Teck

2016 Geotechnical Inspection Tailings Management Facility Sä Dena Hes, Yukon Territory

Prepared for

Teck Resources Limited

Prepared by

srk consulting

SRK Consulting (Canada) Inc.
1CT008.057
October 2016

2016 Geotechnical Inspection Tailings Management Facility
Sä Dena Hes, Yukon Territory

October 2016

Prepared for

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srk consulting

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1 Introduction

1.1 Purpose, Scope of Work and Methodology

In accordance with an authorization by Mr. Gerry Murdoch, Teck Resources Limited, Mr. Peter Healey PEng. an associate of SRK Consulting (Canada) Inc., completed a geotechnical inspection of structures and features associated with the Tailings Management Area (TMA) that would form part of the closed Sä Dena Hes mine located near Watson Lake, Yukon. The inspection was carried out on July 19, 2016. This report presents our observations of the following structures and features, identifies any deficiencies and provides recommendations where appropriate:

- The North Dam;
- The decommissioned North Creek Dyke and Second Crossing;
- The relocated Camp Creek Diversion Channel;
- The North Channel and South Channel;
- The Sediment Retaining Structure; and
- The Burnick and Jewelbox Waste Rock Dump areas.

The weather during the inspection was overcast and cool. It should be noted that all elevations referenced in this report are based on a datum that was established during a LiDAR survey carried out in 2012. The original site datum used to design and build the structures in the early 90's was about 2 m lower than the 2012 datum. All previous inspection reports, prior to 2014, used the 1990 datum.

A map showing the overall mine site is provided on Figure 1. The general arrangement map of the TMA is provided in Figure 2.

1.2 Facility Description, Background Information and History

The original TMA which extended from the North Dam to the South Dam covered an area of approximately 0.205 sq. km (Figure 2). During the operating life of the mine, approximately 700,000 tonnes of tailings were deposited into the impoundment; primarily at the northern end. Between the two dams, at the location of a topographic saddle, was a 2 m high cofferdam, which had a gated culvert to control the flow of water and tailings from the northern half of the impoundment to the southern half.

The decant tower, in the South Tailings Pond, was used to discharge the supernatant water in tailings pond into the Reclaim Pond through a 0.5 m dia. corrugated steel (CSP) decant pipe. During the care and maintenance period after the mine shut down in 1982, water was released from the tailings pond to the Reclaim Pond seasonally by way of syphons to maintain a safe operating level. Water was discharged from the Reclaim Pond to Camp Creek in accordance with the limits imposed by the Water License.

An emergency spillway, consisting of two 900 mm diameter CSP culverts, was located on the west abutment of the South Dam. The discharge from the spillway entered the Reclaim Pond downstream via an unlined channel. In 2003, Teck Cominco installed an HDPE pipeline, through one of the spillway culverts, as a siphon to facilitate the transfer of water from the South Tailings Pond.

An open channel emergency spillway was located at the west side of the Reclaim Pond. This spillway was designed to accommodate the design flood event from the TMA catchment only. Flow through this spillway was directed to the primary spillway system which was part of the Camp Creek Diversion Channel. This primary spillway consisted of two 1,200 mm diameter CSP culverts that was designed to accommodate the 1 in 200-year inflow design event from the catchment for Camp Creek and the TMA.

Two additional surface water diversions, the east and west interceptor ditches, were located on both sides of the TMA to intercept surface runoff from upslope of the TMA.

With 2014 decommissioning work, the TMA has been significantly modified. The Reclaim Dam was completely removed and the final excavated surface of the Reclaim Dam was graded to blend into the surrounded topography.

In 2014, most of the South Dam was removed to form the Sediment Retaining Structure (SRS). The decant tower and the pipe were decommissioned and removed to the on-site landfill. The South Dam overflow spillway was decommissioned by removing the two 900 mm diameter culverts that were disposed of at the landfill. Similar to the decommissioning of the Reclaim Dam, the dam foot print was excavated to original ground (with exception of the SRS) and blended into the surrounded topography.

Three drainage channels were built as part of the 2014 TMA decommissioning. The longest of the three was constructed through the former the Reclaim Dam and the pond area to route Camp Creek flows along its historical alignment. The other two drainages (the North Channel and the South Channel) were constructed to direct runoff from the covered tailings areas to the new Camp Creek drainage channel.

A soil cover, varying up to 2.2m in depth was placed onto areas of exposed tailings, specifically the North Tailings Area and the tailings deposited in South Pond area. The cover comprised excavated dam fill material and was used to reduce wind erosion of tailings and to provide a growth medium over the tailings for future revegetation. The cover was also intended to reduce surface water ponding and to promote runoff of non-contact water.

The total soil cover area is about 0.16 sq. km. The North Tailings Area is 0.09 sq. km, the South Pond including the grassy area is 0.03 sq. km, and the Reclaim Pond is 0.04 sq. km.

The Camp Creek Diversion Channel, exit chute, and culverts were decommissioned in 2015. The interceptor ditches were decommissioned in 2015.

1.3 Regulatory Requirements

In accordance with the 2015 Operations, Maintenance and Surveillance (OMS) (SRK, 2014) and the current Water Licence (YTWB 2002), annual inspections of the mine site will be carried out by a qualified professional engineer. The OMS also requires that extraordinary inspections be carried out after any significant storm or seismic event.

The last Dam Safety Review (DSR) was carried out in 2015 by AMECFW. In accordance with the CDA 2014 guidelines, the next DSR would be carried in the 2025.

2 Site Observations

2.1 Visual Observations

2.1.1 North Dam

A site plan and a section of the North Dam are presented on Figures 3 and 4.

The crest of the North Dam (Photo 1), which is at an elevation of 1,100 m, shows no signs of deformation or abnormal settling. The downstream slope of the dam (Photo 2) shows no signs of surficial movement or erosion nor is there any sign of bulging at the downstream toe.

Teck has been surveying the settlement gauges on the North Dam since 1993. Results are shown on Table 2.1. The last set of readings taken using the 1990 datum was completed in 2010. A recent set of readings was completed in 2016 based on the 2012 datum. These readings are also shown in Table 2.1. The results indicate that there has been no significant settlement of the embankment over the 23-year period that readings have been taken.

The three sets of piezometers and protective caps (Photos 3 and 4) along the crest of the North Dam remain intact. Some of the deformation monitoring pins and the original settlement gauges protected by 40-gallon drums are still evident on the crest of the dam but currently serve very little purpose. Labels on each of the piezometers were recently upgraded and have weathered the elements well.

Table 2.1: Summary of Survey Results for North Dam Settlement Gauges

DATE	NDS3	NDS1	NDS2
August/93	1098.639	1098.501	1098.613
July/94	1098.637	1098.502	1098.589
August/95	1098.690	1098.545	1098.663
July/96	1098.637	1098.493	1098.609
August/97	1098.637	1098.496	1098.618
October/98	1098.627	1098.482	NA
October/02	1098.619	1098.481	1098.607
June/05	1098.637	1098.479	1098.587

DATE	NDS3	NDS1	NDS2
June/06	1098.63	1098.45	1098.57
August/07	1098.786	1098.454	1098.489
June/08	1098.626	1098.482	1098.597
June/09	1098.625	1098.469	1098.587
June/10	1098.59	1098.47	1098.60
August/15	1100.572	1100.412	1100.524
September/15	1100.548	1100.391	1100.512
2016	1100.572	1100.425	1100.547

Note: 2015 and 2016 readings are based on the 2012 datum.

Along the downstream toe of the North Dam there is an 80 m long seepage zone. Seepage from this zone is collected at a monitoring station referred to as MH-02 and is a combination of groundwater discharge from the surrounding hillsides to the west and minimal seepage flow from the impoundment. The monitoring station consists of a 6-inch diameter steel pipe embedded in sandbags. The system is functioning adequately.

2.1.2 Till Tailings Cover

Photo 5 provides a view looking west over the tailings cover at the north end of the TMA. The cover has an overall gentle downslope gradient away from the North Dam. A drainage channel was constructed down the middle of the cover to assist in directing runoff away from the dam. At the time of the site inspection, ponding was noted along the channel as shown in Photos 6 and 7. However, flow in the channel was moving in a southerly direction away from the dam.

Recently, SRK carried out a hydrological study on the cover to assess the likelihood of overtopping in the event of a design flood event. The results indicated that during an extreme case such as the Probable Maximum Flood (PMF), the North Dam crest does not overtop. Although the backwater effect arising from a blockage scenario in the central channel does result in a much increased flood extent, with ponded water reaching within a few centimetres of the dam crest, an overtopping scenario is not reached. The maximum depth of water would vary from 0.5 m in the central channel to less than 0.1 m adjacent to the upstream crest of the dam. The minimum freeboard adjacent to the low point along the upstream edge of the crest at the peak of the event varied from 5 to 8 cm.

2.1.3 North Creek

The riprapped channel that conveys North Creek over the location of the decommissioned North Creek Dyke is shown in Photo 8. At the outlet of the channel (Photo 9) some of the riprap has been dislodged by the flow exposing a small area of the underlying filter fabric. However, the channel remains stable and no remediation is required.

