20 November 2014

AMEC File: VM00615

VIA EMAIL

Teck Highland Valley Copper Partnership
P.O. Box 1500
Logan Lake, British Columbia
V0K 1W0

Attention: Mr. Chris Fleming

Dear Chris,

Reference: **24 Mile Lake Geotechnical Assessment and Standard Operating Procedure**

Please find enclosed the following two documents which provide a geotechnical assessment and operating recommendations regarding the 24 Mile Lake water management facility at the Highland Valley Copper Mine near Logan Lake, BC:

1. A memorandum documenting the data review and geotechnical assessment of the containment and operation of 24 Mile Lake dated March 31, 2014.
2. A draft Standard Operating Procedure (SOP) outlining the water level requirements of 24 Mile Lake based on the findings of the data review memo.

The SOP was developed jointly between AMEC and HVC water management staff during a recent site meeting on May 6, 2014. The SOP is provided in Microsoft Word format as a draft document to allow HVC to adjust the formatting and filing numbers of the SOP to suit their internal tracking system and make revisions to the SOP as needed. A final SOP will not be provided.

Please contact the undersigned if you have any questions regarding our submission.

Sincerely,

AMEC Environment & Infrastructure,
a Division of AMEC Americas Limited

Andrew Witte, M.Eng., P.Eng.
Project Manager

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ATTACHMENT 1

Memo: "*24 Mile Lake Data Review*" dated March 31, 2014

MEMO

To	Ian Haskell (HVC)		
From	Andrew Witte, M.Eng., P.Eng.		
Tel	604.295.3264	**AMEC File No.**	VM00615
Fax	604.294.4664	**Reviewed by:**	Ed McRoberts
Date	March 31, 2014	**cc**	Chris Fleming (HVC) Andy Small (AMEC)
Subject	24 Mile Lake Data Review		

1.0 INTRODUCTION

AMEC Environment and Infrastructure, a division of AMEC Americas Limited (AMEC) was retained by Teck Highland Valley Copper Partnership (HVC) to perform a geotechnical site assessment of the containment around 24 Mile Lake on the HVC property near Logan Lake, British Columbia. This memorandum documents the review of available background information regarding 24 Mile Lake to support discussion with HVC regarding the development of a standard operating procedure for this lake.

2.0 BACKGROUND

2.1 2012 Dam Safety Review

In 2012, AMEC carried out a Dam Safety Review (DSR) for the Highland Tailings Storage Facility (AMEC 2012) which included review of the area known as 24 Mile Lake downstream of the H-H Dam. Figure 1 presents an overall site plan showing 24 Mile Lake, the H-H Dam and the Valley Pit. A more detailed view of 24 Mile Lake is provided in Figure 2.

Although there is no formal dam or embankment structure containing 24 Mile Lake, "*water and sediment are contained and controlled within this old natural lak*e" (AMEC 2012). The containment structure that isolates the lake from the Valley Pit acts like a dam and has been classified with a "high" consequence rating as per the 2007 CDA Guidelines mainly due to the potential for release of tailings and water with discharge into the Valley Pit in the event of overtopping. This represents a safety risk to personnel working within the open pit as well as potential economic losses to HVC associated with disruption and remediation of such an event.

The 2012 DSR recommended that a site investigation be performed to "*identify the type, extent and elevation of waste rock and/or natural bedrock surface*" along the downstream limits of the lake as there were no cross-sections available to define the containment conditions of the lake. The results of the site investigation would be used to support development of a Standard Operating Procedure (SOP) for 24 Mile Lake that would discuss "*maximum water levels, sediment control and removal, etc.*" It was also recommended that a dam break analysis be performed for the H-H Dam to assess the impact of such a breach on 24 Mile Lake and the Valley Pit. Basically the 2012 DSR drew attention to a range of issues surrounding 24 Mile Lake, which while once being viewed as an "*old natural lak*e", can no longer be considered in this manner.

2.2 2014 Dam Break Study

In 2014, AMEC carried out a Dam Break and Tailings Runout Study for the H-H Dam (AMEC 2014b) as recommended in the 2012 DSR. The results of the runout study indicated that during a hypothetical sunny-day earthquake induced breach of the H-H Dam, the tailings would liquefy and flow out of the impoundment at a slope of about 3% into 24 Mile Lake and displace the free water accumulated in the lake. Two scenarios were evaluated for the current (2012) and final configurations of the H-H Dam with crest elevations of 1264.4 m and 1292.7 m, respectively.

In both runout cases the lake was assumed to be full to capacity (i.e. water level at El. 1220 m) such that the water was displaced and would flow into the Valley Pit. The study concluded that under the current H-H Dam conditions, the water displacement could be approximately half the total volume of the lake, or 7.0 million m^3. For the ultimate configuration of the H-H Dam, nearly the entire content of the lake, or 13.5 million m^3, could be displaced by the tailings runout. The premise of these scenarios was the protection of personnel working in the Valley Pit considering the absence of a SOP for 24 Mile Lake and justified the "High" consequence rating assigned to the 24 Mile Lake facility.

While these scenarios are not considered to be impossible, they must be viewed as being highly improbable. That is, the volume of water that will exist within the 24 Mile Lake can reasonably be viewed as being under operational control due to the provided pumping capacity. Whereas, at closure such control would be absent and the lake could be full to capacity. However, at closure there would be no risk to human life as the Valley Pit would be abandoned and likely flooded. Therefore, considering a sunny-day breach of the H-H Dam in concert with a rainy-day flooding event of 24 Mile Lake during operations (where the lake is about 30 m deep) is not typical and may be unduly conservative.

