approved design deviations (Golder 2021 e, f, g, h; Golder 2022b). There were no observations of instability.

There are no outstanding recommendations from the 2021 AFPR. New recommended actions based on the 2022 AFPR are summarized in Table 4.

Table 4: 2022 Annual Swift South Spoil Co-management Facilities Review Recommended Actions

ID Number	Deficiency or Non-conformance	Applicable Regulation or Guideline	Recommended Action	Priority	Recommended Timing for the Action	Status as of March 2023
2022-01	Construction and deviance accountability reporting	HSRC (Section 10.5.1) and GISTM (Requirement 6.5)	Undertake as-built construction reporting consistent with HSRC and deviance accountability reporting consistent with GISTM.	3	Q2 2023	New Recommendation– construction and deviance accountability reporting is in progress
2022-02	Risk Register	HSRC (Section 10.4.2)	Update risk register for the facility to account for design deviations that occurred during the construction period.	3	Q2 2023	New Recommendation
2022-03	OMS manual requires updates	HSRC Guidance Document (Section 4.4)	Update OMS manual to reflect current conditions.	3	2023	New Recommendation

HSRC = Health, Safety and Reclamation Code; CMF = co-management facility; GISTM = Global Industry Standard on Tailings Management; OMS = operations, maintenance and surveillance

Priority	Description
1	A high probability or actual dam safety issue considered immediately dangerous to life, health or the environment, or a significant risk of regulatory enforcement.
2	If not corrected, could likely result in dam safety issues leading to injury, environmental impact, or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.
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.

Source: HSRC Guidance Document, Section 4.2 (Ministry of Energy and Mines 2016).

7.0 CLOSURE

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

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

WSP Canada Inc.



Sophie Bainbridge, P.Eng.
Senior Geotechnical Engineer

Julia Steele, M.Eng., P.Eng.
Senior Principal Geotechnical Engineer

SEB/JMF/ca

[https://golderassociates.sharepoint.com/sites/158990/project files/6 deliverables/issued/2022-122-r-r-rev0-1700- south spoil cmf afpr/22516328-2022-122-r-r-rev0-1700 swift south cmf afpr 16mar_23.docx](https://golderassociates.sharepoint.com/sites/158990/project%20files/6%20deliverables/issued/2022-122-r-r-rev0-1700-south%20spoil%20cmf%20afpr/22516328-2022-122-r-r-rev0-1700-swift%20south%20cmf%20afpr/16mar_23.docx)

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STUDY LIMITATIONS

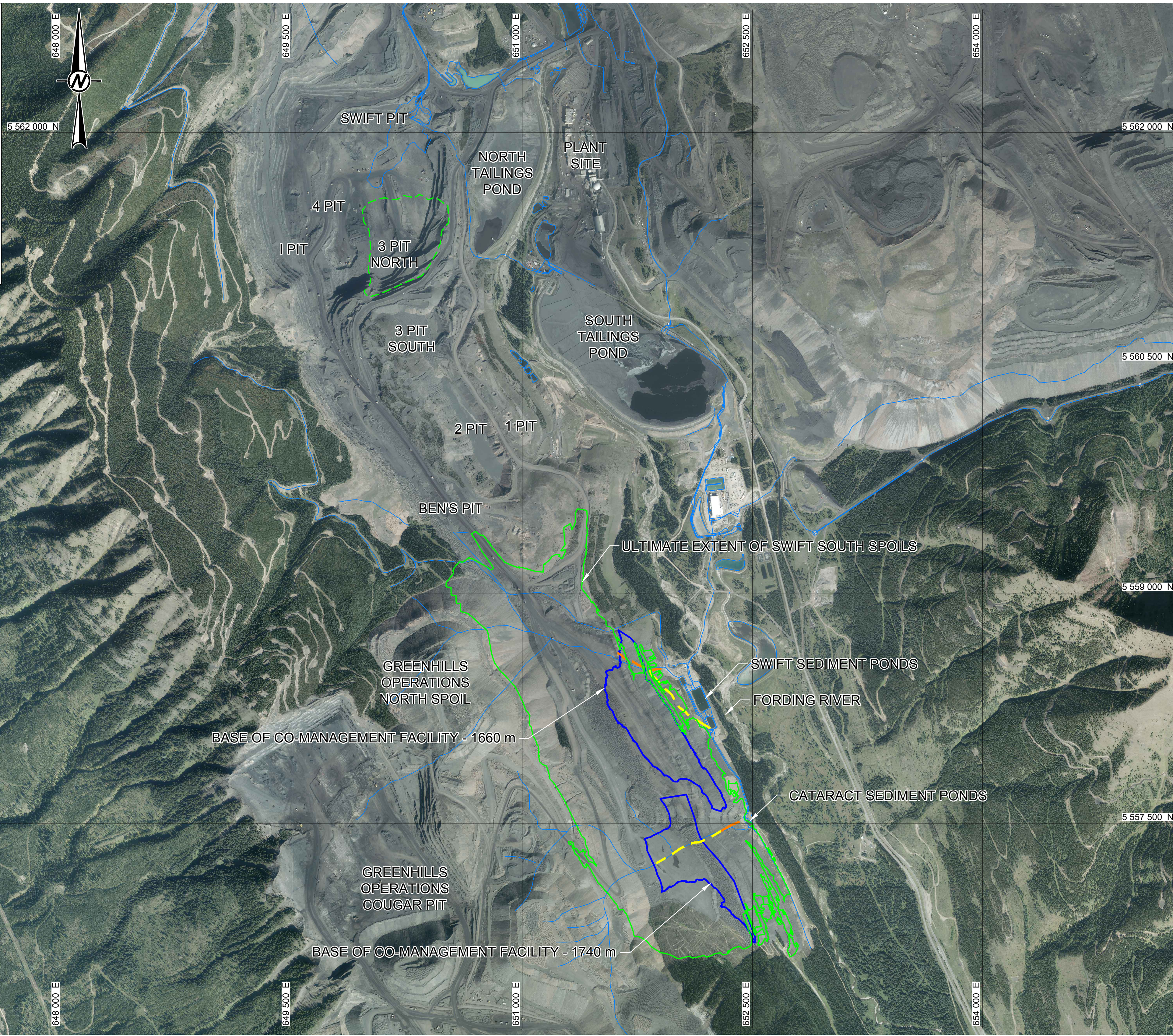
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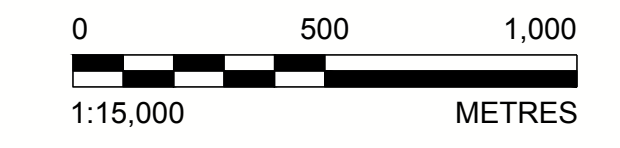
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- LEGEND**
- WATER MANAGEMENT (SEE REFERENCE 2)
 - ULTIMATE SOUTH SPOIL FINAL DESIGN (SEE REFERENCE 4)
 - - - NATURAL WATERCOURSE ROCK DRAINS (APPROXIMATE) (SEE REFERENCE 3)
 - - - ENGINEERED STRUCTURE ROCK DRAINS (APPROXIMATE) (SEE REFERENCE 3)

- NOTES**
1. ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
 2. COORDINATES ARE IN NAD 83 UTM ZONE 11, ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.
 3. AS-BUILT SURVEY OF CMF CONSTRUCTED TO DATE NOT SHOWN ON THIS FIGURE.

