Appendix 9-B

Brucejack Project Environmental Assessment – Numerical Hydrogeologic Model

ERM

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PRETIUM RESOURCES INC

BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT

NUMERICAL HYDROGEOLOGIC MODEL

FINAL

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Suite 800 - 1045 Howe Street
Vancouver, British Columbia
Canada. V6Z 2A9
Telephone (604) 684-5900
Fax (604) 684-5909

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Project No.: 1008-010
Doc. No.: BJ-2014-16

Ian Chang, Vice President Project Development
Pretium Resources Inc.
#1600 – 570 Granville St.
Vancouver BC, V6C 3P1

Dear Mr. Chang,

Re: Brucejack Project Environmental Assessment – Numerical Hydrogeologic Model Report (FINAL)

Please find attached a FINAL copy of the above referenced report, summarizing the numerical hydrogeologic modeling completed in support of the Environmental Assessment (EA) for the Brucejack Project.

We appreciate the continued opportunity to take part in the development of the Brucejack Project; please do not hesitate to contact us with any questions or comments.

Yours sincerely,

BGC ENGINEERING INC.
per:

ISSUED AS DIGITAL DOCUMENT.
SIGNED HARDCOPY ON FILE WITH
BGC ENGINEERING INC.

Trevor Crozier, M.Eng., P.Eng.
Principal Hydrogeological Engineer

EXECUTIVE SUMMARY

BGC Engineering Inc. (BGC) was retained by Pretium Resources Inc. (Pretium) to provide a hydrogeologic assessment in support of the Environmental Assessment (EA) Certificate application for the proposed Brucejack Project, located near Stewart, in northwestern British Columbia. The Brucejack Project proposes to open a gold and silver mine that comprises an underground mine with associated waste rock dumps, subaqueous tailings disposal and a plant site.

This report summarizes data used to develop conceptual and numerical hydrogeologic models for the Brucejack Project, details the numerical model calibration and evaluation, and presents results from the predictive simulations for mining operations and closure, including:

- Simulated groundwater inflow rates to the proposed underground mine throughout mining operations for best estimate parameters as well as a range of sensitivity scenarios.
- Simulated groundwater discharge rates to surface water receptors of interest (e.g., Brucejack Lake and creeks represented in the water balance model) under pre-disturbance conditions, throughout mining operations, at closure, and in the post-closure period.
- Drawdown throughout mining operations and at closure, the post-closure simulated recovery of the groundwater system, and simulated steady-state water table configuration post-closure.

Simulations were performed for calibrated, best fit parameters and for a range of sensitivity scenarios. The time periods and general conditions covered by this work extend back to 2010, when initial investigations were conducted by BGC at the site. Data available through late-2013 and early-2014 were used in model development, calibration, and benchmarking. The predictive simulations cover a 2-year mine construction period, a 22-year mining operations period, and a 30-year closure and post-closure period.

The hydrogeologic assessment was completed for the regional study area (RSA), which comprised the boundaries of the numerical hydrogeologic model, with particular emphasis on changes to the groundwater flow system within the local study area (LSA) in the immediate vicinity of the Brucejack mine site (Brucejack Project).

CONCEPTUAL HYDROGEOLOGIC MODEL

Surface topography has a pervasive influence on the groundwater flow system at the site. The elevation in the vicinity of the Brucejack Project ranges from approximately 1,300 m to over 2,000 m at the highest peaks, while elevations in the modeled area descend as low as 500 m in the Sulphurets Creek Valley. Measured groundwater elevations suggest that the water table is a subdued replica of topography, with depths to groundwater typically greater in the uplands relative to the valley bottoms

The climate in the immediate vicinity of the Brucejack Project in considered subarctic, with variable temperatures, and precipitation generally exceeding 1,900 mm/yr. Groundwater enters the flow system from infiltration of precipitation and snowmelt, with lesser components supplied by surface water infiltration in lakes. Groundwater discharge zones are generally restricted to lakes, creeks, gullies, and breaks in slope.

The Brucejack Lake catchment is approximately 27% glaciated; estimates of glacier contributions to streamflow or to groundwater recharge were not available at the time of this analysis.

The hydrostratigraphy of the site comprises a thin layer of glacial till or colluvium underlain by bedrock. Thicker unconsolidated deposits are confined to local sections of the valley bottom and are not present in the vicinity of the proposed underground mine. Bedrock at the Brucejack Project LSA can be broadly divided as follows:

1. Triassic marine sedimentary and volcanic rocks of the Stuhini Group.
2. Jurassic sediments and volcanics of the Hazelton Group.
3. Early Jurassic dikes, sills, and plugs of diorite, monzonite, syenite, and granite, the most common of which are grouped as the “Sulphurets Intrusions”.

Site wide, a general trend of decreasing bedrock hydraulic conductivity with depth is observed, though hydraulic conductivity varies by 2 to 3 orders of magnitude at any given depth. Based on available data there is no apparent relationship between hydraulic conductivity and the major structure in the immediate vicinity of the Brucejack Project, the Brucejack Fault. However, the structure referred to as the Bruce Fault, a westward trending feature occupying Brucejack Creek at the outlet of Brucejack Lake, appears to act as a control on groundwater flow in that area.

NUMERICAL HYDROGEOLOGIC MODEL

The conceptual model described above was used as the basis for the development of a numerical hydrogeologic model, built using the graphical user interface Groundwater Vistas (Environmental Simulations Inc., 2011) and the MODFLOW-Surfact code (Harbaugh et al., 2000; HydroGeoLogic, 2012). Surface water features, including Brucejack Lake and streams in the LSA were represented by general head, drain or river boundary conditions, depending upon the conceptual model appropriate for the hydraulic connection of the feature to groundwater. The numerical model was calibrated in stages to available hydrogeologic data collected within the study area, including 67 packer and slug tests within bedrock, 32 hydraulic head targets, streamflow data and winter low-flow estimates for the period 2008 to 2012, and volumetric discharge data available from mine dewatering activities for the period 2011 to early 2013.

An iterative approach was adopted to adjust parameter values and compare results for the average annual, or steady-state simulations, and transient simulations for both seasonal and dewatering conditions, until a suitable calibration was achieved. The groundwater model was considered calibrated when the best match to steady-state hydraulic head targets in standpipe piezometers and groundwater monitoring wells, and low flow stream flows were achieved, while maintaining a good match to seasonal variations for the head targets in the transient seasonal simulations and drawdown due to adit dewatering.

Prior to predictive simulation runs, an additional simulation was completed to represent ongoing dewatering at the site, and benchmark the model with observed dewatering data. Model benchmarking suggests that the model may slightly over-predict groundwater inflow to the underground workings. Consequently, the base model results will be biased towards over-predicting estimates of the amount of water that will be of operational and environmental concern.

PREDICTIVE SIMULATIONS – MINING OPERATIONS

The average annual rate of groundwater inflow to the underground workings is predicted to remain relatively stable throughout the development of the VOK resource during years 1 to 7 of mine life, ranging between 4,100 and 4,600 m^3/d. The rate of inflow to the underground workings is predicted to increase to an annual average peak of approximately 6,500 m^3/d in year 8, with the initiation of development of the WZ resource. During years 9 to 18 of mine life, predicted annual average inflows range between 5,200 and 5,500 m^3/d, before decreasing slightly to range between 4,900 and 5,200 m^3/d for the final four years of mine life. The overall average flow for the entire simulated period is 4,900 m^3/d.

With the advent of mining operations, groundwater flow within the LSA becomes largely directed towards the dewatered mine workings. The elevation of the water table is drawn down substantially, up to approximately 400 m, within the footprint of the underground workings. At the height of dewatering, drawdown contours propagate over an area 2 to 3 times the size of the mine footprint and the cone of depression associated with 10 m or more of drawdown due to mine dewatering has an areal extent of about 2 km by 3 km.

In general, the surface water streams (e.g., Camp Creek, VOK Creek, and Brucejack Creek) closest to the proposed underground mine are expected to be most impacted by mine dewatering. Changes in groundwater discharge to surface water receptors can be measured through changes to predicted groundwater baseflow at the BJ 2.62 monitoring point and BJL-H1 gauging stations, as the groundwater baseflow consists of the sum of groundwater discharge to boundary conditions upstream of these points (i.e., groundwater discharge to general head boundaries, drain and river boundaries, and groundwater seepage at the defined boundaries). The average baseflow at BJ 2.62 throughout mining operations is predicted to be 6,100 m^3/d, which represents a 20% reduction of the estimated pre-disturbance baseflow of 7,600 m^3/d. The average baseflow at the downstream point BJL-H1 throughout mining operations is predicted to be 7,200 m^3/d, versus the estimated pre-disturbance baseflow of 9,000 m^3/d.

A range of sensitivity analyses (S.A.) were considered to evaluate changes to predicted groundwater heads and water table elevations, groundwater flow rates, and overall fit of the model to field data for a range of input parameters.

Of the 16 sensitivity scenarios considered for the groundwater flow model, two were provided as bounding cases for the water balance model (WBM) sensitivity analysis:

1. S.A. Run 2, with decreased (factor of 5) hydraulic conductivities (K), yielded the smallest groundwater contribution to surface water receptors; and,
2. S.A. Run 12, with increased (factor of 5) hydraulic conductivities and increased recharge (factor of 2) yielded the highest peak groundwater flows to surface water receptors.

For the low K sensitivity scenario (S.A. Run 2), the average estimated rate of groundwater inflow to the underground workings for the entire simulated period is 2,300 m^3/d, which is approximately half the predicted inflow for the base case modeling scenario. Groundwater baseflow reporting to the BJL-H1 gauging station throughout mining operations is predicted to average 5,200 m^3/d for S.A. Run 2, in comparison with 7,200 m^3/d for the base case scenario.

For the high K and high recharge scenario (S.A. Run 12), the overall average flow for the entire simulation is 14,600 m^3/d, which is a factor of 3 greater than the predicted inflow for the calibrated base case scenario. Groundwater baseflow reporting to BJL-H1 throughout mining operations is predicted to average 12,300 m^3/d, a factor of 1.7 greater than the predicted flow to surface water receptors for the base case scenario.

PREDICTIVE SIMULATIONS – CLOSURE AND POST-CLOSURE

The transient post-closure simulation indicates that most recovery happens within 1 to 3 years of the end of active mining operations (i.e., after dewatering ceases), with the groundwater flow system approaching a new equilibrium (i.e., new steady-state condition) within 5 years after the end of active mining. Post-closure, the general arrangement of groundwater elevation contours is consistent with pre-disturbance conditions: the water table is predicted to be a subdued replica of the surface topography and within the LSA the predicted direction of groundwater flow is from areas of higher topographic elevation towards Brucejack Lake and Brucejack Creek. There is also a component of deeper groundwater flow within the LSA that moves westwards, towards the Sulphurets glacier.

Within the footprint of the mine workings, the post-closure water table is predicted to be lower than it was under pre-disturbance conditions; this is a result of the specified hydraulic conductivities of the backfill materials, which are higher than the surrounding bedrock. The areal extent impacted in post-closure with drawdowns of 10 to 25 m relative to pre-disturbance conditions is approximately 0.5 km by 1 km.

Groundwater discharge to surface water receptors is predicted to return to rates approaching pre-disturbance within approximately 5 years following the end of active mining. The post-closure baseflow estimates at BJ 2.62 and BJL-H1 (7,400 m^3/d and 8,800 m^3/d, respectively) both represent 98% of the predicted pre-disturbance flows for these locations (7,600 m^3/d and 9,000 m^3/d, respectively). This suggests that mining operations associated with the Brucejack Project do not result in any significant long-term impact to baseflow in the Brucejack Creek watershed.

Post-closure sensitivity simulations were run as steady-state simulations, with the specific objective of defining the range of possibilities for the final elevation of the water table. The overall direction of the groundwater flow system is consistent for all sensitivity scenarios, though final elevations of the water table vary between sensitivity scenarios. The highest predicted water table is for the scenario represented by S.A. Run 2, in which K was decreased by a factor of 5, and the lowest predicted water table corresponds to the conditions of S.A. Run 16, in which K was increased by a factor of 5 and recharge was decreased by a factor of 2. For all sensitivity scenarios the steady-state post-closure water table is predicted to remain below the mine portals.

Post-closure the steady-state average baseflow at BJl-H1 is predicted to be 8,800 m^3/d for the base case scenario, in comparison with 7,200 m^3/d throughout mining operations and 9,000 m^3/d pre-disturbance. For the sensitivity scenarios, post-closure groundwater flow reporting to BJL-H1 is predicted to range from 5,600 m^3/d (S.A. Run 2) to 19,200 m^3/d (S.A. Run 12). In general, post-closure flows for all sensitivity scenarios are predicted to return to within about 200 to 300 m^3/d of predicted pre-disturbance flows. This suggests that the conclusion that mining operations are not likely to have a significant lasting impact on the quantity of groundwater discharge to surface water receptors within the LSA is robust.

RECOMMENDATIONS

Recommendations for the next phase of project development are summarized below:

- Further investigation of the hydraulic conductivities in the area of the Brucejack Fault is recommended to support the distribution of K in the model and inform fault-related sensitivity analyses. Additional packer testing is recommended for additional geotechnical boreholes targeting the Brucejack Fault as part of the detailed design.
- The inflow estimates are sensitive to the recharge applied to the model in addition to the hydraulic properties of the bedrock at the Brucejack Project. Further consideration and potentially further investigation may be warranted to characterize glacial contributions to baseflow and groundwater recharge.
- The current model does not include a potential lake outlet structure. The next phase of modeling should include the effects of this structure, if it is carried into the detailed design, which, depending upon how it is operated, could alter the elevation of Brucejack Lake and potentially local groundwater flow conditions.
- It will be important to continue the collection of hydraulic head data and pumping rate data from adit dewatering operations on a year-round basis at the project site, as these data are important for future refinement of the conceptual hydrogeologic model and the numerical flow model calibration.

The provided estimates of groundwater inflow to the underground workings are independent of any estimates of excess, or ‘bleed’ water contributed by paste backfilling activities, and are based on mining plans provided by AMC Consultants on February 27, 2013 (stopes) and July 3, 2013 (volumes and elevations). The numerical hydrogeologic model simulations should be revisited if significant deviations from the proposed mining plans are expected.

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LIST OF ACRONYMS & ABBREVIATIONS

3-D	three-dimensional
AET	actual evapotranspiration
ATO	adaptive time-stepping (MODFLOW-Surfact package)
BCF	block centered flow (MODFLOW-Surfact package)
BC MOE	British Columbia Ministry of Environment
CHD	constant head boundary condition
DRN	drain boundary condition
EA	Environmental Assessment
ET	evapotranspiration
FS	Feasibility Study
FWL	fracture well (MODFLOW-Surfact package)
GAL	Galena Zone
GHB	general head boundary condition
K	hydraulic conductivity
LSA	local study area
Ma	mega-annum; million years
mah	metres along hole
m asl	metres above sea level
m bgs	metres below ground surface
m btoc	metres below top of casing
MDRU	Mineral Deposit Research Unit
ML/ARD	metal leaching / acid rock drainage
NRMSE	normalized root mean square error
PCG4	pre-conditioned conjugate gradient (MODFLOW-Surfact package)
PEA	Preliminary Economic Assessment
PET	potential evapotranspiration
RCH	recharge boundary condition
RIV	river boundary condition

RSA	regional study area
RSF	recharge seepage face (MODFLOW-Surfact package)
S.A.	sensitivity analysis
SI	site investigation
S_s	specific storage
S_y	specific yield
TMP	time-varying properties (MODFLOW-Surfact package)
USGS	U.S. Geological Survey
VC	valued component
VOK	Valley of Kings Zone
VWP	vibrating wire piezometer
WZ	West Zone

LIMITATIONS

BGC Engineering Inc. (BGC) prepared this document for the account of Pretium Resources Inc. The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of document preparation. Any use which a third party makes of this document or any reliance on decisions to be based on it is the responsibility of such third parties. BGC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

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1.0 INTRODUCTION

BGC Engineering Inc. (BGC) was retained by Pretium Resources Inc. (Pretium) to complete a hydrogeologic assessment of conditions at their Brucejack Project. The Brucejack Project is located near Stewart, in northwestern British Columbia (Drawing 01), and proposes to open a gold and silver mine that comprises an underground mine with associated waste rock dumps, subaqueous tailings disposal and a plant site.

The hydrogeologic studies comprise a baseline investigation, submitted under separate cover (BGC, 2014a), and the development of a numerical groundwater flow model to provide Feasibility Study (FS) and Environmental Assessment (EA) level hydrogeologic assessment for the Project.

The objective of this report is to summarize previously reported baseline conditions, describe the conceptual and numerical hydrogeologic models, detail the numerical model calibration and evaluation, and provide results from predictive simulations for mining operations and closure. This report will support the EA Certificate application, to be submitted for the Brucejack Project during 2014.

1.1. Previous Work

Previously, BGC provided input to the Preliminary Economic Assessment (PEA) for the combined Snowfield and Brucejack properties, with contributions ranging from mine site geotechnical design (BGC, 2010a), to geohazards assessment, waste-dump design and preparation of a mine water balance. The results of the PEA are summarized in the technical report issued in June 2011 (Wardrop, 2011).

Three geotechnical drill holes and limited field mapping were completed by BGC in 2010, as part of a geotechnical site investigation that also included borehole televiewer surveys, packer testing and the installation of vibrating wire piezometers (VWPs) (BGC, 2011a). Nested shallow and deep VWPs were installed in two of the angled geotechnical drill holes, with a single VWP was installed in the third.

As part of a 2011 groundwater investigation, BGC installed nine vertical groundwater monitoring wells at six locations in the vicinity of the existing underground workings and proposed new development areas (BGC, 2012a). The objective of this investigation was to establish preliminary baseline monitoring points in support of concurrent FS and EA hydrogeology programs at the site.

BGC provided monitoring support during the initial dewatering program for the existing adit at Brucejack (BGC, 2011b), completed between November 2011 and February 2012. The purpose of the dewatering was to decrease the water level within the existing mine workings to allow completion of underground geologic mapping and planning for a bulk sample extraction. Data collected during this program included volumetric discharge from the mine adit, as well as notes on pumping levels and inflow observations. Water quality field parameters were also monitored, and water quality samples were collected.

A *Feasibility Study and Technical Report* was completed for the project, and submitted in June 2013 (Tetra Tech, 2013). In support of the Brucejack Project FS, BGC conducted an extensive site investigation program in 2012 (BGC, 2013a). In the 17 geotechnical drillholes completed as part of the underground and plant site investigations, 3 standpipe piezometers and 16 VWPs were installed. This program also saw the installation of an additional twelve groundwater monitoring wells at the site (MW-BGC12-BJ-4B, MW-BGC12-BJ-6B, MW-BGC12-BJ-8A/B, MW-BGC12-BJ-9A/B, MW-BGC12-BJ-10A/B, MW-BGC12-BJ-11A/B, and MW-BGC12-BJ-12A/B). Packer tests were conducted in seven of the monitoring well boreholes, as well as eleven of the geotechnical drillholes. Following development of the newly installed wells, hydraulic response tests were attempted in all 21 monitoring wells at the site, and dataloggers were installed in all new monitoring wells.

As part of the FS scope of work, BGC developed a numerical hydrogeologic model to estimate inflows to the proposed underground workings (BGC, 2013b), and provided geotechnical guidance and recommendations for the design of the Brucejack Project underground workings (rock mechanics) (BGC, 2013c). BGC also developed a site-wide water balance and surface water management plan for the Project (BGC, 2013d), in addition to providing input on waste rock management (ML/ARD) (BGC, 2013e), and building foundations at the proposed plant site (BGC, 2013f).

1.2. EA Scope of Work

The EA level hydrogeologic assessment conducted for the Brucejack Project consists of the following tasks and deliverables:

- Compilation and review of existing geological and hydrogeologic data, including available data from investigations at neighbouring properties.
- Site investigations to provide additional data for the FS, including packer testing in geotechnical and hydrogeologic drill holes, monitoring well installations and well-response testing, VWP installations, and data logger deployment.
- Hydrogeologic analyses of the data collected to support development of a conceptual hydrogeologic model for the Brucejack Project study area to support the FS and the EA application.
- Numerical modeling using industry-standard software, comprising: model building and development; calibration and pre-operations simulations; predictive operations and post-closure simulations; and, sensitivity analyses.
- Reporting and recommendations for additional work to be completed at subsequent project design phases.

The specific objectives of the predictive mining operations simulations for the EA are: 1) to estimate the rate of groundwater inflow to the proposed underground workings; 2) to predict changes to the groundwater flow system throughout mining operations; and, 3) to estimate groundwater discharge to surface water receptors throughout mining operations.

The objectives of the predictive post-closure simulations are: 1) to predict changes to the groundwater flow system (i.e., groundwater elevation and flow) following mining operations; and, 2) to estimate groundwater discharge to surface water receptors and ground surface in the post-closure period.

This report summarizes data used to develop the conceptual and numerical hydrogeologic models for the site, details the calibration of the flow model, and presents results from the predictive mining operations and post-closure model simulations.

1.2.1. Spatial & Temporal Scope

The groundwater flow model covers the regional study area (RSA), with particular emphasis on the groundwater flow system within the local study area (LSA) in the immediate vicinity of the Brucejack Project (Drawing 02).

The LSA is defined as the Project footprint (all physical structures and activities that comprise the Project) and surrounding area within which there is a reasonable potential for immediate effects on a specific intermediate component or receptor VC due to an interaction with a Project component(s) or physical activity. For the purposes of a hydrogeologic assessment, such effects may broadly include: 1) drawdown of the water table or hydraulic heads due to mine dewatering; 2) accompanying changes in groundwater recharge and/or discharge rates; and/or, 3) changes to groundwater chemistry from geochemical reactions within the mine or waste materials, or within any zones that are dewatered.

It is anticipated that the effects on the groundwater system at the Brucejack Project site will be focused around the underground mine development, and that the LSA from a hydrogeologic perspective will extend over a radial distance of a few kilometres from the proposed mine. This assumption is supported by results from the numerical modeling exercise, discussed further in Sections 8, 9, and 10.

Temporal boundaries covered by this work extend back to 2010, when initial investigations were conducted by BGC at the site. Data available through late-2013 and early-2014 were used in model development, calibration, and benchmarking. The predictive operations simulation covers a 2-year mine construction period and a 22-year mining operations period (25-year model simulation). The predictive closure and post-closure period was modeled with steady-state, as well as 30-year transient simulations.

2.0 OVERVIEW OF SETTING

The Brucejack Project is located in northwestern BC, approximately 70 km north-northwest of Stewart, B.C. at 56°28’20”N latitude by 130°11’31”W longitude (Drawing 01). The project is located in the high alpine of the Sulphurets District of the Iskut River region, approximately 30 km west of Bowser Lake and near the western extent of Pretium’s claims in the area. It is located in a historically active mining and exploration region. Other past producers near the Brucejack Project include: Eskay Creek, Granduc, Scottie, and Snip Mines.

The Brucejack Project proposes to open a gold and silver mine that was previously explored by Newhawk Gold Mines Ltd. during the 1980’s and 1990’s (Pretium, 2012). At the end of Newhawk’s tenure, the project site included camp facilities, shop facilities, a ventilation shaft, an adit, and approximately 5,300 m of exploratory underground development (McLeod, 1999). A major reclamation program was completed in 1999 and the property was placed on a schedule of care and maintenance (McLeod, 1999).

The Brucejack Project was acquired by Silver Standard Resources Inc. in 1999-2000, and subsequently by Pretium Resources Inc. following the discovery of the Valley of Kings Zone in 2009-2010 (Pretium, 2013). Active exploration has been ongoing at the site since that time, including a bulk sample excavation from the Valley of Kings in 2013.

Due to the remote location of the project site, there are no existing public infrastructure works such as power lines. Access to the site is via an all-season access road that crosses the Knipple Glacier, or via helicopter from Bell II or Stewart, B.C., or Granduc via Hyder, Alaska.

The proposed underground operation is to be located to the southwest of Brucejack Lake (Drawing 03). The project will include development of a mill adjacent to Brucejack Lake for primary processing of the ore. Flotation tailings from this mill will be deposited in Brucejack Lake along with a component of the waste rock from the underground mine. Waste rock and paste thickened tailings will also be used to backfill portions of the underground mine. Concentrate produced at the mine site will be hauled off-site by truck along the 70 km long access road that connects to Highway 37.

2.1. Study Area Physiography

The Brucejack Project is located within the Boundary Range of the Coast Mountain Physiographic Belt along the western margin of the Intermontane Tectonic Belt. The region is characterized by steep mountains and extensive glaciation. Within the local project area, elevations vary from 1,300 to 2,000 m asl, but regional relief can reach 1,500 m. Prominent depositional and erosional features that have resulted from glaciation include melt water channels on sloping surfaces and small depressions frequently occupied by ponds and lakes.

The tree line is at approximately 1,200 m elevation; therefore the main project site is sparsely vegetated. Sparse fir, spruce, and alder grow along the valley bottoms, and scrub alpine spruce, juniper, alpine grasses, moss, and heather cover the steep valley walls (Rescan, 2011a).

2.2. Climate & Meteorology

The climate at lower elevations in the modeled area is generally that of a temperate or northern coastal rainforest, with subarctic conditions at the high elevations where the Brucejack Project is located. Within similar mountainous terrain an orographic influence of increased precipitation with increased elevation is often observed (Loukas & Quick, 1996) and this same effect is expected within the study area, resulting in highly variable precipitation and air temperature (Rescan, 2012). Though the Brucejack Project is located more than 200 km inland from the Pacific Ocean, lower mountains near the coast and a corridor created by Behm Canal, Burroughs Bay, and the Unuk River valley allow penetration of maritime air and subsequent abundant precipitation. At high elevations, the heavy precipitation and low temperatures lead to annual snowfalls exceeding annual snowmelts, and permanent icefields result (Rescan, 1987).

Meteorology baseline studies for the Brucejack Project were initiated in 2009, with the installation of an automated meteorological station near the site at an elevation of 1,360 m asl (Rescan, 2012). Precipitation and climate have also been monitored within the region at the Unuk River – Eskay Creek (#1078L3D) and Bob Quinn (#1200R0J) stations, operated by Environment Canada from 1989 to present and 1977 to 1994, respectively.

Mean monthly precipitation estimates at site (BGC, 2014b) are provided in Table 1 along with monthly average values from limited site data and the nearby Unuk River regional station maintained by Environment Canada. The average annual precipitation for the Brucejack meteorological station is about 1,590 mm based on data collected from 2010 to 2012. However, this station is likely under-reporting precipitation due to high wind speeds at the project site leading to undercatch at the precipitation gauge (i.e., wind induced bias leading to reduced precipitation measured by the gauge). In contrast, average annual precipitation estimated by the ClimateBC climate data model (Wang et al., 2012) for an elevation of 1,400 m asl exceeds 2,000 mm, as does annual average precipitation observed at the lower-elevation Unuk River – Eskay Creek station (Table 1). A more detailed description and analysis of site and regional precipitation data is provided in BGC (2014b).

From October to May, most precipitation falls as snow. At higher elevations, snow accumulation can reach between 10 m and 15 m, while snow accumulation in low river valleys ranges from 2 m to 3 m (Rescan, 2011a). Strong winds in all seasons at high elevations lead to significant redistribution of snow (Rescan, 2012). The length of the snow-free season varies from about May through November at lower elevations and from July through September at higher elevations. Monthly mean air temperatures range from approximately -10°C in December and January to +10°C in July and August for this area (Rescan, 2011a). These temperatures are generally similar to regional climate normals for the Unuk River – Eskay Creek station (Table 2).

2.3. Hydrology

The modeled area contains glaciated areas and several streams, wetlands and lakes, the largest of which is Brucejack Lake. The lake is located in the immediate vicinity of the Brucejack Project within a relatively small sub-basin (10.1 km^2) of the Sulphurets Creek watershed (300 km^2). Sulphurets Creek is a tributary to the Unuk River (2,577 km^2) which flows southwest, draining into the Pacific Ocean to the northeast of Ketchikan, Alaska.

The hydrology of the modeled area is characteristic of a snowmelt dominated regime supplemented by glacier meltwaters in the late summer. Peak flows typically occur in mid-summer and low flow conditions occur during the winter months of January to March (Rescan, 2013a). The long period of snow and ice cover limit evaporation at the site. The local terrain at the Brucejack Project is steep, with elevations ranging from 1,300 to 2,000 m above sea level.

The Brucejack Lake catchment is approximately 27% glaciated (Knight Piesold, 2011; BGC, 2014b). Estimates of glacier contributions to streamflow or to groundwater recharge were not available at the time of this analysis.

A hydrology baseline study for the Brucejack Project was undertaken in 2010 (Rescan, 2011b) and updated in 2013 (ERM Rescan, 2014). As the 2013 hydrology baseline report was not available at the time of model development and calibration, data from the 2010 baseline report were used. The 2010 baseline study presented data from automated hydrometric stations installed by Rescan during 2007 and 2008 to characterize the hydrology at a neighbouring property. The hydrometric stations relevant for the Brucejack Project are BJL-H1 and SL-H1 (Drawing 04), which collect continuous water level data downstream of Brucejack Lake and Sulphurets Lake, respectively. Details of the monitoring stations are provided in Table 3, along with mean annual flows and low flows.

A site-wide water balance model and water management plan were developed by BGC for the purposes of the EA, and will be documented under separate cover.

2.4. Geology

The regional geology of the area has previously been described in detail by Grove (1971, 1986), Alldrick (1989), Britton and Alldrick (1988), Alldrick and Britton (1988), Roach and MacDonald (1992), McPherson, et al., (1994) and Savell (2008). Geology of the area used for the numerical hydrogeologic model is illustrated on Drawing 05 while site-specific geology is summarized briefly below; for more detail on local geology, refer to the FS level rock mechanics assessment completed by BGC and provided under separate cover (BGC, 2013c).

2.4.1. Geologic Setting of the Study Area

2.4.1.1. Unconsolidated Deposits

The surficial materials in the local study area consists of a sparse veneer of well-graded glacial till over bedrock. Grain size varies from sand to gravel, with some silt and clay, and variable quantities of cobbles and boulders. Clasts are subrounded to rounded, and colour varies from orange-brown to grey. The thickness of unconsolidated deposits varies but is generally less than 5 m and often less than 1 m. A thin layer of sandy organics, often less than 0.5 m but occasionally up to 3 m, overlies the glacial till deposits.

2.4.1.2. Bedrock Geology

The Brucejack Property is underlain by Upper Triassic volcaniclastic and epiclastic sedimentary rocks of the Stuhini Group and Lower to Middle Jurassic volcanic, volcaniclastic, and sedimentary rocks of the Hazelton Group. An angular unconformity marks the contact between the sedimentary rocks of the Stuhini Group and medium- to coarse-grained sandstones of the Jack Formation which is the basal formation of the Hazelton Group and is dated at about 196 Ma.

The sedimentary rocks belonging to the Jack Formation are overlain by a 10-50 m thick unit of mudstone/argillite and cherty argillite belonging to the Unuk River Member of the Betty Creek Formation. This argillaceous unit is exposed along the southwest side of the West Zone deposit.

Overlying the argillite unit is a 500 m metre-thick package of hornblende and plagioclase-phyric andesitic flows, flow breccias and intermediate tuffaceous rocks intercalated with volcaniclastic conglomerates, sandstones and siltstones. These rocks form the bulk of the Unuk River Member in the Brucejack Property and outcrop extensively within a northwest-trending belt that passes beneath Brucejack Lake. Uranium-lead (U-Pb) geochronology and biochronology done by Mineral Deposit Research Unit (MDRU) geoscientists have determined the age of the Unuk River Member volcanics to be in the range of 196 to 194 Ma.

The rocks of the Unuk River Formation are overlain by a thick sequence of dacitic pyroclastic rocks (tuff-breccia, lapilli tuff, crystal-lithic tuffs, minor ash tuff) and flows with thin argillite interbeds belonging to the Brucejack Lake Member of the Betty Creek Formation. These are exposed on the mountainside north of Brucejack Lake.