Below the above channel is a second riprapped channel that was built following the removal of the two culverts as part of the site reclamation (Photo 10). The channel is stable and requires no remediation.

2.1.4 Sediment Retaining Structure

The Sediment Retaining Structure (SRS) was built during the decommissioning of the South Dam between 2014 and 2015. Figures 5 and 6 provide a site plan and sections of the SRS.

During the 2015 inspection, a small subsidence was observed in the lower portion of the exit chute from the spillway. The material displaced was retained by the geotextile filter fabric and some of the riprap had moved. Teck repaired the spillway after the 2015 inspection by placing additional riprap from the cofferdam located upstream of the pond. No further subsidence was noted during this year's inspection.

The GeoJute erosion protection and the riprap buttress along the downstream toe of the SRS that Teck installed last year has performed well (Photo 11). No further erosion of the downstream slope or the downstream toe of the structure was evident this year.

Seepage from the hillside area to the east of the structure is still evident along the downstream toe of the SRS (Photo 12).

The pond was not very clear at the time of our inspection and an estimate of the silt buildup in the pond was not possible.

2.1.5 Drainage Channels

The riprapped drainage channels (the North Channel, the Camp Creek channel and the South Channel) were constructed during the TMA decommissioning in 2014. Figure 7 provides a plan view of the three channels. SRK inspected each of the channels for any signs of subsidence and movement of the riprap erosion protection.

Photos 13 to 15 show the North Channel that drains into the SRS. At the outlet of the channel, there was evidence of some subsidence and erosion of the west embankment (Photo 14). However, the erosion would not impact the performance of the channel and no remediation is required.

No movement of the riprap or subsidence was evident in the other channels (Photos 16 to 20).

2.1.6 Burnick and Jewelbox Waste Rock Dumps

SRK inspected the Burnick waste dump at the 1200 portal and the Main Zone and Jewelbox waste dumps (Photos 21 and 23). The locations of these dumps are shown in Figures 8 and 9. The dumps were recontoured to provide added long-term stability. No subsidence of the slopes was noted.

Some minor settlement of the fill that was placed over the 1200 portal was noted (Photo 22). This settlement is to be expected and no remediation is required.

Photo 24 was taken from the Jewelbox dump overlooking the TMA.

2.2 Instrumentation Review

The water levels in the North Dam piezometers are recorded monthly and the 2016 data are presented in Appendix B. Figure B1 in Appendix B shows the seasonal water level fluctuation within the dam over the last two years for all the piezometers. Figure B2 provides a plot of seasonal water levels from 2011 for Piezometers NDW-1A, 2A, 3A and 4A compared to the maximum safe levels established for the North Dam and listed in the OMS Manual. The seasonal fluctuations recorded this year in the piezometers are generally consistent with those in previous years and are within acceptable tolerance limits. Table B1 (Appendix B) presents the water levels from 2015 to August 2016.

The peak levels recorded in May, 2016 are plotted on the dam section shown on Figure 4.

3 Dam Safety Assessment

3.1 Design Basis Review

The original design of the starter dam for the North Dam required a crest elevation of 1,100 m with an ultimate dam design crest elevation of 1,106 m. However, this ultimate design crest elevation was modified in subsequent revisions to the mine plan to El. 1,104 m. A summary of the design criteria for the North Dam is provided in Table 3.1. The design criteria was also updated to reflect changes to the CDA 2014 Dam Consequence Classification.

Table 3.1: Design Criteria of the North Dam (Updated)

Design Crest Elevation (Ultimate)	Not applicable
Starter Dam Crest (Existing)	1,100 m
Top of Till Core Elevation (Ultimate)	Not applicable
Maximum Operating Tailings Level (ultimate)	Not applicable
Maximum Operating Pond Level (Ultimate)	Not applicable
Spillway Invert Elevation	No emergency spillway in dam
Design Operating Freeboard	Not applicable
Design Seepage (SRK/AMCL, 2000)	35-50 L/min
Tailings Storage Capacity (Ultimate)	Not applicable
Dam Consequence Classification (2015 DSR)	Significant
Target Earthquake Level (CDA, 2014) (Passive care) Seismic Event	1 in 2475 year (PGA = 0.203g)
Target FOS (CDA, 2014)	1.5 (static); 1.0 (pseudo-static)
Target Flood Levels (CDA, 2014)	1/3 between the 1,000-year event and the PMF

3.2 Hazards and Failure Modes Review

As a permanently closed site, structures at Sä Dena Hes mine site that have the potential to endanger human life or create environmental damage were either removed or upgraded to ensure long-term physical stability. As stated in the 2015 OMS Manual for the mine site, events exceeding the design criteria (Section 3.1) could result in failure from the following failure modes:

- Dam overtopping;
- Dam embankment instability (North Dam); and
- Seismic instability during large earthquake events (North Dam).

The recent studies completed by SRK reviewed the above scenarios. The dam overtopping scenarios are discussed in SRK 2016. The studies also looked at the stability of the North Dam following an earthquake event and assuming liquefaction of the tailings impounded by the dam during the seismic event. The results of the post-seismic stability analyses completed on the North Dam, indicated that the dam exceeds minimum factors of safety requirements as outlined by the CDA (2014).

3.3 Review of Downstream and Upstream Conditions

As stated in the observation made in Section 2.1.1, there have been no changes to the downstream or upstream conditions of the North Dam since the 2015 inspection.

3.4 Dam Consequence Classification Review

Following the issuance of the 2015 Dam Safety Review (AMECFW 2015), it was agreed that the CDA Dam Consequence Classification of the North Dam should be changed from “Low” to “Significant”. The change was based on a recommendation from AMECFW in the 2015 DSR that believed that there was a potential for liquefaction of the tailings if the dam were to fail and that during a flood event there was a potential for overtopping of the dam. Therefore, the IDF for the North Dam under passive care was changed to 1/3 between the 1,000-year event and the PMF and the design earthquake event was changed from the 1 in 1,000-year event to the 1 in 2,475-year event, respectively.

3.5 OMS Manual Review

The last OMS Manual was prepared by SRK in 2015. The manual was reviewed as part of this 2016 DSI and a number of changes to the OMS are required. These include changes to the design criteria based on the updated dam consequence classification and the frequency of settlement readings for the gauges on the North Dam.

3.6 Emergency Preparedness & Response Review

The last Emergency and Response Plan (ERP) was prepared by SRK as part of the 2015 OMS update and focused on the decommissioned site. No changes to the document are required.

4 Summary and Recommendations

4.1 Summary

Table 4.1 provides a summary of key recommendations from the 2016 dam safety inspection (DSI). Details of the recommendations are provided in the following sections.

Table 4.1: Summary of Key Recommendations

Structure	ID#	Deficiency or Non Compliance	Applicable Regulatory or OMS Reference	Recommended Action	Priority (Teck 2014)	Recommended Deadline/ Status
TMA Till Cover	1	Central drainage ditch grade		Regrade channel to reduce ponding in channel	3	Before end of the year

4.2 North Dam

SRK recommends the following:

- Take water level readings as per the OMS.
- To establish trends in dam settlement, annual readings of the settlement gauges on the North Dam should be taken based on the 2012 datum until 2020. This requirement will be updated in the OMS.

4.3 Till Tailings Cover

SRK recommends that the grade of the central drainage channel down the middle of the till cover be modified to improve drainage of runoff from the cover and the instances of ponding currently observed in the channel.

This final report, 2016 Sä Dena Hes Annual Geotechnical Inspection, was prepared by SRK Consulting (Canada) Inc.

Peter Healey, PEng

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

5 References

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited. 2016. Sa Dena Hes Mine, Tailings Management Facility 2051 Dam Safety Review. Report prepared for Teck Resources Limited. TE133102.5000. February 2016.

Canadian Dam Association (CDA). 2014. Draft Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams, April 2014.

SRK Consulting (Canada) Inc., (2015a). 2015 Operation, Maintenance and Surveillance Manual for the Tailings Management Area at Sä Dena Hes Mine. Report prepared for Teck Resources Limited. 1CT008.055. October, 2015.