Thus, when defining the consequence classification for the facility it may be more appropriate to consider separate sunny-day and rainy-day failure mechanisms. A plausible sunny-day scenario being a seismically triggered breach of the H-H Dam into a significantly reduced flooding scenario (e.g. no operation of the pumping barge for several months due to mechanical or electrical problems). Likewise, a plausible rainy-day scenario could be overtopping of the 24 Mile Lake containment due to extreme precipitation inputs and additive to pit inflows in the absence of an H-H Dam breach. The consequences of such scenarios might then justify a reduced consequence classification for 24 Mile Lake and support a more observational approach to management. These and other scenarios should be considered as part of the upcoming FMEA risk assessment workshops planned for the tailings and water management systems to be conducted between HVC and AMEC.

2.3 Follow-Up Issues

The remaining items to be addressed from the 2012 DSR regarding 24 Mile Lake include investigation of the materials forming the downstream containment of the lake and development of a SOP for the lake to satisfy dam safety objectives as outlined in the CDA guidelines. The following considerations are implicit in achieving this:

1. Maintenance of adequate geotechnical stability within the area between 24 Mile Lake and the Valley Pit.
2. Assessment of flood storage and routing/attenuation capacity for the displaced water through the area between 24 Mile Lake and the Valley Pit in the event of an H-H Dam breach.
3. Review of the constraints governing the flexibility/capacity of the current tailings and water management infrastructure at 24 Mile Lake.

The following sections provide additional discussion on each of these considerations based on review of available background information provided by HVC. A full list of references is provided at the end of this memo.

3.0 OPERATING FUNCTIONS OF 24 MILE LAKE

3.1 Lake Operations

24 Mile Lake is currently operated as a water containment and sediment control facility, receiving tailings slurry discharges only in the cases of emergency or pump house malfunction. The facility may also potentially receive some of the seepage water from and around the East end of the Highland TSF either through the H-H Dam or its foundation. Accumulated water within 24 Mile Lake is pumped into the Highland TSF using a floating pump barge located at the south end of facility. It is understood that the pumps are operated manually on a campaign basis in order to maintain as small a free water pond as possible. However, as episodic discharge of tailings into 24 Mile Lake continues, the free water pond will continue to rise above the rising tailings surface. This will reduce the available freeboard within the facility, however the total volume of free water impounded within the facility will continue to be managed by pumping.

3.2 Closure Landscape

It is understood that the Reclamation and Closure Plan for HVC is currently scheduled to be updated as the last update was performed in the late 1990's. Closure prescriptions related to 24 Mile Lake are currently undefined/unavailable although it is not likely that an open body of water within 24 Mile Lake defined by the current topographical configuration of the surrounding waste dumps would be acceptable to HVC or to regulatory agencies over the long term. Such a scenario would result in the lake recharging to the full capacity (13.5 million m^3) prior to relatively uncontrolled discharge into the flooded Valley Pit. This is relevant to assumptions within the dam break analysis, the ongoing operation of the facility and any mitigation contemplated over the long term.

4.0 FILLS SURROUNDING 24 MILE LAKE

Around the entire perimeter of the lake, the shoreline has been raised by placement of waste dump fills and the buttresses of the H-H Dam with only a small patch of original ground visible on the west side of the lake denoted by a few small trees. The lowest point of the containment fill is at approximately El. 1220 m, on the south side of the lake where the haul road heads south towards the valley pit. This haul road then gently rises by approximately 5 m prior to reaching the pit which denotes the eventual outlet of the facility.

The average volume of water typically stored within 24 Mile Lake is around 600,000 m^3 (El. 1195m) with a depth of about 4 m based on the 2013 bathymetry provided by HVC. If the "containment fills" were viewed as impounding water, then this facility would be classified according to CDA guidelines as a dam and reservoir. This is consistent with the 2012 DSR where an incremental consequence rating of "high" was applied to 24 Mile Lake for the first time. Prior to significant tailings deposition and infilling of the original lake it might have been acceptable to justify this facility as not being a dam and in fact being a "lake" as long as there was little to no water impounded against the dumps. Today, the water level has risen by about 15 m above the original lake level and original ground surface. Given the intended function of this facility moving forward as an emergency dump pond for tailings, then it is inevitable that water levels will continue to rise. Arguably it is then necessary to consider this facility as a dam, either as a separate license, or under the umbrella of the H-H Dam management procedures. It is understood that HVC has already taken this position as discussed in the recent Dam Classification Workshop held on February 13, 2014.

Based on information provided by HVC, it is understood that the two dumps formed on the valley sideslopes downstream of the lake consist of overburden stockpiled from pit stripping operations. Some of these dumps are known to contain free dumped high plastic clay which may be in excess of 40 m thick above the outlet haul road level. It is also understood that a portion of these dumps are capped with waste rock for armouring purposes. It is unknown whether these dumps currently exhibit any stability concerns. However, such clay rich soils are typically susceptible to erosion (hence the armouring with waste rock) and could also be easily eroded in the event of an overtopping scenario, especially at the toes of the dumps in the valley bottoms where flow would be concentrated prior to discharge into the Valley Pit. Such a scenario could also result in down-cutting through the haul road fill which could in turn lead to the release of more water.

5.0 LAKE CONFIGURATION AND GEOLOGY

The current configuration of 24 Mile Lake approximately occupies its original (pre-development) footprint, about 1700 m northwest of the Valley Pit, at the downstream toe of the H-H Dam. The original water level of the lake was approximately El. 1180 m (based on pre-development photogrammetric survey data dated 3 July 1972 provided by HVC), with the ground surface gently sloping down to the shore. A second lake called Big Divide Lake was historically located upgradient of 24 Mile Lake to the southeast as shown on Figure 2. Thus, the original direction of surface water flow was to the northwest which was reversed with construction of the H-H Dam in 1972. Big Divide Lake was subsequently buried beneath the two waste dumps (composed of Valley Pit stripping materials) that straddle the sides of the valley between 24 Mile Lake and the Valley Pit. A single haul road currently bisects the two dumps in the valley bottom and outlets to the Valley Pit on a portion of original ground at roughly El. 1224.5 m which represents a local topographical high point between 24 Mile Lake and the Valley Pit.