The intrusive Unuk River Member andesites are the most important host rocks to the gold and silver bearing quartz veins discovered in the Brucejack Property (P&E Mining Consultants, 2009), and are the focus of the proposed development in the Valley of Kings (VOK) and West Zone (WZ).

2.4.2. Lithologies and Alteration of the Study Area

Multiple stages and zones of alteration have been noted at the Brucejack site. The rocks in the VOK and WZ are highly altered, and in many cases stratigraphic relationships must be used on top of lithologic descriptions. The main lithologies include:

- Volcanics: Felsic, intermediate, and mafic volcanics as well as mafic dykes.
- Porphyries: Plagioclase-hornblende porphyritic rocks, potassium feldspar-hornblende-plagioclase porphyritic rocks, and plagioclase porphyritic rocks.
- Intrusives: Felsic, intermediate, and mafic intrusives.
- Sediments: Conglomerates, sandstone/arenite, mudstone/siltstone/pelites, carbonates, cherts/jasperites.
- Hydrothermals: Quartz veins, quartz-carbonate veins, quartz-silicate veins, hydrothermal replacement, hydrothermal breccias, and intensely silicified breccia zones.
- Metamorphics: Metamorphosed felsic igneous rock, and metamorphose intermediate to mafic igneous rocks (these lithologies present only in Snowfields).
- Fault zones.

Alteration assemblages vary with proximity to deformation events, but sericitic alteration is pervasive throughout the project area. Carbonate, chlorite, and silica alteration are also common.

As summarized by Greig (2012), mid-Cretaceous deformation, which represents the major phase of regional deformation, has deformed both the mineralized zones and the host stratigraphy and therefore post-dates the mineralization event. The regional event led to the development of the predominant west-north-west to east-north-east trending, very steeply dipping foliation best displayed in the altered rocks which are the immediate hosts to the mineralization. Late stage brittle faulting has locally disrupted some of the earlier tectonic fabrics. There is evidence for northerly, northwest, and northeast fault trends.

Two major phases of folding are present on the property. Although their origin is uncertain, they may have been developed during the mid-Cretaceous event. One fold axis generally trends northerly but with an arcuate shape, and the other is a tightly folded syncline plunging to the east-southeast with the above-mentioned dominant foliation primarily axially parallel to it. Both fold axes are steeply plunging.

2.4.3. Major Structures of the Study Area

At the time of model development and report preparation, a structural geologic model was not available from Pretium. The major regional lineaments, as interpreted by ERSi (2010), around the Brucejack area are the Brucejack Fault lineament, the Upper Treaty Glacier lineament and the Treaty Creek lineament. The Bruce Fault, a west-trending fault occupying Brucejack Creek was also identified at earlier stages of exploration as a major feature at the site (McPherson et al., 1994).

The Brucejack Fault truncates several site-scale faults at the western extent of the Brucejack property, and thus has been interpreted as post-dating site-scale deformation events. Orientations parallel to the inferred Brucejack Fault lineament were commonly observed in downhole structural measurements across the property. All interpreted structural domains include sets oriented along the Brucejack Fault with dips ranging from 56˚ to vertical.

The Upper Treaty Glacier lineament is a prominent high angle topographic lineament north of the Brucejack property. Although not associated with a specific fault set, similarities in regional topography and drainages make it likely that parallel structures will be prevalent throughout the study area. The Upper Treaty Glacier appears in drillhole and underground mapping data in the northern regions of the property, and appears locally in the West Zone and VOK 1 domains as a moderately strong shear and joint set. It also aligns with the topographic lineament used to define the VOK 2 – VOK 3 structural domain boundary.

The Treaty Creek lineament strikes east-southeast and extends north to the Iskut River Fault. The lineament marks the contact between the Hazleton Group and Bowser Lake Group rocks to the north of the property, and is a common orientation for valleys and drainages in the region. It is expected that lineament-parallel steep structures will be prevalent throughout the study area. The Treaty Creek lineament was observed in drillhole data as a joint and shear set throughout the property, and parallels the VOK 1 – VOK 2 domain boundary.

The Brucejack Fault lineament is currently the only known major structure that intersects the proposed mining footprint. It is a northerly striking anastomosing fault zone located along the western margin of the study area and extends north to the Iskut River Fault. In places the lineament appears to be several sub-vertical to moderately (greater than 60°) dipping fault strands braided together. The zone has normal faulting with variable displacement estimated at 500 to 800 m (ERSi, 2010).

3.0 HYDROGEOLOGIC DATA

To support the development of a numerical hydrogeologic model for the Brucejack Project, BGC has compiled hydrogeologic data available from recent site investigations, reports, other consultants, and geologic models. The data set is summarized in the following sections.

3.1. Overview

Hydrogeologic data specific to the Brucejack Project has been collected since 2010, through site investigations associated with a Preliminary Economic Assessment (PEA), Feasibility Study (FS), and Environmental Assessment (EA) hydrogeology baseline study (BGC, 2014a). Additional hydrogeologic data are available to the west of the Project location, from site investigations at the neighbouring KSM Project (Tetra Tech – Wardrop, 2012).

In 2010, three geotechnical drillholes were completed by BGC at Brucejack as part of a combined Snowfield and Brucejack Property site investigation (SI). Packer tests were conducted in all three drillholes, and nested shallow and deep RST vibrating wire piezometers (VWPs) were installed in two of the drillholes (SU-82, SU-88). A single VWP was installed in the third drillhole (SU-77). Continuous single-channel dataloggers set to record measurements of pressure and temperature at 6-hour time intervals were attached to all VWP installations.

In the fall of 2011 BGC completed a preliminary hydrogeologic investigation at Brucejack, with nine groundwater monitoring wells installed at six locations; three sets of nested shallow and deep wells (MW-BGC11-BJ-1A/B, MW-BGC11-BJ-3A/B, MW-BGC11-BJ-5A/B), and three individual wells (MW-BGC11-BJ-2A, MW-BGC11-BJ-4A, MW-BGC11-BJ-6A). All wells were developed, purged, and sampled as part of the baseline groundwater monitoring program. Pressure transducers (HOBO data loggers by Onset Corporation) were installed in all nine monitoring wells, collecting water level measurements at 6-hour time intervals.

Pretium commenced dewatering of the existing underground workings in late fall 2011, and proceeded for a period of approximately three months, terminating in February 2012. During this time ‘drawdown’ in the workings was monitored by Pretium, as was volumetric discharge from the underground workings via an in-line flow gauge.

In spring 2012, BGC conducted an extensive site investigation program associated with the Brucejack Project FS. In the 17 geotechnical drillholes completed as part of the underground and plant site investigations, 3 standpipe piezometers and 16 VWPs were installed. This program also saw the installation of an additional twelve groundwater monitoring wells at the site (MW-BGC12-BJ-4B, MW-BGC12-BJ-6B, MW-BGC12-BJ-8A/B, MW-BGC12-BJ-9A/B, MW-BGC12-BJ-10A/B, MW-BGC12-BJ-11A/B, MW-BGC12-BJ-12A/B). Packer tests were conducted in seven of the monitoring well boreholes, as well as eleven of the geotechnical drillholes. Following development of the newly installed wells, hydraulic response tests were attempted in all 21 monitoring wells at the site. HOBO pressure transducers and data loggers collecting water level measurements at 6-hour time intervals were installed in all new monitoring wells.

Dewatering of the existing workings was resumed in August 2012, and has been on-going since that time. In 2013, Pretium excavated a bulk sample from the VOK to further evaluate the geological interpretation and Mineral Resource estimate for the site (Snowden, 2013). The underground development reached the bulk sampling area in May 2013, and underground drilling in support of the bulk sample program commenced in mid-May. Underground drilling terminated in November 2013.

To the west of the Brucejack Project and within the numerical model domain, additional hydrogeologic data is available from field investigations carried out at a neighbouring property by Rescan Environmental Services Ltd. (Rescan) and Klohn Crippen Berger Ltd. (KCBL) in 2008 and 2009. These field investigations included packer testing, standpipe piezometer installation, water level readings and slug tests. Groundwater elevation data were reviewed and incorporated into the hydrogeologic model, while hydraulic conductivity estimates not within the LSA were excluded.

Locations of the instrumentation described above are shown on Drawing 04.

3.2. Hydraulic Conductivity Data

Hydraulic conductivity (K) data from a total of 67 hydraulic tests carried out in bedrock at the Brucejack Site were available for analysis and review. Six packer tests results were available from 2010 investigations, with an additional 46 results obtained during the 2012 site investigations. Slug tests completed in monitoring wells at the Brucejack project in 2012 provide another 15 estimates of hydraulic conductivity. Hydraulic conductivity data are summarized in Table 4, with further details provided in Appendix A. Analyses of packer tests are included as Appendix B, and analyses of slug tests are included as Appendix C.

Hydraulic conductivity data are presented schematically versus depth by test type (i.e., packer test, slug test) in Drawing 06, and by lithology (i.e. sedimentary, metamorphic, volcanic, intrusive, hydrothermal) in Drawing 07. There is no clear relationship between hydraulic conductivity and rock type. The general trend of decreasing hydraulic conductivity with depth (or with increasing confining stress) shown on Drawings 06 and 07 is commonly observed within bedrock, and is illustrated in Figure 3-1 after Rutqvist and Stephansson (2003).

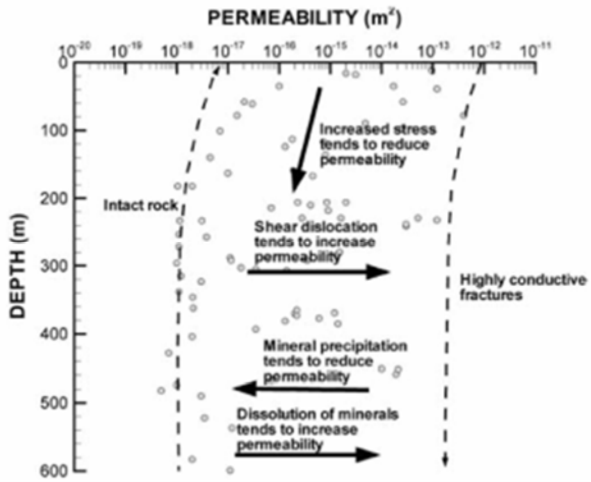

Figure 11. Permeability measured in short-interval well tests fractured crystalline rocks in Gidea, Sweden. Effects of shear dislocation and mineral precipitation/dissolution pro cesses obscure the dependency of permeability on depth (stress). The permeability values on the left-hand side represent intact rock granite, whereas the permeability values on the right-hand side represent highly conductive fractures.

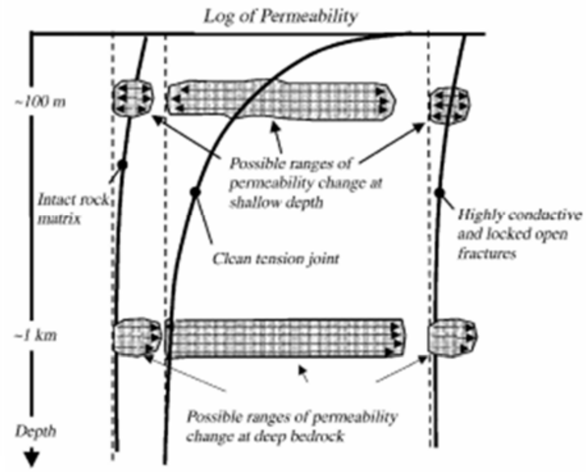

Figure 23. Schematic representation of possible permeability changes at shallow and deep locations in fractured bedrock. The solid lines represent the depth-(or stress-) permeability function for intact rock, clean tension joints and highly conductive and locked-open fractures.

Figure 3-1 Permeability vs. Depth - from Rutqvist and Stephansson, 2003.

Though a general trend of decreasing hydraulic conductivity with depth is observed in site data, hydraulic conductivity is observed to vary by two to three orders of magnitude at any given depth. The geometric mean of hydraulic conductivity estimates from slug tests is higher than the geometric mean of estimates from packer tests, with values of $8.3x10^{-7}$ m/s and $1.5x10^{-7}$ m/s, respectively (Table 4). This is expected, as site monitoring wells are screened within 100 m of ground surface, and were installed to target conductive zones in order to facilitate groundwater quality sampling for the EA baseline program (BGC, 2014a). Packer tests, while generally targeting conductive features as well, were completed over intervals at depths reaching up to 500 m below ground surface.

The geometric means of hydraulic conductivity estimates differentiated by lithology are generally similar, ranging from $1.0x10^{-7}$ m/s to $6.0x10^{-7}$ m/s, with the exception of the lower geometric mean of $3.0x10^{-8}$ m/s obtained for metamorphic materials. This estimate, however, is based on very few results (n=2); the majority of hydraulic conductivity results for the Brucejack site are for the volcanic (n=16) and sedimentary (n=22) materials of the Hazelton Group, and associated intrusives (n=25) (Table 4).

Drawing 08 presents hydraulic conductivity data from tests conducted over intervals where fault zones or multiple discontinuities were noted, along with tests conducted over intervals of stickrock with one or fewer minor discontinuities noted. Hydraulic conductivity results were similar in both the faulted and non-faulted intervals, with geometric means of $3.8x10^{-7}$ m/s and $1.3x10^{-7}$ m/s, respectively. Two packer tests were completed in a single drillhole at intervals specifically identified as the Brucejack Fault. The results from these packer tests varied significantly; a constant head packer test at a depth of approximately 510 m bgs returned a hydraulic conductivity of $2.0x10^{-8}$ m/s, and a series of falling head tests at a depth of approximately 450 m bgs returned a geometric mean hydraulic conductivity of $9.4x10^{-7}$ m/s. Due to this variability, further investigation of hydraulic conductivity within the Brucejack Fault zone has been recommended.

Hydraulic conductivity data are not available for unconsolidated deposits in the LSA. However, estimated hydraulic conductivity from falling head tests conducted in boreholes and standpipe piezometers completed in unconsolidated materials during the 2008 and 2009 drilling programs by Rescan and KCBL at the KSM property ranged from $1x10^{-5}$ m/s to $3x10^{-9}$ m/s, with a geometric mean of $2x10^{-7}$ m/s (BGC, 2010b).

3.3. Hydraulic Head Data

Hydraulic head data are collected by the network of dataloggers attached to VWPs and pressure transducers, described in Section 3.1, supplemented by manual water level measurements in standpipe piezometers. Plots of groundwater elevation through time for the majority of the instruments installed at the Brucejack Project are included as Appendix D (Groundwater Hydrographs).

The vibrating wire piezometers (VWPs) installed in 2010 have the longest continuous record of groundwater elevation at the site, with data extending back to September of 2010. These hydrographs show pronounced annual variation in groundwater elevation for a given location, with water levels slowly decreasing 10 to 20 m over the course of the winter season, and recovering rapidly with the recharge that occurs during snowmelt. In general, groundwater elevations are observed to mimic topography (i.e., higher groundwater elevations in instrumentation completed at higher elevations and vice versa), and show greater seasonal variation at higher elevations. Observed hydraulic heads at the Brucejack Project ranged from at or just above ground surface, typically at lower elevations (e.g., MW-BGC11-BJ-3A/B), to 60 to 70 m below ground surface (e.g., MW-BGC12-BJ-12A).

Interpretation of hydraulic head data at the Brucejack Project is complicated by dewatering and drilling activity at the site. Adit dewatering, which occurred from November 2011 to February 2012, created a very pronounced decrease in the water table in nearby wells, with some water levels dropping below the level of the pressure transducers (e.g., MW-BGC11-BJ-1A/B). Dewatering recommenced in August 2012, and has been ongoing on an intermittent basis since that time. Drilling associated with mineral exploration and geotechnical investigations at the site involves the rapid, localized injection of water on a sporadic basis throughout the Brucejack Project area. This is reflected in the groundwater hydrographs as a spiky pattern of rapidly fluctuating water levels (e.g., MW-BGC11-BJ-5A/B).

3.4. Storage Parameter Data

Insufficient field data were available to calculate reliable estimates of storage parameters of the bedrock at the time of model development. For the purposes of this modeling study, storage values were initially estimated based upon experience with similar materials in similar settings and on values from the literature and then were adjusted during the model calibration process (Section 7.0). Additional time-varying field data (i.e., groundwater elevation and volumetric discharge data versus time) collected as part of adit dewatering ongoing since August 2012 will be used to further refine estimates of storage parameters in subsequent phases of modeling.

4.0 CONCEPTUAL HYDROGEOLOGIC MODEL

4.1. Overview and Development

Hydrogeologic data collected by BGC in the vicinity of the existing and proposed underground workings were compiled to identify hydrostratigraphic units, to assess hydraulic conductivity of these units, and to build an understanding of groundwater flow within the LSA. Hydrogeologic data collected by other consultants during site investigations at the neighbouring KSM property were reviewed and were used to inform the conceptual model for the RSA.

The conceptual model as it relates to pre-disturbance conditions is described below (Section 4.2) with particular emphasis on the LSA, and is summarized schematically in Drawing 09. The conceptualization of mining operations and post-closure conditions are discussed in Sections 4.3 and 4.4, respectively. The conceptual model described in the sections that follow formed the basis for development of the numerical hydrogeologic model.

4.2. Pre-Disturbance Conditions

4.2.1. Groundwater Elevations, Recharge & Discharge

Surface topography can be expected to have a pervasive influence on the underlying mountain flow system (Forster & Smith, 1988), particularly with the abundance of precipitation at the site. Elevations in the vicinity of the Brucejack Project range from approximately 500 m in the Sulphurets Creek Valley to over 2,000 m at the highest peaks. Measured groundwater elevations suggest that the water table is a subdued replica of topography, with depths to groundwater typically greater in the uplands relative to the valley bottoms.

Groundwater enters the flow system from infiltration of precipitation and snowmelt, with lesser components supplied by surface water infiltration from lakes. There are pronounced seasonal fluctuations in groundwater levels, particularly at higher elevations. Groundwater discharge zones are generally restricted to lakes, creeks, gullies, and breaks in slope (Drawing 02). Only a minor component of groundwater discharge is anticipated to occur via evapotranspiration at within the sparsely vegetated LSA and evaporation is expected to be very limited.

Within the RSA, groundwater recharge is expected to be greater at higher elevations due to orographic effects and associated increases in precipitation with elevation. Groundwater recharge in areas not covered by glaciers is inferred to occur over approximately 6 months per year, as typical temperature time-series plots show above-zero temperatures from May through October, corresponding to increases in groundwater elevations. There is significant uncertainty with respect to groundwater recharge below areas covered with temperate glaciers in the LSA and RSA. It is believed that these glaciers may contribute recharge to the groundwater system year round; however, the magnitude of this contribution is unknown.

4.2.2. Groundwater Flow Directions

Within the LSA groundwater recharge occurs at upper elevations, while groundwater discharge is expected to be concentrated in streams and Brucejack Lake. The groundwater flow reporting to streams and creeks may be associated with gullies, breaks in slope, or geological contacts, though otherwise no groundwater seeps have been reported at the site.

The major lake within the LSA, Brucejack Lake, sits at an approximate lake elevation of 1364.5 m asl. Insufficient data are available to characterize seasonal fluctuations in lake level, although these fluctuations are not likely significant from a groundwater flow perspective because there is continuous flow from Brucejack Lake to Brucejack Creek, effectively regulating the lake level.

Regionally and at depth groundwater flow occurs westwards following topography within the RSA, towards the Sulphurets Glacier and further west towards the Unuk River system. The bedrock K, discussed further in the section that follows, is considered sufficiently low that regional head boundaries representing the Unuk River are not necessary.

4.2.3. Hydrostratigraphy & Structural Controls

The hydrostratigraphy of the Brucejack site and surrounding area comprises a thin, discontinuous layer of glacial till or colluvium, underlain by bedrock.

Thicker unconsolidated deposits are confined to local sections of the valley bottom within the RSA and are generally absent in the vicinity of the proposed underground mine (LSA). Because of the general absence of unconsolidated surficial materials, and the fact that the geometric mean hydraulic conductivity estimate for unconsolidated materials at the neighbouring KSM Project, $2x10^{-7}$ m/s (BGC, 2010b), is very similar to the geometric mean hydraulic conductivity estimate for shallow bedrock at the Brucejack Project, $4x10^{-7}$ m/s, explicit representation of surficial unconsolidated deposits in the numerical model is not considered necessary.

The bedrock of the RSA can be broadly divided as follows:

1. Triassic marine sedimentary and volcanic rocks of the Stuhini Group.
2. Jurassic sediments and volcanics of the Hazelton Group.
3. Early Jurassic dikes, sills, and plugs of diorite, monzonite, syenite, and granite, the most common of which are grouped as the “Sulphurets Intrusions”.

The LSA lies entirely within the undifferentiated bedrock of the Hazelton Group, while at a regional scale differentiation between the Hazelton and Stuhini Groups is considered appropriate.

Site-wide, a general trend of decreasing bedrock hydraulic conductivity with depth is observed (Drawing 06 and Drawing 07), though hydraulic conductivity varies by 2 to 3 orders of magnitude at any given depth. This range of variation in hydraulic conductivity in a fractured rock setting is largely a function of the point scale of measurement of a packer test or slug test (i.e., the length of the test interval may only extend several metres to several 10's of meters and the radius of influence of an individual test is on the order of metres) and the number, continuity, aperture and infilling of joints and discontinuities in the rockmass. In general, a large number of point scale tests are required to obtain a reasonable estimate of the mean hydraulic conductivity of a rockmass.[1] The range of hydraulic conductivities obtained via hydraulic response testing at the site extends from approximately 10^{-9} m/s to 10^{-5} m/s.

There is no apparent relationship between K and discontinuities observed in the bedrock (Drawing 08), possibly due to extensive infilling. Similarly, there is no apparent relationship between hydraulic conductivity and the major structure in the immediate vicinity of the Brucejack Project, the Brucejack Fault. However, the Bruce Fault, a west-trending feature occupying Brucejack Creek is considered a significant feature in the local flow system. Its conceptualization as a high K fault is supported by drilling investigation observations (e.g., discontinuity logging) and packer testing.

4.3. Mining Operations Conditions

The conceptualization of mining operations outlined below formed the basis for the implementation of the underground mine in the predictive model simulations.

The deepest mine workings will occur at an elevation of approximately 1,000 m asl, with the portals used to access the underground workings located at an approximate elevation of 1,410 m asl. It is anticipated that all boreholes and exploration drillholes will be located and grouted or plugged prior to mining operations

It is expected that the existing mine workings and VOK bulk sample exploration drift will be dewatered leading up to mining operations. The land surface will be altered during construction to accommodate a mill site, laydown area, and other infrastructure. These changes to surficial topography are not anticipated to affect the hydrogeologic system leading up to operations, as drawdown due to dewatering of the existing underground workings and any future exploration developments will already be occurring. Minor alterations to the site topography during mining operations (e.g., construction of a contact water collection pond, waste rock dumps etc.) are not expected to have any significant influence on the groundwater flow system.

Mining is conceptualized to advance on an annual time step, with stopes and mine development (i.e., access and egress ramps and declines) becoming active simultaneously at the start of each year, according to a specified annual mine plan. Stopes will be backfilled with waste rock or paste tailings. Stope backfilling is assumed to be complete one year following mining of a stope elevation. Mine access developments are anticipated to remain open throughout mining operations, until mine closure.

[1] Methods to measure larger scale hydraulic conductivities (e.g., pumping tests, or monitoring of adit dewatering) are generally necessary to confirm mean hydraulic conductivity estimated from point scale testing.

It is anticipated that passive groundwater infiltration to the underground workings during mining operations will report to sumps and be pumped from the underground. Paste backfilling activity during mine operations is not expected to significantly influence the hydrogeologic system (i.e., act as a source of either recharge or discharge), though it may result in additional ‘bleed’ water reporting to pumps.

Throughout mining operations, tailings will be deposited in Brucejack Lake. It is assumed that the lakebed conductance will decrease with the deposition and consolidation of fine-grained tailings materials. Simplifying assumptions around tailings deposition and consolidation will be required for the numerical model. Waste rock will also be deposited in Brucejack Lake, however, due to the anticipated contrast in hydraulic conductivity between waste rock and lake bed sediments (i.e., K waste rock >> K lake bed) this is not considered to be a limiting factor with regards to conductance through the base of the lake.

4.4. Post-Closure Conditions

Post-closure it is anticipated that the last of the underground stopes as well as all of the underground development will be backfilled with a combination of paste backfill, waste rock, and miscellaneous mine waste. This will yield a net increase in the hydraulic conductivity of the bedrock fabric in the LSA where mining occurred. In the absence of detailed information on backfilling and closure operations, it is assumed that the stopes will be one order of magnitude more permeable than the bedrock fabric, and that the development cells will be two orders of magnitude more permeable.

As mentioned in Section 4.3, the bed conductance of Brucejack Lake will be altered during mining operations due to the deposition of tailings in the lake. The tailings deposit is expected to consolidate through time; simplifying assumptions consistent with those used throughout operations will be used to represent the lakebed conductance post-closure.

The mine site layout and other changes to surface topography will need to be represented accurately in the post-closure model to assess the final position of the water table and to gauge the potential for seepage from the mine portals.

5.0 NUMERICAL MODEL DEVELOPMENT & REFINEMENT

This section describes the development of the three-dimensional (3-D) numerical groundwater flow model for the Brucejack Project. The model was initially developed in support of the Feasibility Study (FS) submission (BGC, 2013b). The model was subsequently refined in support of the Environmental Assessment (EA) submission and is the subject of this report. This EA modeling effort specifically focused on targets in the immediate vicinity of the LSA, and incorporated data that became available following the FS submission.

The objective during development of the numerical groundwater flow model was to simulate groundwater flow by incorporating controlling features of the conceptual hydrogeologic model for the site, as described in Section 4.

The numerical groundwater flow model was calibrated to best represent the following components of the hydrogeologic system under steady-state and transient conditions:

- Observed groundwater elevations and flow rates within the study area.
- Surface-water baseflow within the study area.
- Adit dewatering drawdown response.

Final calibrated parameters and boundary conditions are presented in the sub-sections below, with specifics on the steady-state and transient calibration simulations detailed in Sections 6 and 7, respectively. As part of the process of calibration and model refinement, the groundwater flow model was benchmarked against ongoing dewatering activities at the site, as described in Section 8.

5.1. Numerical Model Description

Groundwater Vistas (version 6.22, Build 2; ESI, 2011), a graphical user interface, was used to develop the MODFLOW-Surfact groundwater flow model for the Brucejack Project and surrounding regional study area. MODFLOW is an industry standard 3-D, finite-difference groundwater flow model developed by the U.S. Geological Survey (Harbaugh et al., 2000). The model utilized the block-centered flow (BCF), recharge seepage face (RSF), and time-varying property (TMP) add-on packages available in Surfact (Version 4.0; HydroGeoLogic, 2011) in order to simulate variably saturated flow, seepage faces, and time-varying hydraulic properties. The adaptive time stepping (ATO) package was used to optimize time-stepping in conjunction with the robust flow solver PCG4.

Inputs to the model include (1) hydraulic parameters that control the flow of water within the model domain, and (2) boundary conditions that control the addition and removal of water to and from the model domain.

Steady-state simulations were run by assigning boundary conditions to represent average annual conditions, discussed further in Section 6. Transient simulations were run using stress periods (i.e., individual periods with specified boundary conditions) of varying length, to simulate seasonal trends in groundwater recharge and evapotranspiration, hydraulic heads and creek flows. Winter conditions were simulated over a 6-month period, from November to

April, with summer conditions occurring over a 6-month period, from May to October. Details of the transient model calibration and benchmarking are discussed in Section 7.

5.2. Numerical Model Geometry and Grid

The 3-D groundwater model domain encompasses the area shown on Drawing 09. The model grid consists of 220 columns and 183 rows, covering an area of approximately 12 km by 12 km. Ten model layers were used to discretize the domain in the vertical dimension for a total of 402,600 grid blocks. Uniform 25 m by 25 m grid blocks were defined in the vicinity of the existing and proposed underground workings (LSA). The horizontal dimensions of the grid blocks were expanded away from this operational area by a factor of approximately 1.5 to a maximum size of 120 m by 150 m at the outer regions.

The elevation of the top layer was set at ground surface. In the vertical direction, the upper 300 m was divided into 7 layers, with layers increasing in thickness from 5 m in layer 1 to 100 m in layer 7. The three underlying layers range from approximately 50 m thick in the valley bottoms to 1,100 m thick below the ridge tops. The base of the model domain was set at sea level, which is approximately 1,000 m below the deepest extent of the proposed underground mine workings. The model grid is shown on Drawing 10.

A groundwater divide was inferred along ridge tops (i.e., topographic divide) that form the upper reaches of the Sulphurets Creek watershed, which is the hydrogeologic area of interest (see Section 5.6 for discussion of boundary conditions). Grid blocks lying outside of this region were deactivated in the model, as shown on Drawing 10.

5.3. Hydrogeologic Units and Parameters

The distribution of hydrogeologic units within the groundwater model domain is shown on Drawing 11, and the hydraulic parameters assigned are described in Table 5. Note that these parameters were obtained through calibration, as described later in Sections 6 and 7. Throughout the model domain, hydraulic conductivity was specified to decrease with depth. A distinct model layer for the surficial unconsolidated material model layer was not included because the material is thin and discontinuous, it has a geometric mean hydraulic conductivity that is similar to that of the shallow bedrock unit, and it is generally absent in the area of interest (LSA). Thus, the unconsolidated material was assumed to have properties similar to that of the shallow bedrock within the upper model layer (Layer 1).

The near-surface values of hydraulic conductivity assigned to each hydrogeologic unit were initially based on the results of hydraulic testing performed to date and summarized in Table 4. These hydraulic conductivity values were subsequently refined by calibrating the model to observed hydraulic head and flow targets (Sections 6 and 7).

In the vicinity of the Brucejack Project, the Hazelton Group was assigned calibrated hydraulic conductivities that decreased from $2x10^{-6}$ m/s in the upper 20 m to $4x10^{-7}$ m/s at depths of 50 m to 100 m. Below that depth, hydraulic conductivity decreased further, from $1x10^{-7}$ m/s to $5x10^{-9}$ m/s at the base of the model domain. To the west of the Brucejack Project, the Stuhini

Group was assigned a lower calibrated hydraulic conductivity of 1×10^{-7} m/s in the upper 100 m of the model domain, and hydraulic conductivities decreased from 2×10^{-8} m/s to 5×10^{-9} m/s through the remainder of the model domain. A graphical representation of observed and calibrated hydraulic conductivity values versus depth is provided as Drawing 12.

Aquifer storage parameters (i.e., specific storage, S_s and specific yield, S_y) were assigned based on representative values from reference materials (Maidment, 1992; Freeze & Cherry, 1979), and were assessed on the basis of transient adit dewatering response observed in monitoring wells in the LSA (see Section 7.2).

5.4. Boundary Conditions

Boundary conditions applied to all model simulations are discussed below. Boundary conditions specific to each calibration or predictive simulation are discussed at the start of later sections.

5.4.1. Areal Boundary Conditions

Boundary conditions applied over the surface area of the model domain for all cases include recharge, which represents the addition of water to the groundwater system (Section 5.4.1.1), and evapotranspiration (Section 5.4.1.2) which represents the removal of water from the groundwater system.

5.4.1.1. Recharge

Areal recharge was assigned to the water table to represent groundwater recharge from precipitation and runoff. To represent anticipated differences in the areal or topographic distribution of precipitation (see Section 2.2) recharge was divided into four zones: valley, mid-slope, uplands, and glacier-covered areas. The areal zonation was held constant while recharge rates were modified as part of the calibration process in order to best match hydraulic head and streamflow targets. The four recharge zones are shown on Drawing 13, with calibrated rates summarized in Table 6.