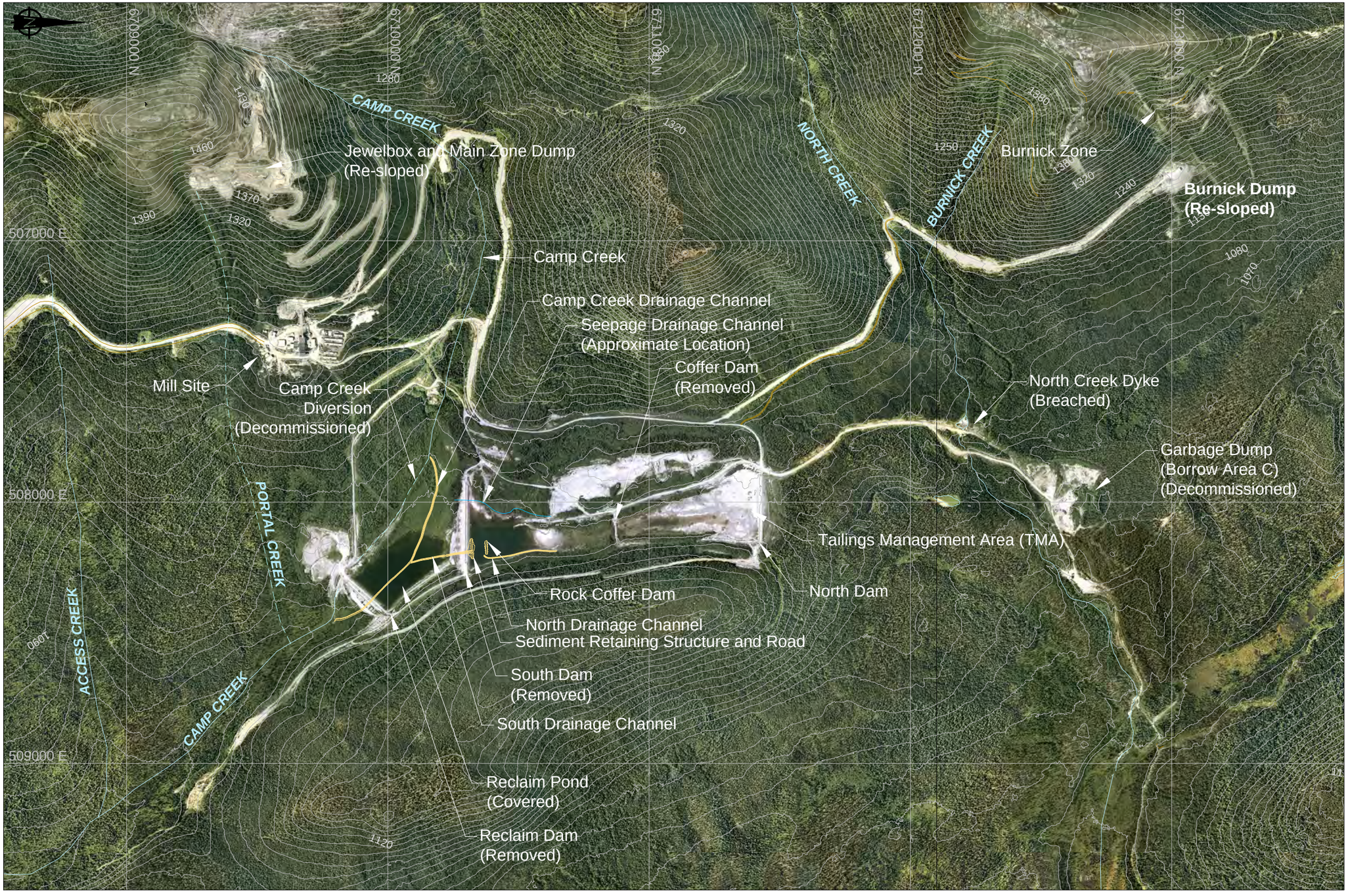
SRK Consulting (Canada) Inc., (2015b). 2015 Geotechnical Inspection, Tailings Management facility, SDH, YT, November 2015.

SRK Consulting (Canada) Inc., 2016. Dam Safety Review Technical Studies, Sa Dena Hes Mine.

Teck Resources Limited (2014). Guidelines for Tailings and Water Retaining Structures, Nov 2014.

Yukon Territory Water Board Water License QZ99-045 for SDH mine (YTWB 2002), and its amendments (YTWB 2005 and YTWB 2010) .

Figures



NOTES

1. Topographic contour data and aerial photos were obtained from McElhanney and are based on August 15, 2012 LiDAR survey. Coordinate system is UTM NAD 83CSRS zone 9V.
2. Orthographic photo depicts pre-decommissioned surface.

0 100 200 300 400 500

Scale in Metres

CONTOUR INTERVAL=10m

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2016 Geotechnical Inspection

Vicinity Map

SRK JOB NO.:	1CT008.057
FILE NAME:	1CT008.057 - Vicinity Map.dwg

Sä Dena Hes Project

DATE:	APPROVED:	FIGURE:
September 2016	PH	1

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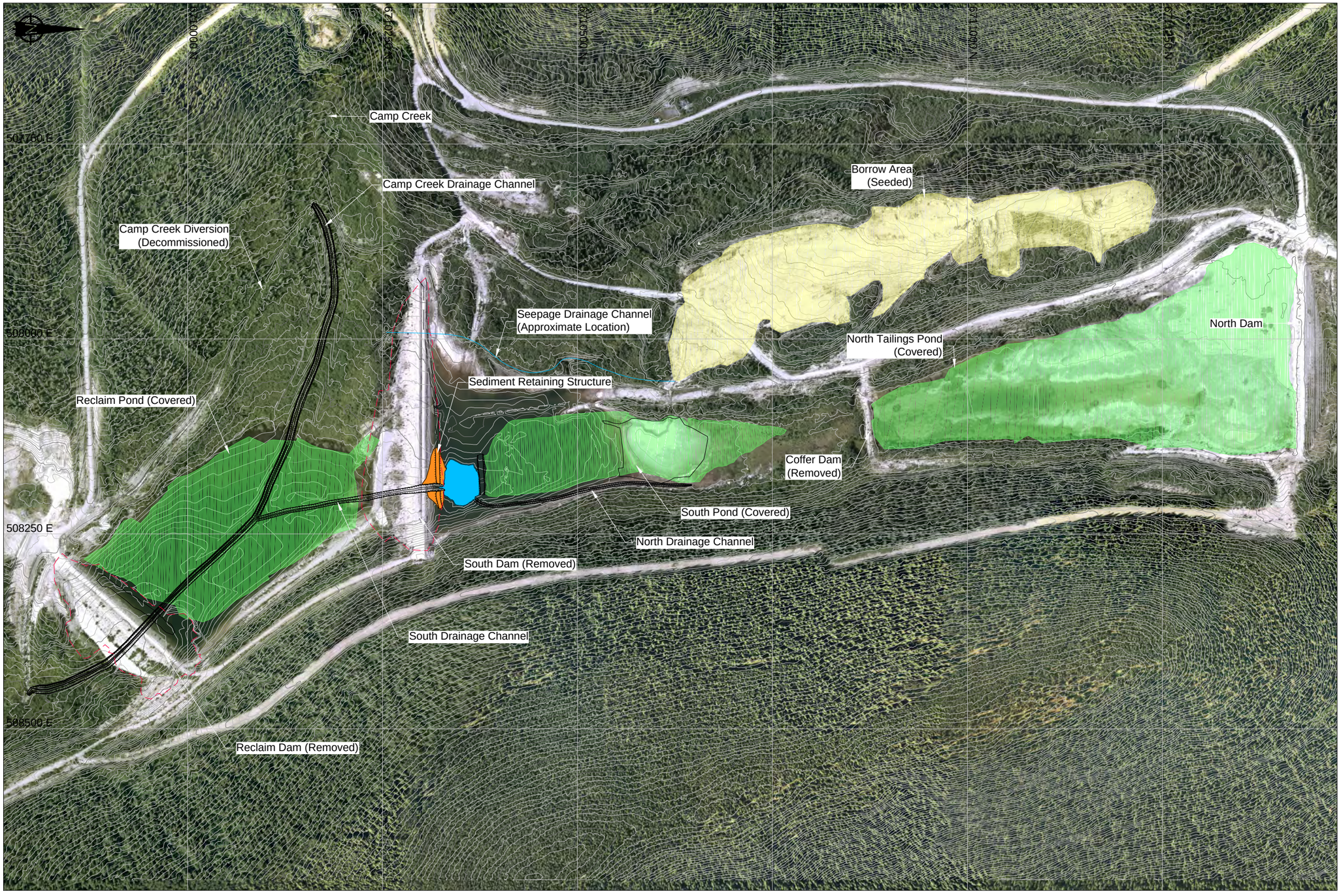

LEGEND

- Major Contour (5m interval)
- Minor Contour (1m interval)
- Edge of Road
- Design Edge of Road
- Camp Creek Drainage Channel
- Dam Excavation Extent
- Sedimentation Pond
- Capped Areas
- Seeded Area

NOTES

1. Preconstruction topographical contour data was obtained from McElhanney and is based on August 15, 2012 LiDAR Survey.
2. As-built survey data was collected by Yukon Engineering Services and Amec Foster Wheeler.
3. Coordinate system is UTM NAD 83 CSRS Zone 9V.
4. Tailings characterization work conducted by Golder and Associates determined the location of capping at the South Pond and Reclaim Pond areas.