Subsequent disposal of tailings within 24 Mile Lake, as well as raising of the lakeshore by fill placement as previously discussed, has raised the water level to approximately El. 1195 m (water level survey data provided by HVC) which is currently maintained by a pumping barge located at the south end of the facility.

Based on a review of borehole information from Valley Pit piezometers, three-dimensional geology surfaces (provided by HVC), and summaries of interpreted geology in the vicinity of the H-H Dam (Golder 1970 & 1972, Klohn Leonoff 1988, KCB 2010), the following native soil units are generally found to occur in the valley between the Valley Pit and Highland TSF:

- Glaciofluvial sands and gravels (Upper Aquifer). These vary from silty sand to cobbles and boulders, and vary in thickness through the valley from 2 m to 18 m. These deposits were originally the ground surface depicted by the 1972 topography.
- Glacial till, a well-graded mixture of silt, sand and gravel with trace clay and cobbles. This unit is very dense and of low hydraulic conductivity, and occurs throughout the valley up to 40 m thick.
- Interglacial silts and sands. These units, which include the Main Aquifer, 10A, 10B, 10C and Basal Aquifer units, range from interbedded sands and gravels to laminated silts and clays. The upper unit, known as the Main Aquifer, is a sand/gravel unit through which most groundwater reporting to the Valley Pit flows. The 10A, 10B, and 10C units are glaciolacustrine units which contain slickensided shear surfaces. These units may have a combined thickness in excess of 140 m.

Based on drilling conducted prior to the construction of the H-H Dam, significant thicknesses of overburden exist at the north end of 24 Mile Lake. Boreholes U.D.21 to U.D.28 found overburden thicknesses varying between 20 m at the valley edges, to in excess of 170 m at the outlet of the lake (Golder 1972). A similar thickness of soils is seen on the North Wall of the Valley Pit (Piteau 2010). It is expected that overburden thickness in the vicinity of 24 Mile Lake would also be of a similar depth. Inferred ground conditions under 24 Mile Lake are illustrated on Figures 3 and 4.

Groundwater flow is primarily through the Main Aquifer sand and gravel unit, with flow south towards the Valley Pit (Piteau 2010). It is inferred from existing instrumentation in the pit that groundwater levels beyond the limits of pit dewatering are approximately at the elevation of 24 Mile Lake. It is also expected that some perched groundwater flow occurs in the Upper Aquifer which is in direct contact with 24 Mile Lake. The Upper and Main Aquifers are separated by glacial till which is inferred to provide some level of hydraulic separation due to the low hydraulic conductivity of the till. As such, minor transient variations in the level of 24 Mile Lake should not have a measureable effect on the Main Aquifer but will likely transfer to variations in flows within the Upper Aquifer. However, it was noted in the design report for the H-H Dam that 24 Mile Lake may contribute to artesian pressures of up to 1 m in the Main Aquifer unit (Canadian Bechtel 1972).

It is understood that piezometric heads in the Main Aquifer unit are the controlling factor in the amount of groundwater reporting to the Valley Pit, which, in turn, has an effect on the stability of the pre-sheared silt units in the Northeast Wall of the pit (Piteau 2010). Due to both the large distance between 24 Mile Lake and the Valley Pit (approximately 1700 m), as well as the hydraulic separation between the lake and the Main Aquifer afforded by the natural till blanket, it is not expected that variations in lake level would have a significant effect on groundwater levels/flows in the pit. This is evidenced in the pit piezometric data from 2011, where pit piezometers showed little to no response to the highest recorded level in 24 Mile Lake. If lake levels were to rise, it is expected that the groundwater response could be monitored effectively by the pit instrumentation; and managed with the pump barge as required.

Furthermore, it would be extremely unlikely that a failure of the north wall of the Valley Pit would reach 24 Mile Lake or substantially degrade perimeter containment to cause a breach of the lake. The final slope of a hypothetical pit wall failure initiated in the weak (slickensided) Unit 10B lacustrine silts would be close to the residual strength friction angle of the material (defined as 9° by Piteau 2010 based on detailed lab testing and back analysis of historical slope performance) and would not reach within 500 m of the south end of 24 Mile Lake. This assumes that the failure is initiated at the bottom of the 10B unit at about El. 1000 m. Such a scenario is extremely conservative, if not kinematically inadmissible, considering that the weak lacustrine soils governing pit stability are primarily located along the northeast to east sides of the pit and any failure would be roughly cross valley in orientation with limited lateral extents to the north and south. However, this scenario serves as a good illustration of the safety provided by the approximately 1700 m setback of 24 Mile Lake from the current Valley Pit limits.

6.0 FLOOD STORAGE AND WATER MANAGEMENT

The previous high water mark in 24 Mile Lake is El. 1196.7 m which was recorded on 22 November 2013. This corresponds to a volume of approximately 1.0 million m^3 of water based on 2013 bathymetry provided by HVC as previously discussed. Based on initial discussions with HVC staff this volume seems to be roughly sufficient for mill operations and water management. However, it is understood that the current (March 2014) water level has exceeded the previous 2013 high water mark due to limitations on the barge pumping capacity. Nonetheless, this volume (roughly around 1.0 million m^3) is low enough such that the displaced water is still contained within the 3.2 million m^3 of available remaining flood storage above the tailings runout surface and below El. 1224.5 m under a hypothetical sunny-day breach of the ultimate dam configuration with a typical lake operating level.