- REFERENCES**
1. 2021 AERIAL PHOTO PROVIDED BY TECK COAL LIMITED FORDING RIVER OPERATIONS, RECEIVED: 12 OCTOBER 2021, DATES FLOWN: 22 JULY 2021.
 2. WATER MANAGEMENT FEATURES PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 JANUARY 2021, FILE NAME: "WMIines_012020.DXF".
 3. ENGINEERED STRUCTURE ROCK DRAINS AND NATURAL WATERCOURSE ROCK DRAINS DIGITIZED FROM FIGURE SWIFT NORTH ENGINEERED STRUCTURE & NATURAL WATERCOURSE ROCK DRAIN LOCATIONS PROVIDED BY TECK, RECEIVED: NOVEMBER 20, 2020.
 4. ULTIMATE SOUTH SPOIL FINAL DESIGN PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 16 SEPTEMBER 2021, FILE NAME: "SWF S Merged Surf Sep15.dxf".



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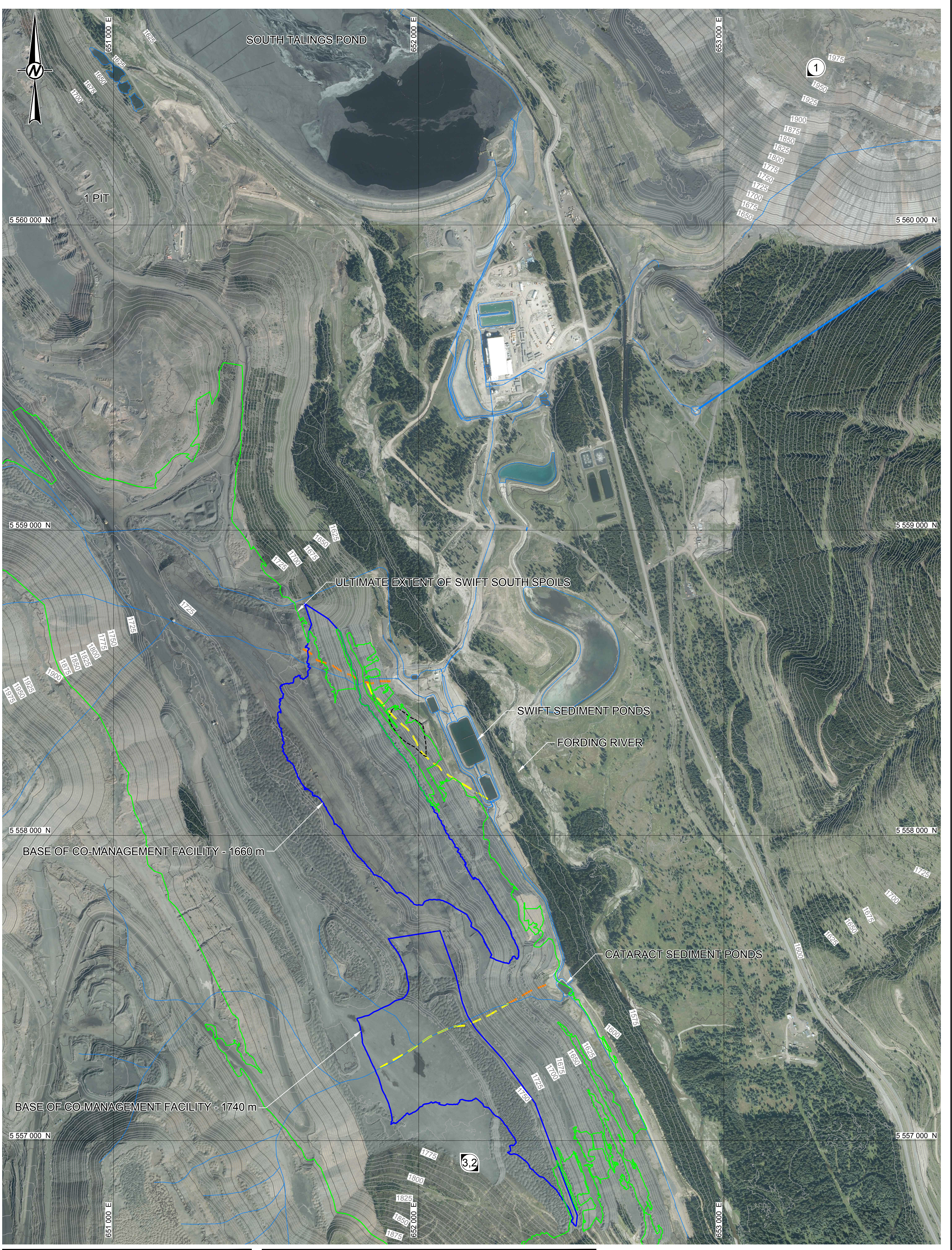
CONSULTANT	YYYY-MM-DD	2023-03-14
	DESIGNED	P.AMINI-MOTLAGH
	PREPARED	J.FUNKE
	REVIEWED	S.BAINBRIDGE
	APPROVED	J.STEELE

PROJECT
FORDING RIVER OPERATIONS
SOUTH SPOIL CO-MANAGEMENT FACILITIES
2022 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE
OVERALL SITE PLAN

PROJECT NO.	PHASE/TASK/DOC.	REV.	FIGURE
22516328	1000/1700/2022-122	0	1

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LEGEND

- WATER MANAGEMENT (SEE REFERENCE 2)
- ULTIMATE SOUTH SPOIL FINAL DESIGN (SEE REFERENCE 4)
- - - NATURAL WATERCOURSE ROCK DRAINS (APPROXIMATE) (SEE REFERENCE 3)
- - - ENGINEERED STRUCTURE ROCK DRAINS (APPROXIMATE) (SEE REFERENCE 3)
- PHOTOGRAPH LOCATION

- REFERENCES**
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 2. WATER MANAGEMENT FEATURES PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 JANUARY 2021, FILE NAME: "WMLines_012020.DXF".
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 3. AS-BUILT SURVEY OF CO-MANAGEMENT FACILITY CONSTRUCTED TO DATE NOT SHOWN ON THIS FIGURE.

CLIENT
TECK COAL LIMITED
 FORDING RIVER OPERATIONS
 ELKFORD, B.C.

CONSULTANT

0 200 400
 1:6,000 METRES

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PROJECT
FORDING RIVER OPERATIONS
 SOUTH SPOIL CO-MANAGEMENT FACILITIES
 2022 ANNUAL FACILITY PERFORMANCE REVIEW

TITLE
PHOTOGRAPH LOCATION PLAN

CLIENT	TECK COAL LIMITED	CONSULTANT	WSP
DATE	2023-03-14	DATE	2023-03-14
DESIGNED	P.AMINI-MOTLAGH	PREPARED	J.FUNKE
REVIEWED	S.BAINBRIDGE	APPROVED	J.STEELE
PROJECT NO.	22516328	PHASE/TASK/DOC.	1000/1700/2022-122
REV.	0	FIGURE	2

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APPENDIX A

2022 Site Inspection Photographs

2022 Annual Facility Performance Report – Swift South Spoil CMF

PHOTOGRAPH 1

29 September 2022



Overview of Swift South Spoil, looking southwest from Old South Spoil; at the time of the inspection the CMF was encapsulated within Swift South Spoil. Re-sloping of the south end of the Swift South spoil is underway (white dash).