A Thornthwaite water budget analysis for the Brucejack Project site, detailed in Appendix E, estimates a maximum ‘net infiltration’ of 800 mm/yr. For steady-state simulations, recharge rates applied where glaciers are not present increased from about 380 mm/yr in the valleys to 550 mm/yr in the uplands. These rates are equivalent to approximately 19% to 27% of mean annual precipitation at the Unuk River – Eskay Creek Meteorological Station. A uniform recharge rate of 350 mm/yr was applied to glacier-covered areas within the model domain.

For transient simulations, recharge in non-glaciated areas was assumed to be 0 mm/month during the snow covered period (November through April). Recharge rates of approximately 65 mm/month to 90 mm/month, from valley bottom to uplands, were assigned during the summer period (May through October). Consistent with the steady-state model, a constant, uniform recharge rate of 350 mm/yr was assigned to glacier-covered areas in the transient model.

There is no information available on sub-glacial groundwater flow in the vicinity of the Brucejack Project, nor is there consensus in the literature on the best approach to modeling recharge beneath temperate glaciers. The recharge assigned to the model (i.e., 350 mm/yr) under glacier-covered areas is an approximation, and is explored further through sensitivity analyses (Section 11).

5.4.1.2. Evapotranspiration

Evapotranspiration (ET) was included in the numerical model to represent the loss of water from groundwater to the atmosphere.

An evapotranspiration rate of 450 mm/yr was applied to the model in layer 1 at elevations less than 1,200 m asl; that is, at valley bottoms in the western portion of the model domain (Drawing 14). ET was not applied above an elevation of 1,200 m asl, as sparse vegetation occurs above this elevation. For the transient model, evapotranspiration was applied for summer stress periods only, similar to recharge. The extinction depth (i.e., the water table depth below which ET ceases) was set at 5 m everywhere that evapotranspiration was applied.

5.4.2. Additional Boundary Conditions

In addition to recharge and evapotranspiration, three types of boundary conditions were assigned to the model domain: specified head boundaries, head-dependent boundaries, and no-flow boundaries. The geometry of the pre-disturbance boundary conditions is shown on Drawing 15.

5.4.2.1. Creek & Stream Boundaries

The majority of the creeks within the model domain were simulated using the Drain Package (DRN). The Drain Package allows groundwater to discharge to surface when the water table is higher than the specified drain elevation, but does not allow any groundwater recharge from streams. Stream bed elevations were based on surface topography, while conductance was based on an assumed stream width of 3 m and an assumed hydraulic conductivity of $1x10^{-5}$ m/s. This relatively high hydraulic conductivity value essentially allows groundwater to freely drain into streams where the water table reaches the stream elevation.

The River Package (RIV) was used to simulate the section of Brucejack Creek downstream of Brucejack Lake and above the Sulphurets Glacier, as well as the stream that runs along the trace of the Brucejack Fault. The RIV package allows water to both enter and exit the model domain at these boundaries, which are in close proximity to the proposed underground workings. Sulphurets Creek downstream of Sulphurets Lake was also modeled using a river boundary. Riverbed elevations were based on surface topography, and incised 3 m into the surface of model layer 1. River stage (i.e., water depth) was assumed to be 0.5 m downstream of Brucejack Lake and 1.5 m downstream of Sulphurets Lake. River conductance was based on assumed river widths of 3 m, and an assumed hydraulic conductivity of $5x10^{-6}$ m/s.

5.4.2.2. Brucejack & Sulphurets Lake Boundaries

The two lakes lying within the model domain, Brucejack Lake and Sulphurets Lake, were simulated using head-dependent and specified-head boundaries, respectively. The general-head boundary (GHB) at Brucejack Lake was set at the approximate design elevation for the lake, 1364.5 m asl. As limited information on the Brucejack Lake bed was available at the time of modeling, lake conductance was calculated based on an assumed bed thickness of 1 m and assumed vertical hydraulic conductivity of $1x10^{-6}$ m/s. Topography within the footprint of Brucejack Lake was set to follow the lake bathymetry (Rescan, 2013b). The constant head boundary at Sulphurets Lake was set at the approximate lake elevation of 590 m asl. In the absence of sufficient data, lake elevations did not vary seasonally for the transient model.

5.4.2.3. No-Flow Boundary Conditions

The ridgelines located to the north, south and west of the active model domain, the regional study area (RSA), were set as no-flow boundaries. These ridges represent inferred groundwater divides that correspond to surface-water divides. To the east of the active model domain the ground surface topography is undefined due to the presence of the Knipple Glacier. This area has been interpreted as a surface-water catchment divide by others (e.g., Knight Piesold, 2011) and this divide, based on glacier topography, was set as a no-flow boundary in the numerical model. The bottom of the model domain at elevation 0 m asl, approximately 1,000 m below the deepest proposed mine workings and situated within materials having very low hydraulic conductivities, was also assumed to act as a no-flow boundary.

6.0 CALIBRATION OVERVIEW AND STEADY-STATE MODEL CALIBRATION

6.1. Numerical Model Calibration Overview

The groundwater flow model was calibrated using a strategic trial-and-error process involving the manual variation of hydraulic conductivity, storage and recharge within observed and expected ranges to obtain the best match to hydraulic head measurements recorded in piezometers, and to estimated low-flow streamflow from a synthetic dataset.

Calibration was performed in three stages:

1. The model was calibrated to average annual heads using the average annual (i.e., steady-state) boundary conditions described in Section 5.4. Initial hydraulic properties were assigned to each material using best estimates from field studies (Section 5.3), and were manually adjusted within measured or estimated parameter ranges. This first stage of model calibration is discussed in Section 6.2.
2. The model was further calibrated to trends in seasonal hydraulic heads and low-flow streamflow measurements using the seasonal (i.e., transient) boundary conditions described in Section 5. The emphasis for this transient simulation was matching winter low-flow streamflow data, as discussed in Section 7.1.
3. The model was used to simulate the transient dewatering of the existing underground workings that took place from early November 2011 to early February 2012, and from August 2012 onwards. This final stage of model calibration is discussed in Section 7.2.

An iterative, manual approach was used to adjust the parameter values and compare results for the average annual steady-state simulation, and the transient simulations for seasonal and dewatering effects, until a suitable calibration was achieved. The groundwater model was considered calibrated when the best match to steady-state hydraulic head targets in standpipe piezometers and groundwater monitoring wells, and low-flow surface water flows reported at BJL-H1 was achieved, while maintaining a good match to seasonal variations (i.e., summer and winter) for the head targets in the transient seasonal simulations, as well as drawdown due to adit dewatering.

6.2. Steady-State Hydraulic Head Calibration Simulations

The following subsections describe the boundary conditions and hydraulic head targets used in the steady-state model calibration, and summarize steady-state head target calibration results.

6.2.1. Boundary Conditions

The boundary conditions used in the steady-state hydraulic head calibration are as described in Section 5.4.

The steady-state recharge rates applied where glaciers are not present varied from about 380 mm/yr in the valleys to 550 mm/yr in the uplands. A uniform recharge rate of 350 mm/yr was applied to glacier-covered areas within the model domain. An evapotranspiration rate of 450 mm/yr was applied to the model in layer 1 at elevations less than 1,200 m asl; that is, at valley bottoms in the western portion of the model domain.

No changes were made to the boundary conditions representing the lakes, streams, or inferred hydrologic divides within the model domain.

6.2.2. Hydraulic Head Targets

Within the groundwater model domain, groundwater elevation data were available for 20 instruments in the LSA plus 12 instruments installed during site investigations at the neighbouring KSM property. Of the 20 instruments located at the Brucejack Project, 5 are VWPs installed during geotechnical investigations and 15 are monitoring wells installed during hydrogeologic investigations at the site. All are located within approximately a 2 km radius (Drawing 04) in the vicinity of the zones targeted for mining operations. Of the 12 instruments installed in the RSA to the west of the Brucejack Project, all are standpipe piezometers installed at elevations ranging from 1,400 m asl on the walls of the Sulphurets Valley to 700 m asl near the valley bottom (Drawing 04).

The frequency and duration of data collection varied widely between calibration targets; for some locations two or more years of monitoring data were available, while for others only 2 to 3 months of baseline data (i.e., measurements not impacted by drilling or dewatering; see Section 3.3) were available. Calculated average annual groundwater elevations were used as calibration targets for the steady-state model where sufficient data were available to capture seasonal fluctuations in water levels. Where sufficient data un-impacted by drilling or dewatering within the LSA were not available, average annual groundwater elevations were estimated by visual assessment of groundwater hydrographs (Appendix D).

6.2.3. Steady-State Simulation Calibration Results

Model calibration results are discussed below; the emphasis for the steady-state calibration was matching average annual hydraulic heads. The final, calibrated hydraulic parameters, based on all of the calibration simulations, are presented in Table 5.

Simulated versus observed hydraulic heads for the calibrated steady state model are summarized in Table 7. The same results are presented graphically on Drawing 16 for head targets in the immediate vicinity of existing and proposed underground workings as well as for targets outside the LSA. A normalized root mean square error (NRMSE) of 10% is generally suggested as a guideline for the maximum difference between simulated and measured target values (Wels et al., 2012). The NRMSE of the Brucejack model calibration is 1.8% for all hydraulic head targets within the RSA, 8.3% for all head targets within the LSA (i.e., including both geotechnical instrumentation and monitoring wells), and 4.6% for monitoring well targets only in the LSA.

Simulated steady-state groundwater discharge (i.e., baseflow) to Brucejack Lake and the creeks reporting to BJL-H1 was 4,600 m^3/d (0.053 m^3/s). This rate is on the same order as the average annual 7-day low-flow rate of 0.073 m^3/s reported for the BJl-H1 gauging station by Rescan (2013c) for 2008 to 2011.

A plot of the calibrated steady-state simulated water table contours is provided as Drawing 17. In general, the water table is predicted to mimic the surface topography, consistent with the conceptual model of the hydrogeologic system. Within the local study area, the predicted direction of groundwater flow is from areas of higher elevation towards Brucejack Lake and Brucejack Creek. There is a component of deeper groundwater flow that occurs westwards, towards the Sulphurets Glacier.

7.0 TRANSIENT NUMERICAL MODEL CALIBRATION

The transient numerical model calibration consists of the 2nd and 3rd stages of calibration described in Section 6.1. The subsections that follow describe the boundary conditions and targets used in the transient baseflow calibration (Section 7.1) and adit dewatering calibration (Section 7.2) simulations, as well as results from these calibration simulations.

7.1. Baseflow Calibration Simulation

The emphasis of the transient seasonal model simulation was matching winter low-flow streamflow data in the LSA, with consideration given to seasonal trends in hydraulic heads. The following sections describe the transient seasonal boundary conditions and creek flow targets used for the simulation (Sections 7.1.1 and 7.1.2), and discuss results of the baseflow calibration simulation (Section 7.1.3). Discussion of seasonal hydraulic heads is reserved for Section 7.2.3.

7.1.1. Boundary Conditions

The boundary conditions used in the transient baseflow calibration are as described in Section 5.4.

Recharge in non-glaciated areas was assumed to be 0 mm/month during the snow covered period (November through April). Recharge rates of approximately 65 mm/month to 0 mm/month, from valley bottom to uplands, were assigned during the summer period (May through October). Similarly, evapotranspiration was applied for summer stress periods only. Consistent with the steady-state model, a constant, uniform recharge rate of 350 mm/yr was assigned to glacier-covered areas in the transient model.

No changes were made to the boundary conditions representing the lakes, streams, or inferred hydrologic divides within the model domain (Section 5.4).

Initial heads for the transient baseflow calibration simulation were exported from the steady-state simulation. The transient simulation was spun-up (i.e., repeatedly solved for the same cyclical, year-long boundary conditions) for 9 years, with results from the 10th year of the simulation being used for comparison to the creek flow targets, discussed below.

7.1.2. Creek Flow Targets

Rescan provided daily observed and estimated streamflows from 2007 through 2012 at BJL-H1 (Drawing 04). A significant portion of the dataset during winter (low-flow) periods is estimated, or synthetic, due to under-ice conditions, and is therefore associated with some uncertainty (Rescan, 2013c). Estimates of winter low-flow at BJL-H1, considered to be a good indicator for baseflow, were used as the primary calibration target for winter stress periods of the transient seasonal model.

Winter low-flow measurements at BJL-H1 ranged from a daily low of 0.015 m^3/s (1,270 m^3/d) on November 20, 2012 to an estimated mean monthly low flow of 0.065 m^3/s (5,630 m^3/d) during February, and averaged 0.18 m^3/s (15,200 m^3/d) from the months of October through May.

Data were also available at SL-H1 (Drawing 04); however, these data were not used as a baseflow target due to the complexity in distinguishing between glacial streamflow and groundwater baseflow contributions. Furthermore, this point is too far removed from the LSA to be considered a reliable target for evaluating calibration in the immediate project vicinity.

7.1.3. Baseflow Calibration Results

Simulated groundwater discharge (i.e., baseflow) to Brucejack Lake and the creeks reporting to BJL-H1 averaged 7,300 m^3/d (0.084 m^3/s) over the 6-month winter season. Observed low-flows and simulated baseflows are summarized in Table 8 for each stress period within the winter season; in general, the model matches mid-winter flows (Jan-Feb stress period) well, with 0.080 m^3/s of baseflow predicted vs. 0.072 m^3/s of low-flow observed.

Groundwater discharge rates to Brucejack Lake and the creeks in the LSA from this transient seasonal model simulation were provided as inputs to the site-wide water balance model (WBM) for undisturbed baseline conditions.

7.2. Transient Dewatering Calibration Simulation

The following subsections describe the data used in the third stage of model calibration, and summarize calibration results for the transient dewatering simulation. Dewatering of the existing underground workings at the Brucejack Project site occurred from early November 2011 to early February 2012. Dewatering activities resumed in August 2012, and have been ongoing since that time.

7.2.1. Hydraulic Head & Adit Dewatering Data

At some monitoring locations, only a few measurements were available; consequently, calibration statistics were calculated using steady-state hydraulic heads targets (Section 6.2.3). Strong consideration was given to reproducing the timing, location, and magnitude of seasonal trends in undisturbed groundwater elevations at monitoring stations for which continuous hydrographs could be developed (Appendix D).

Adit dewatering data provided by Pretium for November 2011 to early February 2012, and from August 2012 through early January 2014 are presented in Appendix F, and summarized in Table 9. Totalized volume of flow from the adit was measured through a gauged line prior to discharge until January 2013, when a water treatment system was installed. With the water treatment system in place total system discharge is reported, in addition to inlet flow rates for each of the treatment lines and the by-pass system (EMC, 2013).

Data from the first three months of dewatering (Nov 2011 – Feb 2012) can be summarized as daily totalized volumetric discharge that averaged 975 m^3/d, but varied on a daily basis from 50 m^3/d to 13,500 m^3/d. When dewatering resumed in August 2012, it was at a lower rate; the average daily totalized volumetric discharge rates for the subsequent 3-month periods can be summarized as follows:

- Aug 2012 – Oct 2012 daily average discharge 280 m^3/d
- Nov 2012 – Jan 2013 daily average discharge 260 m^3/d
- Feb 2013 – Apr 2013 daily average discharge 700 m^3/d

Dewatering data through April 2013 were used for the calibration simulation. Data from subsequent dewatering activities were reserved to benchmark the numerical model, as described in Section 8.

7.2.2. Adit Dewatering Simulation Setup & Boundary Conditions

Dewatering of the adit was simulated by breaking seasonal stress periods of the transient model into multiple stress periods to achieve the necessary temporal resolution, and by using the Fracture Well (FWL) package available in MODFLOW-Surfact to replicate pumping from the adit. The FWL Package represents the flow of water from multiple high permeability units to a well. Wellbore storage effects, due to the large volume of a water extraction feature, may be accommodated.

A vertical FWL was assigned within the centre of the existing adit with an average radius of 2.0 m and a well screen from 1,390 m asl to 1,200 m asl. Due to the large radius of the adit, wellbore storage effects were incorporated. Model cells in layers 2 to 7 within which the existing workings fall were assigned enhanced horizontal and vertical hydraulic conductivities (K_h of 5.0×10^{-4} m/s and K_z of 2.5×10^{-3} m/s) to allow water to freely drain into the simulated well.

A pumping rate of 975 m^3/d was applied for the 3-month period from November 2011 through January 2012. No adit dewatering occurred over the following six months, and consequently no pumping rate was applied. A pumping rate of 280 m^3/d was applied for the 3-month summer stress period from August through October 2012. A pumping rate of 260 m^3/d was applied for the 3-month winter stress period from November 2012 through January 2013, and a pumping rate of 700 m^3/d was applied for the 3-month winter stress period from February through April 2013.

7.2.3. Transient Dewatering Calibration Results

Plots of simulated and observed hydraulic heads for head targets with continuous data are presented in Appendix G. Although head offsets are generally present at each location, the plots illustrate that the model captures observed fluctuations reasonably well. That is, the magnitude and timing of changes in head at discrete points are represented by the generalized numerical model. This good representation is despite temporal and spatial complications introduced by irregular drilling activities, variable dewatering rates (Section 3.2) and geological uncertainty.

Observed piezometric fluctuations were poorly reproduced at some locations (e.g., MW-BGC11-BJ-1A, -3B, SU-77, -82D, -88S). Rapid, minor fluctuations in observed heads that may be associated with drilling or may be responses to precipitation events cannot be reproduced using the seasonal stress periods selected. Some of the locations with substantial dewatering responses were also poorly reproduced (e.g., MW-BGC11-BJ-1A, DH-BGC12-19). These targets respond immediately to adit dewatering, suggesting a direct hydraulic connection with the underground workings. Such direct connections cannot be represented with the available data and at the scale of discretization possible in the numerical model.

In general, a good match to seasonal variations (i.e., summer and winter) for the head targets in the transient seasonal simulations was achieved. Similarly, good matches to drawdown in response to dewatering, and to steady state hydraulic head targets and low-flows at BJL-H1 were achieved. As such, the model was considered to be adequately calibrated for the purpose of the environmental assessment.

8.0 PRE-OPERATIONS SIMULATIONS & MODEL BENCHMARKING

Steady-state simulations to represent ongoing dewatering occurring at the site leading up to the start of proposed mining operations were run in order to benchmark the numerical model against observed dewatering rates and to create initial head conditions for the predictive simulations.

As discussed previously (Sections 3.1 and 7.2), dewatering of the existing workings in the West Zone (WZ) has been ongoing since August 2012. The monthly average pumping rate from the adit to maintain the water level at roughly 1,300 m asl varied between approximately 1,000 m^3/d and 2,000 m^3/d in the summer of 2013. The pumping rate declined from September 2013 through January 2014, from approximately 1,700 m^3/d to 900 m^3/d (Table 9). This decline follows the seasonal trend in groundwater elevation, and also reflects the cessation of exploration drilling activity, during which water was injected into the bedrock, in November 2013. For the purpose of the model, it was assumed that water level in the adit will be maintained at approximately 1,300 m asl until underground mining commences.

8.1.1. Boundary Conditions

Surface boundary conditions are the same as for the undisturbed steady-state simulations (Section 5.4), with additional drain boundary conditions (i.e., head-dependent boundaries) used to represent the underground workings.

The drains representing the dewatered WZ workings and the newly mined VOK bulk sample drift in the numerical model, and used to simulate ongoing dewatering of the underground workings, are shown on Drawing 18. The conductance of the drains was calculated using the Thiem solution and the Peaceman (1983) formula for calculating conductance for a borehole or underground opening. Tunnels for the existing workings and new VOK drift were assumed to be 2.5 m in radius and hydraulic conductivities were assumed to be those of the associated model cell. Elevations for water levels within drain cells were specified according to the existing adit dimensions down to 1,300 m asl in the WZ, and in the VOK according to existing and planned (at the time of model build) tunnel dimensions and elevations.

8.1.2. Simulation Results & Model Benchmarking

Simulated steady-state water table contours within the LSA for the pre-operations simulation are shown on Drawing 19. In general, the water table is predicted to mimic the surface topography, similar to the pre-disturbance condition. The predicted direction of groundwater flow is from the upland areas towards Brucejack Lake, with slightly altered water table contours in the footprint of the existing WZ underground workings and VOK drift.

Steady-state discharge from the existing underground workings (i.e., flow to drain boundaries representing the underground workings) is predicted to be about 2,500 m^3/d in the simulation. This compares favourably to the 2,000 m^3/d of discharge observed in July 2013, at which point the VOK bulk sample exploration drift was not yet complete. Discharge from the underground workings was expected to increase with completion of the underground drift (i.e., dewatering a greater rock mass should cause an increase in flow), however, it was anticipated that this increase would be checked by the seasonal decrease in groundwater elevations (i.e., lower water levels would result in a lower hydraulic gradient driving flow into the underground workings).

The most recent data from August 2013 through mid-January 2014, which saw pumping rates from the underground decline to approximately 900 m^3/d, indicate that the seasonal reduction in groundwater flow is greater than the anticipated increase with completion of the bulk sample drift. However, because exploration activities were ongoing during a portion of the data collection period, it is not possible at this point to try to resolve inflow to the underground driven by natural processes from anthropogenic (e.g., drilling) activities. In light of this new data, it appears that the predicted steady-state flow to the existing underground workings of 2,500 m^3/d is an overestimate, but should be considered conservative from the perspective of sizing water treatment facilities during operations.

Continued flow and groundwater level monitoring during ongoing mine exploration and development activities over the next several seasons will allow additional model calibration studies to support the next level of project design.

9.0 PREDICTIVE SIMULATIONS: MINING OPERATIONS

9.1. Overview

A base case transient predictive simulation was used to evaluate the groundwater flow system throughout proposed mining operations at the Brucejack Project. The simulation was based on the 22-year underground mine plan received from AMC Consultants on July 3, 2013 (AMC, 2013). The information provided with the 22-year mine plan included annual mined volumes and approximate mined elevations on an annual basis for the West Zone (WZ), Valley of Kings (VOK) Zone, and Galena (GAL) Zone, as well as an annual waste schedule.

The production and waste schedules were combined with the stope plan received from AMC Consultants on February 27, 2013, and the development plan received from AMC Consultants on July 8, 2013 and updated on December 6, 2013, to develop mine sequencing for the predictive simulation. The mine sequencing assumed throughout mining operations is summarized in Table 10. Mining of the VOK Zone occurs from years -2 to 22, while mining of the WZ occurs from years 8 to 22. The GAL Zone, which represents about 2% of the total ore tonnage, was grouped with the VOK Zone for the purposes of the numerical model.

The proposed mine plan has an areal footprint of approximately 1,000 m by 600 m, with development descending to an elevation of about 1,000 m asl in both the VOK Zone and WZ.

The objectives of the predictive mining operations simulation were as follows:

- to estimate the rate of groundwater inflow to the proposed underground workings;
- to predict changes to the groundwater flow system throughout mining operations; and,
- to evaluate changes to groundwater recharge/discharge areas and changes to groundwater discharge to surface water receptors throughout mining operations.

The set-up of the predictive mining operations simulation, and simulation results are described in the following sections.

9.2. Boundary Conditions & Hydraulic Properties

For the most part, boundary conditions for the predictive mining operations simulations are the same as those used in the previous calibration simulations (see Sections 5.4 and 7.1.1). Changes to boundary conditions and any associated changes in hydraulic properties specific to the predictive mining operations simulations are discussed below; boundary conditions for the mining operations simulations are shown in plan view on Drawing 20.

9.2.1. Initial Conditions & Time Stepping

The base case transient predictive simulation was developed using 2-month stress periods with seasonal recharge and evapotranspiration, as discussed in Section 5.4. The mining operations simulation was set up to correspond with the calendar year (i.e., with the first stress period corresponding to the months of January and February), to facilitate integration with the WBM.

Initial heads for the model simulation were exported from the pre-operations steady-state simulation discussed in Section 8.

9.2.2. Underground Mine

Underground mining stopes and associated development were simulated using head-dependent boundaries constrained to only allow outflow (i.e., drain boundary conditions). Water levels within drain cells were specified at the depth of mining. Drains representing the development (i.e., underground workings, access and egress ramps, and declines) were turned on, or became active, according to the annual schedule indicated in Table 10, and remained active throughout mining operations. Drains representing the stopes were turned on according to the phased mining indicated in Table 10, and were turned off when the stopes were assumed to be backfilled with paste tailings, one year after mining of a stope level. The arrangement of drains representing the underground workings is illustrated on Drawing 21 for years -2, 6, 12, and 18 of mining operations.

The conductance of the development drains was calculated using the Thiem solution and the Peacement (1983) formula. Development tunnels were assumed to be 2.5 m in radius, and the hydraulic conductivity was assumed to be that of the associated model cell. In contrast, the conductance of each stope drain was set to a high value based on model cell dimensions to allow water to freely drain into the underground workings.

As mentioned above, stope cells were assumed to be backfilled one year after mining of a stope level. This was represented in the model via deactivation of the drains representing the stope cells and alteration of the hydraulic conductivity in the appropriate cells to one order of magnitude greater than the surrounding bedrock fabric.

9.2.3. Brucejack Lake

The conductance of the general head boundary at Brucejack Lake, set at the elevation of 1,364.5 m asl, was adjusted throughout mining operations to reflect tailings deposition. For the simulation, conductance was adjusted for cells with lake bathymetry below 1,314 m asl (i.e., the assumed maximum elevation of the tailings deposit) assuming a vertical hydraulic conductivity of 1×10^{-7} m/s (Appendix H), and half the tailings thickness to reflect average thickness of the deposit.

The areal extent of the tailings deposit is shown on Drawing 22 for years 1, 4, 8, and 22 of mining operations, and the elevation of the tailings deposit is shown below in Figure 9-1.

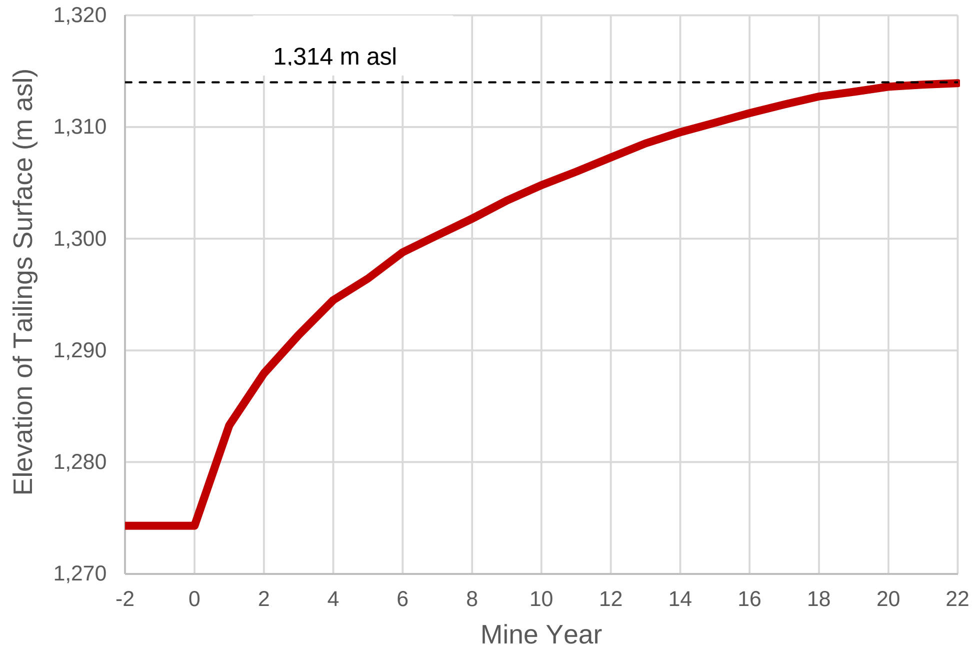

Figure 9-1 Elevation of the tailings deposit in Brucejack Lake throughout mining operations.

The thickness of the tailings deposit in Brucejack Lake was calculated using the provided waste schedule, an assumed density of 1.6 tonnes/m^3, and an assumed settlement of 100% in the year of deposition (Appendix H). Deposition of waste rock will occur along with tailings deposition in Brucejack Lake, but the tailings are considered to be the limiting factor with regards to bed conductance because of their fine-grained nature.

9.3. Mining Operations Model Results

Results of the predictive mining operations simulation are summarized in the following subsections, organized by modeling objective.

9.3.1. Estimated Mine Inflows

The annual average flows to active drains representing the underground workings are presented in Table 11, along with the number of drains operating in each year of mine life. The estimated inflows for each stress period of the numerical model, along with annual average estimated inflows, are shown graphically on Drawing 23.

The average annual rate of groundwater inflow to the underground workings is predicted to remain relatively stable throughout the development of the VOK resource during years 1 to 7 of mine life, ranging between 4,100 and 4,600 m^3/d. The rate of inflow to the underground workings is predicted to increase to an annual average peak of approximately 6,500 m^3/d in year 8, with the initiation of development of the WZ resource. During years 9 to 18 of mine life, predicted annual average inflows range between 5,200 and 5,500 m^3/d, before decreasing slightly and ranging between 4,900 and 5,200 m^3/d for the final four years of mine life. The overall average flow for the entire simulated mining period is 4,900 m^3/d.

Note that the peak inflows that appear on Drawing 23 are in the stress period at the beginning of each year. These peaks arise because the model boundary conditions are set to advance the mine and backfill stopes on an annual basis. A more detailed mine plan would yield a smoother hydrograph.

9.3.2. Groundwater Elevations and Flow

Within the broader RSA, the direction of groundwater flow is similar to pre-mining conditions (Drawing 17) throughout mining operations. Within the LSA, the direction of groundwater flow is substantially altered, particularly in the footprint of the underground workings. Flow within the LSA becomes largely directed towards the dewatered mine workings.

During mining operations, the elevation of the water table is drawn down substantially – up to approximately 400 m – within the footprint of the underground workings. The maximum predicted drawdown is illustrated on Drawing 24; this drawdown occurs in year 12 of mining operations, after which the water table starts to recover as lower elevation stope cells are mined out and backfilled in the WST and VOK. At the height of dewatering, drawdown contours propagate over an area 2 to 3 times the size of the mine footprint. The areal extent where the cone of depression associated with mine dewatering exceeds 10 m is approximately 2 km by 3 km.[2]

Plots of predicted groundwater elevation contours and drawdown at the end of mine life (year 22) are provided on Drawing 25 and Drawing 26, respectively. The groundwater elevation contours and flow vectors clearly illustrate that groundwater flow is directed towards the dewatered underground in the LSA, while westward flow continues in the broader model domain. In terms of drawdown, Drawing 26 shows that approximately 100 to 150 m of recovery occurs between year 12 and year 22 of mining operations. At the end of mine life, the elevation of the water table is drawn down by approximately 250 m within the footprint of the mine workings, and the cone of depression where drawdown exceeds 10 m has shrunk to an approximate areal extent of 1.5 km by 2 km.

9.3.3. Groundwater Discharge to Receptors

Groundwater discharge to surface water receptors throughout mining operations was quantified for each 2-month model stress period using the U.S. Geological Survey (USGS) ZONEBUDGET program, (v.3.01). ZONEBUDGET is a program for computing user-specified sub-regional water budgets for MODFLOW groundwater flow models (Harbaugh, 1990).

Within the Brucejack LSA, the following zones were defined:

[2] A cone of depression with drawdown exceeding 10 m is considered to represent mine dewatering while drawdown less than 10 m is considered to represent seasonal differences in groundwater elevation (i.e., winter operations water table vs. steady-state pre-disturbance water table).