As previously noted there is a high point of original ground at about El. 1224.5 m, at the downstream end of the haul road between 24 Mile Lake and the Valley Pit, just before the haul road reaches the pit. Currently, the capacity of the 24 Mile Lake impoundment is estimated at approximately 13.5 million m^3 below El. 1220 m, with some additional storage afforded by the rising ground between the lake and the outlet to the Valley Pit.

For flood storage from a precipitation (rainy-day) event, the storage capacity of 24 Mile Lake is more than sufficient. The 24-hour, rain on snow probable maximum precipitation (PMP) event is estimated to be 210 mm of water equivalent (AMEC 2014a). For a catchment area of approximately 10.3 million m^2 reporting to 24 Mile Lake and the area bounded by high ground to the south, this gives a required storage of about 2.2 million m^3 to prevent overtopping of the lake containment (note that the PMP flood storage criteria is typically assigned to structures with a consequence classification of “Extreme” under the CDA Guidelines). The impoundment would be able to contain such an event (without flooding the haul roads) if the lake level is maintained below El. 1216 m.

It is understood that generally, HVC personnel do not currently access the Valley Pit below an elevation of 805 m (AMEC 2014b). Currently, the storage volume in the pit below this elevation is approximately 3.1 million m^3. As previously discussed, the dam breach analysis predicted that if the ultimate configuration of the H-H Dam were to breach with 24 Mile Lake at its maximum level, the pit would be inundated up to an elevation of approximately 856 m. However, it is not known how storage potential and safe working elevations within the Valley Pit will change over time with ongoing mining operations. Any water released due to overtopping of 24 Mile Lake containment would likely flow through the current Big Bear Phase 8E mining area, with the potential to cause major disruption to operations and risk the safety of personnel and equipment working in the area. Furthermore, such water flow through the 8E area could negatively impact the stability of the exposed sediments in the northeast pit wall. Thus, it is prudent to manage the water level of 24 Mile Lake such that the volume of impounded free water would be insufficient for any amount to reach the pit during an H-H Dam breach scenario. This recommendation supports the development of a SOP that limits the lake volume to that which can be fully contained by surplus freeboard following displacement by tailings and precludes the potential for erosion of lake containment and pit walls or flooding of the pit due to the absence of flowing water. Under such a management strategy it may be possible to justify reduction of the consequence rating for 24 Mile Lake as mentioned in the 2012 DSR and should be a focus of the upcoming risk assessment workshops.

As discussed in the dam breach analysis, the 3% slope used in the tailings runout analysis is considered to be a conservative value (AMEC, 2014b). Additional review of site specific tailings characteristics may allow for refinement of the predicted runout slopes and could result in an increase to the flood storage capacity predictions for 24 Mile Lake. This could be explored as a separate investigation and analysis if requested by HVC. However the critical case for flood storage is based on the final H-H Dam configuration (crest El. 1292.7 m) which only occurs near the end of the mine life, by which point mining in the Valley Pit would most likely have ceased reducing the risk to human life associated with pit flooding during a dam breach.

7.0 SUMMARY AND PATH FORWARD

Based on the preceding discussions the following summary is provided regarding 24 Mile Lake:

1. Due to the artificial raising of the lake level and surrounding terrain by tailings and waste dump fills, 24 Mile Lake must now be considered as a dam under the CDA guidelines and managed accordingly as discussed in the 2012 DSR. HVC has subsequently adopted this philosophy.

2. The lake is inferred to be hydraulically separated from the Main Aquifer and the Valley Pit by a natural till blanket.

3. The current setback of about 1700 m between the Valley Pit and south end of 24 Mile Lake is considered sufficient to render a failure surface originating in the weak 10B silt unit and impacting the lake as kinematically inadmissible.

4. The waste dumps located along the valley walls between 24 Mile Lake and Valley Pit are reported to be composed of end dumped high plastic clay that is potentially susceptible to erosion and undercutting during an overtopping event.

5. The 2014 dam break study suggested that if the ultimate configuration of the H-H dam were to breach with 24 Mile Lake at its maximum level, the pit would be inundated up to an elevation of approximately 856 m which is about 50 m above the current level accessed by manpower and equipment. Such a scenario reinforces the “high” consequence rating designated by the 2012 DSR in the absence of operational controls.

6. Based on the review of information provided herein, it is recommended that an SOP for 24 Mile Lake be based on limiting the volume of accumulated free water to the maximum extent possible such that the volume of water can be fully contained by surplus freeboard during a breach event without discharge to the Valley Pit. The development and implementation of such a SOP would preclude the conditions forming the basis of the dam break predictions and could likely be used as a basis to justify a lower risk profile for the facility. This should be explored as part of future risk assessments.

7. In order to move forward with development of an appropriate SOP it is necessary for AMEC to better understand the water management requirements for 24 Mile Lake in more detail. Thus, it is recommended that a discussion be convened between AMEC and the relevant HVC stakeholders to develop a limiting volume requirement for 24 Mile Lake prior to pursuing any additional investigation effort.

Attachments:

Figures 1 to 4

REFERENCES

AMEC Environment & Infrastructure (2012) "*Highland Tailings Storage Facility 2012 Dam Safety Review"* Report dated 24 December 2012.

AMEC Environment & Infrastructure (2014a). "Dam Break Study – Highmont TSF– Draft Report", January.

AMEC Environment & Infrastructure (2014b) *"Highland Valley Copper H-H Dam Break and Tailings Runout Study"* Report dated February 2014.

Canadian Bechtel Limited (1972) *"Design Report – Tailings Starter Dam at Axis H-H"* Report dated June 1972.