2022 Annual Facility Performance Report – Swift South Spoil CMF

PHOTOGRAPH 2 (LEFT) and 3 (RIGHT)

29 September 2022



View from on the Swift South Spoil platform at 1,800 m, appearing well compacted, looking southeast (Photograph 2) and northwest (Photograph 3). The CMF was encapsulated within the Swift South Spoil at the time of the inspection.

APPENDIX B

2022 Site Visit Inspection Reports

Client:	Teck Coal Limited, Fording River Operations	By:	Julia Steele, P.Eng., Natasha Carrière, P.Eng.
Project:	22516328 – 2022 Annual Facility Performance Report	Date:	29 September 2022
Location:	Swift South Spoil Co-management Facilities	Reviewed By:	Julia Steele

GENERAL INFORMATION			
Facility Type:	Waste rock and tailings co-management facilities		
Weather:	Cloudy	Temp:	5 to 22°C

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
1. PLATFORM CONDITIONS		
1.1 Crest Elevation	2, 3	1,785 m for CMFs, 1,800 m for spoil platform. Facility was completely encapsulated by waste rock at time of site inspection.
1.2 Placed Material		Blended waste rock and tailings, sub-terrestrial, rehandle, and waste rock. Domestic waste has also been placed, but was not visible at time of inspection.
1.3 Construction Method (top down/ bottom-up)		Bottom up, in 15 m lifts.
1.4 Surface Cracking		Facility was completely encapsulated by waste rock at time of site inspection. No surface cracking, unexpected settlement, significant rutting, or lateral movement in the surrounding waste rock spoil was observed or reported.
1.5 Unexpected Settlement		
1.6 Lateral Movement		
1.7 Other Unusual Conditions		
2. SLOPE FACE		37 deg. Overall interlift at 2 horizontal:1 vertical
2.1 Slope Angle	1	Facility was completely encapsulated by waste rock at time of site inspection.
2.2 Signs of Erosion		
2.3 Signs of Movement (Deformation)		
2.4 Cracks		
2.5 Other Unusual Conditions		
3. TOE		37 deg. Overall interlift at 2 horizontal:1 vertical
3.1 Slope Angle		Facility was completely encapsulated by waste rock at time of site inspection.
3.2 Signs of Erosion		
3.3 Signs of Movement (Deformation)		
3.4 Cracks		
3.5 Seepage or Wet Areas		
3.6 Vegetation Growth		
3.7 Other Unusual Conditions		
4. ADVANCEMENT PATTERN		Facility was completely encapsulated by waste rock at time of site inspection. An even and consistent advancing face was observed in the surrounding encapsulating waste rock spoil.

INSPECTION ITEM	PHOTO	OBSERVATIONS, COMMENTS & OTHER DATA
5. MATERIAL RATIO		
5.1 Mix ratio		Reported as 1-part tailings to 5-parts waste rock, not visible at time of inspection.
5.2 Mix Method		In pit mixing of tailings and waste rock prior to transportation to CMF, not active at time of inspection.
5.3 Tailings segregation		Facility was completely encapsulated by waste rock at time of site inspection. No tailings segregation was reported during reporting period.
6. DOCUMENTATION		
6.1 Operation, Maintenance and Surveillance (OMS) Manual		See below.
6.1.1 OMS Manual exists		Yes
6.1.2 OMS Plan reflects current spoil conditions		Draft revision reviewed; final revision requires Golder review.
6.1.3 Date of last revision		9 April 2021 (draft).
6.2 Emergency Preparedness Plan (EPP)		See below.
6.2.1 EPP Exists		Yes. The emergency response plan for the Swift South Spoil CMFs is covered under the same plans as the Swift South Spoil.
6.2.2 EPP Reflects Current Conditions		
6.2.3 Date of Last Revision		28 February 2022 (Fording River Operations Emergency Response Procedure) 15 October 2021 (Fording River Operations Dumping Procedures)
7. NOTES		
<p>The Swift South Spoil CMFs were fully encapsulated in waste rock at the time of the site inspection, and no major items of concern were noted.</p> <p>The full construction records were not available at the time of the site inspection.</p>		

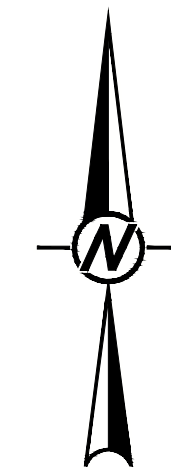
APPENDIX C

Design Drawings

TECK COAL LIMITED FORDING RIVER OPERATIONS SOUTH SPOILS CO-MANAGEMENT FACILITIES DETAILED DESIGN DRAWINGS



PROJECT LOCATION PLAN
NOT TO SCALE



DRAWING LIST				
DRAWING No.	DRAWING TITLE	REVISION No.	PURPOSE OF ISSUE	DATE OF ISSUE
01	TITLE SHEET AND DRAWING INDEX	2	ISSUED FOR CONSTRUCTION	2021-10-29
02	SITE PLAN	2	ISSUED FOR CONSTRUCTION	2021-10-29
03	APPROVED AREA FOR CO-MANAGEMENT FACILITIES CONSTRUCTION	2	ISSUED FOR CONSTRUCTION	2021-10-29
04	SOUTH SPOIL - CO-MANAGEMENT FACILITIES CROSS-SECTIONS (1 OF 4)	2	ISSUED FOR CONSTRUCTION	2021-10-29
05	SOUTH SPOIL - CO-MANAGEMENT FACILITIES CROSS-SECTIONS (2 OF 4)	2	ISSUED FOR CONSTRUCTION	2021-10-29
06	SOUTH SPOIL - CO-MANAGEMENT FACILITIES CROSS-SECTIONS (3 OF 4)	2	ISSUED FOR CONSTRUCTION	2021-10-29
07	SOUTH SPOIL - CO-MANAGEMENT FACILITIES CROSS-SECTIONS (4 OF 4)	0	ISSUED FOR CONSTRUCTION	2021-10-29

2

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REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED
2	2021-10-29	ISSUED FOR CONSTRUCTION	S.B.	T.A.K.	S.B.	J.M.S.
1	2021-06-11	ISSUED FOR CONSTRUCTION	S.B.	J.S.H.	N.E.C.	J.M.S.
0	2021-04-12	ISSUED FOR CONSTRUCTION	S.B.	T.A.K.	S.B.	J.M.S.

SEAL

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FORDING RIVER OPERATIONS
ELKFORD, B.C.