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2016 Geotechnical Inspection

TMA General Arrangement Map

DATE: September 2016

APPROVED: PMH

FIGURE: 2

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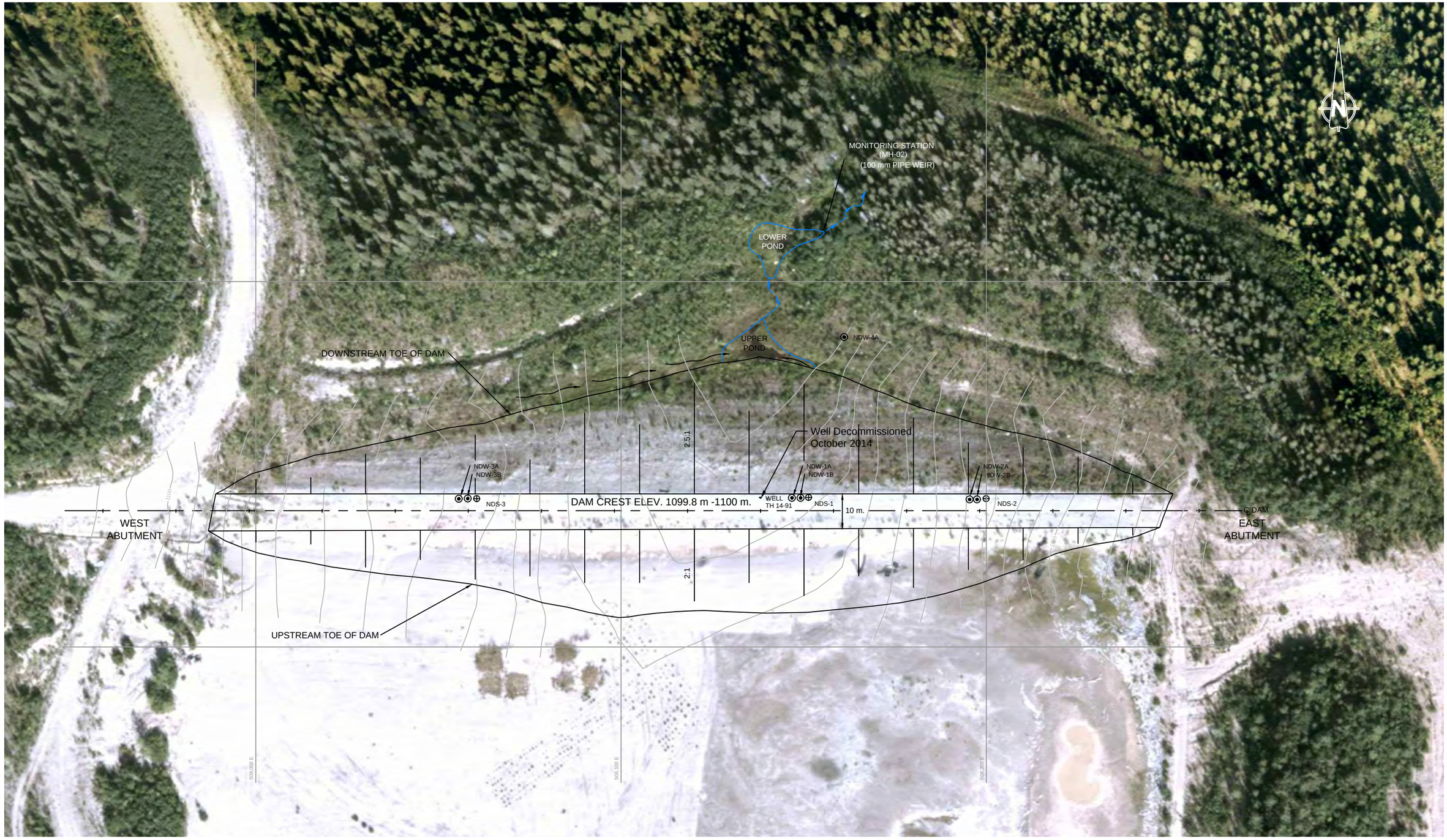

KEY

NDW-1 — PIEZOMETERS INSTALLED (NOV., 1991)

NDS-1 — SETTLEMENT GAUGE INSTALLED (NOV., 1991)

SEEPAGE

NOTES:

1. Topographic contour data and aerial photos were obtained from McElhanney and are based on August 15, 2012 LiDAR survey and October 2013 YES Survey. Coordinate system is UTM NAD 83CSRS zone 9V.

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FILE NAME: 1CT008.057 – North Dam – plan.dwg

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Sa Dena Hes Project

2016 Geotechnical Inspection

North Dam
Site Plan

DATE:	APPROVED:	FIGURE:
November 2016	P.M.H.	3

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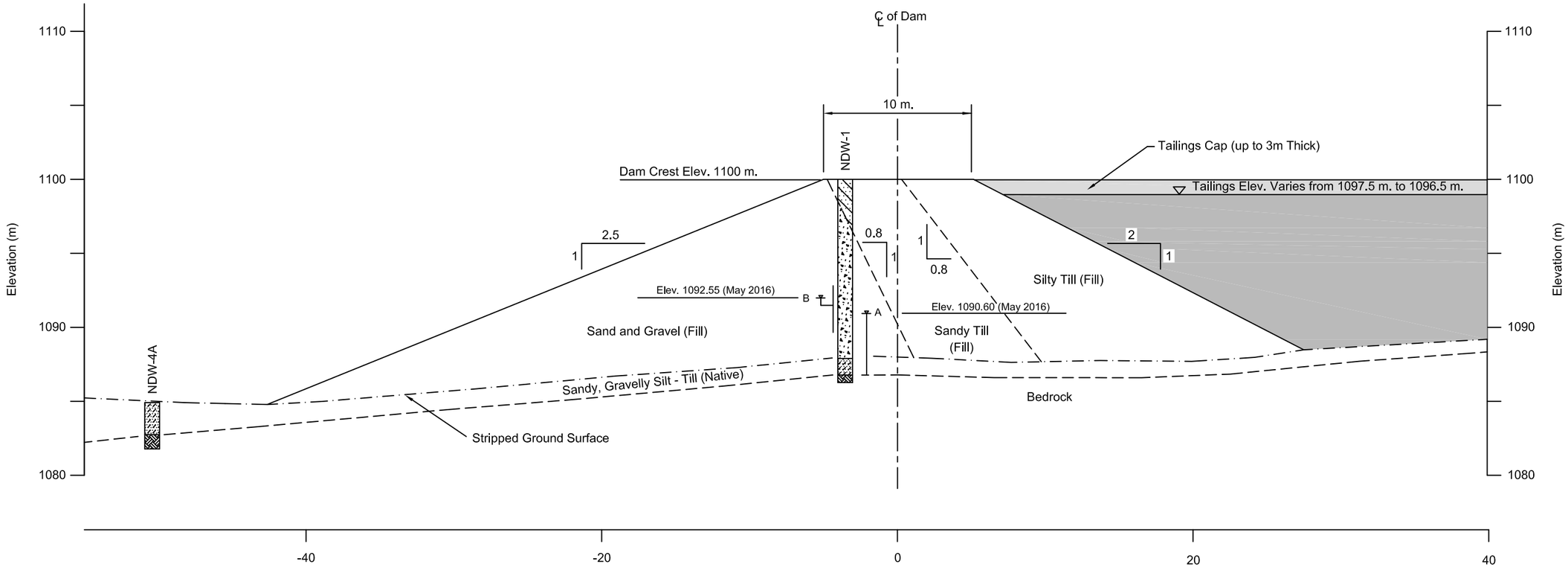

	DATE	T.O.P.	READING	ELEV.
NDW-1B	May 2016	1100.57	8.02	1092.55
NDW-1A	May 2016	1100.69	10.09	1090.60

LEGEND

- Sandy Till (Fill)
- Silty Till (Fill)
- Sand & Gravel(Fill)
- Silty Sand (Till)
- Gravelly Silty Sand (Till)
- Sand & Gravel (Native)
- Bedrock
- Piezometric Head for Filter Zone Indicated
- Tailings
- Tailings Cap

0m 3 6 9 12

NOTES

1. Topographic contour data and aerial photos were obtained from McElhanney and are based on August 15, 2012 LiDAR survey. Coordinate system is UTM NAD 83CSRS zone 9V.