- Brucejack Lake
- Streams that are tributaries to Brucejack Lake
- Brucejack Creek between Brucejack Lake and the BJ 2.62 monitoring point
- Brucejack Creek between BJ 2.62 and the BJL-H1 gauging station
- "Camp Creek", the stream discharging to the south side of Brucejack Creek downstream of Brucejack Lake
- "VOK Creek", the stream discharging to the south side of Brucejack Creek that runs through the trace of the Brucejack fault
- "Unnamed Creek", the stream discharging to the north side of Brucejack Creek that runs through the trace of the Brucejack fault

The zone budget results and data provided for input to the hydrology model are presented in Appendix I, along with a diagram showing the distribution of zones within the numerical model domain. Predicted groundwater discharge to surface water receptors (i.e., baseflow) for the base case development scenario are plotted on Drawing 27, and are discussed in more detail below:

Brucejack Lake & Tributaries

Groundwater discharge to the drains representing tributaries upstream of Brucejack Lake is not predicted to change considerably during mining operations; average annual discharge in the final year of mining operations is a predicted 4,200 m^3/d, versus the pre-disturbance annual average discharge of 4,400 m^3/d.

Groundwater discharge to the general head boundary representing Brucejack Lake is not predicted to change considerably during initial mining of the VOK resource (2,100 m^3/d average annual pre-disturbance vs. 1,900 m^3/d averaged through year 8 of mining operations), but discharge is predicted to decrease somewhat with the advent of mining in the WZ. The estimated average groundwater discharge to the general head boundary for years 8 through 22 of mining operations is 1,800 m^3/d.

Brucejack Creek

The segment of Brucejack Creek between Brucejack Lake and the BJ 2.62 monitoring point is predicted to experience a decrease in groundwater discharge throughout mining operations, and particularly when mining occurs in the WZ. The pre-disturbance average annual groundwater flow is an estimated 1,000 m^3/d, which decreases to 180 m^3/d through year eight of mining operations, and to 20 m^3/d thereafter. Average groundwater discharge to the drain and river cells, as well as groundwater seepage to this boundary throughout mining operations is an estimated 90 m^3/d.

The segment of Brucejack Creek between BJ 2.62 and the BJL-H1 gauging station is farther from the footprint of the proposed mine, and therefore is less impacted. Groundwater discharge to the river cells representing this segment of the stream is not predicted to change considerably during initial mining of the VOK resource (370 m^3/d average annual pre-disturbance vs. 310 m^3/d averaged through year 8 of mining operations), but is also predicted to decrease with the advent of mining in the WZ. The estimated average groundwater discharge for years 8 through 22 of mining operations is 260 m^3/d.

Brucejack Creek Tributaries

There is no groundwater discharge to the drains representing “Camp Creek” throughout mining operations – an expected outcome as the course of this stream directly coincides with the cone of depression created by mine dewatering. The predicted average annual groundwater discharge to “Camp Creek” under pre-disturbance conditions is 100 m^3/d.

The stream referred to as “VOK Creek”, which runs through the trace of the Brucejack Fault, also coincides with the cone of depression created by dewatering. The estimated average annual groundwater discharge to the river cells representing this stream is 180 m^3/d, which decreases to an estimated 30 m^3/d averaged over the 22-year life of mining operations.

The third tributary to Brucejack Creek upstream of BJL-H1 is referred to as “Unnamed Creek”, a stream running through the trace of the Brucejack Fault on the north side of the creek. The pre-disturbance average annual groundwater discharge to drains representing “Unnamed Creek” is an estimated 820 m^3/d, which decreases to 730 m^3/d through year eight of mining operations, and to 620 m^3/d thereafter. The average groundwater discharge throughout mining operations is an estimated 670 m^3/d.

BJL-H1 & BJ 2.62

The predicted groundwater baseflow, or groundwater component of streamflow, at the BJ 2.62 monitoring point and BJL-H1 gauging station consists of the sum of groundwater discharge to boundary conditions upstream of these points (i.e., groundwater discharge to general head cells, drain and river cells, and the groundwater seepage component of recharge out at the defined boundaries). The average baseflow at BJ 2.62 throughout mining operations is a predicted 6,100 m^3/d, which represents a 20% reduction of the estimated pre-disturbance baseflow of 7,600 m^3/d. The average baseflow at the downstream point BJL-H1 throughout mining operations is a predicted 7,200 m^3/d, versus the estimated pre-disturbance baseflow of 9,000 m^3/d.

It should be noted that while baseflows are predicted to decrease during operations, total streamflow is predicted to increase due to the collection, treatment and discharge of groundwater reporting to the underground mine. Detailed discussion of project effects on surface water quantity is provided in BGC (2014b).

Brucejack Mine Site

The Brucejack mine site layout was not represented explicitly in the mining operations model. It is not a receptor of groundwater discharge due to the mine dewatering; no groundwater flow reports to the site cut during mining operations. The site layout and flows to this receptor post-closure are discussed in Sections 8.2.3 and 8.3.2, respectively.

10.0 PREDICTIVE SIMULATIONS: POST-CLOSURE

10.1. Overview

Two base case predictive simulations were used to evaluate the groundwater flow system following closure of mining operations at the Brucejack Project: 1) a steady-state simulation, and 2) a transient 30-year simulation. The steady-state simulation represents average annual conditions post-closure, after the groundwater system has fully recovered following mine dewatering. The transient simulation incorporates seasonality, and simulates the recovery of the groundwater system over time.

The objectives of the predictive post-closure simulations were as follows:

- to predict changes to the groundwater flow system (i.e., groundwater elevation and flow) following mining operations; and,
- to estimate groundwater discharge to surface water receptors and surface cuts in the post-closure period.

The set-up of the post-closure simulations, and the simulation results are described in the following sections.

10.2. Boundary Conditions & Hydraulic Properties

Boundary conditions for the predictive post-closure simulations are shown on Drawing 28. Most of the boundary conditions are the same as those used in the previous calibration and predictive simulations (see Sections 5.4, 7.1.1, and 9.2). Changes to boundary conditions specific to the post-closure simulations, as well as relevant changes in hydraulic properties are discussed below.

10.2.1. Transient Time-Stepping & Initial Conditions

For the transient post-closure simulation, the first ten years were assessed using 2-month stress periods, followed by seasonal 6-month stress periods thereafter. Seasonal recharge and evapotranspiration were applied, as discussed in Section 5.4. The transient post-closure simulation was set up to directly follow the predictive mining operations simulation. Thus, initial heads for the post-closure simulation were exported from final stress period of the mining operations simulation.

10.2.2. Underground Mine

As covered in Section 7.2.1, the underground mining stopes and associated development were simulated using drain boundary conditions. Drains representing the stopes were turned off one year after mining of a stope level, and the hydraulic conductivity of the associated grid blocks was increased to one order of magnitude greater than the surrounding bedrock fabric, to represent backfilling. Drains representing the development (i.e., underground workings access and egress ramps and declines) were turned on one year prior to mining of a stope level, and remained active throughout mining operations. For the post-closure simulations, these drains were deactivated at closure, and the hydraulic conductivity of the associated grid blocks was specified to be two orders of magnitude greater than the surrounding bedrock fabric.

The range of hydraulic conductivities used to represent backfilled model cells was as follows:

- Stope cell K range from 1.6×10^{-5} m/s in Layer 1 to 2.0×10^{-7} m/s in Layer 8
- Development cell K range from 1.6×10^{-4} m/s in Layer 1 to 2.0×10^{-6} m/s in Layer 8

The assumptions around paste backfilling and assigned hydraulic conductivities are explored further through sensitivity analyses, discussed in Section 11.

10.2.3. Brucejack Lake

The conductance of the general head boundary at Brucejack Lake, set at the approximate lake elevation of 1,364.5 m asl, was adjusted for the post-closure simulations to reflect the tailings deposition that occurred throughout mining operations. Conductance was adjusted for cells with lake bathymetry below 1,314 m asl (i.e., the assumed maximum elevation of the tailings deposit) assuming a vertical hydraulic conductivity of 1×10^{-7} m/s (Appendix H), and half the total tailings thickness at closure to reflect average thickness over the deposit.

10.2.4. Mine Site Layout

The proposed mine site layout, provided by Tetra Tech Inc. (Tetra Tech) on November 20, 2013, includes a mill building that will also house the warehouse, mine dry, water treatment plant, and administrative areas under its roof. These facilities will be constructed on a platform at a nominal elevation of 1,407 m asl, that will primarily be developed from a cut made in bedrock. The mill site layout was simulated using head dependent boundaries constrained to outflow (i.e., drains), to represent the bedrock cut (Drawing 28). Water levels within drain cells were specified at the cut elevation of 1,407 m asl, and conductance was set to a high value to allow water to freely flow to the drains.

The proposed site layout also includes a section of fill extending into Brucejack Lake, to house a covered laydown area, batch plant, fuel storage, and a helicopter landing area. The fill will extend to a nominal pad elevation of 1,370 m asl, and was represented in the model by deactivating the GHB cells covered by fill material.

10.3. Post-Closure Model Results

Results of the predictive post-closure simulations are summarized in the following subsections, organized by modeling objective.

10.3.1. Groundwater Elevations and Flow

The transient post-closure simulation indicates that most recovery happens in the 1 to 3 years following mine closure, with the groundwater flow system approaching a new equilibrium condition (i.e. a new steady-state condition) within 5 years of closure.

A plot of simulated water table contours is provided as Drawing 29 for the steady-state post-closure simulation. The general arrangement of groundwater elevation contours is consistent with pre-disturbance conditions: the water table is predicted to mimic the surface topography and within the LSA the predicted direction of groundwater flow is from areas of higher elevation towards Brucejack Lake and Brucejack Creek. There is also a component of deeper groundwater flow within the LSA that occurs westwards, towards the Sulphurets glacier.

The difference between the pre-mining and post-closure groundwater elevation contours is highlighted on Drawing 30, which shows the difference between the pre-mining water table and the steady-state post-closure water table. The difference in groundwater elevation contours, or drawdown, results from the specified hydraulic conductivities of the backfill material; the increased hydraulic conductivity of stope and development cells results in a lower water table within the immediate footprint of the mined areas. The areal extent impacted in post-closure with drawdown greater than 10 m relative to pre-disturbance conditions is approximately 0.5 km by 1 km.

10.3.2. Groundwater Discharge to Receptors

Groundwater discharge to surface water receptors and surface cuts was quantified using the ZONEBUDGET program, as described in Section 9.3.3. In addition to the zones used to determine flows during mining operations, zones for the mill site cut and helipad site fill were defined for the post-closure period.

Zone budgets were also used to quantify the potential flux of groundwater from model cells containing underground workings to surface water receptors. The program MODPATH (v6.0.01), which is a particle tracking post-processing model that computes 3-D flow paths using MODFLOW output (Pollock, 2012), was used to define steady-state pathlines for particles released in cells containing underground workings. Separate zones were delineated for each set of pathlines terminating in Brucejack Lake, Camp Creek, and Brucejack Creek both above and below the BJ 2.62 monitoring point.

The zone budget results and data provided for input to the hydrology model from the 30-year transient post-closure simulation are presented in Appendix I, together with a diagram showing the distribution of zones within the numerical model domain. The predicted transient post-closure flows to surface water receptors are plotted on Drawing 31, and are discussed below:

Brucejack Lake & Tributaries

In the post-closure period, groundwater discharge to Brucejack Lake and its upstream tributaries is predicted to return to approximately pre-disturbance levels. For example, the steady-state post-closure groundwater discharge to the drains representing tributaries upstream of Brucejack Lake is predicted to return to the average annual pre-disturbance discharge rate of 4,400 m^3/d.

Groundwater discharge to the general head boundary representing Brucejack Lake is estimated to be 2,000 m^3/d under steady-state post-closure conditions, versus the average annual pre-disturbance discharge of 2,100 m^3/d. This represents an increase from the estimated 1,900 m^3/d of discharge predicted to flow to Brucejack Lake in the final year of mining operations. Groundwater discharge to Brucejack Lake is predicted to stabilize within approximately 5 years after dewatering operations cease.

Of the 2,000 m^3/d of post-closure groundwater discharge reporting to Brucejack Lake, a small component (<15 m^3/d) is potential flux from model cells containing underground workings (i.e., a small component of the discharge may have come into contact with the underground workings or backfilled stopes). Drawing 32A shows groundwater flow paths from the underground workings in all model layers to surface water receptors, including Brucejack Lake, while Drawing 32B shows flow paths originating in underground working cells in model layers 1 – 4 only (i.e., the potentially unsaturated zone that is of particular interest from a water quality perspective).*Brucejack Creek*

As discussed in Section 9.3.3., the segment of Brucejack Creek between Brucejack Lake and the BJ 2.62 monitoring point is predicted to experience a large decrease in groundwater discharge throughout mining operations, particularly when mining occurs in the WZ. Groundwater discharge to this segment of the creek is estimated to average 100 m^3/d throughout mining operations, and is predicted to recover rapidly post-closure once dewatering ceases. Within 3 years, the average annual model-predicted groundwater discharge is within 70 m^3/d of the estimated pre-disturbance discharge (1,000 m^3/d). The majority of post-closure groundwater flow (>850 m^3/d) reporting to the segment of Brucejack Creek between Brucejack Lake and BJ 2.62 may have come in contact with the underground workings.

The segment of Brucejack Creek between BJ 2.62 and the BJL-H1 gauging station is farther from the footprint of the proposed mine, and therefore is predicted to be less impacted by mine dewatering. The groundwater discharge to this segment of the creek is estimated to average 260 m^3/d in years 8 through 22 of mining operations. Post-closure, groundwater discharge is predicted to increase back to the pre-disturbance rate of 370 m^3/d, with a minor component of this flux (~20 m^3/d) potentially having contacted the underground workings or backfilled stopes (Drawings 32A and 32B).

Brucejack Creek Tributaries

As discussed in Section 9.3.3, there is no groundwater discharge to the drains representing “Camp Creek” throughout mining operations; this is an expected outcome, as the entire creek lies within the cone of depression created by mine dewatering. When mine dewatering concludes groundwater flow to this boundary is predicted to resume, with steady-state post-closure groundwater discharge estimated to be 130 m^3/d. Most of this flow (~95 m^3/d) comprises potential fluxes from model cells containing underground workings.

The stream referred to as “VOK Creek”, which runs through the trace of the Brucejack Fault, also coincides with the cone of depression created by dewatering. The average annual pre-disturbance groundwater discharge to the river cells representing this stream is an estimated 180 m^3/d, which decreases to an estimated 30 m^3/d averaged over the 22-year life of mining operations. Similar to other post-closure flows, groundwater discharge to “VOK Creek” is predicted to recover within approximately 3 years following cessation of mine dewatering, to an estimated 150 m^3/d.

The third tributary to Brucejack Creek upstream of BJL-H1 is referred to as “Unnamed Creek”, a stream running through the trace of the Brucejack Fault on the north side of the creek. The pre-disturbance average annual groundwater discharge to drains representing “Unnamed Creek” is an estimated 820 m^3/d, which decreases to 670 m^3/d averaged over the 22-year life of mining operations. Post-closure, groundwater discharge to this boundary is predicted to return to the pre-disturbance rate of 820 m^3/d.

BJL-H1 & BJ 2.62

The predicted groundwater baseflow, or groundwater component of streamflow, at the BJ 2.62 monitoring point and BJL-H1 gauging station consists of the sum of groundwater discharge to boundary conditions upstream of these points (i.e., groundwater discharge to general head cells, drain and river cells, and the groundwater seepage component of recharge out at the defined boundaries).

The average baseflow at BJ 2.62 throughout mining operations is a predicted 6,100 m^3/d, which represents a 20% reduction of the estimated pre-disturbance baseflow of 7,600 m^3/d. Post-closure the steady state average baseflow at BJ 2.62 is a predicted 7,400 m^3/d.

The average baseflow at the downstream point BJL-H1 is a predicted 7,200 m^3/d throughout mining operations, a reduction from the estimated pre-disturbance baseflow of 9,000 m^3/d. Post-closure the steady state average baseflow at BJl-H1 is a predicted 8,800 m^3/d.

The post-closure baseflow estimates at BJ 2.62 and BJL-H1 (7,400 m^3/d and 8,800 m^3/d, respectively) both represent 98% of the predicted pre-disturbance flows for these locations (7,600 m^3/d and 9,000 m^3/d, respectively). This suggests that mining operations at Brucejack do not result in any significant long-term impact to baseflow in the Brucejack Creek watershed.

Brucejack Mine Site

The Brucejack mine site layout was represented using drain boundary conditions for the post-closure simulations, as discussed in Section 8.2.3. No groundwater discharge reports to the site cut during mining operations due to the mine dewatering. After dewatering stops, groundwater discharge to the cut is predicted to start within 2 years, and is predicted to occur in the area outlined on Drawing 33. The groundwater discharge is predicted to stabilize within 5 years with an estimated 12 m^3/d of groundwater discharge occurring on average in the summer months. No groundwater discharge is predicted to occur during the winter months when the water table experiences seasonal declines.

The proposed site layout also includes a section of fill extending into Brucejack Lake. An estimated 93 m^3/d of groundwater seepage occurs in this zone, though none of the groundwater seepage is anticipated to reach the surface of the pad. Rather, the groundwater flows are expected to report directly to Brucejack Lake via the permeable fill material.

Sulphurets Glacier

As discussed previously (Section 6.2.3, Section 10.3.1), there is a component of deep groundwater flow towards the Sulphurets Glacier. The timescale associated with this flow path is predicted to be on the order of decades to centuries. The amount groundwater predicted to discharge where pathlines (i.e., groundwater flow paths) terminate along the glacier edge is 1,000 – 2,000 m^3/d. A component of this flux is predicted to originate in the Brucejack LSA, and may have contacted underground workings, while the remainder is associated with deep flow paths from other areas up-gradient of the Sulphurets Glacier.

11.0 SENSITVITY SIMULATIONS

Sensitivity simulations were completed using the 25-year transient predictive mining operations model and the steady-state post-closure model. The sensitivity simulations were performed to evaluate changes to predicted groundwater heads and water table elevations, groundwater flow rates, and overall fit of the model to field data for a range of input parameters. For each sensitivity simulation, hydraulic parameters and/or boundary conditions were modified to investigate the likely variation in hydrogeologic response (e.g., water table elevation, predicted mine inflow, discharge to surface water receptors, etc.) relative to the base case model simulation results.

The following 16 sensitivity simulations were performed for comparison with the base case predictive mining operations and post-closure models:

S.A. Run 1. *Hydraulic conductivity (K) of all geologic units was increased by a factor of 5.*

S.A. Run 2. *K of all geologic units was decreased by a factor of 5.*

S.A. Run 3. *Specific storage (S_s) of all units was increased by a factor of 5, while specific yield (S_y) was increased by a factor of 2.*

S.A. Run 4. *Recharge for each recharge zone was increased by a factor of 2.*

S.A. Run 5. *Recharge for the glacier recharge zone was increased by a factor of 5, while recharge in all other zones remained unchanged.*

S.A. Run 6. *Conductance of Brucejack Lake and model river cells was increased by an order of magnitude.*

S.A. Run 7. *Conductance of Brucejack Lake and model river cells was decreased by an order of magnitude.*

S.A. Run 8. *K assigned to model cells comprising the interpreted Brucejack Fault was increased by two orders of magnitude.*

S.A. Run 9. *Glaciers were represented using a constant head boundary set to glacier surface topography.*

S.A. Run 10. *K assigned to underground stope cells after backfilling was increased by an order of magnitude.*

S.A. Run 11. *K assigned to underground stope & K assigned to development cells after backfilling were decreased by an order of magnitude.*

S.A. Run 12. *K of all geologic units was increased by a factor of 5 and recharge for all zones was increased by a factor of 2 (combination of S.A. Runs 1 & 4).*

S.A. Run 13. *K assigned to model cells comprising the interpreted Brucejack Fault was decreased by two orders of magnitude.*

S.A. Run 14. *Ss of all geologic units was increased by a factor of 5, Sy was increased by a factor of 2, K was increased by a factor of 5, and recharge for all zones was increased by a factor of 2 (combination of S.A. Runs 3 & 12).*

S.A. Run 15. *Elevation of the Brucejack Lake general head boundary (GHB) was increased by 5 m to 1369.4 m asl, to represent a controlled lake elevation.*

S.A. Run 16. *K of all geologic units was increased by a factor of 5, and recharge for each recharge zone was decreased by a factor of 2.*

Results of these simulations are discussed in Section 11.2 (Mining Operations Sensitivity Results) and Section 11.3 (Post-Closure Sensitivity Results).

11.1. Comparison with Calibration Targets

As mentioned above, hydraulic parameters and/or boundary conditions were modified to investigate the variation in hydrogeologic response for each sensitivity scenario relative to the base case simulations results. No attempt was made to calibrate the sensitivity models (i.e., sensitivity simulations do not represent alternative conceptualizations of the site). The calibration results for each sensitivity simulation are summarized in Table 12, for the same targets used to calibrate and benchmark the base case modeling scenario. These data are intended to qualitatively help define the likelihood of a given sensitivity simulation outcome, and illustrate the level of confidence that a given sensitivity outcome may be realized.

Hydraulic Head Targets

The hydraulic head targets used to assess calibration of the numerical hydrogeologic model are introduced in Section 6.1.1, with head target calibration results for the base case model discussed in Section 6.1.3.1. The NRMSE for all head targets in the LSA (i.e., including both geotechnical VWPs and monitoring wells) for the base case model was 8.3%.

Hydraulic head calibration results for all head targets in the LSA for the sensitivity simulations ranged from about 8.4% (S.A. Runs 6 and 7) to over 28% (S.A. Run 16). This indicates that the simulated heads in the numerical model at the target locations are relatively insensitive to certain parameters (e.g., the conductance of GHB and RIV cells) and much more sensitive to other changes (e.g., increasing hydraulic conductivity with no commensurate increase in recharge, or increasing hydraulic conductivity with a decrease in recharge). Note that no head target calibration results are presented for runs in which storage parameters (e.g., S_s, S_y) were the only parameters changed (i.e., S.A. Runs 3 and 14). This is because the head calibration simulations were run in steady-state where changes in storage play no role.

Creek Flow Targets

The Brucejack Creek flow targets used to assess calibration of the numerical hydrogeologic model are discussed in Section 6.1.2. Estimates of winter low flow at the streamflow gauging station BJL-H1, considered to be a good indicator for baseflow, were used as a calibration target for winter stress periods of the transient base case seasonal simulation.

The base case simulation matches mid-winter flows (Jan-Feb stress period) relatively well, with 0.080 m^3/s of baseflow predicted vs. 0.072 m^3/s of low-flow reported. For the sensitivity simulations, predicted baseflow at BJL-H1, for the same time period, ranged from 0.075 m^3/s (S.A. Run 7) to 0.19 m^3/s (S.A. Run 14). These results illustrate some changes that might improve the flow target match with further calibration effort (e.g., decreasing hydraulic conductivity, S.A. Run 2; or, decreasing GHB and RIV Cell conductance, S.A. Run 7). The results also demonstrate that certain sensitivity runs result in an excess of water reporting to the surface water system, some more than doubling the reported mid-winter low flows at BJL-H1 (e.g., S.A. Runs 12 and 14).

Mine Inflow Benchmarking

Steady-state mine inflow benchmarking simulations were also run for a point of comparison between the base case scenario and sensitivity scenarios.

Mine inflow benchmarking data and results for the base case model are discussed in Section 6.3.2. Briefly, the predicted steady-state mine inflow for the base case scenario simulation was almost 2,500 m^3/d (Table 12). This compares favourably with mine dewatering data from July 2013 (about 2,000 m^3/d of observed discharge from the underground mine workings), but represents an overestimate of undisturbed winter dewatering data from December 2013 (about 900 m^3/d of observed discharge).

Predicted mine inflows for the sensitivity simulations ranged from about 840 m^3/d (S.A. Run 2) to 7,500 m^3/d (S.A. Run 12). As with the base case scenario, most sensitivity scenarios over predict inflow to the underground mine workings; a more extensive dataset and further calibration effort will be required to match the seasonal fluctuations in mine inflow.

11.2. Mining Operations Sensitivity Results

Plots of predicted groundwater inflow to the underground mine and predicted baseflow at the BJL-H1 gauging station throughout mining operations are provided in Appendix J for each sensitivity scenario relative to the base case. These results are summarized numerically in Table 12, and discussed in more detail in the sections below.

11.2.1. Estimated Mine Inflows

As discussed in Section 9.3.1, the average rate of groundwater inflow to the underground workings throughout construction and operations is predicted to be about 4,900 m^3/d. An annual average peak flow of approximately 6,500 m^3/d is predicted to occur in year 8 of mining operations, with the initiation of development of the WZ resource.

Large changes in mine inflows were observed for sensitivity scenarios where K of the bedrock fabric was increased (S.A. Run 1) or decreased (S.A. Run 2) relative to the base case. S.A. Run 1, with hydraulic conductivity increased by a factor of 5, resulted in increased flows by a factor of approximately 2.4, on average. S.A. Run 2, with hydraulic conductivity decreased by a factor of 5, resulted in corresponding decreases in average inflow and peak annual inflow by a factor of 0.5.

The high K sensitivity simulations (S.A. Runs 1, 12, and 14) yielded the highest inflow estimates, averaging approximately 11,700 m^3/d, 14,600 m^3/d, and 14,700 m^3/d, respectively. As with the base case modeling scenario, peak inflows for all sensitivity scenarios are predicted to occur in year 8 of mining operations, with the development of the WZ resource. The high K sensitivity scenarios are associated with annual average peak flows summarized below:

- S.A. Run 1 annual average peak inflow: 14,400 m^3/d (factor of 2.2)
- S.A. Run 12 annual average peak inflow: 17,400 m^3/d (factor of 2.7)
- S.A. Run 14 annual average peak inflow: 19,100 m^3/d (factor of 2.9)

Increasing and decreasing the hydraulic conductivity of grid cells intersecting the interpreted Brucejack Fault (S.A. Runs 8 and 13) was associated with much smaller changes in predicted mine inflow. S.A. Run 8, representing a high K Brucejack Fault, resulted in increased inflow to the underground workings (factor of 1.2) while S.A. Run 13, representing a low K Brucejack Fault, resulted in decreased inflow to the underground workings (factor of 0.9).

Estimated mine inflows are not as strongly sensitive to storage parameters (i.e., S_s and S_y) as they are to hydraulic conductivity. Increasing the specific storage by a factor of 5 and specific yield by a factor of 2 (S.A. Run 3) resulted in a small increase in average annual mine inflow (about 200 m^3/d) and a slightly larger increase in maximum annual flows (factor of 1.2).

When recharge was increased by a factor of two in all recharge zones (S.A. Run 4), simulated mine inflows increased by a factor of 1.4, yielding average annual flows of approximately 6,700 m^3/d and maximum annual flows of approximately 8,300 m^3/d. When recharge under glacier-covered areas was increased by a factor of 5 (S.A. Run 5), estimated mine inflows increased by a factor of 1.3. Given the uncertainty associated with hydraulic head conditions in glacier-covered areas (e.g., Person et al., 2012; Piotrowski et al., 2009) an additional sensitivity scenario was considered (S.A. Run 9), which represented glaciers as constant head boundaries with the boundary elevation set to the topography of the glacier surface. S.A. Run 9, which represents the maximum possible recharge scenario under glacier-covered areas, resulted in average mine inflows increased by a factor 1.7, to approximately 8,500 m^3/d.

The conductance assigned to the bed of Brucejack Lake and model RIV boundaries is another factor in the hydrogeologic system determining flows to the underground workings. Increasing the conductance of GHB and RIV cells by a factor of 10 (S.A. Run 6) resulted in an increase in the average annual mine inflow (factor of 1.3) and maximum annual mine inflow (factor of 1.2) estimates. Decreasing the conductance of model GHB and RIV cells by a factor of 10 (S.A. Run 7) resulted in a decrease in the average annual and maximum annual mine inflow estimates by a factor of 0.9.

The effect of Brucejack Lake on the hydrogeologic system was further investigated in S.A. Run 15, which simulated the general head boundary at an elevation of 1369.4 m asl, as opposed to the 1364.5 m asl elevation specified in the base case scenario. This 5-m increase in lake level was intended to represent a potential lake control structure (e.g., a dam). Overall, the elevation of Brucejack Lake was not found to be a significant factor with respect to groundwater inflow to the underground workings (less than 10 m^3/d change for both average annual flow and maximum annual flows).

Two sensitivity scenarios were selected to explore uncertainty around the representation of the underground workings and paste backfilling. In S.A. Run 10, the K of underground stope cells assumed to be backfilled with paste was increased by an order of magnitude. In S.A. Run 11, the backfilled hydraulic conductivity of both underground stope cells and of mine development cells was decreased by an order of magnitude. Neither scenario resulted in a significant change in predicted mine inflows: average annual flows were only about 200 m^3/d greater for S.A. Run 10 and about 400 m^3/d less for S.A. Run 11.

A limited number of combination scenarios were considered, including S.A. Runs 12 and 14 mentioned above in the discussion of hydraulic conductivity sensitivities. The combination scenarios involved the simultaneous modification of more than one parameter, and are outlined below:

- *S.A. Run 12 (increased K and recharge)* – Increasing K alone (S.A. Run 1) resulted in a factor of 2.4 increase in groundwater flows to the underground workings, relative to the base case, while increasing recharge alone (S.A. Run 4) resulted in a factor of 1.4 increase in flows. Increasing both hydraulic conductivity and recharge (S.A. Run 12) resulted in a factor of 3.0 increase to average mine inflows, and a factor of 2.7 increase to peak annual inflows.
- *S.A. Run 14 (increased K, recharge, and storage)* – As with S.A. Run 12, increasing the hydraulic conductivity, recharge, and storage properties resulted in an increase to average mine inflows by a factor of 3.0. A greater increase in peak annual inflows was observed relative to S.A. Run 12 (factor of 2.9 vs. factor of 2.7) due to the increased storage in S.A. Run 14.
- *S.A. Run 16 (increased K and decreased recharge)* – Increasing K alone (S.A. Run 1) resulted in a factor of 2.4 increase in groundwater flows to the underground workings, relative to the base case. Simultaneously decreasing recharge (S.A. Run 16) tempers this response, resulting in a factor of 1.9 increase in both average annual and peak annual inflows, (9,400 m^3/d and 12,100 m^3/d, respectively).

It is worth noting that while these runs (and S.A. Run 1) are considered conservative from a feasibility perspective (i.e., they result in the highest rates of groundwater inflow to the underground workings), none are supported by the calibration results (Table 12).

Of the 16 sensitivity scenarios considered for the groundwater flow model, two were provided as input for the water balance model (WBM) sensitivity analysis:

1. S.A. Run 2, with decreased hydraulic conductivities, yielded the smallest groundwater contribution to surface water receptors; and,
2. S.A. Run 12, with increased hydraulic conductivities and recharge yielded the highest peak groundwater flows to surface water receptors.

Predicted mine inflows for these two sensitivity scenarios were provided as bounding cases for the WBM and are summarized below, with data presented in Appendix I.

The average annual rate of groundwater inflow to the underground workings for the low K scenario (S.A. Run 2) is predicted to remain relatively stable throughout the development of the VOK resource during years 1 to 7 of mine life, ranging between 2,000 and 2,400 m^3/d. The rate of inflow to the underground workings is predicted to increase to an annual average peak of approximately 3,500 m^3/d in year 8, with the initiation of development of the WZ resource. During years 9 to 18 of mine life, predicted annual average inflows range between 2,300 and 2,400 m^3/d, before decreasing slightly and ranging between 2,100 and 2,300 m^3/d for the final four years of mine life. The overall average flow for the entire simulated period for the low K sensitivity scenario (S.A. Run 2) is 2,300 m^3/d, or approximately half the predicted inflow for the base case modeling scenario.

The average annual rate of groundwater inflow to the underground workings for the high K and high recharge sensitivity scenario (S.A. Run 12) is predicted to increase throughout the first 7 years of mining operations, from 12,200 m^3/d in the first year of mine life to 13,100 m^3/d in year 7. The rate of inflow to the underground workings is predicted to increase to an annual average peak of approximately 17,400 m^3/d in year 8, with the initiation of development of the WZ resource. During years 9 to 18 of mine life, predicted annual average inflows range between 16,300 and 16,800 m^3/d, before decreasing slightly and ranging between 15,700 and 16,000 m^3/d for the final four years of mine life. The overall average flow for the entire simulated period for the high K and high recharge scenario (S.A. Run 12) is 14,600 m^3/d, which is 3 times greater than the calibrated base case scenario.