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PROJECT
FORDING RIVER OPERATIONS
SOUTH SPOILS CO-MANAGEMENT FACILITIES
DETAILED DESIGN DRAWINGS

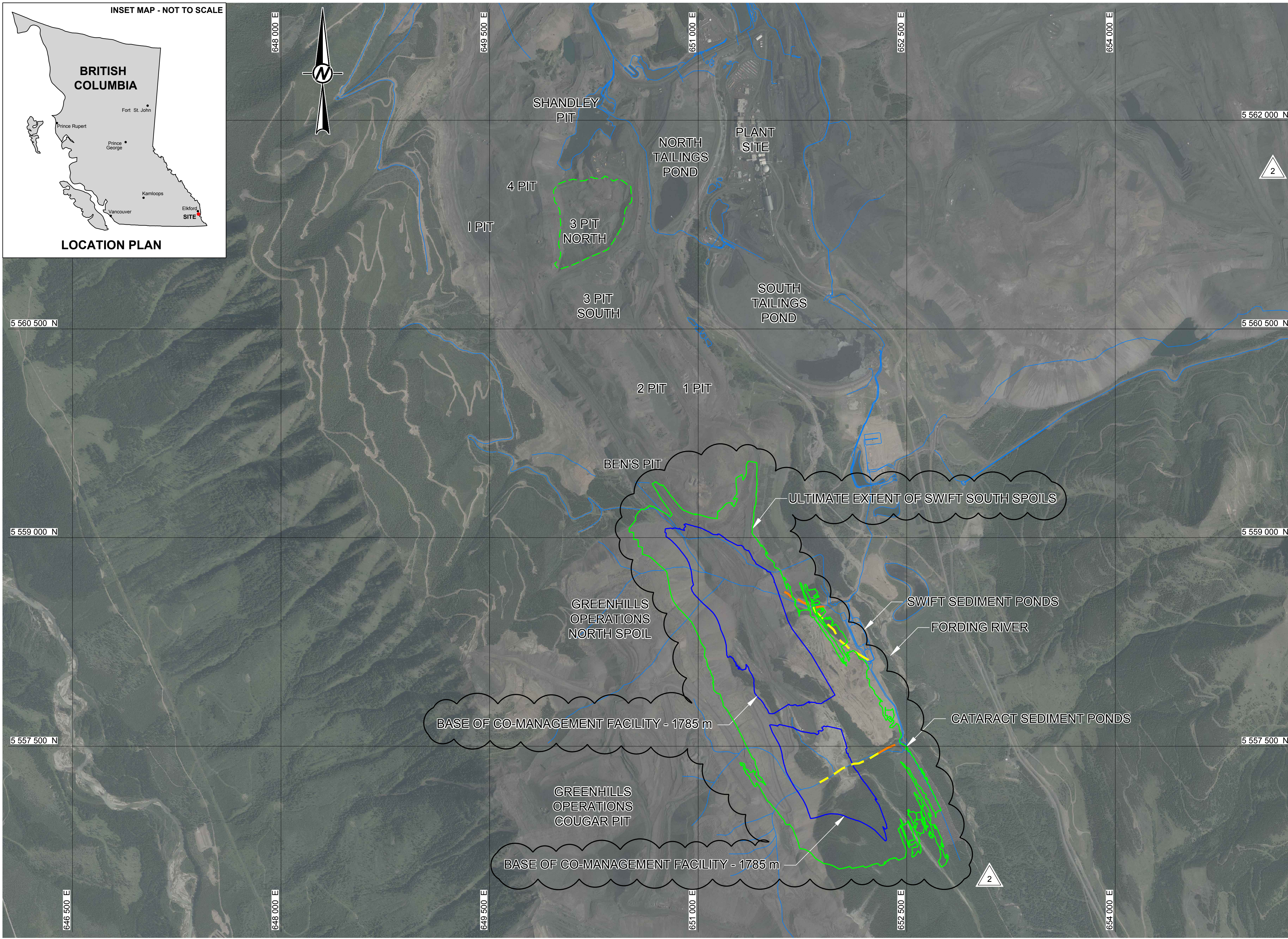
TITLE
TITLE SHEET AND DRAWING INDEX

PROJECT NO. 19127181 PHASE/TASK/DOC. 8100/8107/2021-028 REV. 2 01 of 07 DRAWING 01

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LEGEND

- WATER MANAGEMENT (SEE REFERENCE 2)
- ULTIMATE SOUTH SPOIL FINAL DESIGN (SEE REFERENCE 4)
- NATURAL WATERCOURSE ROCK DRAINS (APPROXIMATE) (SEE REFERENCE 3)
- ENGINEERED STRUCTURE ROCK DRAINS (APPROXIMATE) (SEE REFERENCE 3)

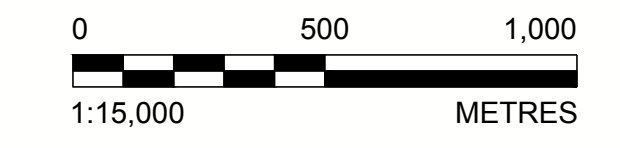
NOTES

- ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
- COORDINATES ARE IN NAD 83 UTM ZONE 11, ELEVATIONS ARE REFERENCED TO THE **ELK VALLEY ELEVATION DATUM**.
- AS-BUILT SURVEY OF CMF CONSTRUCTED TO DATE NOT SHOWN ON THIS DRAWING.

REFERENCES

- 2020 AERIAL PHOTO PROVIDED BY TECK COAL LIMITED FORDING RIVER OPERATIONS, RECEIVED: DECEMBER 10, 2020, FILE NAME: "Orthophotos_SPOIL 2020-5mpix.tif".
- WATER MANAGEMENT FEATURES PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 JANUARY 2021, FILE NAME: "WMIines_012020.DXF".
- ENGINEERED STRUCTURE ROCK DRAINS AND NATURAL WATERCOURSE ROCK DRAINS DIGITIZED FROM FIGURE SWIFT NORTH ENGINEERED STRUCTURE & NATURAL WATERCOURSE ROCK DRAIN LOCATIONS PROVIDED BY TECK, RECEIVED: NOVEMBER 20, 2020.
- ULTIMATE SOUTH SPOIL FINAL DESIGN PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 16 SEPTEMBER 2021, FILE NAME: "SWF S Merged Surf Sep15.dxf".

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CONSTRUCTION



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0	2021-04-12	ISSUED FOR CONSTRUCTION	S.B.	T.A.K.	S.B.	J.M.S.