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FILE NAME: 1CT008.057 - North Dam XS.dwg

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Sä Dena Hes Project

2016 Geotechnical Inspection

North Dam
Section 0+400

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September 2016	PMH	4

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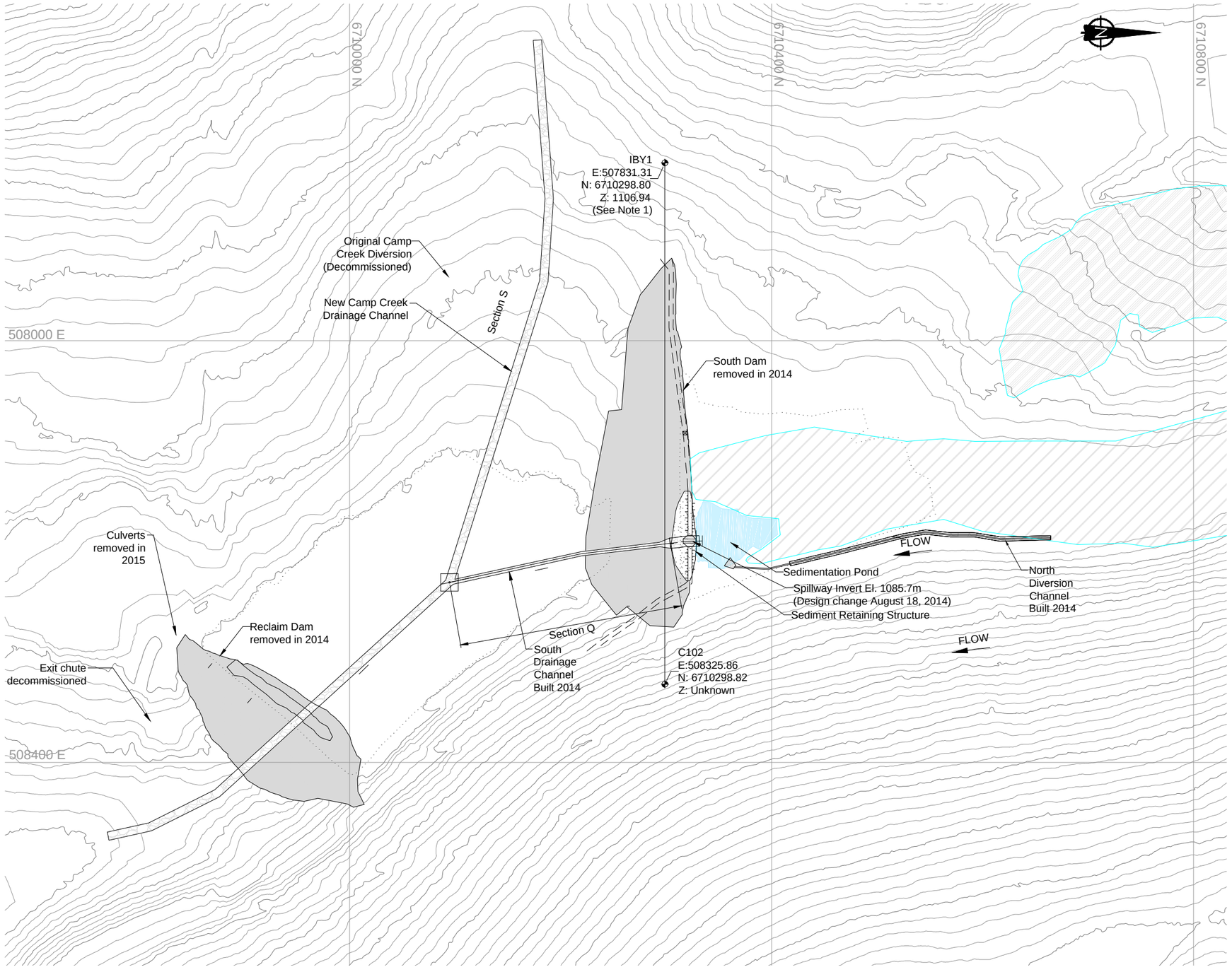

LEGEND

- Covered Tailings
- Removed Dams
- Sedimentation Pond
- Minor Contours (1m interval)
- Major Contours (5m interval)
- Camp Creek
- Drainage Channel

NOTES

1. This Benchmark datum is currently used to monitor settlement gauges on the dam and was used as the benchmark in construction of the dam. The elevation has been adjusted from 1103.54m to the current LiDAR Survey elevation.

0 20 40 60 80 100
Scale in Metres

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2016 Geotechnical Inspection

Sediment Retaining Structure Location Map

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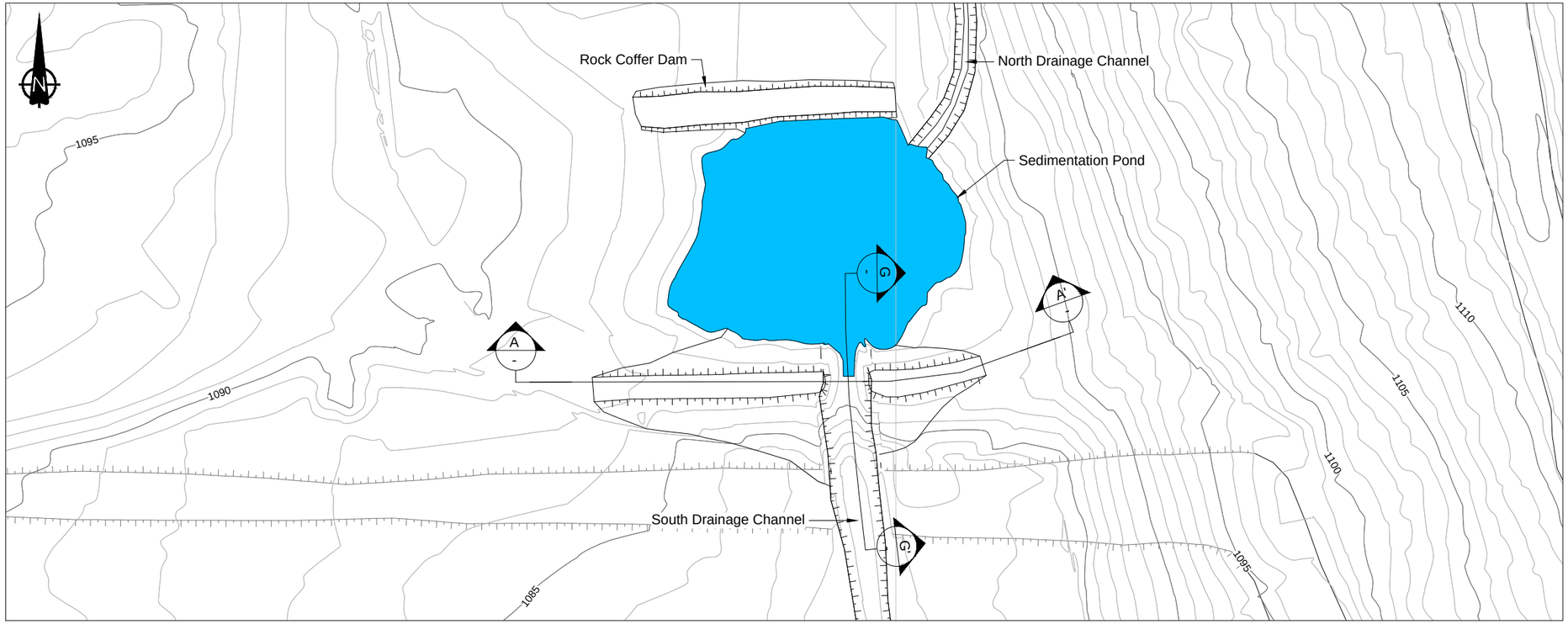


Plan

0m 10 20 30 40

LEGEND

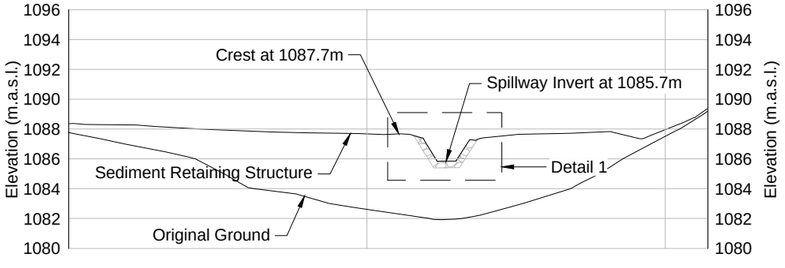
- Major Contour (5m)
- Minor Contour (1m)
- Dam Crest
- Dam Toe
- Edge of Road
- Sediment Pond

PROFILE AND DETAIL LEGEND

- Original Ground
- Non-woven Geotextile
- Riprap

NOTES

1. Excavated dam fill material was used to cap tailings. The final excavated surface was graded to promote drainage and blended topography into adjacent natural topography.
2. Rip rap from downstream toe buttress was salvaged and reused during channel construction.
3. The decant tower was demolished down to the foundation. Steel reinforced concrete was deposited in the onsite landfill located in Borrow Area C. The remaining concrete foundation was covered with dam fill material and graded to blend into topography.
4. Design extents of rip rap and geotextile, as no as-built survey.