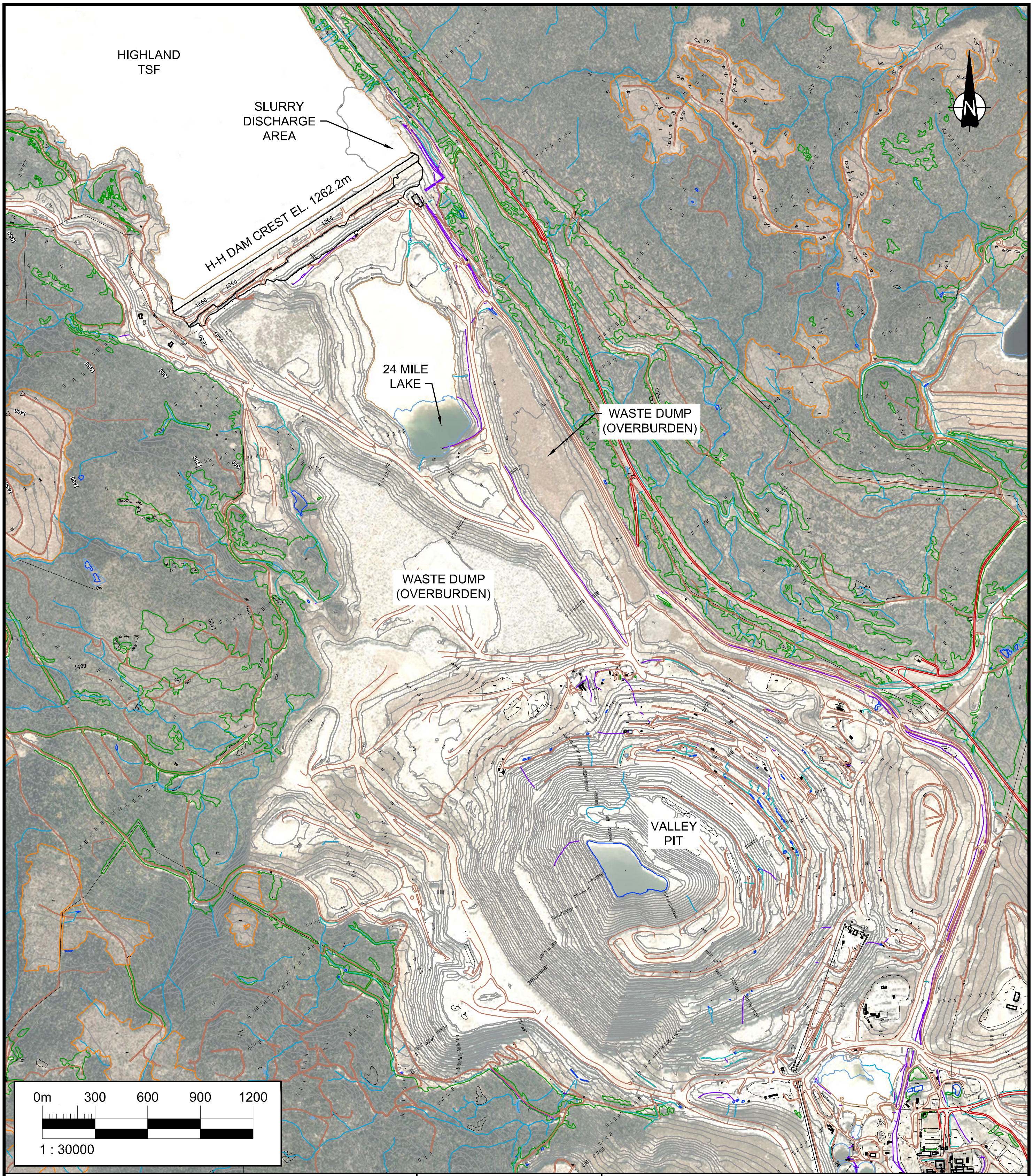
Golder, Bawner Associates (1970). Report on *Preliminary Field and Laboratory Investigation for Upper Tailings Dam*. Prepared for Cominco Ltd. June 1970.

Golder, Bawner Associates (1972). Report on *Supplementary Field and Laboratory Investigations for Tailings Starter at Axis H-H*, Lornex Copper Project. February 1972.

Klohn Leonoff Consulting Engineers (1988). *Highland Valley Tailings Storage Facility Design Report, Volume II – Field and Laboratory Investigations*. 9 December 1988.

Klohn Crippen Berger (2010). *Highland Tailings Storage Facility – Design Update for L-L Dam Crest Elevation 1279 m, Appendix IV – Geology Background*. 30 September 2010.

Piteau Associates (2010). *Geotechnical and Hydrogeological Investigations and Design for the Big Bear PXM and Phase 8E Mine Plans on the East Wall of the Valley Pit*. November 2010.