SEAL

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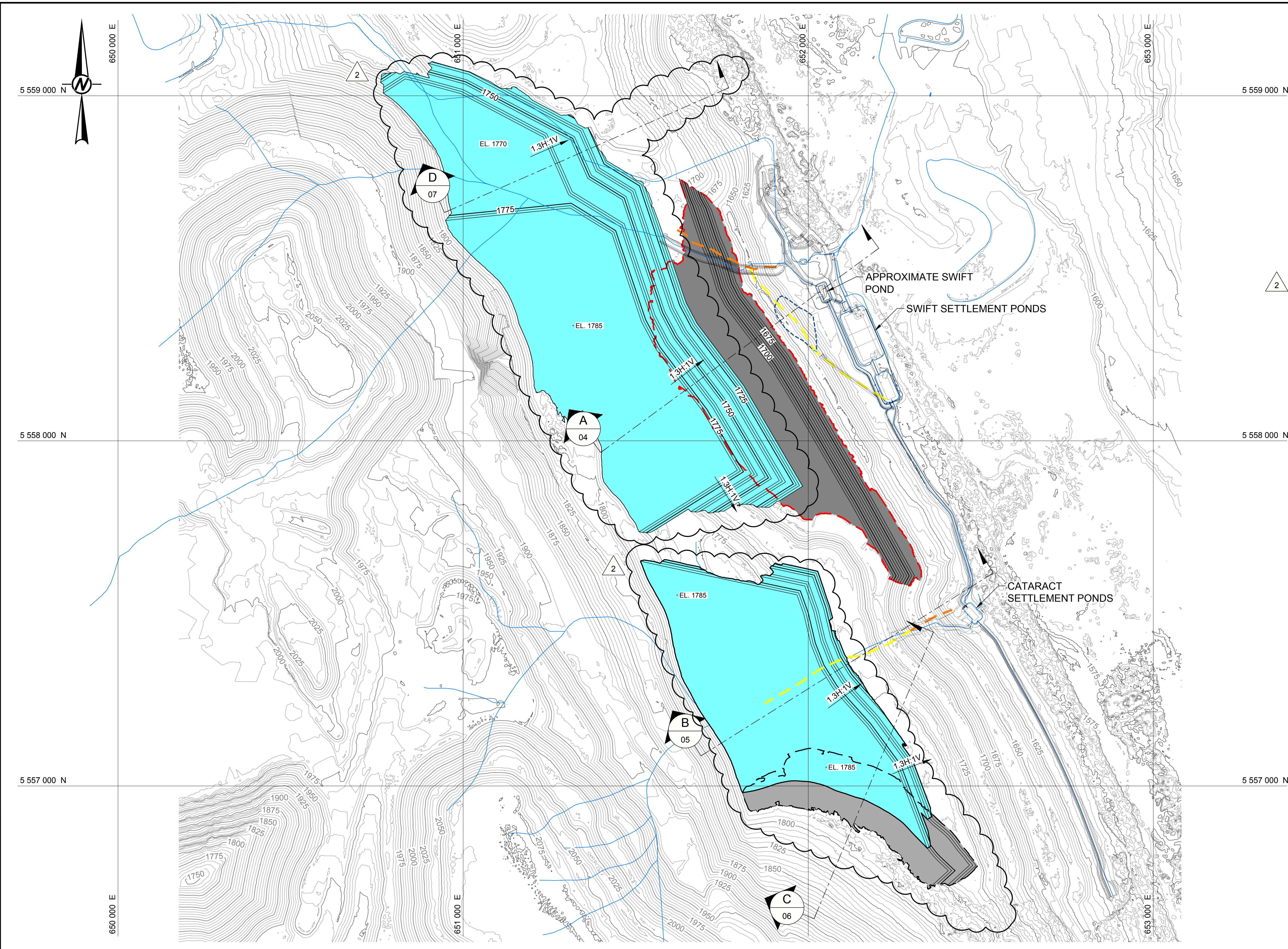
PROJECT
FORDING RIVER OPERATIONS
 SOUTH SPOILS CO-MANAGEMENT FACILITIES
 DETAILED DESIGN DRAWINGS

TITLE
SITE PLAN

PROJECT NO.	PHASE/TASK/DOC.	REV.	02 of 07	DRAWING
19127181	8100/8107/2021-028	2		02

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

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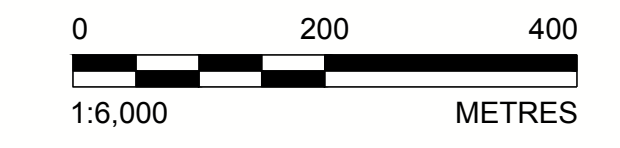
LEGEND

- EXISTING GROUND CONTOURS (SEE REFERENCE 1)
- PROPOSED CO-MANAGEMENT FACILITIES CONTOURS
- WATER MANAGEMENT (SEE REFERENCE 3) 2
- NATURAL WATERCOURSE ROCK DRAINS (APPROXIMATE) (SEE REFERENCE 4)
- ENGINEERED STRUCTURE ROCK DRAINS (APPROXIMATE) (SEE REFERENCE 4)
- 1710 m CONSTRUCTION PLATFORM (SEE REFERENCE 2) 2
- CO-MANAGEMENT FACILITIES 1785 m LIFTS
- WASTE ROCK OFFSET FROM ORIGINAL GROUND

- NOTES**
1. ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
 2. COORDINATES ARE IN NAD83 UTM ZONE 11, ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.
 3. CONTOUR INTERVALS ARE 5 m MINOR INTERVALS AND 25 m MAJOR INTERVALS.
 4. AS-BUILT SURVEY OF CMF CONSTRUCTED TO DATE NOT SHOWN ON THIS DRAWING.

- REFERENCES**
1. 2021 APRIL TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 APRIL 2021, FILE NAME: "210423 TOPO.dxf".
 2. SPOIL LIFT (1710 m) BASED OFF OF THE ULTIMATE SOUTH SPOIL FINAL DESIGN PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 16 SEPTEMBER 2021, FILE NAME: "SWF S Merged Surf Sep15.dxf".
 3. WATER MANAGEMENT FEATURES PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 JANUARY 2021, FILE NAME: "WMinlines_012020.DXF".
 4. ENGINEERED STRUCTURE ROCK DRAINS AND NATURAL WATERCOURSE ROCK DRAINS DIGITIZED FROM FIGURE SWIFT NORTH ENGINEERED STRUCTURE & NATURAL WATERCOURSE ROCK DRAIN LOCATIONS PROVIDED BY TECK, RECEIVED: NOVEMBER 20, 2020.

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0	2021-04-12	ISSUED FOR CONSTRUCTION	S.B.	T.A.K.	S.B.	J.M.S.