11.2.2. Groundwater Discharge to Receptors

As described in Section 8.3.3, the ZONEBUDGET post-processing program was used to quantify groundwater flows to the following zones within the LSA for the base case modeling scenario:

- Brucejack Lake
- Streams that are tributaries to Brucejack Lake
- Brucejack Creek between Brucejack Lake and the BJ 2.62 monitoring point
- Brucejack Creek between BJ 2.62 and the BJL-H1 gauging station
- “Camp Creek”, the stream discharging to the south side of Brucejack Creek downstream of Brucejack Lake

- “VOK Creek”, the stream discharging to the south side of Brucejack Creek that runs through the trace of the Brucejack fault
- “Unnamed Creek”, the stream discharging to the north side of Brucejack Creek that runs through the trace of the Brucejack fault

The same ZONEBUDGET setup was used for analysis of the sensitivity scenarios; however, discussion of groundwater discharge to surface water receptors for the mining operations sensitivity simulations focuses only on baseflow at the BJL-H1 gauging station. The predicted groundwater baseflow, or groundwater component of streamflow, at BJL-H1 consists of the sum of groundwater discharge to boundary conditions upstream of this point (i.e., groundwater discharge to general head boundaries, drain and river boundaries, and the groundwater seepage component of recharge out at the defined boundaries).

The average groundwater baseflow at BJL-H1 throughout the entire period of mine construction and mining operations is summarized in Table 12 for each sensitivity scenario, and plots of predicted baseflow reporting to BJL-H1 throughout mining operations are included in Appendix J.

For the base case modeling scenario, the average baseflow at BJL-H1 throughout mining operations was predicted to be 7,200 m^3/d, versus the estimated pre-disturbance baseflow of 9,000 m^3/d. All sensitivity scenarios resulted in a similar decrease in average baseflow during mining operations. In general, groundwater discharge to surface water receptors decreased during mine construction, remained stable through year 7 of mining operations, and then decreased again with the advent of mining in the WZ in year 8. Groundwater baseflow reporting to BJL-H1 is predicted to remain stable through years 8 to 22 of mining operations, with annual highs and lows varying by sensitivity scenario.

As discussed in Section 11.2.1, two sensitivity runs were provided for input to the Brucejack WBM: 1) S.A. Run 2, which yielded the smallest groundwater contribution to surface water receptors; and, 2) S.A. Run 12, which yielded the highest peak groundwater flows to surface water receptors. Groundwater discharge to surface receptors for these runs is discussed in more detail below, and Appendix I includes data provided for WBM purposes from S.A. Runs 2 and 12.

- *S.A. Run 2 (decreased K)* – Groundwater baseflow reporting to BJL-H1 throughout mining operations is predicted to average 5,200 m^3/d, and vary by about 4,000 m^3/d on an annual basis. Groundwater discharge to surface water receptors in the LSA is predicted to be stable throughout mine construction and years 1 to 7 of mining operations, averaging 5,300 m^3/d, and then decrease slightly to 5,100 m^3/d through years 8 to 22 of mining operations.
- *S.A. Run 12 (increased K and recharge)* – Groundwater baseflow reporting to BJL-H1 throughout mining operations is predicted to average 12,300 m^3/d, varying by 10,000 to 15,000 m^3/d on an annual basis. Groundwater discharge to surface water receptors in the LSA is predicted to decrease through mine construction, average

13,500 m^3/d in years 1 to 7 of mining operations, and decrease to 11,400 m^3/d in years 8 to 22 of mining operations.

As highlighted above, the decrease in flow in year 8 of mining operations for sensitivity scenarios 2 and 12 corresponds to the initiation of mining in the West Zone.

11.3. Post-Closure Sensitivity Results

Post-closure sensitivity simulations were run as steady-state simulations, with the specific objective of defining the range of possibilities for the final elevation of the water table. Groundwater elevations and flows are discussed below in Section 11.3.1., while predicted baseflow at the BJL-H1 gauging station post-closure for each sensitivity scenario are summarized numerically in Table 12, and discussed in more detail in Section 11.3.2.

11.3.1. Groundwater Elevations and Flows

A plot of the water table contours simulated for the steady-state post-closure base case scenario is provided as Drawing 29. As discussed in Section 9.3.1, the general arrangement of groundwater elevation contours is consistent with pre-disturbance conditions: the water table is predicted to be a subdued replica of the surface topography and within the LSA the predicted direction of groundwater flow is from areas of higher elevation towards Brucejack Lake and Brucejack Creek. There is also a component of deeper groundwater flow within the LSA that occurs westwards, towards the Sulphurets Glacier.

The overall direction of the groundwater flow system is consistent for all sensitivity scenarios, though final elevations of the water table vary between sensitivity scenarios. Drawing 34 uses a cross-section view to illustrate the range of water table surfaces calculated for steady-state post-closure sensitivity simulations. The highest predicted water table is for the scenario represented by S.A. Run 2, in which K was decreased by a factor of 5, and the lowest predicted water table corresponds to the conditions of S.A. Run 16, in which K was increased by a factor of 5 and recharge was decreased by a factor of 2.

The location of the mine portals and ground surface are also indicated on Drawing 34. For all sensitivity scenarios the steady-state post-closure water table is predicted to remain below ground surface, and therefore no groundwater discharge from the mine portals is expected.

11.3.2. Groundwater Discharge to Receptors

As with the discussion of groundwater discharge to surface water receptors for mining operations sensitivity scenarios (Section 10.2.2), discussion of groundwater discharge to surface water receptors post-closure focuses on flows reporting to BJL-H1. The predicted groundwater baseflow, or groundwater component of streamflow at BJL-H1, is summarized in Table 12 for each post-closure sensitivity scenario. These values represent steady-state, average annual predicted flows.

For the base case scenario, the average baseflow at BJL-H1 is predicted to be about 7,200 m^3/d throughout mining operations, a reduction from the estimated pre-disturbance baseflow of 9,000 m^3/d. Post-closure the steady-state average baseflow at BJl-H1 is predicted to be 8,800 m^3/d.

In comparison with the 8,800 m^3/d of steady-state post-closure flow predicted using the base case modeling scenario, post-closure groundwater flow reporting to BJL-H1 is predicted to range from 5,600 m^3/d (S.A. Run 2) to 19,200 m^3/d (S.A. Run 12) for the sensitivity scenarios. In general, post-closure flows for all sensitivity scenarios are predicted to return to within about 200 to 300 m^3/d of predicted pre-disturbance flows. This suggests that the conclusion that mining operations are not likely to have a significant lasting impact on the quantity of groundwater discharge to surface water receptors within the LSA is robust.

12.0 SUMMARY OF RESULTS

A calibrated 3-D numerical hydrogeologic flow model was developed in support of the EA application for the Brucejack Project, in northwestern BC. The objective of this report is to summarize previously reported baseline conditions, describe the conceptual and numerical hydrogeologic models, detail the numerical model calibration and evaluation, and provide results from predictive simulations for mining operations and closure.

The numerical model was calibrated using an iterative procedure, to the following metrics:

- Average annual head targets;
- Estimated winter low-flows at the BJL-H1 gauging station; and
- Transient adit dewatering data.

The model was bench-marked using additional adit dewatering data. Model benchmarking suggests that the model over-predicts groundwater inflow to the underground workings, which is considered conservative from a feasibility perspective because it over-predicts the volume of water reporting to the dewatering and treatment systems. It is also conservative from a water quality perspective because higher inflow to the mine workings results in increased mass loadings from the underground in the water quality model.

Following model calibration and benchmarking, predictive simulations for mining operations (22-year mine life) and post-closure were developed.

The objectives of the predictive mining operations simulations were:

- to estimate the rate of groundwater inflow to the proposed underground workings;
- to predict changes to the groundwater flow system throughout mining operations; and,
- to estimate groundwater discharge to surface water receptors throughout mining operations.

The average annual rate of groundwater inflow to the underground workings is predicted to remain relatively stable throughout the development of the VOK resource during years 1 to 7 of mine life, ranging between 4,100 and 4,600 m^3/d. The rate of inflow to the underground workings is predicted to increase to an annual average peak of approximately 6,500 m^3/d in year 8, with the initiation of development of the WZ resource. During years 9 to 18 of mine life, predicted annual average inflows range between 5,200 and 5,500 m^3/d, before decreasing slightly and ranging between 4,900 and 5,200 m^3/d for the final four years of mine life. The overall average flow for the entire simulated period is 4,900 m^3/d.

With the advent of mining operations, groundwater flow within the LSA becomes largely directed towards the dewatered mine workings. The elevation of the water table is drawn down substantially, up to approximately 400 m, within the footprint of the underground workings. At the height of dewatering, drawdown contours propagate over an area 2 to 3 times the size of the mine footprint. The cone of depression associated with 10 m or more of drawdown due to mine dewatering has an approximate areal extent of 2 km by 3 km.

In general, the surface water features closest to the proposed underground mine are expected to be most impacted by mine dewatering (e.g., Camp Creek, VOK Creek, and Brucejack Creek). Predicted seasonal groundwater discharge to surface water receptors in the LSA throughout the Construction, Operations, and Post-Closure periods is summarized in Table 13, which includes an assessment of percentage change from pre-disturbance or baseline conditions. As expected, Camp Creek, VOK Creek, and the section of Brucejack Creek above the BJ 2.62 monitoring point are all predicted to experience reductions in groundwater discharge exceeding 80%.

Changes to predicted groundwater baseflow at the BJ 2.62 monitoring point and BJL-H1 gauging stations can be used as an indicator of change in groundwater discharge to LSA surface water receptors, as groundwater baseflow consists of the sum of groundwater discharge to boundary conditions upstream of these points (i.e., groundwater discharge to general head boundaries, drain and river boundaries, and groundwater seepage at the defined boundaries). The average baseflow at BJ 2.62 throughout mining operations is a predicted 6,100 m^3/d, which represents a 20% reduction of the estimated pre-disturbance baseflow of 7,600 m^3/d. The average baseflow at the downstream point BJL-H1 throughout mining operations is a predicted 7,200 m^3/d, versus the estimated pre-disturbance baseflow of 9,000 m^3/d.

The objectives of the predictive post-closure simulations were:

- to predict changes to groundwater flow system (i.e., groundwater elevation and flow) following mining operations; and,
- to estimate groundwater discharge to surface water receptors and surface cuts in the post-closure period.

The transient post-closure simulation indicates that the majority of recovery happens in the 1 to 3 years following mine closure, with the groundwater flow system approaching steady-state conditions within 5 years of closure. Post-closure, the general arrangement of groundwater elevation contours is consistent with pre-disturbance conditions: the water table is predicted to mimic the surface topography and within the LSA the predicted direction of groundwater flow is from areas of higher elevation towards Brucejack Lake and Brucejack Creek. There is also a component of deeper groundwater flow within the LSA that occurs westwards, towards the Sulphurets glacier.

Within the footprint of the mine workings, the post-closure water table is lower than it was under pre-disturbance conditions; this is a result of the specified hydraulic conductivities of the backfill materials, which are a higher K than the surrounding bedrock. The areal extent impacted in post-closure with drawdown greater than 10 m relative to pre-disturbance conditions is approximately 0.5 km by 1 km.

No groundwater discharge reports to the proposed mine site cut during mining operations due to the mine dewatering; after dewatering stops, groundwater discharge to the cut is predicted to start within 2 years. The groundwater discharge is predicted to stabilize within 5 years with an estimated 12 m^3/d of groundwater discharge occurring on average in the summer months.

No groundwater discharge is predicted to occur during the winter months when the water table experiences seasonal declines.

Groundwater discharge to surface water receptors is predicted to return to levels approaching pre-disturbance within approximately 5 years following mine closure. The post-closure baseflow estimates at BJ 2.62 and BJL-H1 (7,400 m^3/d and 8,800 m^3/d, respectively) both represent 98% of the predicted pre-disturbance flows for these locations (7,600 m^3/d and 9,000 m^3/d, respectively). This suggests that mining operations associated with the Brucejack Project do not result in any significant long-term impact to baseflow in the Brucejack Creek watershed.

In addition to predictive mining operations and post-closure modeling, sensitivity simulations were performed to evaluate changes to model-predicted groundwater elevations and flows for a range of input parameters. For each sensitivity simulation, hydraulic parameters and/or boundary conditions were modified to investigate the variation in hydrogeologic response (e.g., water table elevation, predicted mine inflow, discharge to surface water receptors, etc.) relative to the base case model simulation results.

Of the 16 sensitivity scenarios considered for the groundwater flow model, two were provided for input to the water balance model (WBM):

- S.A. Run 2 (K decreased by a factor of 5) yielded the smallest groundwater contribution to surface water receptors, with a decrease of 30 to 40% relative to the calibrated model; and,
- S.A. Run 12 (K increased by a factor of 5 and recharge increased by a factor of 2) yielded the highest peak groundwater flows to surface water receptors, with an increase of 70 to 120% relative to the calibrated model.

Results of the groundwater modeling are based on mining plans provided by AMC Consultants on July 3, 2013. The numerical hydrogeologic model simulations should be revisited if significant deviations from the proposed mining plans are expected, or if any other changes potentially impacting the hydrogeologic response of the system are made (e.g. changes to portal locations or surface layouts, changes to waste deposition plans, changes to lake elevations, etc.).

It will be important to continue collection of hydraulic head data and pumping rate data from underground dewatering operations on a year-round basis at the project site, as these data could be used for future refinement of the conceptual hydrogeologic model. These data could also be used for numerical flow model calibration at subsequent project design stages in support of water treatment plant sizing and/or permitting.

13.0 CLOSURE

We trust the above satisfies your requirements at this time. Should you have any questions or comments, please do not hesitate to contact us.

Yours sincerely,

BGC ENGINEERING INC.
per:

ISSUED AS DIGITAL DOCUMENT. SIGNED HARDCOPY ON FILE WITH BGC ENGINEERING INC.

Dawn Paszkowski, M.Sc.
Environmental Scientist

ISSUED AS DIGITAL DOCUMENT. SIGNED HARDCOPY ON FILE WITH BGC ENGINEERING INC.

Trevor Crozier, M.Eng., P.Eng
Principal Hydrogeological Engineer

Reviewed by:

Carl Mendoza, Ph.D., P.Eng., P.Geo.
Principal Hydrogeological Engineer

TC/CM/bb/dp/pg

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TABLES

Table 1. Brucejack Lake and Regional Mean Monthly Precipitation Estimates

Month	Brucejack Lake Estimated[1]	Brucejack Lake (1,360 m asl)[2]	ClimateBC Model (1,400 m asl)[3]	Unuk River - Eskay Creek (887 m asl)[4]
	(mm)	(mm)	(mm)	(mm)
January	233	137	322	249
February	200	99	228	214
March	169	114	180	181
April	91	106	129	97
May	82	90	112	88
June	63	84	91	67
July	78	88	117	83
August	130	128	178	139
September	193	367	227	207
October	231	180	346	247
November	201	124	297	215
December	231	72	299	247
Annual Total	**1,900**	**1,589**	**2,526**	**2,034**
Monthly Average	**158**	**132**	**210**	**170**

Notes:

1. As reported in BGC (2014b).
2. Data collected from the Brucejack meteorological station from 2010 to 2012 (Rescan, 2013a).
3. Climate normals (1981 to 2010) generated from the ClimateBC model for latitude (56°28’20”), longitude (130°11’31”W), and elevation (1,400 m asl) (Wang et al., 2012).
4. Data from Environment Canada Unuk River - Eskay Creek climate station (1989 to 2010).

Table 2. Brucejack Lake Station and Regional Average Temperatures

Month	Brucejack Lake (1,360 m asl)[1]	ClimateBC Model (1,400 m asl)[2]	Unuk River - Eskay Creek (887 m asl)[3]	Bob Quinn AGS (610 m asl)[3]
	(°C)	(°C)	(°C)	(°C)
January	-8.2	-12.1	-8.1	-8.8
February	-6.9	-8.9	-6.0	-6.4
March	-6.5	-6.4	-4.0	-0.3
April	-2.6	-2.3	0.5	3.8
May	1.7	2.6	4.3	8.2
June	4.4	6.7	8.2	11.9
July	6.9	8.9	10.2	14.1
August	7.5	8.1	10.4	13.4
September	4.6	4.2	5.8	9.3
October	-1.3	-1.6	0.6	3.9
November	-6.2	-7.3	-4.7	-3.7
December	-8.2	-10.5	-7.0	-8.8
Annual	-1.2	-1.6	0.9	3.1

Notes:

1. Data from Brucejack Lake meteorological station for period 2010-2012.
2. Data from ClimateBC model for coordinates 56°28’20”N by 130°11’31”W (Wang et al., 2012).
3. Data from Environment Canada Unuk River - Eskay Creek meteorological station for period 1989-2010; data from Environment Canada Bob Quinn AGS meteorological station for period 1977-1994.

Table 3. Baseline Hydrometric Station Mean and Low Flow Measurements

Monitoring Station[1]	Location	Northing	Easting	Drainage Basin Characteristics				Mean Annual Flow[2]	Mean Winter Flow[3]	Winter Low Flow
				Median Elevation	Area	Median Slope	Glacier Cover			
		(NAD 83 Zone 9N)		(m asl)	(km^2)	(%)	(%)	(m^3/s)	(m^3/s)	(m^3/s)
BJL-H1	Brucejack Lake downstream of outlet	6,258,899	425,840	1,625	11.7	32	41	0.64	0.18	0.065
SL-H1	Sulphurets Lake at lake outlet	6,261,229	420,398	1,610	84.2	36	48	6.45	-	-

Notes:

1. See Drawing 03 for locations of hydrometric stations.
2. Mean annual flow data for years 2010-2011 for BJL-H1, and 2008-2011 for SL-H1 (Rescan, 2013a).
3. Mean winter flow for months November through April and winter low flow for month of February averaged for period 2007-2012; note that a substantial amount of data is estimated, or synthetic, due to under-ice conditions at the flow gauging station (Rescan, 2013c).

Table 4. Bedrock Hydraulic Conductivity Data Summary

Grouping	# of Tests	Hydraulic Conductivity (m/s)		
		Geometric Mean	Maximum	Minimum
By Test Type				
Packer Test	52	1.5E-07	4.6E-06	8.6E-09
Slug Test	15	8.3E-07	3.0E-05	3.0E-09
By Lithology				
Sedimentary	22	1.0E-07	2.0E-06	2.0E-08
Metamorphic	2	3.0E-08	8.0E-08	2.0E-08
Volcanic	16	2.0E-07	4.0E-06	3.0E-09
Intrusive	25	6.0E-07	3.0E-05	9.0E-09
Sedimentary / Hydrothermal	2	1.0E-07	4.0E-07	4.0E-08
By Faulting				
Stickrock / 1 Discontinuity	34	1.3E-07	4.3E-06	8.6E-09
2+ Discontinuities / Fault Zone	33	3.8E-07	3.0E-05	3.0E-09
By Depth				
0 - 100 m bgs	42	3.5E-07	3.0E-05	3.0E-09
> 100 m bgs	25	9.6E-08	4.3E-06	8.6E-09

Notes:

1. For a more comprehensive summary of hydraulic conductivity data, see Appendix A. For packer test and slug tests analyses refer to Appendices B and C, respectively.

2. "m bgs" indicates metres below ground surface.

Table 5. Calibrated Hydraulic Parameters Assigned to Hydrogeologic Units

Hydrogeologic Unit	Model Layer(s)	Model Depth Extent (m bgs)[1]	Hydraulic Conductivity[2] (m/s)		S_s [3] (m^{-1})	S_y [3] (-)
			K_h	K_h:K_v		
Hazelton Group	1	0 - 5	2.E-06	1	1.E-05	0.1
	2	5 - 20	2.E-06	1	1.E-06	0.01
	3	20 - 50	8.E-07	1	1.E-06	0.01
	4	50 - 100	4.E-07	1	1.E-06	0.01
	5	100 - 150	1.E-07	1	1.E-06	0.01
	6-7	150 - 300	5.E-08	1	1.E-06	0.01
Stuhini Group	1	0 - 5	1.E-07	1	1.E-05	0.1
	2-4	5 - 100	1.E-07	1	1.E-06	0.01
	5-7	100 - 300	2.E-08	1	1.E-06	0.01
Undifferentiated Bedrock	8-9	300 - 950[4]	2.E-08	1	1.E-06	0.01
	10	950 - 1,600[4]	5.E-09	1	1.E-06	0.01

Notes:

1. "m bgs" indicates metres below ground surface.
2. "K_h" indicates horizontal hydraulic conductivity; "K_v" indicates vertical hydraulic conductivity.
3. "S_s" indicates specific storage; "S_y" indicates specific yield.
4. Thickness of model layers 8 and 9 ranges from 52 m to 555 m, averaging 325 m. Thickness of model layer 10 ranges from 105 m to 1,110 m, averaging 651 m.

Table 6. Calibrated Recharge Rates Applied to the Numerical Model

Recharge Zones	Recharge Rates			% of Mean Annnual Precipitation
	Steady State (m/d)	Transient (m/d)	Average Annual (mm/yr)	
< 900 m asl (valley bottom and no glacier coverage)	0.00105	0.00210	384	19%
900 to 1300 m asl (mid-slope and no glacier coverage)	0.00123	0.00246	449	22%
> 1300 m asl (uplands and no glacier coverage)	0.00150	0.00300	548	27%
glacier coverage	0.00096	0.00096	350	17%

Notes:

1. "m asl" indicates metres above sea level.
2. Steady state recharge rate (m/d) applied to year-long (12 month) simulations; transient recharge rate (m/d) applied to summer stress periods only (6 months per year).
3. Recharge rates compared with mean annual precipitation at Unuk River - Eskay Creek meteorological station (see Table 1); comparison does not account for anticipated differences in the areal or topographic distribution of precipitation within the regional study area (RSA).

Table 7. Groundwater Elevation Statistics - Observed vs. Simulated Heads

Monitoring Point ID	Easting	Northing	VWP Tip or Well Screen Elevation (m asl)	Observed Head[1] (m asl)	Simulated Head (m asl)	Residual (m)
Brucejack Project Area - Monitoring Wells						
MW-BGC11-BJ-1A	426,280	6,258,840	1304.0	1365.0	1376.3	-11.3
MW-BGC11-BJ-1B	426,280	6,258,840	1385.8	1364.0	1376.1	-12.1
MW-BGC11-BJ-2A	426,886	6,258,812	1349.4	1368.0	1378.1	-10.1
MW-BGC11-BJ-3A	426,615	6,258,844	1282.0	1368.0	1370.0	-2.0
MW-BGC11-BJ-3B	426,615	6,258,844	1360.2	1367.0	1369.6	-2.6
MW-BGC11-BJ-4A	427,031	6,258,750	1364.6	1377.0	1368.3	8.7
MW-BGC12-BJ-4B	427,031	6,258,750	1294.0	1377.0	1372.6	4.4
MW-BGC11-BJ-5A	426,346	6,258,041	1453.0	1503.0	1505.9	-2.9
MW-BGC11-BJ-5B	426,346	6,258,041	1480.6	1504.0	1506.7	-2.7
MW-BGC11-BJ-6A	427,095	6,258,983	1354.0	1369.0	1365.4	3.6
MW-BGC12-BJ-6B	427,095	6,258,983	1277.8	1366.0	1367.8	-1.8
MW-BGC12-BJ-8A	426,106	6,258,819	1314.1	1385.0	1378.7	6.3
MW-BGC12-BJ-8B	426,106	6,258,819	1355.5	1380.0	1378.0	2.0
MW-BGC12-BJ-9B	426,444	6,258,383	1470.9	1478.0	1465.5	12.5
MW-BGC12-BJ-12A	426,503	6,257,811	1488.3	1520.0	1528.7	-8.7
KSM Project Area - Instrumentation[2]						
KC09-10	419,477	6,262,095	867.5	876.0	867.0	9.0
KC09-11	418,143	6,262,738	759.7	768.0	751.6	16.4
RES-07A	422,108	6,262,881	1375.7	1443.0	1442.2	0.8
RES-07B	422,108	6,262,881	1425.6	1445.0	1446.0	-1.0
RES-09A	422,052	6,258,142	1225.6	1297.0	1300.7	-3.7
RES-09B	422,052	6,258,142	1265.3	1295.0	1298.0	-3.0
RES-12A	418,336	6,262,265	620.6	671.0	708.4	-37.4
RES-12B	418,336	6,262,265	682.4	692.0	708.4	-16.4
RES-13A	421,541	6,260,332	927.1	1002.0	1031.9	-29.9
RES-13B	421,541	6,260,332	986.1	1001.0	1025.7	-24.7
RES-14A	419,260	6,261,996	771.4	814.0	815.4	-1.4
RES-14B	419,260	6,261,996	799.0	819.0	815.4	3.6
Brucejack Project Area - Geotechnical Instrumentation						
DH-BGC12-19	426,605	6,258,786	1168.0	1357.0	1381.4	-24.4
SU-77	426,721	6,258,024	1262.2	1429.0	1476.0	-47.0
SU-82S	426,596	6,257,832	1476.3	1528.0	1510.2	17.8
SU-82D	426,445	6,257,768	1204.6	1494.0	1481.8	12.2
SU-88D	426,694	6,258,783	1182.1	1354.0	1364.6	-10.6

Notes:

1. Observed head values represent annual average groundwater elevations.
2. Instrumentation installed as part of site investeigations at the KSM (Kerr-Sulphurets-Mitchell) project (Tetra Tech - Wardrop, 2012).
3. The normalized root mean sqaure error (NRMSE) for the steady state calibration is 1.8%; see Drawing 15 for graphic representation of the data.

Table 8. Baseflow Calibration - Observed vs. Simulated Baseflow at BJL-H1[1]

Month	Observed Low Flows[2] (m^3/s)	Average Observed Flows (m^3/s)	Model Simulated Baseflow[3] (m^3/s)
November	0.24	0.19	0.10
December	0.15		
January	0.08	0.07	0.08
February	0.07		
March	0.08	0.10	0.07
April	0.11		
Average	**0.12**	**0.12**	**0.08**

Notes:

1. See Drawing 03 for location of BJL-H1 hydrometric station.
2. "Observed low flows" represent estimated, or synthetic data due to under-ice conditions at the BJL-H1 flow gauging station (Rescan, 2013c). Observed flows averaged over 2-month periods for comparison with transient model stress periods.
3. Model simulated baseflow represents the sum of groundwater discharge to boundary conditions (DRN, RIV, GHB) upstream of the BJL-H1 flow gauging station.

Table 9. Adit Dewatering Data - Monthly Summary

Month - Year	Monthly Average Flow Rate		Daily Maximum Flow Rate	Daily Minimum Flow Rate
	(m³/d)	(US gpm)	(m³/d)	(m³/d)
2011				
November	1,124	206	6,728	413
December	938	166	2,461	13
2012				
January	818	150	12,218	0
February	-	-	-	-
March	-	-	-	-
April	-	-	-	-
May	-	-	-	-
June	-	-	-	-
July	-	-	-	-
August	-	-	-	-
September	452	83	1,107	0
October	121	22	639	0
November	52	10	464	0
December	274	50	1,433	0
2013				
January	525	96	2,660	0
February	612	112	883	525
March	796	146	1,451	0
April	677	124	864	618
May	988	181	2,738	0
June	1,817	333	2,836	1,335
July	1,996	366	3,708	0
August	1,729	317	2,957	1,299
September	1,665	305	2,666	948
October	1,731	317	2,953	0
November	1,485	272	1,934	1,193
December	1,036	190	1,177	910
2014				
January	934	171	1,950	523

Notes:

1. Adit dewatering data provided by Pretium Resources Inc.
2. Initial dewatering of the underground workings occurred between November 6, 2011 and February 4, 2012. Dewatering resumed in August 2012, and has been ongoing since that time.

Table 10. Mine Sequencing Assumed for Predictive Simulations

Mine Year[1]	Stope Elevations[2] (m asl)					Development Elevations[2] (m asl)	
	WST Upper	WST Lower	GAL & VOK Upper	VOK Middle	VOK Lower	WST All	VOK All
-3	-	-	-	-	-	-	>1360
-2	-	-	1360	-	-	-	>1210
-1	-	-	1360	1210	-	-	>1210
1	-	-	1390	1210	-	-	>1000
2	-	-	1420	1210	1000	-	>1000
3	-	-	1420	1210	1000	-	>1000
4	-	-	1450	1240	1000	-	>1000
5	-	-	1450	1240	1030	-	>1000
6	-	-	1480	1240	1060	-	>1000
7	-	-	1480	1240	1090	>1300	>1000
8	1300	-	1480	1270	1090	>1000	>1000
9	1300	1030	1510	1270	1120	>1000	>1000
10	1300	1030	1510	1270	1120	>1000	>1000
11	1300	1030	1510	1300	1150	>1000	>1000
12	1300	1060	1510	1300	1150	>1000	>1000
13	1300	1060	1540	1300	1150	>1000	>1000
14	1300	1090	1570	1300	1150	>1000	>1000
15	1300	1090	1570	1330	1150	>1000	>1000
16	1300	1120	1570	1330	1180	>1000	>1000
17	1330	1150	1570	1330	1180	>1000	>1000
18	1360	1180	1570	1330	1180	>1000	>1000
19	1390	1210	1570	1330	1180	>1000	>1000
20	1420	1240	1570	1330	1180	>1000	>1000
21	1420	1270	1570	1330	1180	>1000	>1000
22	1420	1270	1570	1330	1180	>1000	>1000

Notes:

1. Mine production schedule provided by AMC Consultants, July 3, 2013. The mine development (access to stopes) is assumed to advance one year prior to mining stopes at a given elevation.

2. The mine development is assumed to remain open as mining advances. Stopes are assumed to be backfilled with paste tailings one year after mining at the elevations indicated above.

3. "WST" indicates West Zone; "GAL" indicates Galena Zone; "VOK" indicates Valley of Kings Zone

Table 11. Predicted Annual Inflow to Underground Workings

Mine Year	Development Dewatering Level[1] (m asl)		Number of Active Underground Drains	Average Annual Flow to Underground Workings		
	WST[2]	VOK[2]		(m^3/d)	(L/s)	(US gpm)
-3	-	1360	630	3,800	44	700
-2	-	1210	1108	4,500	52	830
-1	-	1210	1198	4,300	50	790
1	-	1000	1445	4,300	50	790
2	-	1000	1446	4,100	47	750
3	-	1000	1446	4,100	47	750
4	-	1000	1470	4,300	50	790
5	-	1000	1488	4,300	50	790
6	-	1000	1495	4,200	49	770
7	1300	1000	1681	4,600	53	850
8	1000	1000	1945	6,500	75	1,200
9	1000	1000	1932	5,400	63	990
10	1000	1000	1932	5,400	63	990
11	1000	1000	1905	5,200	60	960
12	1000	1000	1913	5,300	61	970
13	1000	1000	1876	5,400	63	990
14	1000	1000	1866	5,400	63	990
15	1000	1000	1854	5,400	63	990
16	1000	1000	1868	5,300	61	970
17	1000	1000	1869	5,400	63	990
18	1000	1000	1870	5,500	64	1,000
19	1000	1000	1738	4,900	57	900
20	1000	1000	1718	5,200	60	960
21	1000	1000	1718	5,200	60	960
22	1000	1000	1718	5,200	60	960
			AVERAGE	**4,900**	**57**	**910**

Notes:

1. Development refers to mine infrastructure (e.g. ramps, declines). Drains of varying elevations associated with stopes are active in the VOK years -2 to 22, and in the WST years 8 to 22 (see Table 10).