AMEC Environment & Infrastructure

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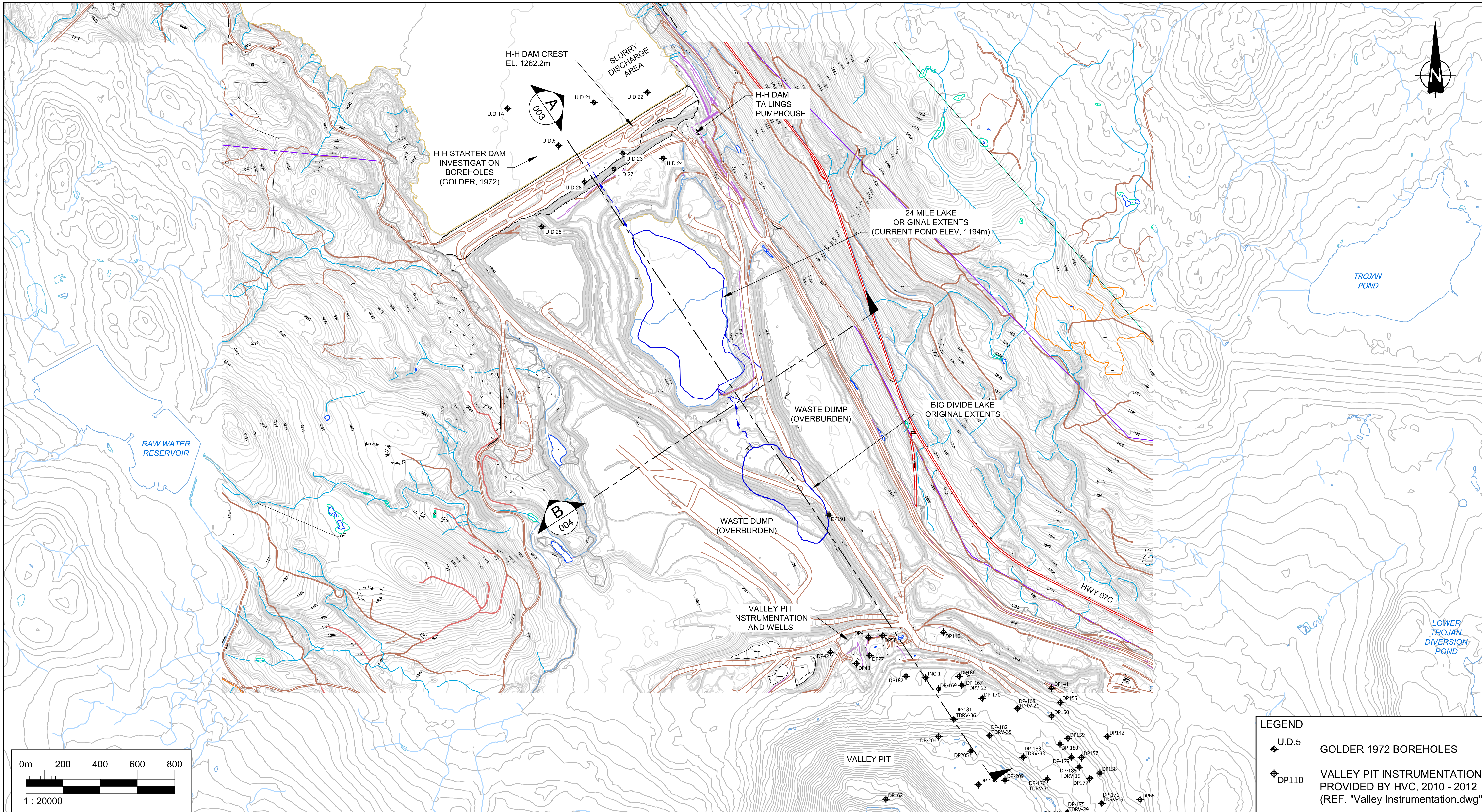
amec

CLIENT LOGO:

Teck Highland Valley Copper Partnership

Teck

PROJECT: HIGHLAND VALLEY COPPER	DWN BY: TH	DATUM: NAD 83	DATE: MARCH 2014
TITLE: 24 MILE LAKE AND VALLEY PIT FACILITY PLAN VIEW	CHK'D BY: AW	REV. NO: A	PROJECT NO: VM00615
	PROJECTION: UTM Zone 10	SCALE: AS SHOWN	FIGURE NO: 001



THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC ENVIRONMENT & INFRASTRUCTURE MEMO No. VM00615 DATED MARCH 2014.

TOPOGRAPHIC BASE DATA
10m CONTOURS AND PLANIMETRY, HVC TILED DATA, 2010.
2.5m CONTOURS AND PLANIMETRY, HVC, 2013.

CLIENT:
Teck Highland Valley Copper Partnership
Teck

AMEC Environment & Infrastructure
#600-4445 Lougheed Highway, Burnaby, B.C., V5C 0E4
Tel. 604-294-3811 Fax 604-294-4664

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PROJECTION:	MINE
SCALE:	AS SHOWN

PROJECT
HIGHLAND VALLEY COPPER

TITLE
24 MILE LAKE GEOTECHNICAL INVESTIGATION PLAN

DATE:	MARCH 2014
PROJECT NO:	VM00615
REV. NO:	A
FIGURE NO:	002

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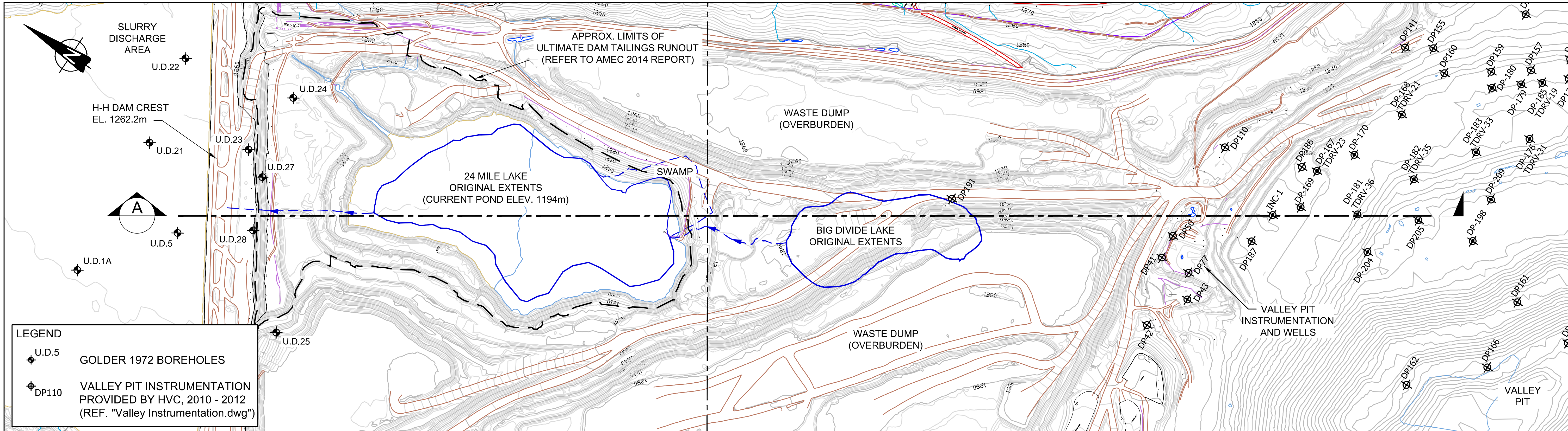