SEAL

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CONSULTANT

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MEMBER OF WSP

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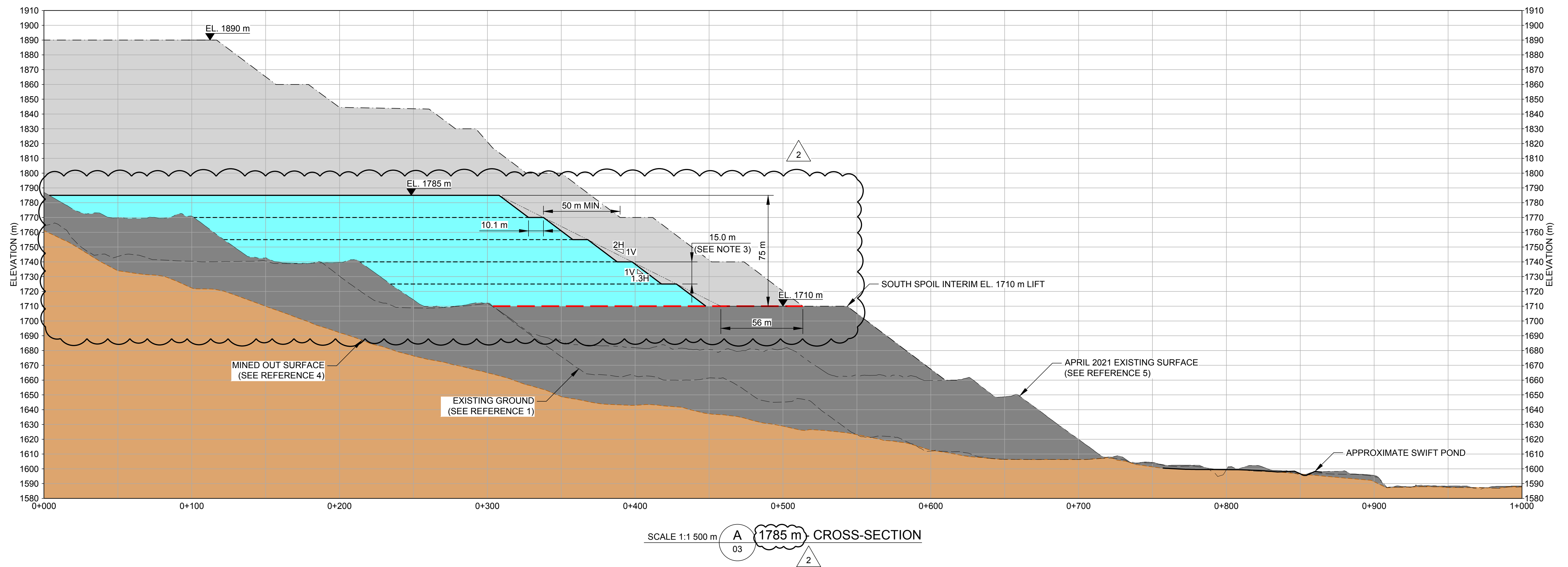
PROJECT
 FORDING RIVER OPERATIONS
 SOUTH SPOILS CO-MANAGEMENT FACILITIES
 DETAILED DESIGN DRAWINGS

TITLE
**APPROVED AREA FOR CO-MANAGEMENT FACILITIES
 CONSTRUCTION**

PROJECT NO. 19127181	PHASE/TASK/DOC. 8100/8107/2021-028	REV. 2	03 of 07 DRAWING 03
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D 296 mm

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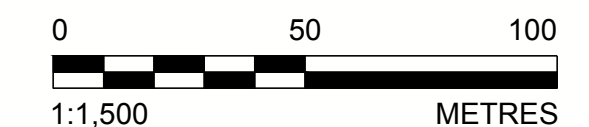


LEGEND	
	EXISTING GROUND (SEE REFERENCE 1)
	APRIL 2021 EXISTING SURFACE (SEE REFERENCE 5)
	1710 m CONSTRUCTION PLATFORM (SEE REFERENCE 2)
	ULTIMATE SOUTH SPOILS FINAL DESIGN (SEE REFERENCE 3)
	MINED OUT SURFACE (SEE REFERENCE 4)
	NATURAL GROUND
	FUTURE WASTE ROCK TO BE PLACED
	EXISTING WASTE ROCK
	CO-MANAGEMENT FACILITY (1785 m)

NOTES	
1.	ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
2.	ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.
3.	15 m TYPICAL. INCREASED LIFT THICKNESSES OF UP TO 15 m MAY BE ALLOWABLE PENDING DISCUSSION WITH AND APPROVAL BY FOR AS-BUILT SURVEY OF CMF CONSTRUCTED TO DATE NOT SHOWN ON THIS DRAWING.

REFERENCES	
1.	2020 TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, FLOWN: 15-26 JULY 2020, RECEIVED: 01 DECEMBER 2020.
2.	SPOIL LIFT (1710 m) BASED OFF OF THE ULTIMATE SOUTH SPOILS FINAL DESIGN PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 16 SEPTEMBER 2021, FILE NAME: "SWF_S_Merged_Surf_Sep19.dwg".
3.	ULTIMATE SOUTH SPOILS FINAL DESIGN PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 27 APRIL 2021, FILE NAME: "SFTSTH_01Dec20_Final SURF.dwg".
4.	MINED OUT SURFACE PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, SURVEYED: AUG 2017, RECEIVED: 06 FEBRUARY 2017, FILE NAME: "AUG2017 MOUT.dwg".
5.	2021 APRIL TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 APRIL 2021, FILENAME: "210423 TOPO.dwg".

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0	2021-04-12	ISSUED FOR CONSTRUCTION	S.B.	T.A.K.	S.B.	J.M.S.

CLIENT
 TECK COAL LIMITED
 FORDING RIVER OPERATIONS
 ELKFORD, B.C.

CONSULTANT

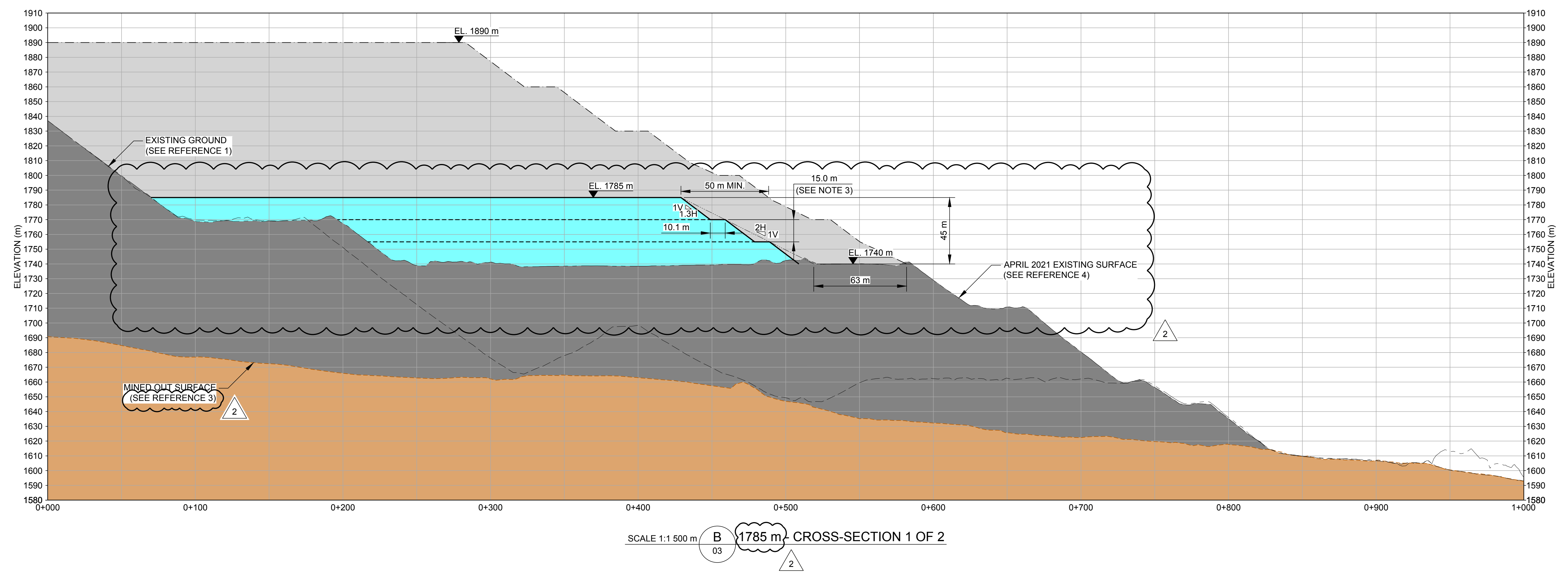
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PROJECT
 FORDING RIVER OPERATIONS
 SOUTH SPOILS CO-MANAGEMENT FACILITIES
 DETAILED DESIGN DRAWINGS
 TITLE
**SOUTH SPOIL - CO-MANAGEMENT FACILITIES
 CROSS-SECTIONS (1 OF 4)**