A - Profile A-A'

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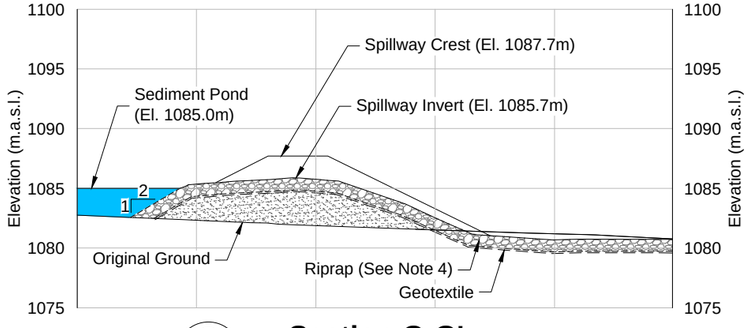
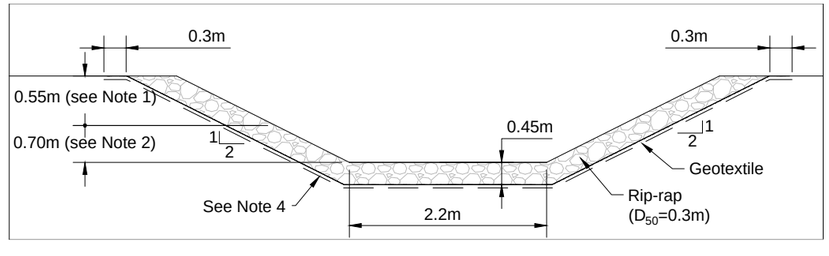
0m 4 8 12 16 Vertical



G - Section G-G'

0m 5 10 15 20



1 - Detail 1 - Design Spillway Typical Section

N.T.S.

srk consulting	Teck	2016 Geotechnical Investigation	
SRK JOB NO.: 1CT008.057		Sediment Retaining Structure Plan and Profile	
FILE NAME: 1CT008.057 - Sediment Retaining Structure.dwg	Sä Dena Hes Project	DATE: September 2016	APPROVED: PMH / DRAWING: 6

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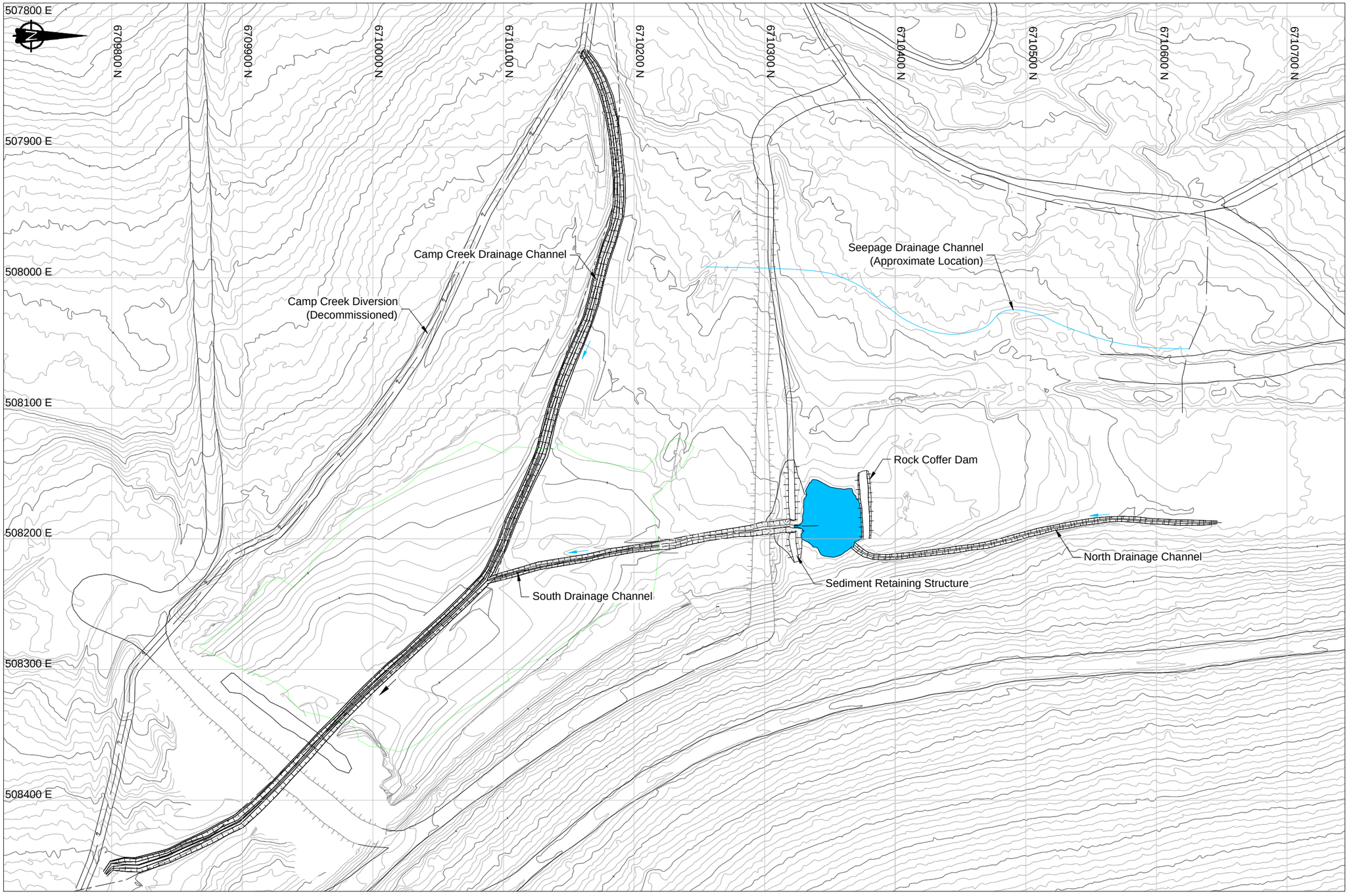

LEGEND

- Major Contour (5m)
- Minor Contour (1m)
- Dam Crest
- Dam Toe
- Edge of Road
- Direction of Flow
- Sediment Pond

NOTES

1. As-built Camp Creek Drainage Channel upstream and downstream tie-in locations and North Drainage Channel alignments were modified from the design by Amec foster wheeler, with consultation from SRK and Teck, based on field conditions.

0m 30 60 90 120

srk consulting

SRK JOB NO.: 1CT008.057

FILE NAME: 1CT008.057 - Drainage Channel.dwg

Teck

Sä Dena Hes Project

2016 Geotechnical Investigation

Drainage Channel Plan

DATE:	APPROVED:	DRAWING:
September 2016	PMH	7

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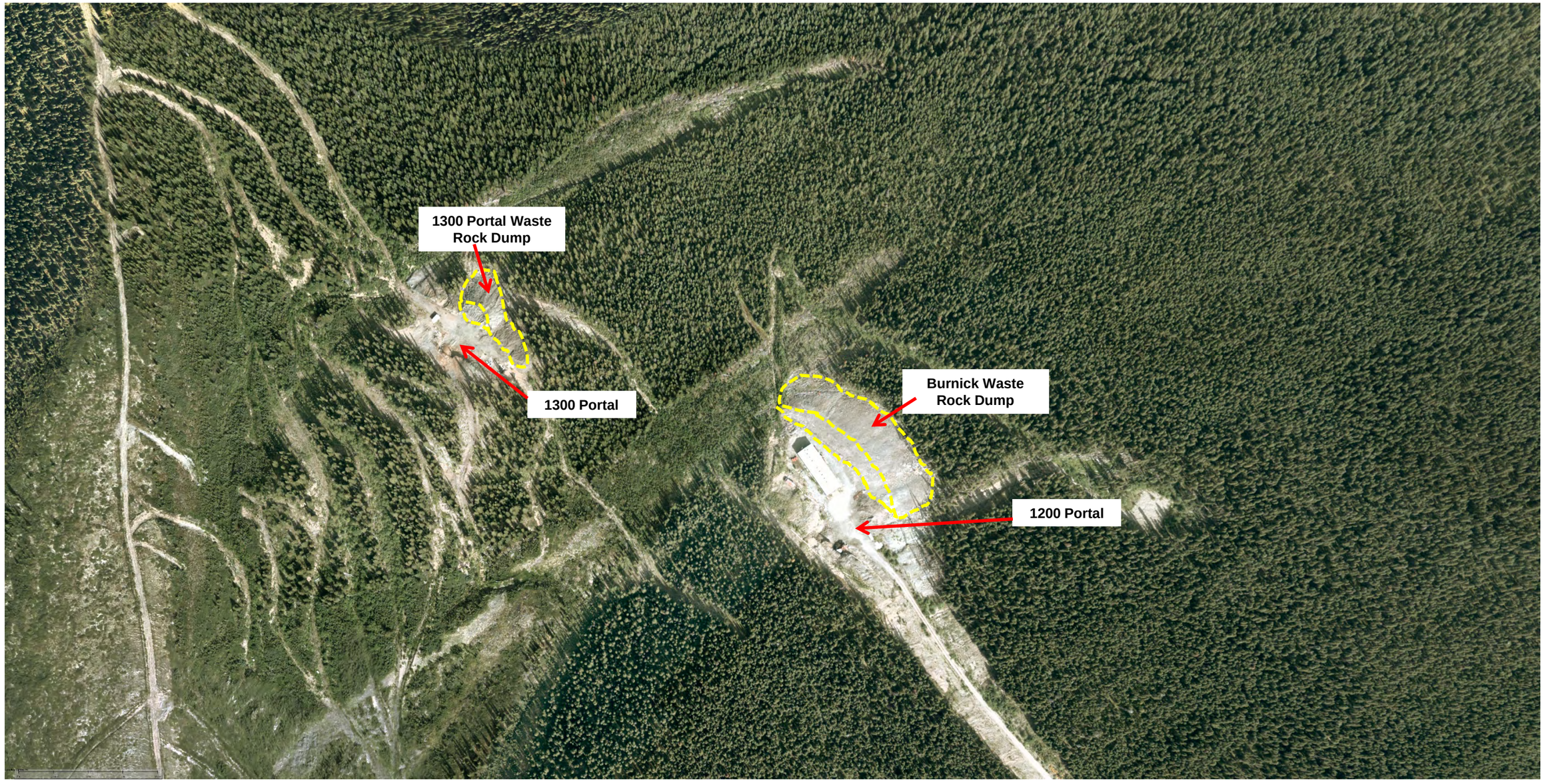

srk consulting	Teck	2016 Geotechnical Inspection
		Burnick Zone Plan View
Job No: 1CT008.057 Filename: Burnick Zone.pptx	Sä Dena Hes	Date: September 2015 · Approved: PMH · Figure: **8**