2. "WST" indicates West Zone; "VOK" indicates Valley of Kings Zone.

Table 12. Sensitivity Scenarios for Mining Operations and Post-Closure Simulations

Simulation[1]	Description	Calibration Simulations				Predictive Simulations			
		Head Target Calibration (%NRMSE)	Jan-Feb Baseflow @ BJL-H1 (m^3/s)	Avg Annual Baseflow @ BJL-H1 (m^3/d)	Dewatering Discharge (m^3/d)	Estimated Flows to Underground Workings[3] (m^3/d)		Estimated Baseflow @ BJL-H1 Gauging Station[4] (m^3/d)	
						Avg Annual	Max Annual	Operations	Post-Closure
Base Case	Calibrated numerical model	8.3%	0.08	9,000	2,500	4,900	6,500	7,200	8,800
S.A. Run 1	K of all units increased by a factor of five (x5)	21.2%	0.12	11,900	5,800	11,700	14,400	6,900	11,600
S.A. Run 2	K of all units decreased by a factor of five (/5)	13.8%	0.05	5,800	840	2,300	3,500	5,200	5,600
S.A. Run 3	Ss of all units increased by a factor of five (x5) and Sy of all units increased by a factor of two (x2)[5]	-	0.09	9,000	-	5,100	7,800	7,300	-
S.A. Run 4	Recharge increased by a factor of two (x2)	10.6%	0.12	15,300	3,000	6,700	8,300	13,100	15,000
S.A. Run 5	Recharge under glacier-covered areas increased by a factor of five (x5); other recharge areas unchanged	10.6%	0.09	10,100	2,700	6,200	7,900	8,300	9,800
S.A. Run 6	Conductance of Brucejack Lake bed and model river cells increased by an order of magnitude (x10)	8.4%	0.09	9,900	2,900	6,200	7,900	8,400	9,600
S.A. Run 7	Conductance of Brucejack Lake bed and model river cells decreased by an order of magnitude (/10)	8.4%	0.08	8,200	2,200	4,300	5,800	6,500	8,000
S.A. Run 8	K along Brucejack Fault increased by two orders of magnitude (x100)	9.9%	0.08	8,700	2,300	5,700	7,300	6,900	8,500
S.A. Run 9	Glaciers represented with a constant head boundary set to glacier surface topography	11.3%	0.11	12,200	2,700	8,500	10,300	10,300	12,000
S.A. Run 10	K of underground stope cells backfilled with paste increased by an order of magnitude (x10)[6]	-	-	-	-	5,100	6,600	7,200	8,800
S.A. Run 11	K of underground stope cells and K of mine development cells decreased by an order of magnitude (/10)[6]	-	-	-	-	4,600	6,200	7,300	8,800
S.A. Run 12	K of all units increased by a factor of five (x5) and recharge increased by a factor of two (x2)	14.3%	0.16	19,300	7,500	14,600	17,400	12,300	19,200
S.A. Run 13	K along Brucejack Fault decreased by two orders of magnitude (/100)	8.6%	0.08	9,200	2,400	4,500	6,100	7,500	9,000
S.A. Run 14	K of all units increased by a factor of five (x5), recharge increased by a factor of two (x2), Ss increased by a factor of five (x5) and Sy increased by a factor of two (x2)[5]	-	0.19	19,700	-	14,700	19,100	13,100	-
S.A. Run 15	Brucejack Lake GHB set to an elevation of 1369.4 m asl, representing a lake control structure[6]	-	-	-	-	4,900	6,500	6,100	7,500
S.A. Run 16	K of all units increased by a factor of five (x5) and recharge decreased by a factor of two (/2)	28.6%	0.09	7,200	4,300	9,400	12,100	2,900	5,900

Notes:
1. "S.A" indicates "sensitivity analysis" - these runs were modified as described above relative to the base case simulations for mine operations and closure.
2. "K" indicates hydraulic conductivity; "S_s" indicates specific storage; "S_y" indicates specific yield.
3. Maximum annual estimated flows to underground workings for all sensitivity scenarios occur in year 8 of mining operations .
4. For mining operations simulations, etimated baseflow at BJL-H1 gauging station represents an average over the full simulation period. For post-closure simulations, estimated baseflow at BJL-H1 represents steady-state post-closure flows.
5. Steady state results (i.e., head target calibration, dewatering discharge, and post-closure estimated baseflow) for S.A. Run 3 are the same as the base case calibrated numerical model. Steady state results for S.A. Run 14 are the same as for S.A. Run 12.
6. Select sensitivity scenarios (e.g., S.A. Runs 10, 11, & 15) did not apply to pre-disturbance conditions, and were only run for predictive simulations.

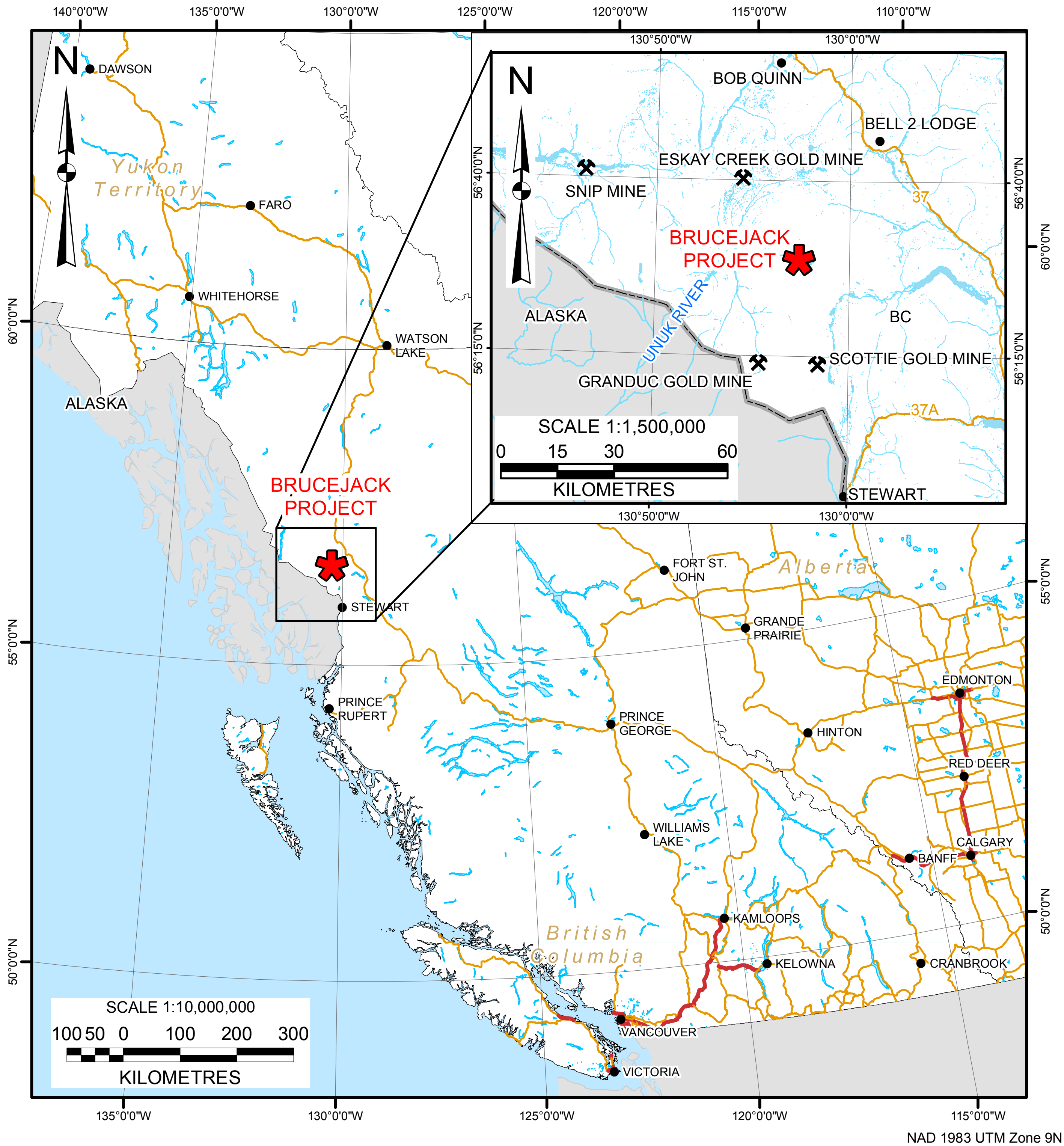
Table 13. Summary of Predicted Groundwater Discharge to Surface Water Receptors in the LSA

Surface Water Receptor[1]	Pre-Disturbance / Baseline (m^3/d)		Construction[3] (m^3/d)		Operations (Y8) (m^3/d)		Operations (Y22) (m^3/d)		Post-Closure (m^3/d)	
	summer[2]	winter	summer	winter	summer	winter	summer	winter	summer	winter
Tributaries to Brucejack Lake	5,400 (-)	3,400 (-)	5,300 (-1%)	3,300 (-1%)	5,300 (-2%)	3,300 (-3%)	5,200 (-3%)	3,200 (-4%)	5,500 (+2%)	3,300 (-3%)
Brucejack Lake	2,200 (-)	2,000 (-)	2,100 (-4%)	1,900 (-4%)	1,800 (-17%)	1,600 (-19%)	2,000 (-11%)	1,800 (-11%)	2,100 (-5%)	1,800 (-7%)
Camp Creek	130 (-)	50 (-)	0 (-100%)	0 (-100%)	0 (-100%)	0 (-100%)	0 (-100%)	0 (-100%)	160 (+22%)	100 (+91%)
Brucejack Creek between Brucejack Lake and BJ 2.62	1,300 (-)	820 (-)	320 (-75%)	150 (-82%)	40 (-97%)	10 (-99%)	30 (-97%)	4 (-100%)	1,100 (-11%)	820 (-1%)
VOK Creek	250 (-)	120 (-)	80 (-70%)	40 (-67%)	40 (-86%)	20 (-85%)	30 (-87%)	20 (-88%)	200 (-17%)	90 (-23%)
Unnamed Creek	1,000 (-)	600 (-)	970 (-5%)	540 (-10%)	860 (-17%)	450 (-26%)	820 (-20%)	410 (-32%)	1,000 (+2%)	580 (-4%)
Brucejack Creek between BJ 2.62 and BJL-H1	420 (-)	320 (-)	390 (-7%)	280 (-12%)	330 (-23%)	220 (-32%)	320 (-25%)	200 (-38%)	430 (+1%)	310 (-1%)

Notes:

1. Predicted groundwater discharge to surface water receptors comprises flux to the boundary conditions that represent those receptors (i.e., DRN, RIV, and GHB cells). Total flowrates are presented along with percentage change from pre-disturbance or baseline conditions.
2. Summer flows represent the average of three 2-month summer stress periods, while winter flows represent the average of three 2-month winter stress periods.
3. Construction flows are averaged over mining operations model years -3 through -1. Operations flows are presented for years 8 and 22 (i.e., end of mine life).

DRAWINGS



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SCALE:	1:10,000,000	DESIGNED:	DP
DATE:	JUNE 2014	CHECKED:	CM
DRAWN:	MIB, SMR	APPROVED:	TC

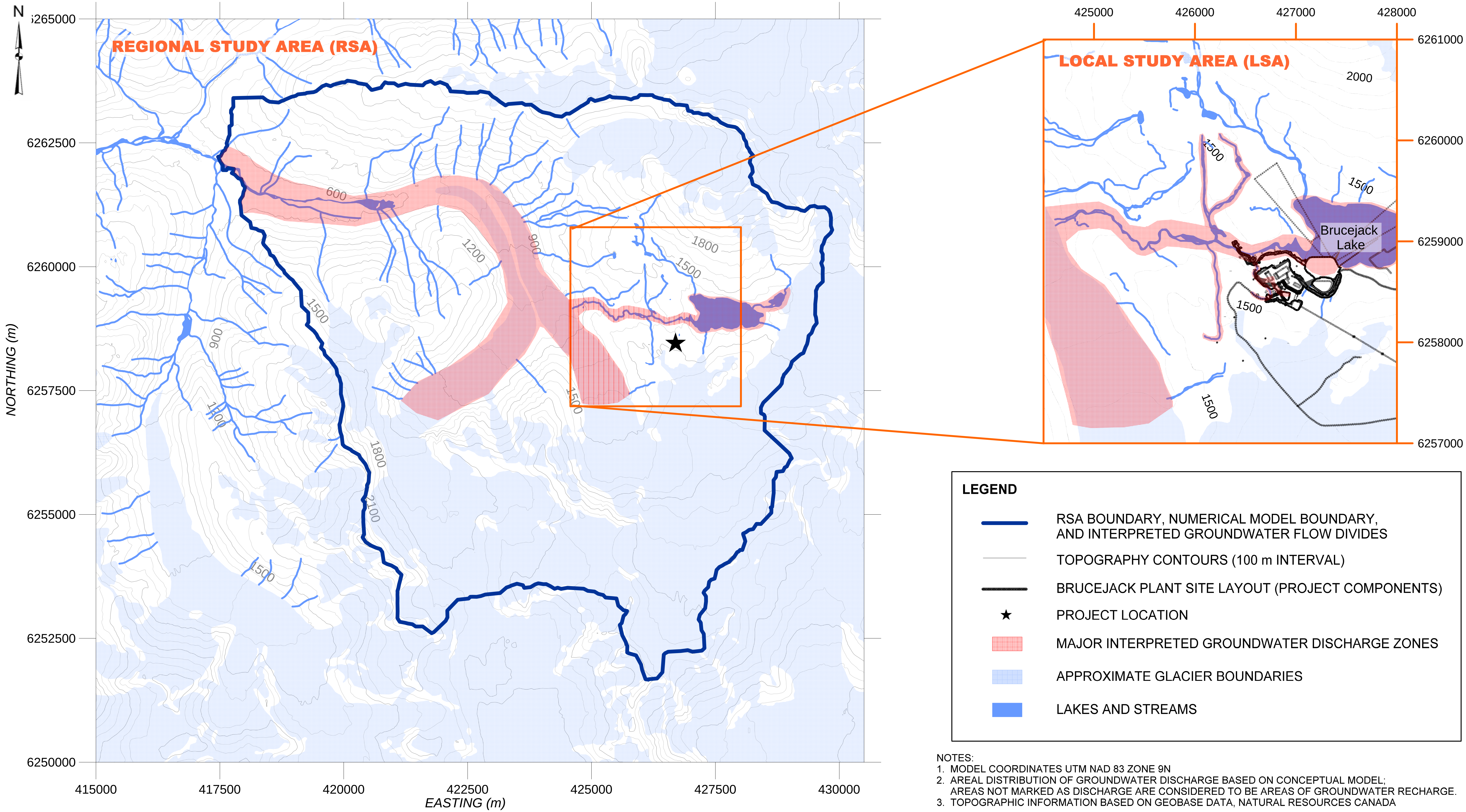
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: PROJECT LOCATION

CLIENT: PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-010	01	



NOTES:
1. MODEL COORDINATES UTM NAD 83 ZONE 9N
2. AREAL DISTRIBUTION OF GROUNDWATER DISCHARGE BASED ON CONCEPTUAL MODEL; AREAS NOT MARKED AS DISCHARGE ARE CONSIDERED TO BE AREAS OF GROUNDWATER RECHARGE.
3. TOPOGRAPHIC INFORMATION BASED ON GEOBASE DATA, NATURAL RESOURCES CANADA

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	DP
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APPROVED:	TC

PROFESSIONAL SEAL:

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CLIENT: PRETIUM RESOURCES INC.

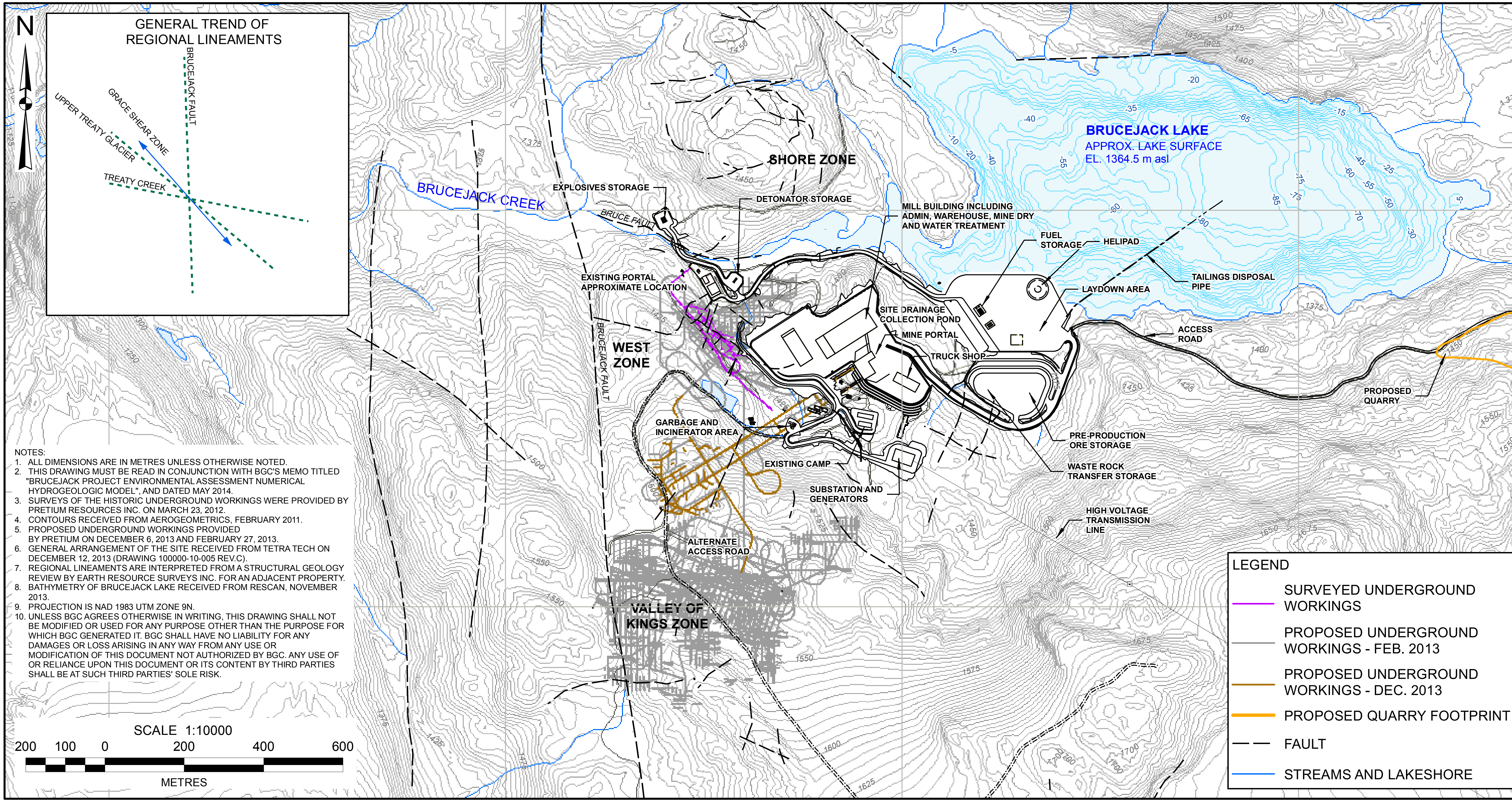
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: BRUCEJACK HYDROGEOLOGY RSA & LSA, GROUNDWATER FLOW DIVIDES AND DISCHARGE

PROJECT No.:	FIG No.:	REV.:
1008-010	02	0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

N:/BGC/Projects/1008 Pretium/007 Feasibility/004 Hydrogeo - office/01 Brucejack/09 Reporting/Figures/Surfer Working



NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S MEMO TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL", AND DATED MAY 2014.
3. SURVEYS OF THE HISTORIC UNDERGROUND WORKINGS WERE PROVIDED BY PRETIUM RESOURCES INC. ON MARCH 23, 2012.
4. CONTOURS RECEIVED FROM AEROGEOMETRICS, FEBRUARY 2011.
5. PROPOSED UNDERGROUND WORKINGS PROVIDED BY PRETIUM ON DECEMBER 6, 2013 AND FEBRUARY 27, 2013.
6. GENERAL ARRANGEMENT OF THE SITE RECEIVED FROM TETRA TECH ON DECEMBER 12, 2013 (DRAWING 100000-10-005 REV.C).
7. REGIONAL LINEAMENTS ARE INTERPRETED FROM A STRUCTURAL GEOLOGY REVIEW BY EARTH RESOURCE SURVEYS INC. FOR AN ADJACENT PROPERTY.
8. BATHYMETRY OF BRUCEJACK LAKE RECEIVED FROM RESCAN, NOVEMBER 2013.
9. PROJECTION IS NAD 1983 UTM ZONE 9N.
10. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.

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SCALE:	1:10,000
DATE:	JUNE 2014
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DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

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AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: BRUCEJACK PROJECT SITE PLAN

PROJECT No.:	DWG No.:	REV.:
1008-010	03	

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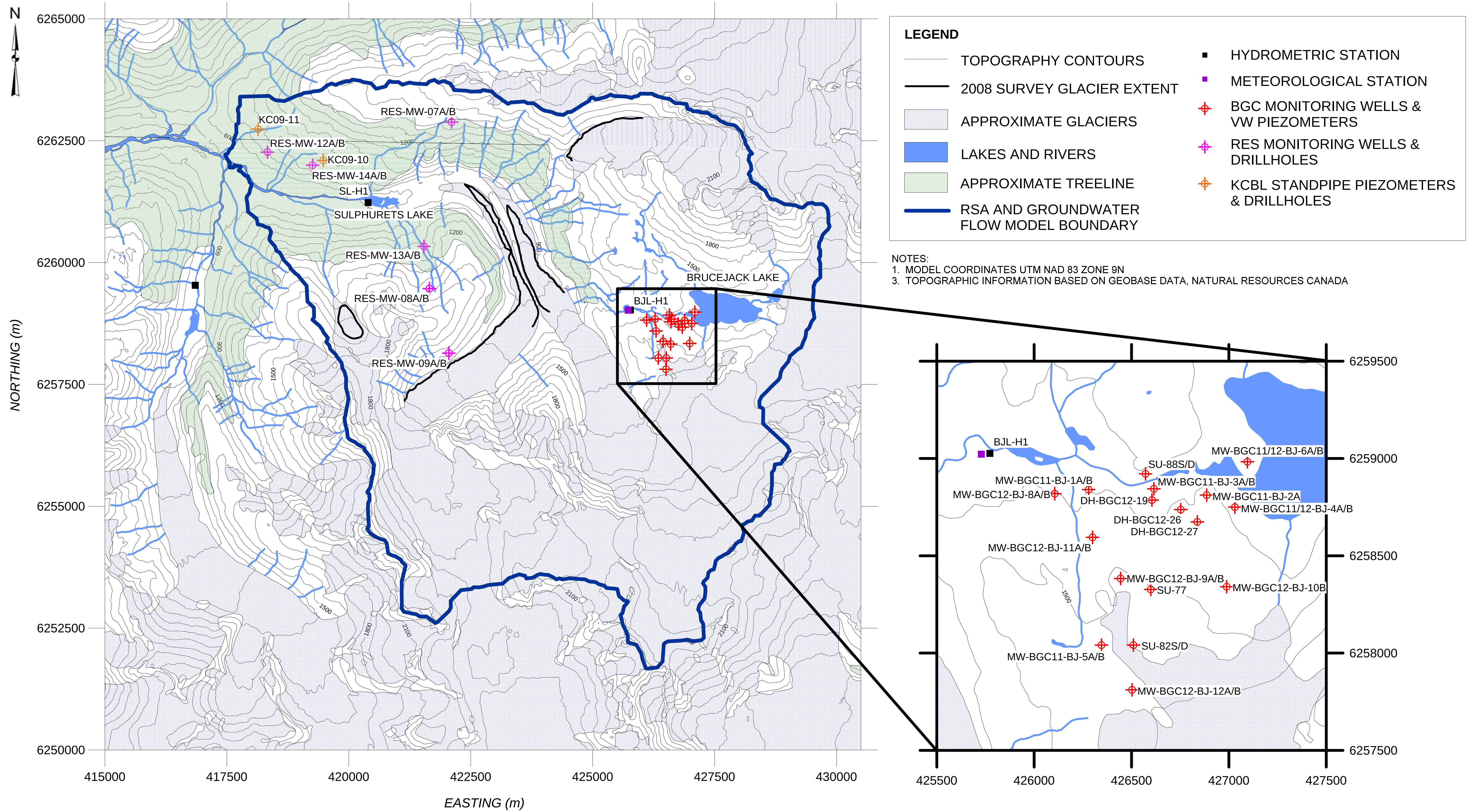


NOTES:
1. MODEL COORDINATES UTM NAD 83 ZONE 9N
3. TOPOGRAPHIC INFORMATION BASED ON GEOBASE DATA, NATURAL RESOURCES CANADA

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	DP
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

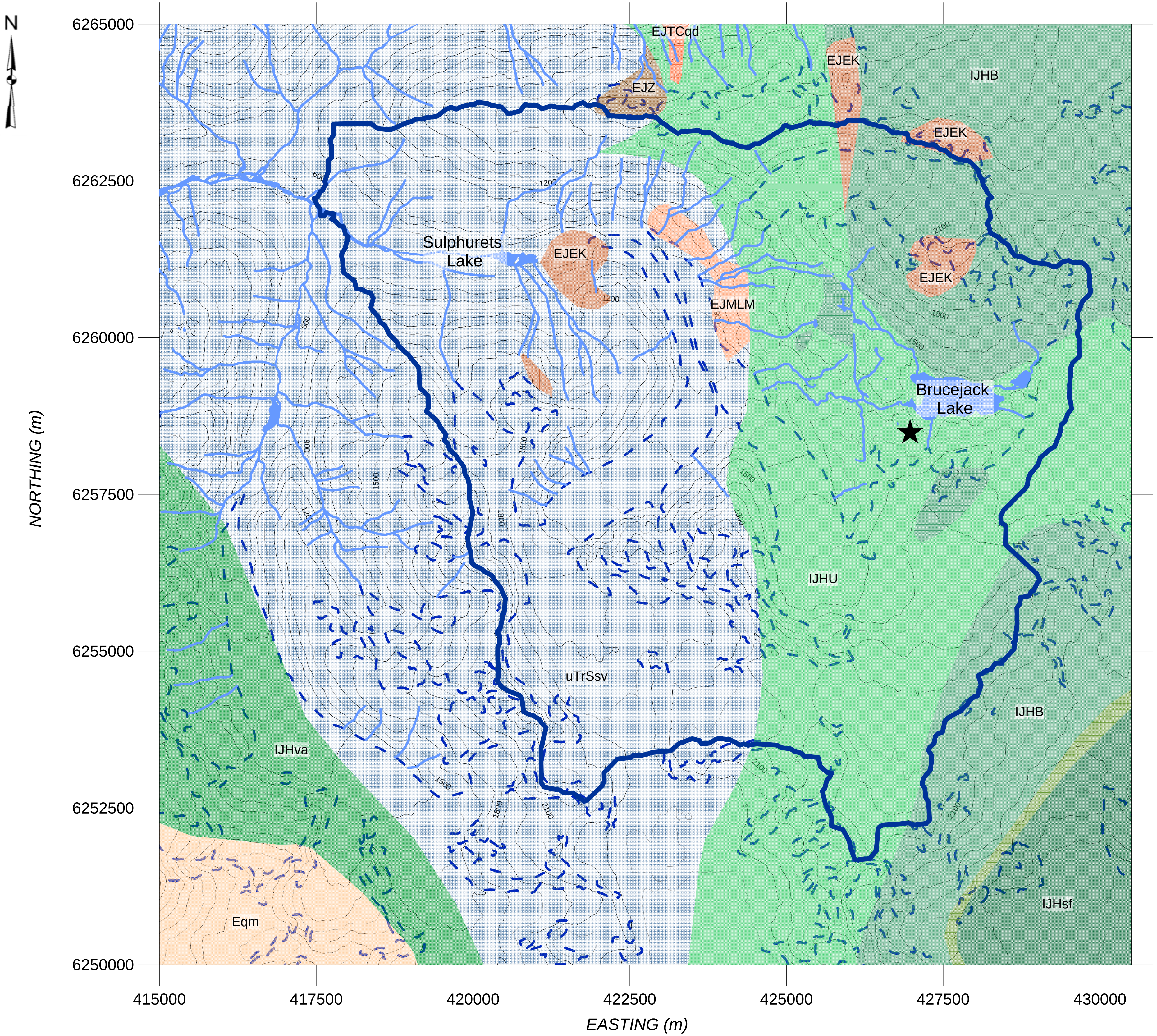
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: REGIONAL STUDY AREA SITE PLAN

PROJECT No.:	FIG No.:	REV.:
1008-010	04	0

N:/BGC/Projects/1008 Pretium/007 Feasibility/004 Hydrogeo - office/01 Brucejack/09 Reporting/Figures/Surfer Working

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

- GROUNDWATER FLOW MODEL BOUNDARY
- APPROXIMATE GLACIER BOUNDARIES
- RIVERS AND LAKES
- TOPOGRAPHY CONTOURS (100 m INTERVAL)
- ★ PROJECT LOCATION

GEOLOGY

HAZELTON GROUP

- muJHM - MESOZOIC - MOUNT DILWORTH FORMATION CALC-ALKALINE VOLCANIC ROCKS
- lJHB - MESOZOIC - BETTY CREEK FORMATION VOLCANICLASTIC ROCKS
- lJHU - MESOZOIC - UNUK RIVER FORMATION ANDESITIC VOLCANIC ROCKS
- lJHva - MESOZOIC ANDESITIC VOLCANIC ROCKS
- lJHsf - MESOZOIC MUDSTONE, SILTSTONE, SHALE FINE CLASTIC SEDIMENTARY ROCKS

STUHINI GROUP

- uTrSsv - MESOZOIC MARINE SEDIMENTARY AND VOLCANIC ROCKS

INTRUSIVE ROCKS

- Eqm - CENOZOIC - COAST PLUTONIC COMPLEX (?) QUARTZ MONZONITIC INTRUSIVE ROCKS
- EJEK - MESOZOIC ESKAY PORPHYRY, KNIPPLE PORPHYRY OR INEL STOCK FELDSPAR PORPHYRITIC INTRUSIVE ROCKS
- EJMLM - MESOZOIC - MELVILLE AND LEHTO PLUTONS, MITCHELL INSTRUSIONS, RED BLUFF PORPHYRY STOCK MONZODIORITIC TO GABBROIC INTRUSIVE ROCKS
- EJZ - MOSOZOIC - ZIPPA MOUNTAIN PLUTONIC COMPLEX DIORITIC INTRUSIVE ROCKS
- EJTCqd - MESOZOIC - TEXAS CREEK PLUTONIC SUITE QUARTZ DIORITIC INTRUSIVE ROCKS

NOTES:
1. MODEL COORDINATES UTM NAD 83 ZONE 9N
2. GEOLOGICAL BOUNDARIES ACQUIRED FROM BRITISH COLUMBIA GEOLOGICAL SURVEY GEOFILE GF2005-9.
3. TOPOGRAPHIC INFORMATION BASED ON GEOBASE DATA, NATURAL RESOURCES CANADA

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	DP
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AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