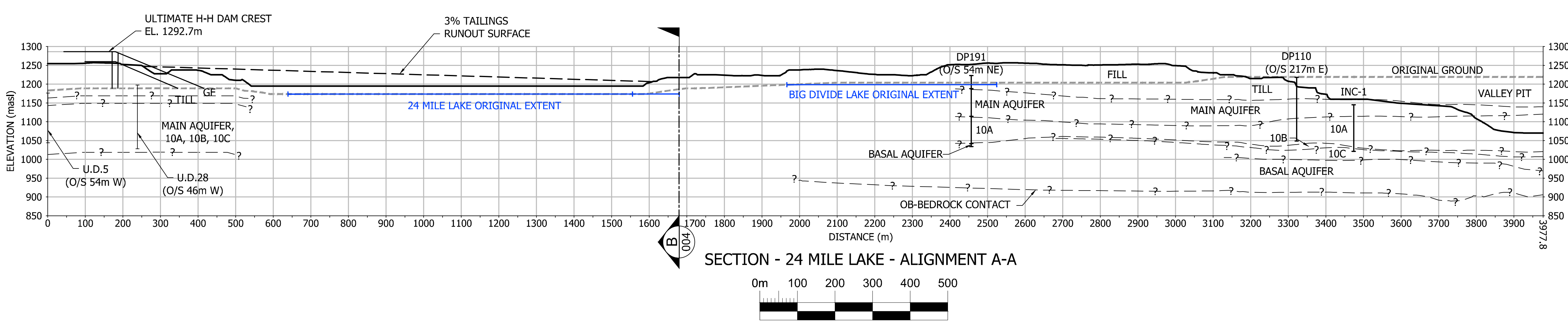

SECTION - 24 MILE LAKE - ALIGNMENT A-A

1 : 12500

NOTES:

1. GEOLOGICAL BOUNDARIES AROUND VALLEY PIT BASED ON DATA FILE 'GEOLOGYSOLIDS.DXF', PROVIDED BY HVC. REFER TO TEXT FOR DESCRIPTION OF GEOLOGICAL UNITS.
2. GEOLOGICAL BOUNDARIES BELOW H-H DAM BASED ON DATA PROVIDED IN GOLDER 1970 AND 1972, KLOHN LEONOFF 1988, AND KCB 2010.
3. TALINGS RUNOUT SURFACE LIMITS BASED ON AMEC 2014.
4. ORIGINAL GROUND BASED ON PHOTOGRAMMETRIC SURVEY DATED 3 JULY 1972.

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC ENVIRONMENT & INFRASTRUCTURE MEMO No. VM00615 DATED MARCH 2014.

TOPOGRAPHIC BASE DATA
10m CONTOURS AND PLANIMETRY, HVC TILED DATA, 2010.
2.5m CONTOURS AND PLANIMETRY, HVC, 2013.

CLIENT: Teck Highland Valley Copper Partnership

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PROJECT: HIGHLAND VALLEY COPPER

TITLE: 24 MILE LAKE
PLAN AND PROFILE - SECTION A

DATE:	MARCH 2014
PROJECT NO:	VM00615
REV. NO:	A
FIGURE NO:	003

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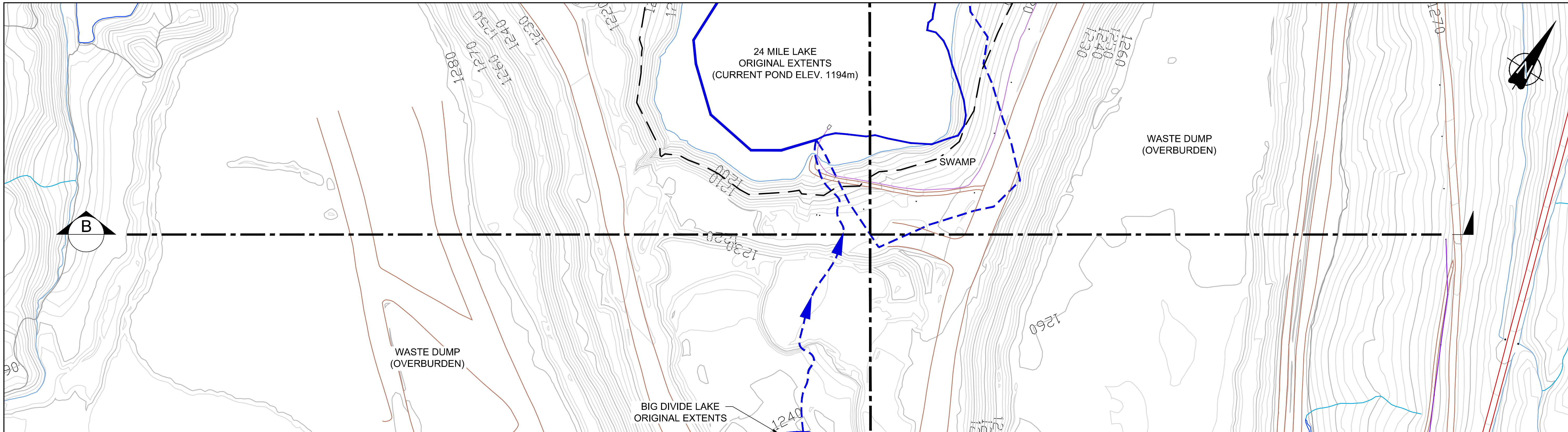