PROJECT NO.	PHASE/TASK/DOC.	REV.	04 of 07	DRAWING
19127181	8100/8107/2021-028	2		04

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SCALE 1:1 500 m **B** 1785 m - CROSS-SECTION 1 OF 2

LEGEND

- EXISTING GROUND (SEE REFERENCE 1)
- APRIL 2021 EXISTING SURFACE (SEE REFERENCE 4)
- ULTIMATE SOUTH SPOILS FINAL DESIGN (SEE REFERENCE 2)
- MINED OUT SURFACE (SEE REFERENCE 3)
- NATURAL GROUND
- FUTURE WASTE ROCK TO BE PLACED
- EXISTING WASTE ROCK
- CO-MANAGEMENT FACILITY

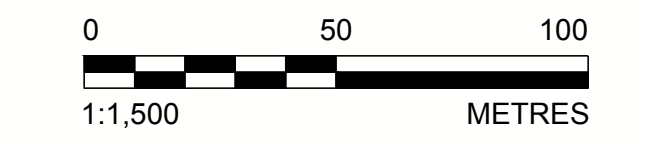
NOTES

- ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
- ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.
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REFERENCES

- 2020 TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, FLOWN: 15-26 JULY 2020, RECEIVED: 01 DECEMBER 2020.
- ULTIMATE SOUTH SPOIL FINAL DESIGN PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 27 APRIL 2021, FILE NAME: "SFTSTH_01Dec20_Final SURF.dxf".
- MINED OUT SURFACE PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, SURVEYED: AUG 2017, RECEIVED: 06 FEBRUARY 2017, FILE NAME: "AUG2017 MOUT.dwg".
- 2021 APRIL TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 APRIL 2021, FILENAME: "210423 TOPO.dxf"

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0	2021-04-12	ISSUED FOR CONSTRUCTION	S.B.	T.A.K.	S.B.	J.M.S.

CLIENT
TECK COAL LIMITED
FORDING RIVER OPERATIONS
ELKFORD, B.C.

CONSULTANT

GOLDER
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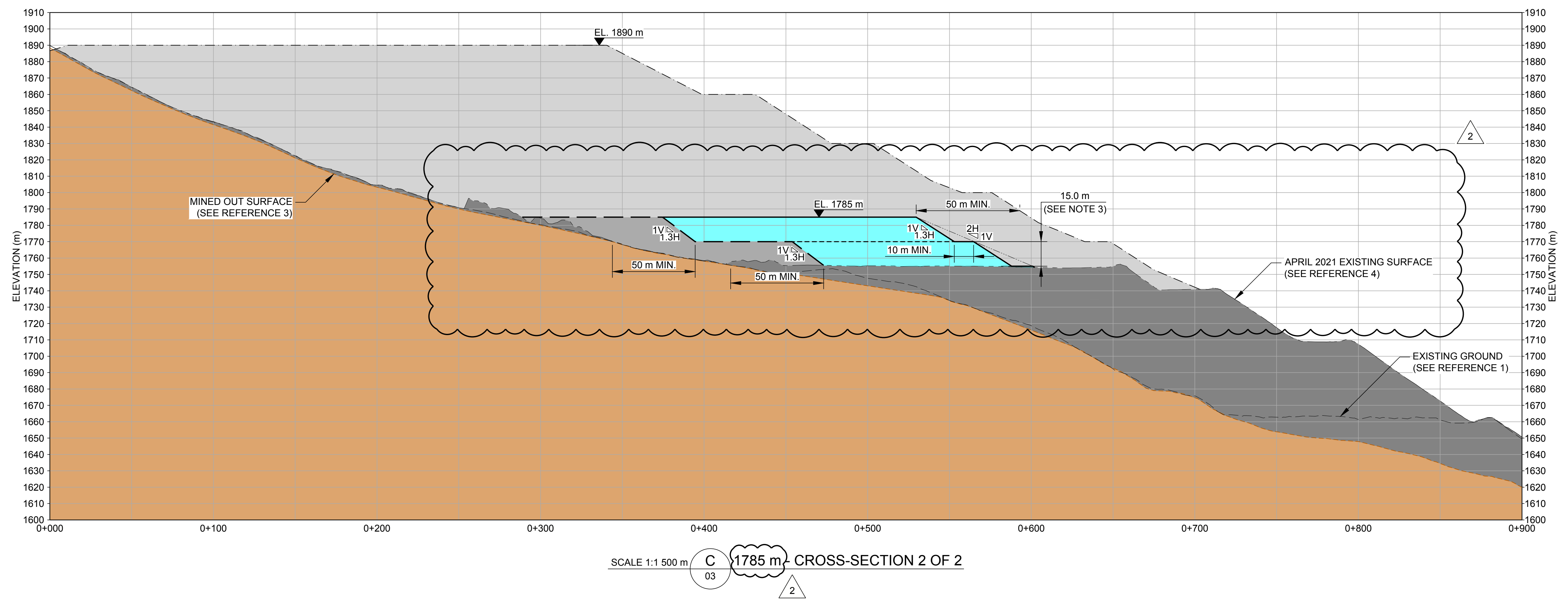
PROJECT
FORDING RIVER OPERATIONS
SOUTH SPOILS CO-MANAGEMENT FACILITIES
DETAILED DESIGN DRAWINGS

TITLE
**SOUTH SPOIL - CO-MANAGEMENT FACILITIES
CROSS-SECTIONS (2 OF 4)**

PROJECT NO. 19127181 PHASE/TASK/DOC. 8100/8107/2021-028 REV. 2 05 of 07 DRAWING 05

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

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SCALE 1:1 500 m **C** 1785 m - CROSS-SECTION 2 OF 2

LEGEND

- EXISTING GROUND (SEE REFERENCE 1)
- APRIL 2021 EXISTING SURFACE (SEE REFERENCE 4)
- ULTIMATE SOUTH SPOILS FINAL DESIGN (SEE REFERENCE 2)
- MINED OUT SURFACE (SEE REFERENCE 3)
- NATURAL GROUND
- FUTURE WASTE ROCK TO BE PLACED
- WASTE ROCK OFFSET FROM ORIGINAL GROUND
- EXISTING WASTE ROCK
- CO-MANAGEMENT FACILITY (1785m)

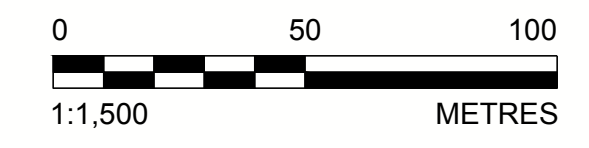
NOTES

- ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
- ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.
- 15 m TYPICAL. INCREASED LIFT THICKNESSES OF UP TO 15 m MAY BE ALLOWABLE PENDING DISCUSSION WITH AND APPROVAL BY FOR AS-BUILT SURVEY OF CMF CONSTRUCTED TO DATE NOT SHOWN ON THIS DRAWING.