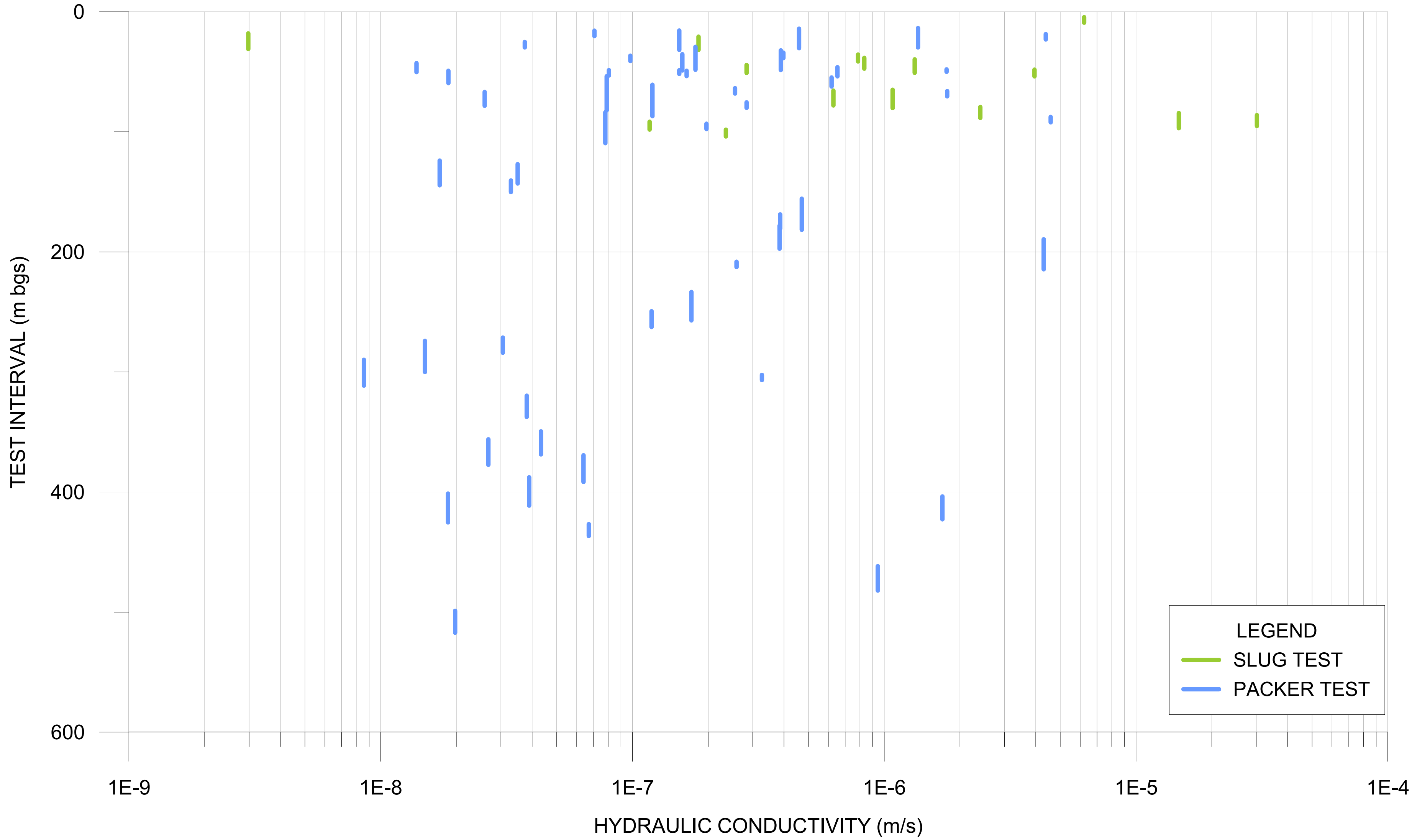
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: REGIONAL STUDY AREA GEOLOGY

PROJECT No.:	FIG No.:	REV.:
1008-010	05	0

N:/BGC/Projects/1008 Pretium/007 Feasibility/004 Hydrogeo - office/01 Brucejack/09 Reporting/Figures/Surfer Working

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



SCALE: N/A
DESIGNED: DP
DATE: JUN 2014
CHECKED: CM
DRAWN: DP
APPROVED: TC

BGC ENGINEERING INC.
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PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

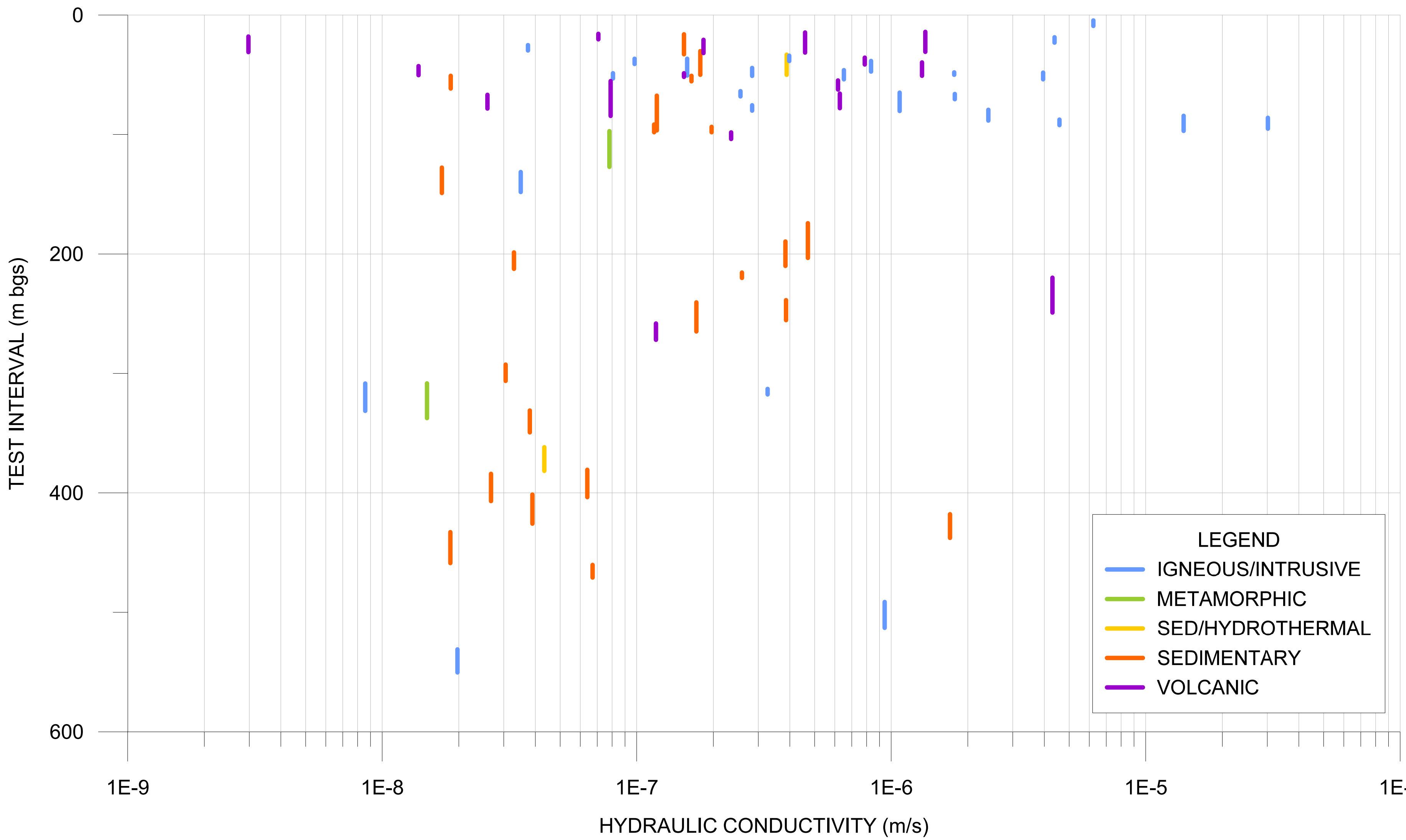
TITLE: HYDRAULIC CONDUCTIVITY VS. DEPTH BY TEST TYPE

CLIENT: PRETIUM RESOURCES INC.

PROJECT No. 1008-010
FIG No. 06
REV. 1

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings



SCALE: N/A	DESIGNED: DP
DATE: JUN 2014	CHECKED: CM
DRAWN: DP	APPROVED: TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

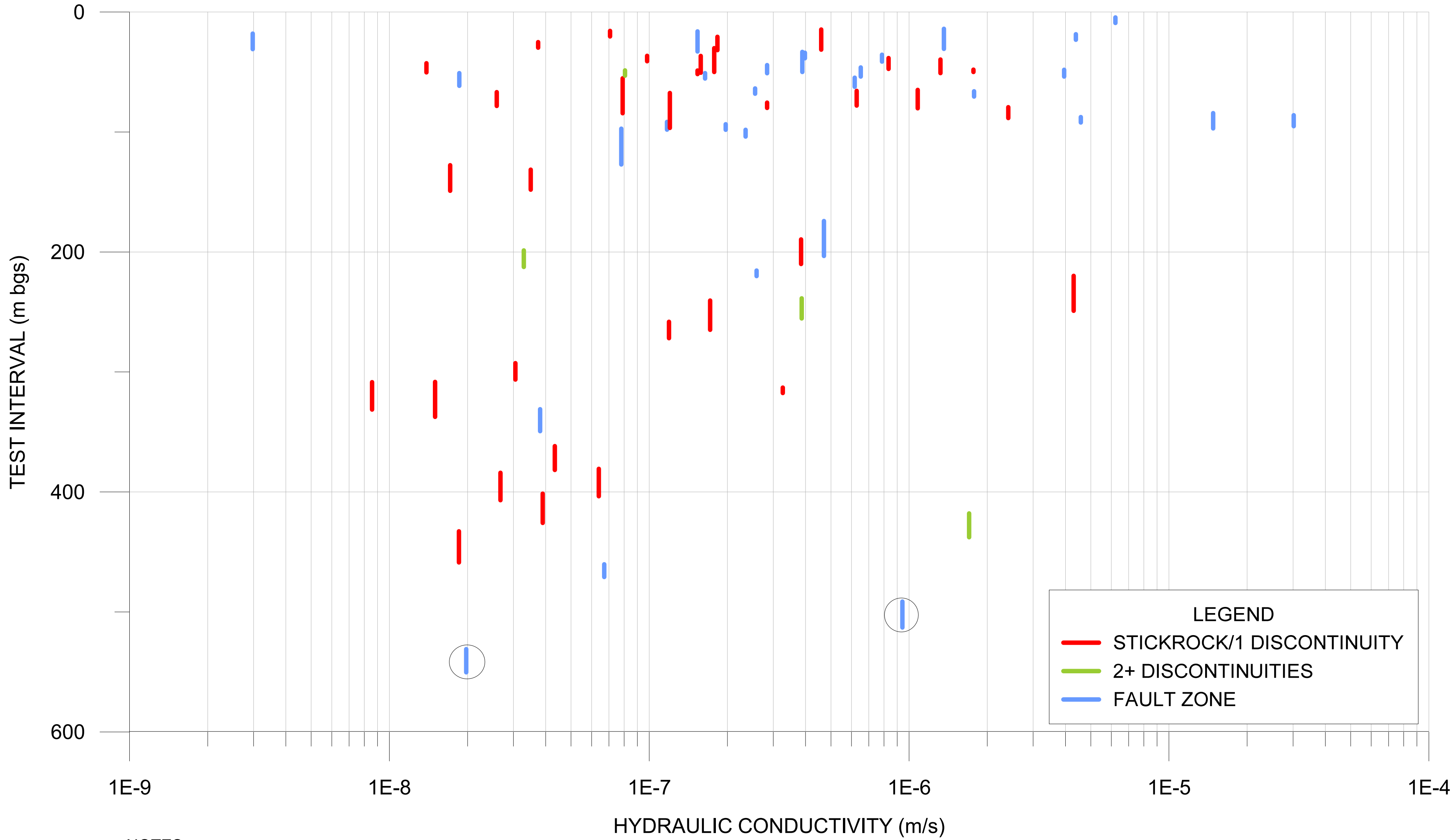
CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
HYDRAULIC CONDUCTIVITY VS. DEPTH
BY LITHOLOGY

PROJECT No.	FIG No.	REV.
1008-010	07	1

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



NOTES:
1) Circled results (2) are packer tests completed in the Brucejack Fault.

SCALE: N/A	DESIGNED: DP	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: JUN 2014	CHECKED: CM		TITLE: HYDRAULIC CONDUCTIVITY VS. DEPTH FOR FAULT ZONES
DRAWN: DP	APPROVED: TC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / FIG No. 08 / REV. 1

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings

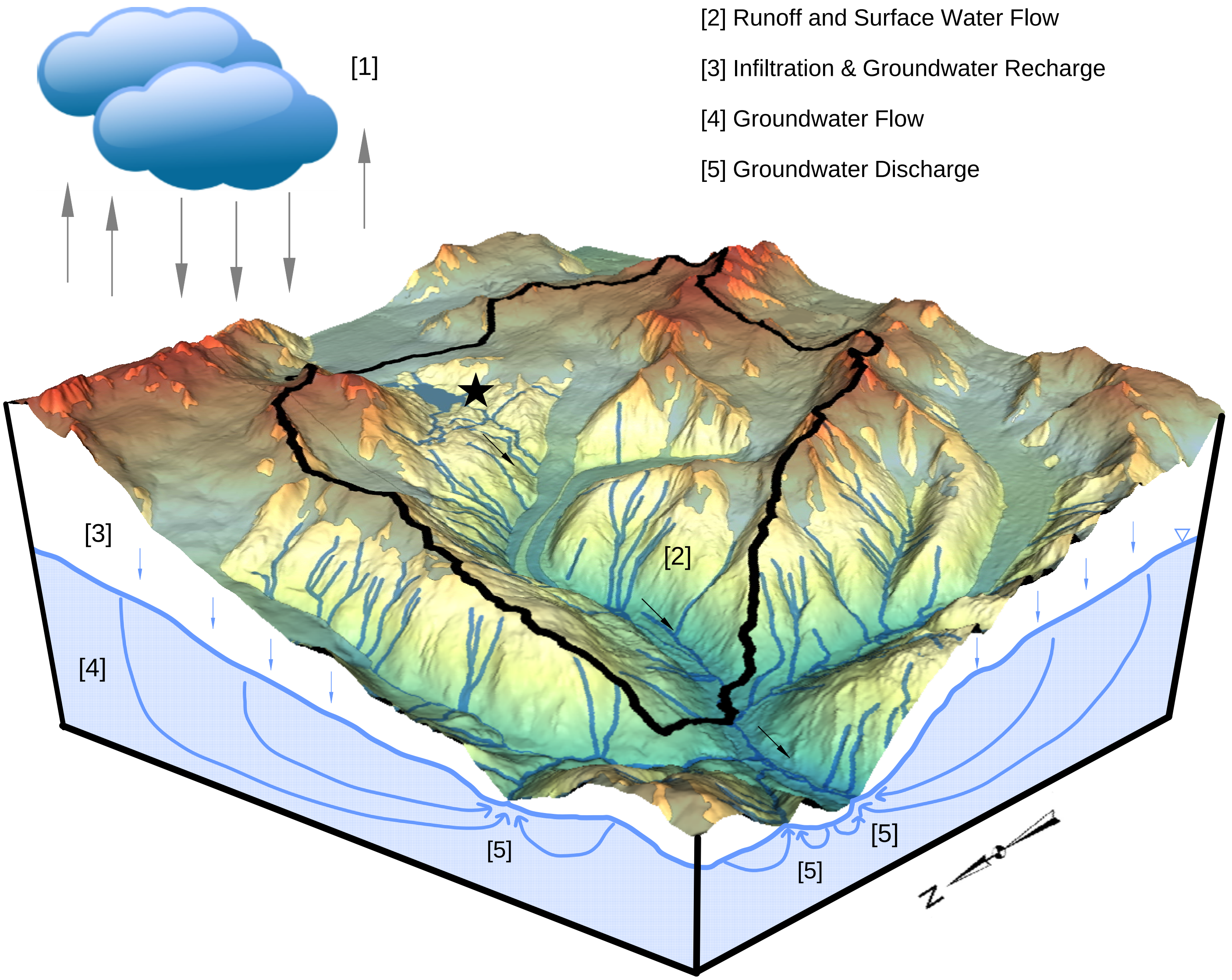
[1] Precipitation, Evaporation & Evapotranspiration

[2] Runoff and Surface Water Flow

[3] Infiltration & Groundwater Recharge

[4] Groundwater Flow

[5] Groundwater Discharge



SURFACE TOPOGRAPHY (m asl)

400 | 700 | 1,000 | 1,300 | 1,600 | 1,900 | 2,200 | 2,500

HYDROLOGY

GLACIERS

★ PROJECT LOCATION

SURFACE WATER FLOW DIRECTION

SCALE:	NTS	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	RT
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

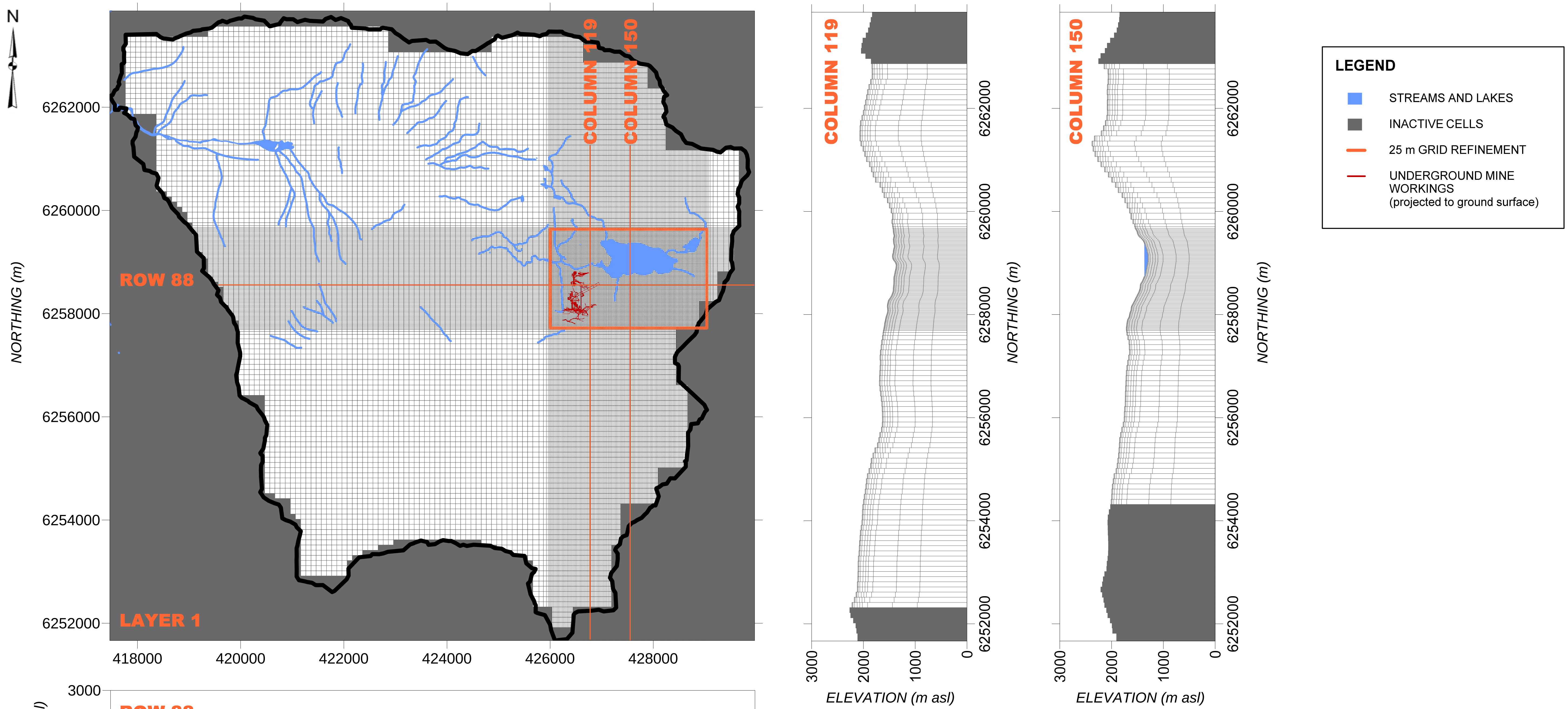
TITLE: CONCEPTUAL HYDROGEOLOGIC MODEL

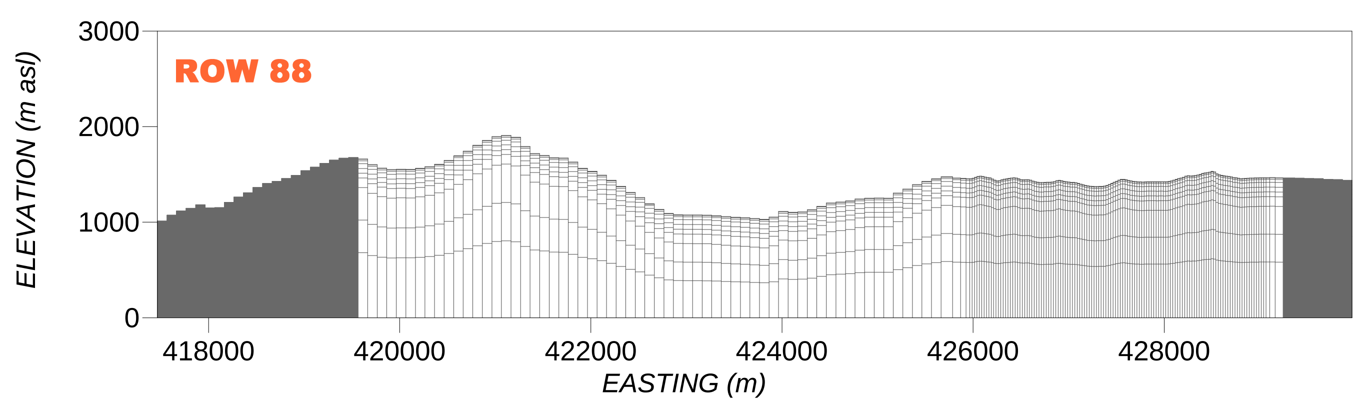
CLIENT: PRETIUM RESOURCES INC.

PROJECT No:	DWG No:	REV.
1008-010	09	0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/02 EA Modeling Report/02 Drawings





NOTES:
1. Model coordinates are UTM NAD 1983 Zone 9N.
2. Cross-section vertical exaggeration 1X.
3. Grid refinement in the project area is 25 m and expands up to 150 m outside of the LSA.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	DP
DESIGNED:	RT
CHECKED:	RT
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

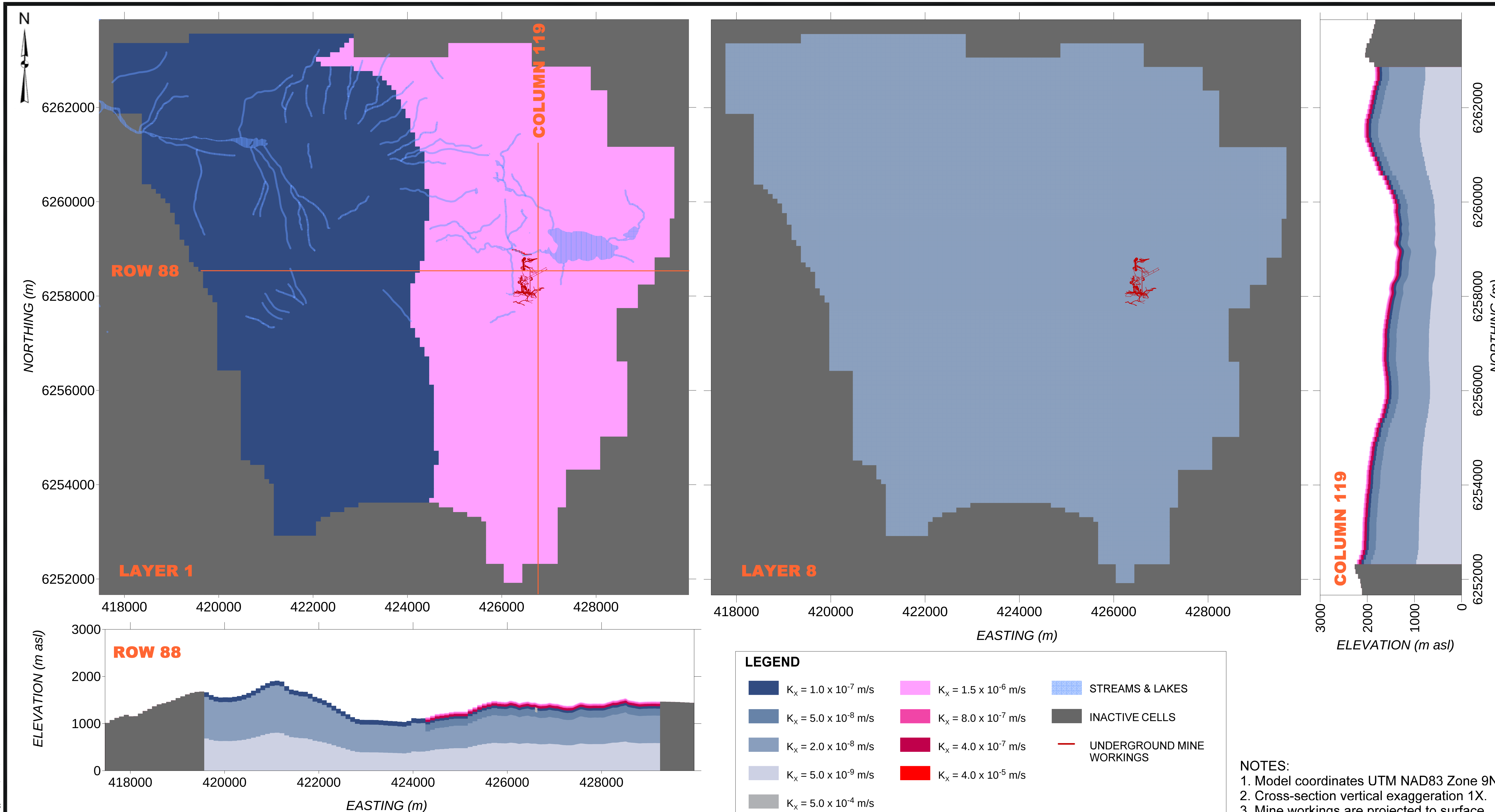
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MODEL FINITE DIFFERENCE GRID

PROJECT No.:	DWG No.:	REV.:
1008-010	10	0

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Cross-section vertical exaggeration 1X.
3. Mine workings are projected to surface.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	DP
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

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CLIENT: PRETIUM RESOURCES INC.

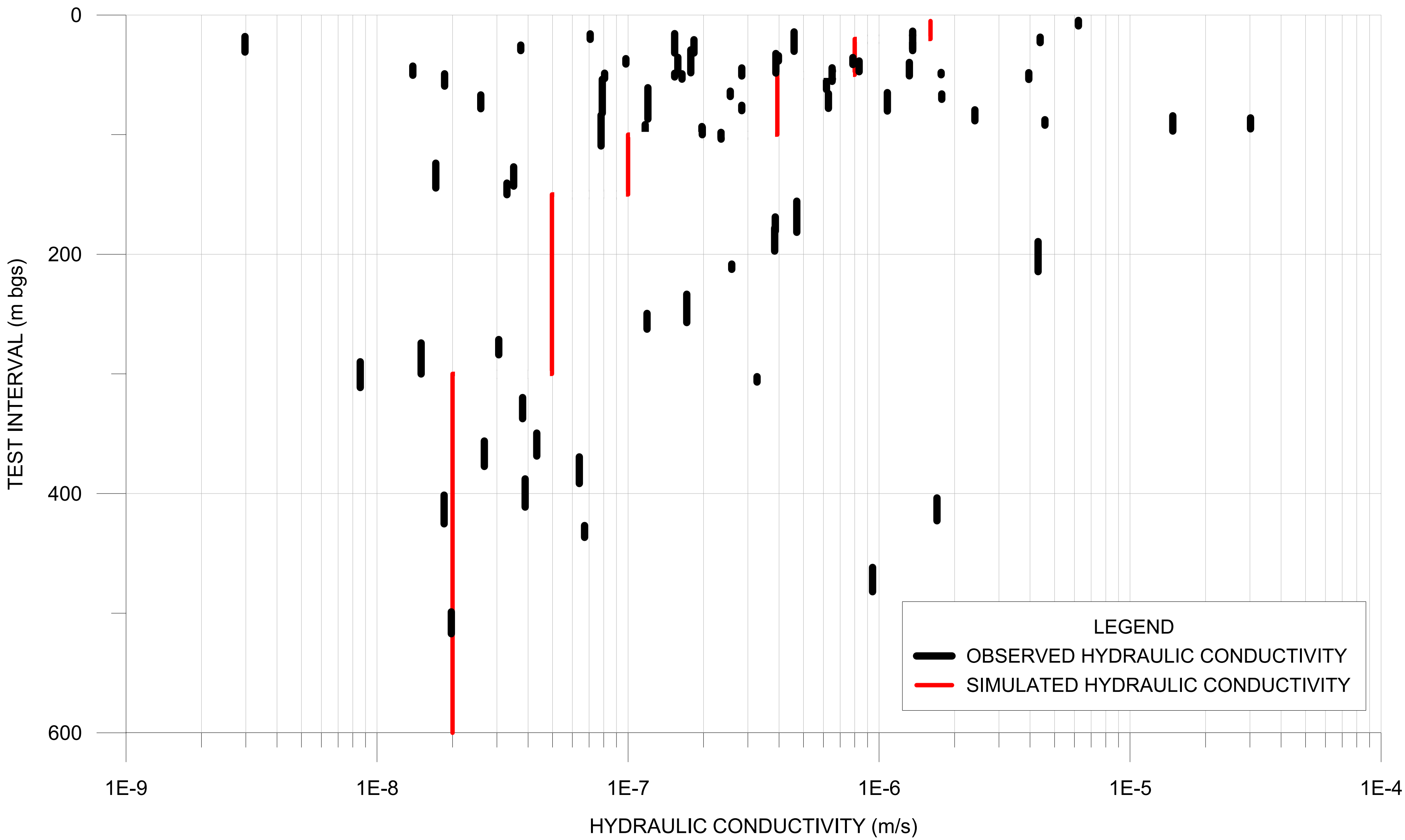
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MODEL HYDRAULIC CONDUCTIVITY DISTRIBUTION

PROJECT No.:	DWG No.:	REV.:
1008-010	11	0

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/02 EA Modeling Report/02 Drawings