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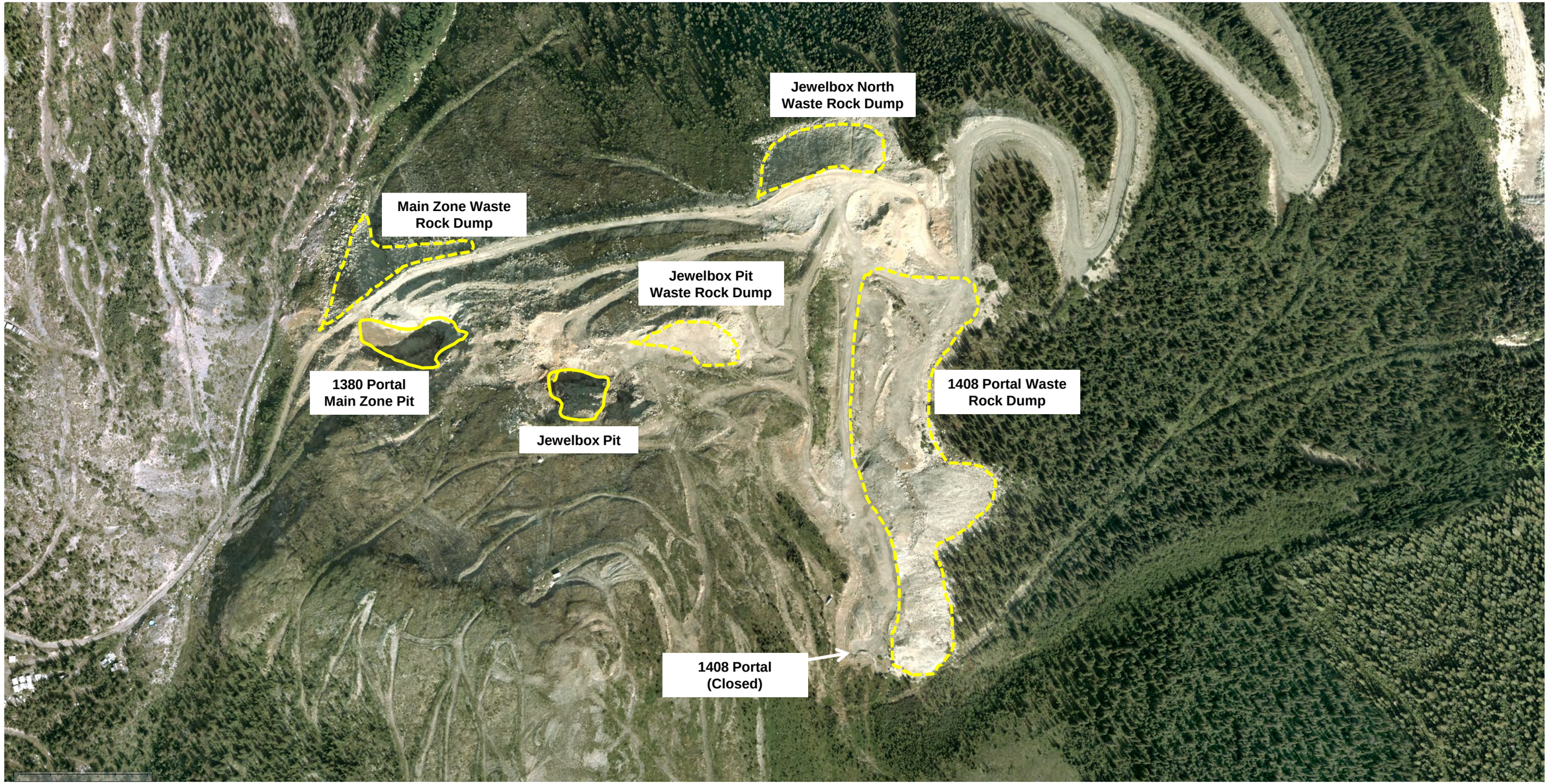

srk consulting	Teck	2016 Geotechnical Inspection
		Main Zone and Jewelbox Zone Plan View
Job No: 1CT008.057 Filename: Main Zone and Jewelbox Zone.pptx	Sä Dena Hes	Date: September 2016 · Approved: PMH · Figure: **9**

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Appendices

Appendix A: Photo Log

Photo 1: View West along the North Dam Crest

Photo 2: View East along the Downstream Face of the North Dam

Photo 3: Protective Steel Caps for Piezometers NDM 3A and 3B, Settlement Gauge NDS 3

Photo 4 PVC Piezometer Inside the Protective Caps

Photo 5: View looking West over the Till Cover Adjacent to the North Dam

Photo 6: Ponding in the Central Drainage Channel within the Till Cover

Photo 7: Central Drainage Channel Looking Downstream

Photo 8: Riprapped Section of North Creek at the Location of the Reclaimed North Creek Dyke

Photo 9: Exposed Fabric at the Outlet of the Riprapped Channel in North Creek

Photo 10: Riprapped Channel at the Second Crossing of North Creek s

Photo 11: Spillway at Sediment Retaining Structure

Photo 12: Seepage along Toe of the Sediment Retaining Structure from Hillside Springs

Photo 13: Upper Reach of the North Channel

Photo 14: Subsidence Zone adjacent to the outlet of the North Channel

Photo 15: Sediment Pond and outlet from the North Drainage channel in background

Photo 16: View downstream of the South drainage channel

Photo 17: View upstream of the Camp Creek drainage channel

Photo 18: View Downstream of the Camp Creek Drainage Channel

Photo 19: Inlet of Camp Creek into the Camp Creek drainage channel

Photo 20: View downstream of the Camp Creek Drainage Channel

Photo 21: Regraded areas of the Jewelbox waste rock dump

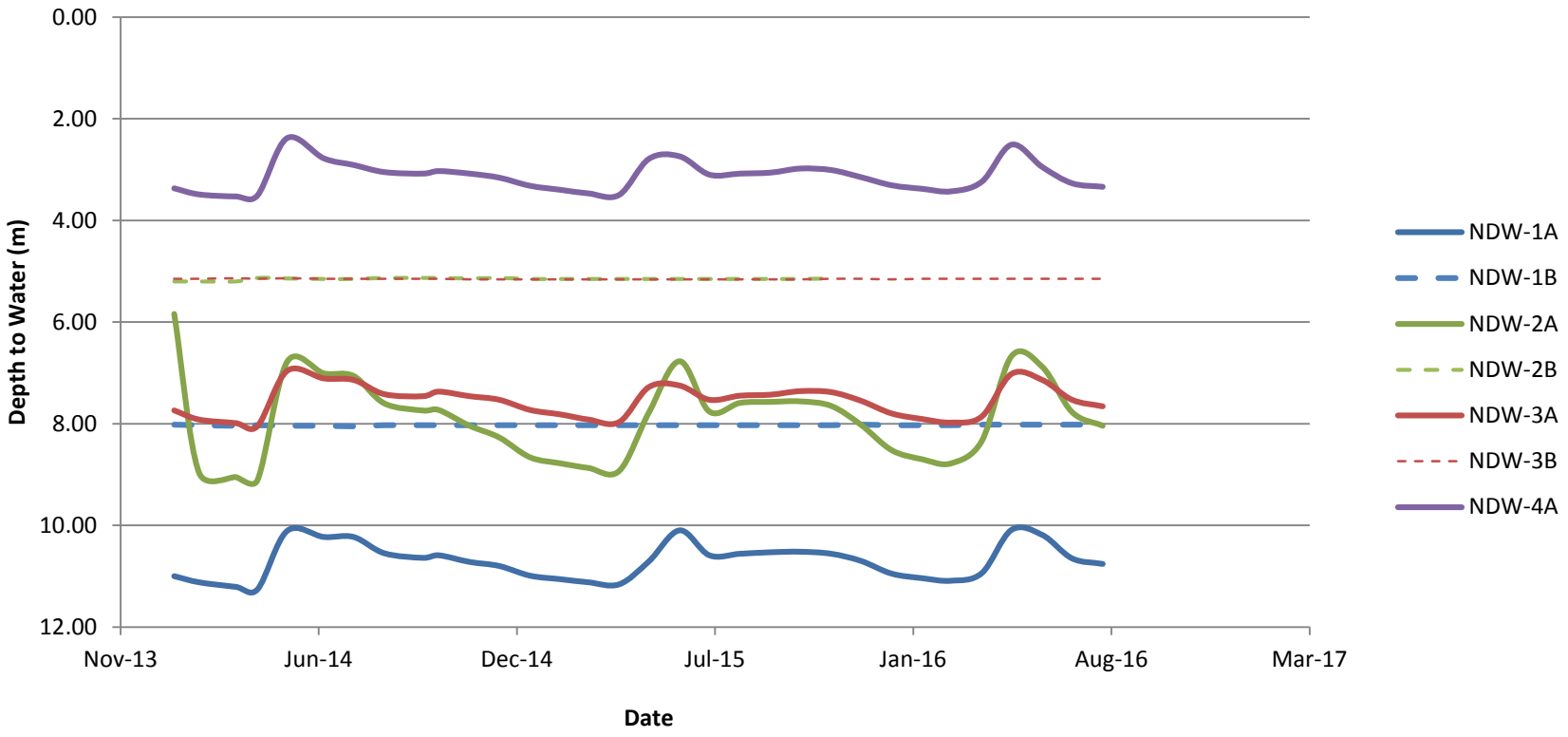
Photo 22: Subsidence Cracks due to Settlement of the Fill Placed over the 1200 Portal