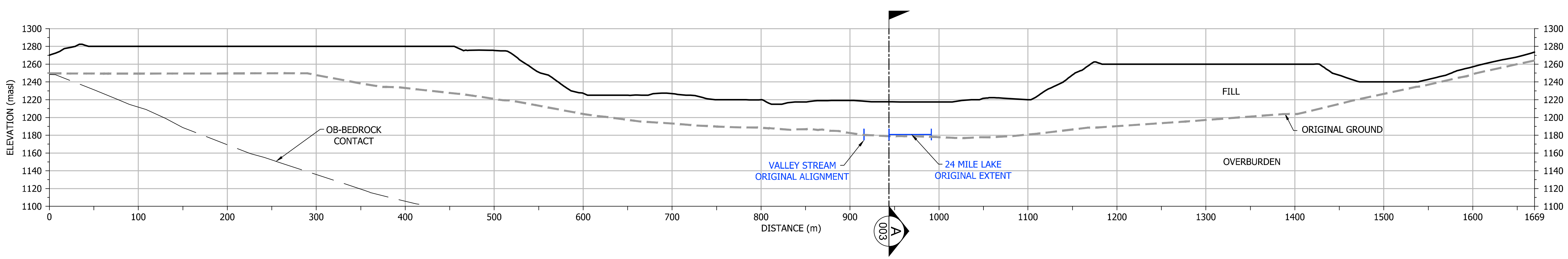

SECTION - 24 MILE LAKE - ALIGNMENT B-B

0m 50 100 150 200

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NOTES:

1. BEDROCK CONTACT BASED ON DATA FILE 'GEOLOGYSOLIDS.DXF', PROVIDED BY HVC.
2. ORIGINAL GROUND BASED ON PHOTOGRAMMETRIC SURVEY DATED 3 JULY 1972.

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC ENVIRONMENT & INFRASTRUCTURE MEMO No. VM00615 DATED MARCH 2014.

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CHK'D BY: AW			
DATUM: MINE	TITLE: 24 MILE LAKE PLAN AND PROFILE - SECTION B	REV. NO: A	FIGURE NO: 004
PROJECTION: MINE			
SCALE: AS SHOWN			

ATTACHMENT 2

24 Mile Lake Standard Operating Procedure dated June 2, 2014

ORIGINATING DEPT Tailings & Water Mgmt.	***STANDARD POLICY/PROCEDURE***	**SECTION** X **NUMBER** X.XX
DATE ISSUED May 2014 **DATE REVIEWED**	**TITLE** 24 MILE LAKE WATER LEVEL MANAGEMENT PROCEDURE	**REVISIONS**

Background:

The 24 Mile Lake water management facility is located at the toe of the H-H Dam and is operated as a water containment and sediment control facility, receiving episodic tailings slurry discharges from the H-H Pumphouse during tailings line maintenance or emergencies. The 24 Mile Lake facility is located upgradient of the active Valley Pit and has the potential to overtop in the event of a breach of the H-H Dam if the free water volume within the facility is not managed appropriately. This procedure provides target maximum operating water levels to govern pump barge operation for the protection of personnel working in and around the Valley Pit.

Application:

1. Areas
   - 24 Mile Lake, H-H Dam and H-H Pumphouse

2. Posting
   - Copies of this procedure are posted on the info center and shall be included in the Highland TSF OMS Manual.

3. Training and Compliance
   - Employees and contractors associated with the operation of 24 Mile Lake and the H-H Pumphouse shall be trained in, and comply with, this procedure.

4. Responsibilities:
   - The Superintendent Tailings and Water Management, or their designate, is responsible for keeping this procedure current on the info center and its inclusion in the Highland TSF OMS Manual.
   - The Mill Shops Maintenance General Foreman (GF) is responsible for H-H Pumphouse operation and 24 Mile Lake barge operation. The GF shall be responsible for performing annual updates to this procedure (or as required based on

H-H Pumphouse operations and tailings solids input to 24 Mile Lake). The GF shall coordinate with Tailings and Water Management personnel to identify operational changes to 24 Mile Lake and acquire the requisite survey information to facilitate timely revision of this procedure.

Procedure:

The free water volume within the 24 Mile Lake facility shall be maintained using the pump barge at the south end of the facility as required to reduce the potential for loss of water to the Valley Pit in the event of a dam break of the H-H Dam or the Raw Water Reservoir. The barge is currently operated manually on a campaign basis and pumps water directly into the Highland TSF, bypassing the H-H Pumphouse. Current hydrologic inputs to 24 Mile Lake include:

- Direct precipitation and catchment runoff (including Winslow Creek Diversion Runoff and Fred Brook sump overflows),
- H-H Pumphouse emergency dump of tailings and water during tailings line maintenance.
- H-H Dam seepage, and
- Valley Pit dewatering emergencies (normal operation is to Witches Brook Pumphouse to the Mill thickeners).

Annual bathymetric surveys should be performed to account for changes in the facility configuration due to tailings inputs from H-H Pumphouse operations. The target water level shall be revised based on the annual surveys.

The current operating water level targets are as follows:

Bathymetric Survey Date:	July 2013
Total Water Storage Volume Available below El. 1220 m:	13.5 million m^3
Current H-H Dam Crest El.:	1264.4 m
Target Maximum Annual Water Level (1.0 million m^3):	1196.5 m or lower
Maximum Short Term Water Level During Freshet (2.0 million m^3):	1199.0 m or lower

The water level should be drawn down to the maximum extent possible throughout the fall/winter of each year to provide additional storage for freshet inflows in the following spring.