REFERENCES

- 2020 TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, FLOWN: 15-26 JULY 2020, RECEIVED: 01 DECEMBER 2020.
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- 2021 APRIL TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 APRIL 2021, FILENAME: "210423 TOPO.dxf"

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REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED
2	2021-10-29	ISSUED FOR CONSTRUCTION	S.B.	T.A.K.	S.B.	J.M.S.
1	2021-06-11	ISSUED FOR CONSTRUCTION	S.B.	J.S.H.	N.E.C.	J.M.S.
0	2021-04-12	ISSUED FOR CONSTRUCTION	S.B.	T.A.K.	S.B.	J.M.S.

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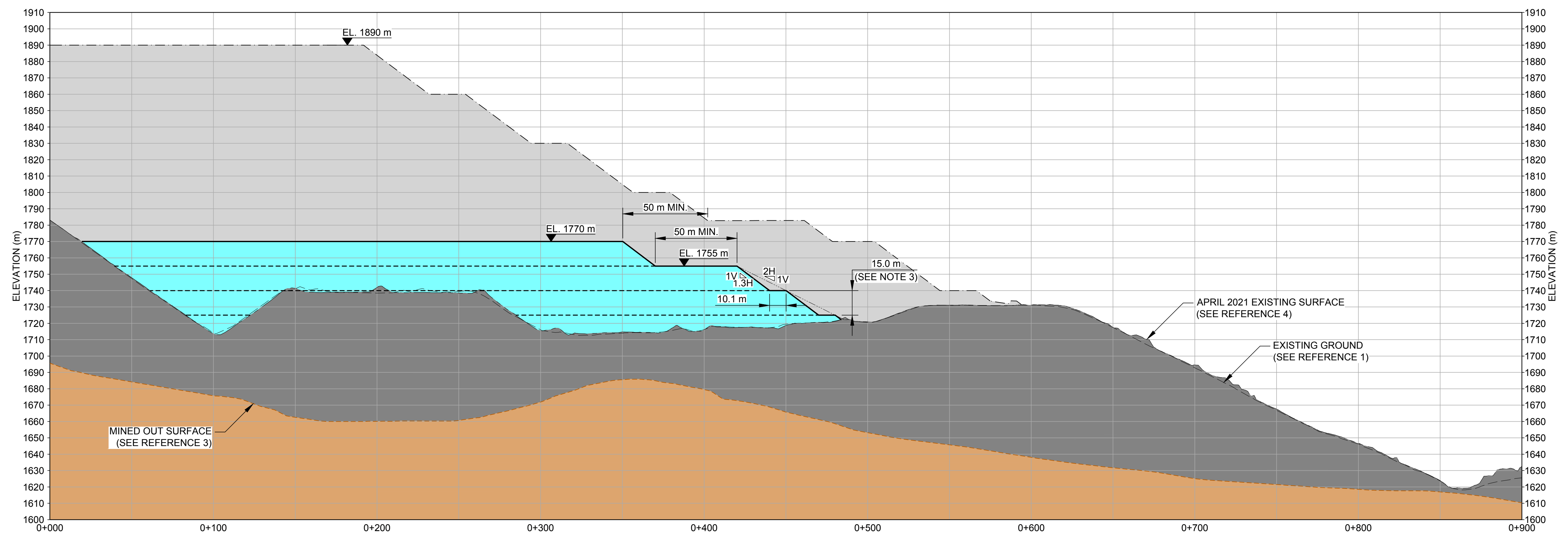
PROJECT
FORDING RIVER OPERATIONS
SOUTH SPOILS CO-MANAGEMENT FACILITIES
DETAILED DESIGN DRAWINGS

TITLE
**SOUTH SPOIL - CO-MANAGEMENT FACILITIES
CROSS-SECTIONS (3 OF 4)**

PROJECT NO.	PHASE/TASK/DOC.	REV.	06 of 07	DRAWING
19127181	8100/8107/2021-028	2		06

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

Path: \\golder\gfs\gsl\Van\cove\CAD-CIS\Clients\Tech_CoMgmt\FordRiv\Rev09_PROJECTS\19127181\181000\07\Dec 2021_0228\02_PROD\CD\DWG\19127181-10-28-2021-0228-04-07.dwg | Last Edited By: YKlassen Date: 2021-10-28 Time: 02:25:33 AM



SCALE 1:1 500 m **D** 1785 m - CROSS-SECTION
03

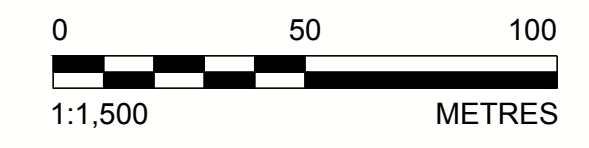
LEGEND	
	EXISTING GROUND (SEE REFERENCE 1)
	APRIL 2021 EXISTING SURFACE (SEE REFERENCE 4)
	ULTIMATE SOUTH SPOILS FINAL DESIGN (SEE REFERENCE 2)
	MINED OUT SURFACE (SEE REFERENCE 3)
	NATURAL GROUND
	FUTURE WASTE ROCK TO BE PLACED
	EXISTING WASTE ROCK
	CO-MANAGEMENT FACILITY - 1785 m

- NOTES**
- ALL UNITS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
 - ELEVATIONS ARE REFERENCED TO THE ELK VALLEY ELEVATION DATUM.
 - 15 m TYPICAL INCREASED LIFT THICKNESSES OF UP TO 15 m MAY BE ALLOWABLE PENDING DISCUSSION WITH AND APPROVAL BY FOR AS-BUILT SURVEY OF CMF CONSTRUCTED TO DATE NOT SHOWN ON THIS DRAWING.

- REFERENCES**
- 2020 TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, FLOWN: 15-26 JULY 2020, RECEIVED: 01 DECEMBER 2020.
 - ULTIMATE SOUTH SPOILS FINAL DESIGN PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 27 APRIL 2021, FILE NAME: "SFTSTH_01Dec20_Final SURF.dwg".
 - MINED OUT SURFACE PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, SURVEYED: AUG 2017, RECEIVED: 06 FEBRUARY 2017, FILE NAME: "AUG2017 MOUT.dwg"
 - 2021 APRIL TOPOGRAPHY PROVIDED BY TECK COAL LIMITED, FORDING RIVER OPERATIONS, RECEIVED: 28 APRIL 2021, FILENAME: "210423 TOPO.dxf"



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SEAL

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PROJECT
FORDING RIVER OPERATIONS
SOUTH SPOILS CO-MANAGEMENT FACILITIES
DETAILED DESIGN DRAWINGS

TITLE
**SOUTH SPOIL - CO-MANAGEMENT FACILITIES
CROSS-SECTIONS (4 OF 4)**

PROJECT NO. 19127181 PHASE/TASK/DOC. 8100/8107/2021-028 REV. 0 07 of 07 DRAWING 07

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