Photo 23: Burnick Dump Slopes

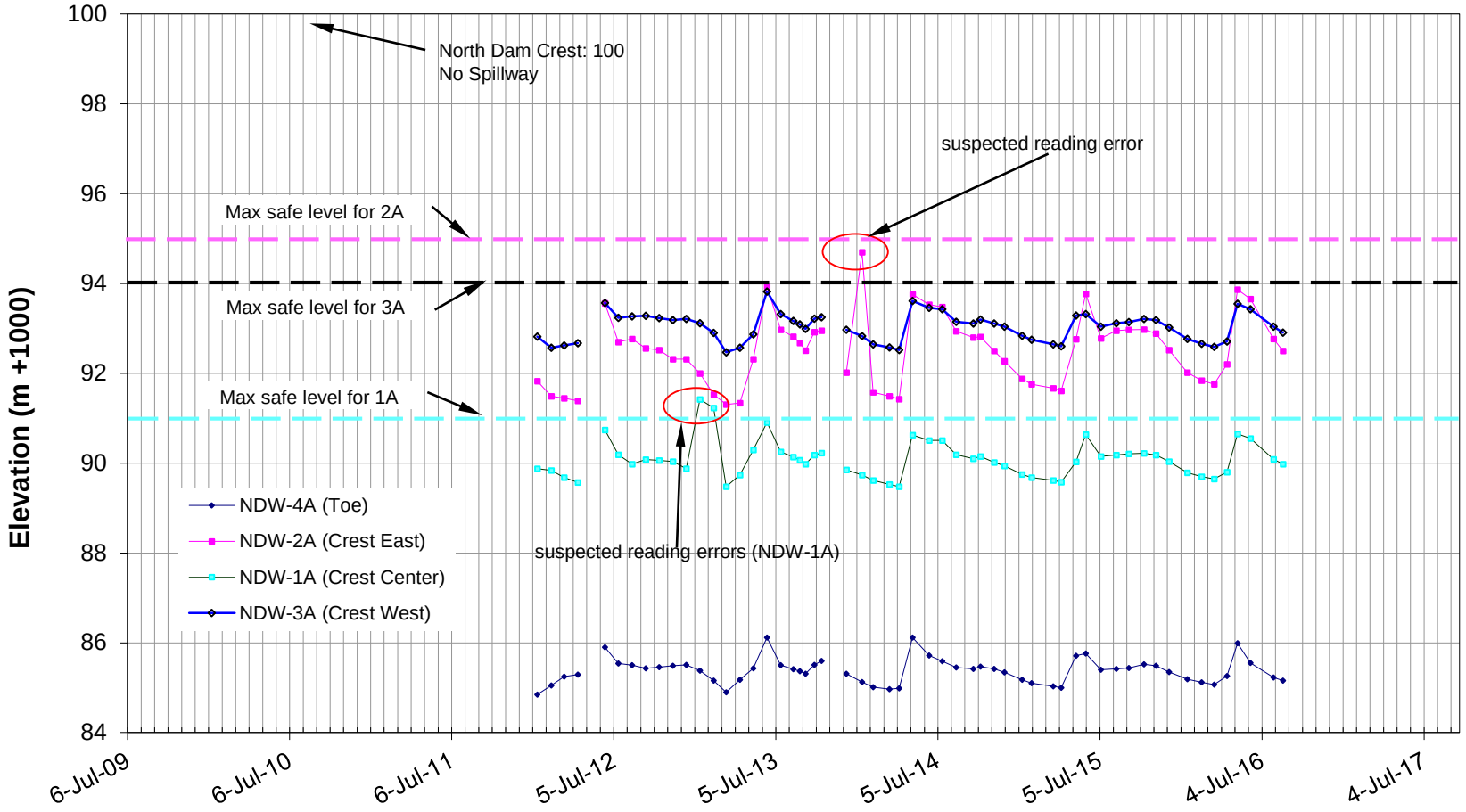
Photo 24: Overview of the TMA from Jewelbox Dump

Appendix B: Water Levels

Depth to Water - North Dam Crest Piezometers 2014-16



srk consulting	Teck	North Dam
		2014-2016 Piezometric Levels in North Dam
Job No: 1CT008.057 Filename: FigB1_2014_2016PiezoLevels_1CT008.057_rev1.pptx	Sa Dena Hes	Date: September 2016 / Approved: PMH / Figure: **B1**



srk consulting	Teck	2016 Geotechnical Inspection
Job No: 1CT008.057 Filename: FigB1_2011_2016PiezoLevels_1CT008.057_rev1.pptx	Sa Dena Hes	**2011-2016 Piezometric Levels in North Dam**
		Date: October 2016 / Approved: PMH / Figure: **B2**

Table B1: NDM Piezometer Levels

	12-Oct-15	08-Nov-15	08-Dec-15	18-Jan-16	21-Feb-16	18-Mar-16	16-Apr-16	10-May-16	08-Jun-16	30-Jul-16	20-Aug-16
NDW-1A	10.52	10.56	10.70	10.95	11.04	11.09	10.94	10.09	10.19	10.65	10.76
NDW-1B	8.02, soft bottom @ 8.05	8.03, soft bottom @ 8.05	8.02, soft bottom @ 8.05	8.03, soft bottom @ 8.05	8.03, soft bottom @ 8.04	8.03, soft bottom @ 8.05	8.02, soft bottom @ 8.05	8.02, soft bottom @ 8.05	8.03, soft bottom @ 8.04	8.01, soft bottom @ 8.04	8.02, soft bottom @ 8.05
NDW-2A	7.56	7.65	8.02	8.52	8.70	8.78	8.34	6.67	6.88	7.77	8.04
NDW-2B	5.13, soft bottom @ 5.16	5.14, soft bottom @ 5.15	5.15, soft bottom @ 5.16	5.15, soft bottom @ 5.16	5.15, soft bottom @ 5.16	5.15, soft bottom @ 5.16	5.13, soft bottom @ 5.16	5.13, soft bottom @ 5.16	5.14, soft bottom @ 5.15	5.14, soft bottom @ 5.16	5.14, soft bottom @ 5.16
NDW-3A	7.36	7.38	7.55	7.80	7.91	7.98	7.86	7.02	7.14	7.53	7.66
NDW-3B	5.15, soft bottom @ 5.23	5.15, soft bottom @ 5.23	5.15, soft bottom @ 5.23	5.16, soft bottom @ 5.23	5.15, soft bottom @ 5.23	5.15, soft bottom @ 5.23	5.15, soft bottom @ 5.23	5.14, soft bottom @ 5.23	5.14, soft bottom @ 5.22	5.14, soft bottom @ 5.23	5.15, soft bottom @ 5.23
NDW-4A	2.98	3.01	3.15	3.31	3.38	3.43	3.24	2.51	2.95	3.27	3.34
TH-14-91	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
Pond level							NO WATER AGAINST DAM				
RDW-1A	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
RDW-1B	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
RDW-1C	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
RDW-2A	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
RDW-2B	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
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GW-1B	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
Pond level	Pond filled, covered	Pond filled, covered	Pond filled, covered	Pond filled, covered	Pond filled, covered	Pond filled, covered	Pond filled, covered	Pond filled, covered	Pond filled, covered	Pond filled, covered	Pond filled, covered
SDW-1A	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
SDW-1B	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
SDW-2A	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
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SDW-4B	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
SDW-4C	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned	Decommissioned
Pond level	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTES: Yellow highlighting: water level measurement could not be made; piezometer dry;