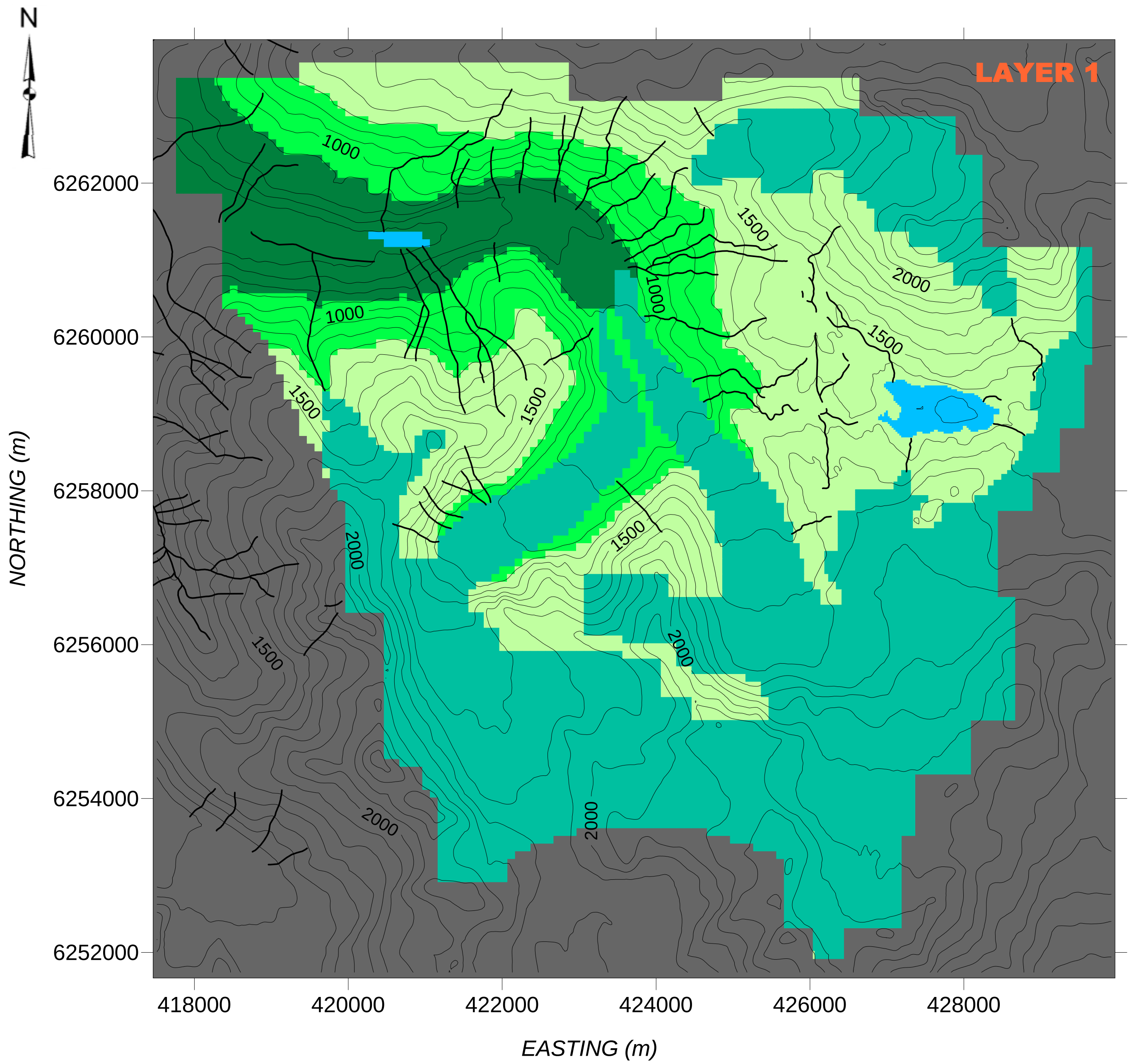
DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



SCALE: N/A	DESIGNED: DP	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: JUN 2014	CHECKED: CM		TITLE: OBSERVED AND MODEL-CALIBRATED HYDRAULIC CONDUCTIVITY VS. DEPTH
DRAWN: DP	APPROVED: TC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / FIG No. 12 / REV. 0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings



LEGEND

INACTIVE CELLS	■	VALLEY RECHARGE ZONE	■	UPLANDS RECHARGE ZONE	■
TOPOGRAPHY (100 m CONTOURS)	—	MID-SLOPE RECHARGE ZONE	■	GLACIER RECHARGE ZONE	■
				BRUCEJACK & SULPHURETS LAKES	■

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

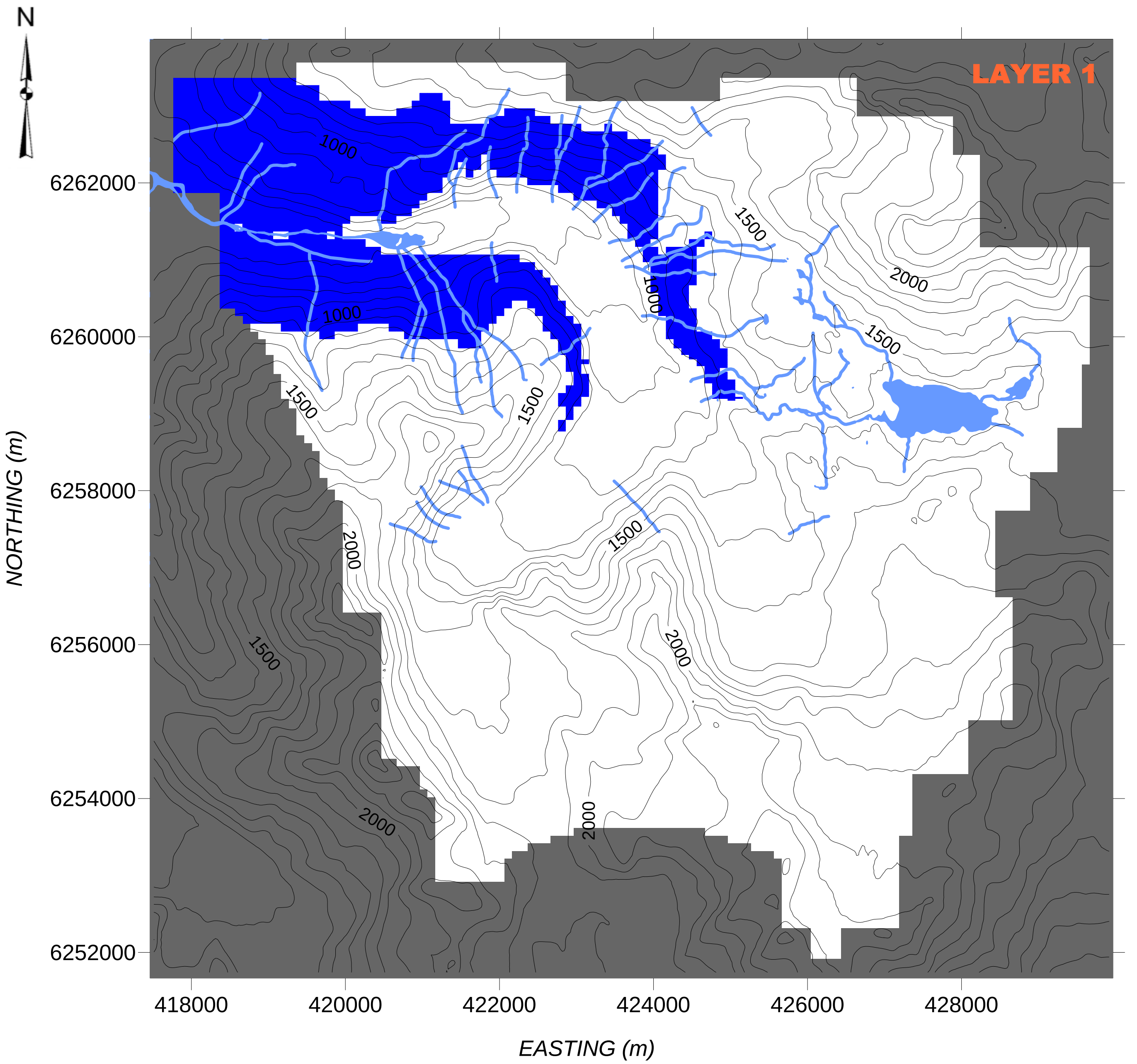
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MODEL RECHARGE DISTRIBUTION

CLIENT: PRETIUM RESOURCES INC.	PROJECT No: 1008-010	DWG No: 13	REV. 1

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings



LEGEND

INACTIVE CELLS	■	BRUCEJACK & SULPHURETS LAKES AND STREAMS	■
TOPOGRAPHY (100 m CONTOURS)	—	EVAPOTRANSPIRATION	■

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

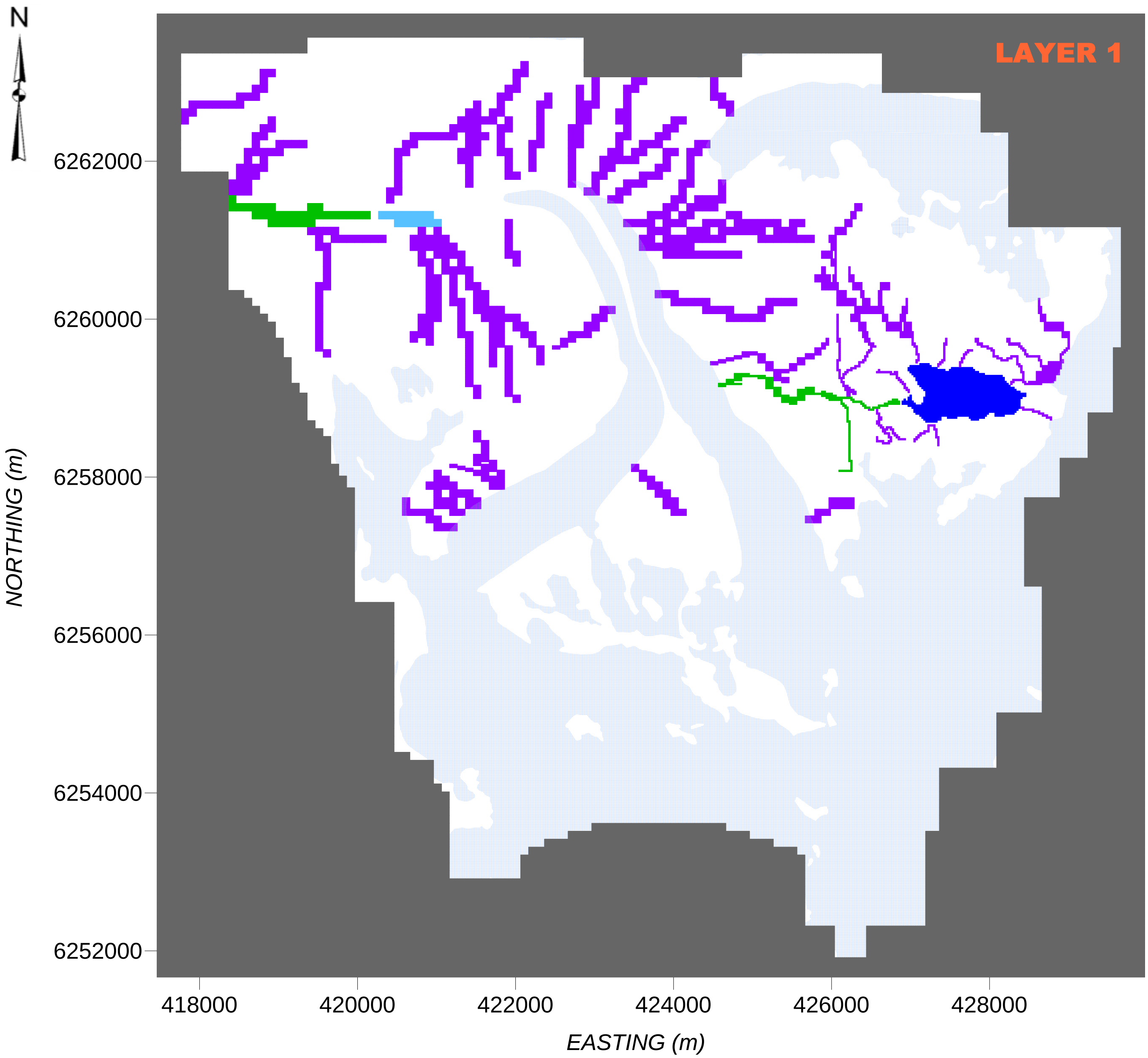
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MODEL EVAPOTRANSPIRATION DISTRIBUTION

CLIENT	PROJECT No:	DWG No:	REV.
PRETIUM RESOURCES INC.	1008-010	14	1

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

GENERAL HEAD BOUNDARY
CONSTANT HEAD BOUNDARY
INACTIVE CELLS
GLACIERS
DRAIN - STREAMS
RIVER - STREAMS

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

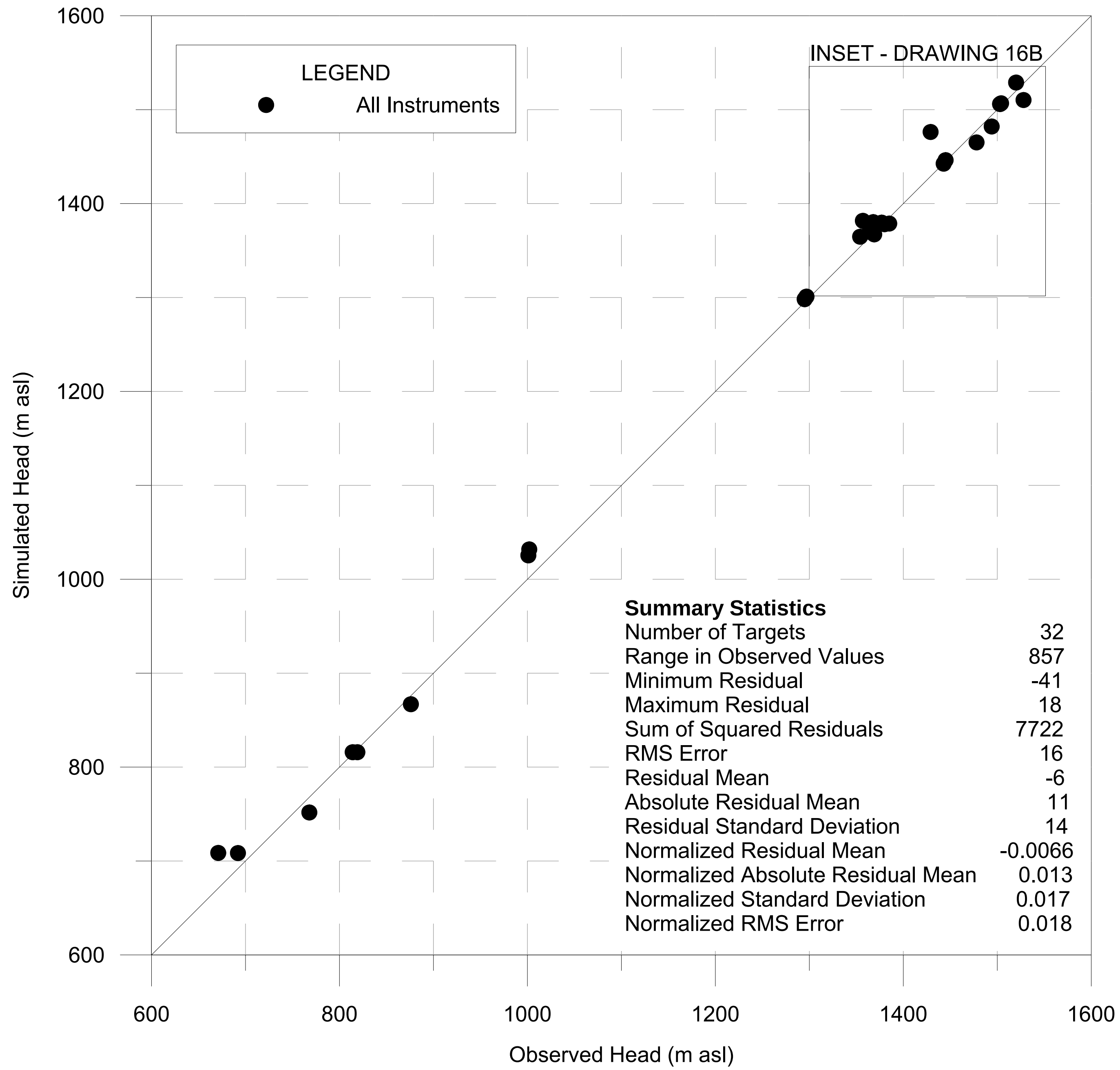
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE: BOUNDARY CONDITIONS - PRE-DISTURBANCE SIMULATIONS

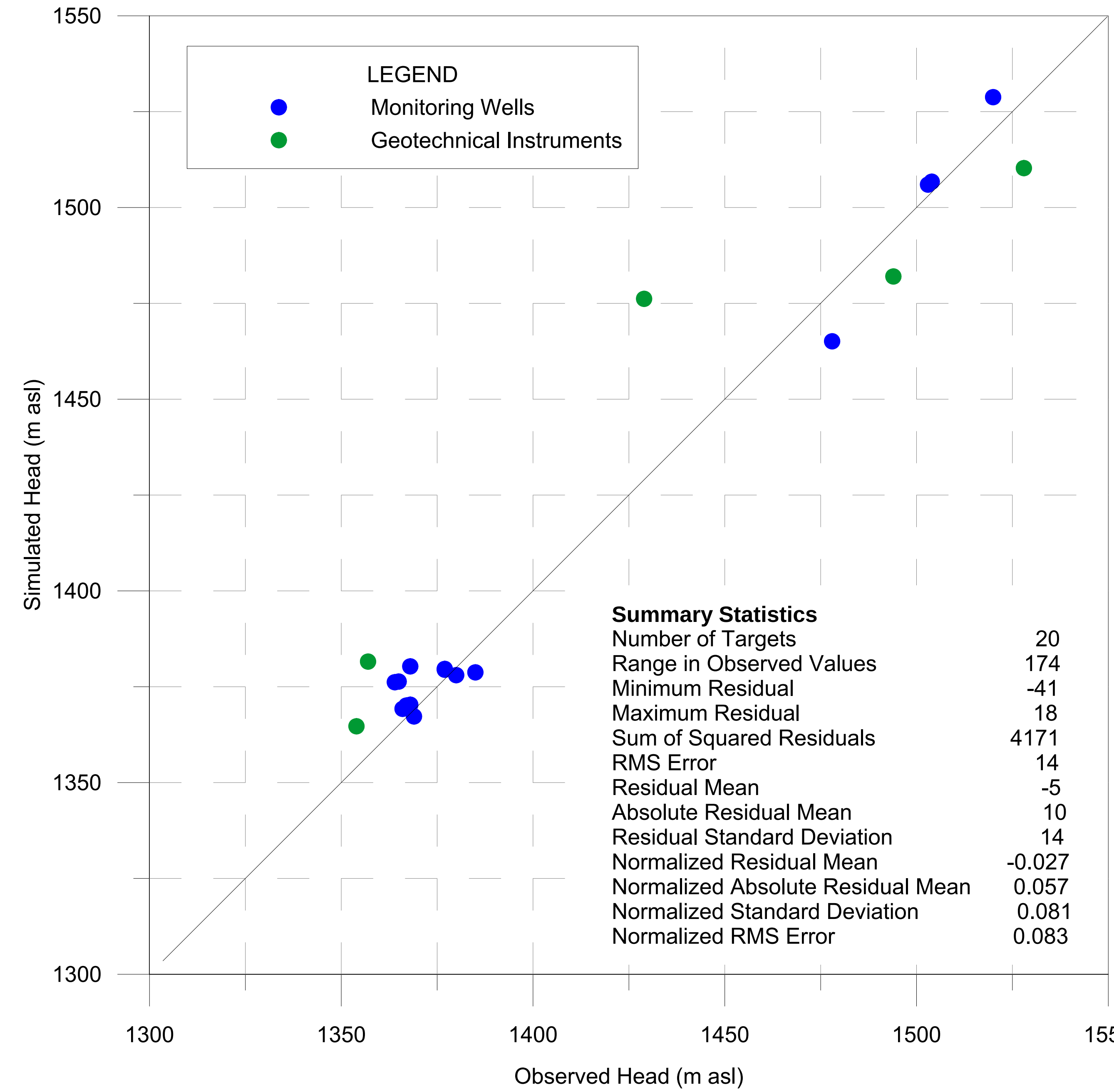
CLIENT	PROJECT No:	DWG No:	REV.
PRETIUM RESOURCES INC.	1008-010	15	1

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



A] RSA - ALL HYDRAULIC HEAD TARGETS



B] LSA - BRUCEJACK PROJECT HYDRAULIC HEAD TARGETS

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	DP
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

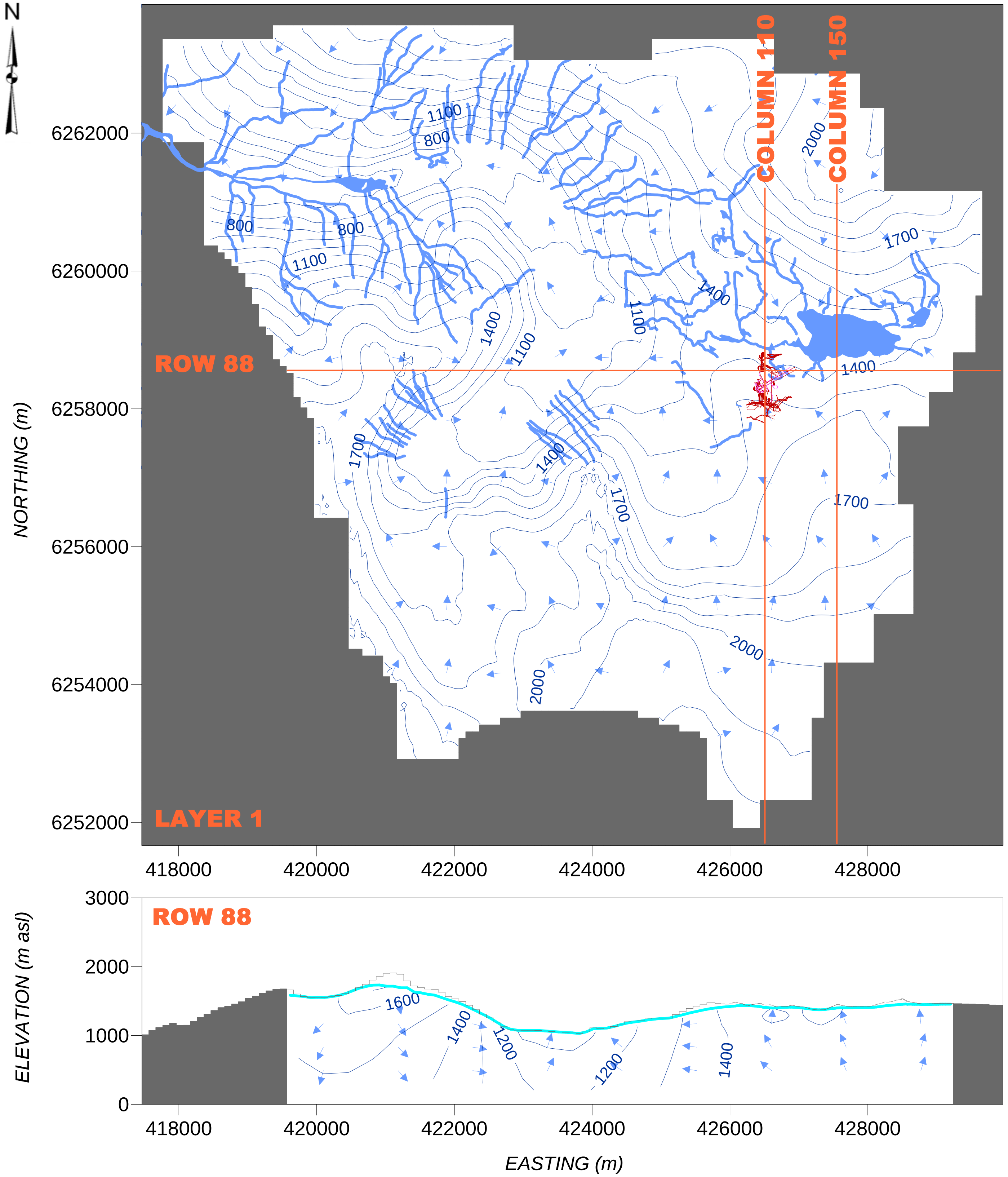
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

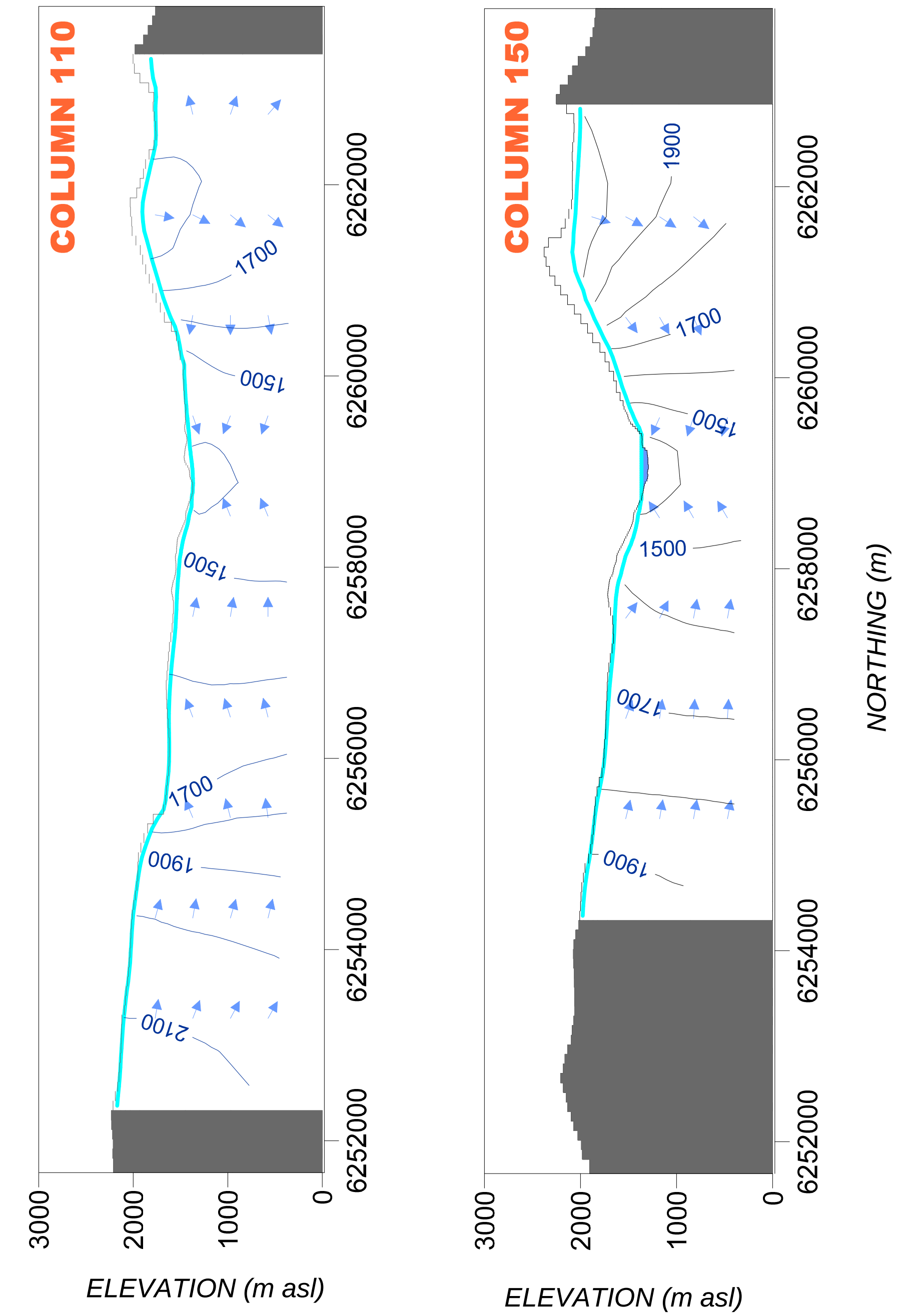
TITLE: STEADY STATE CALIBRATION RESULTS FOR HYDRAULIC HEAD TARGETS

PROJECT No.:	DWG No.:	REV.:
1008-010	16	1

N:\BGC\PROJECTS\1008 PRETIUM\010 EA 2013\002 HYDROGEOLOGY\09 REPORTING\02 EA MODELING REPORT\02 DRAWINGS

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014





LEGEND

- HYDROLOGY
- INACTIVE CELLS
- MINE WORKINGS
- UPDATED MINE WORKINGS (DEC 2013)
- WATER TABLE (m asl)
- HYDRAULIC HEAD (m asl)
- GROUNDWATER FLOW (NOT TO SCALE)

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Cross-section vertical exaggeration 1X.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	As shown
DATE:	JUN 2014
DRAWN:	RC
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

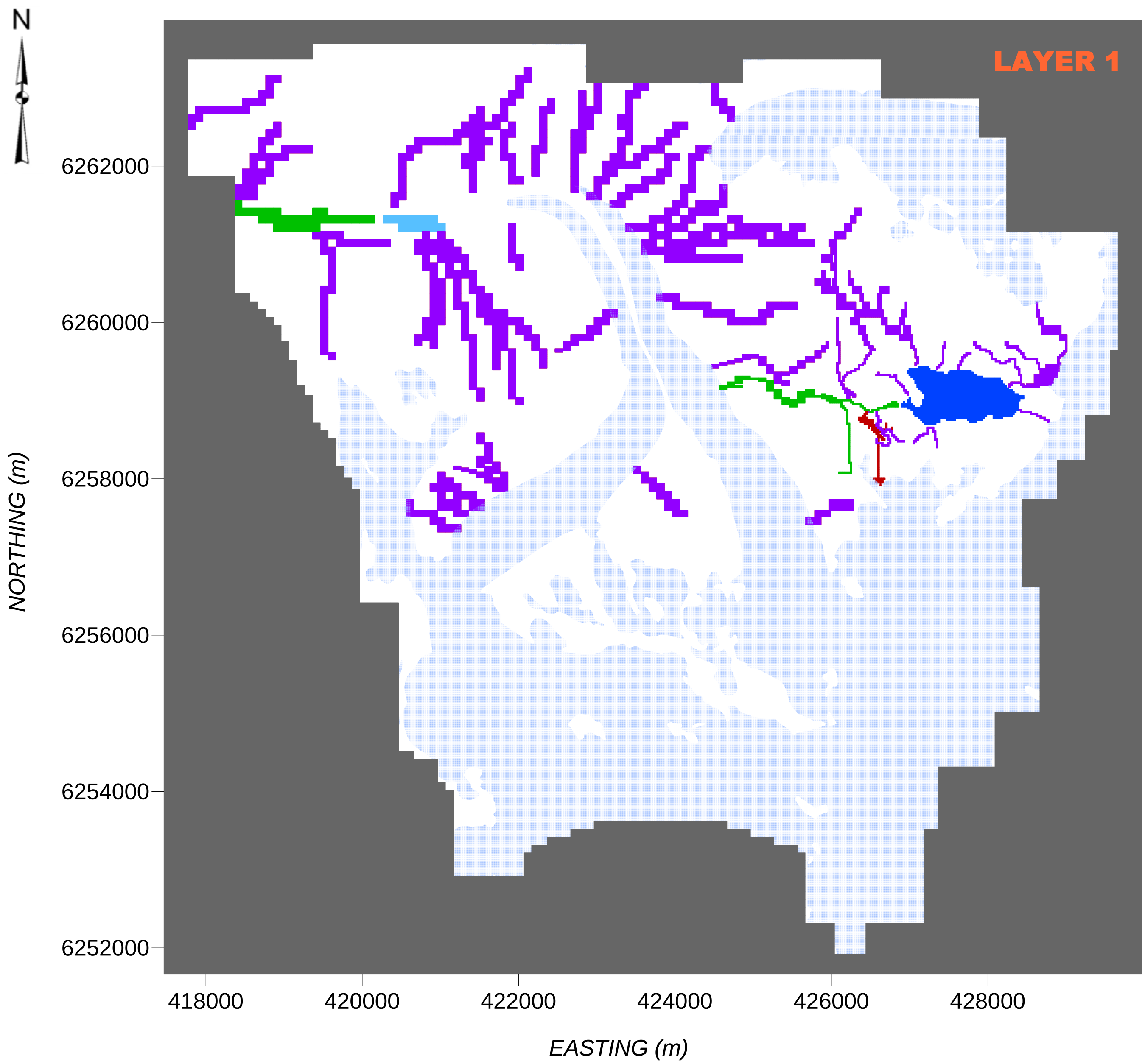
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: SIMULATED GROUNDWATER ELEVATION CONTOURS PRE-DISTURBANCE STEADY STATE

PROJECT No.:	DWG No.:	REV.:
1008-010	17	0

N:/BGC/PROJECTS/1008 PRETIUM/010 EA 2013/002 HYDROGEOLOGY/09 REPORTING/02 EA MODELING REPORT/02 DRAWINGS

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

GENERAL HEAD BOUNDARY	INACTIVE CELLS	RIVER - STREAMS
CONSTANT HEAD BOUNDARY	GLACIERS	DRAIN - STREAMS
		DRAIN - MINE WORKINGS

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Underground workings (drains) projected to ground surface.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

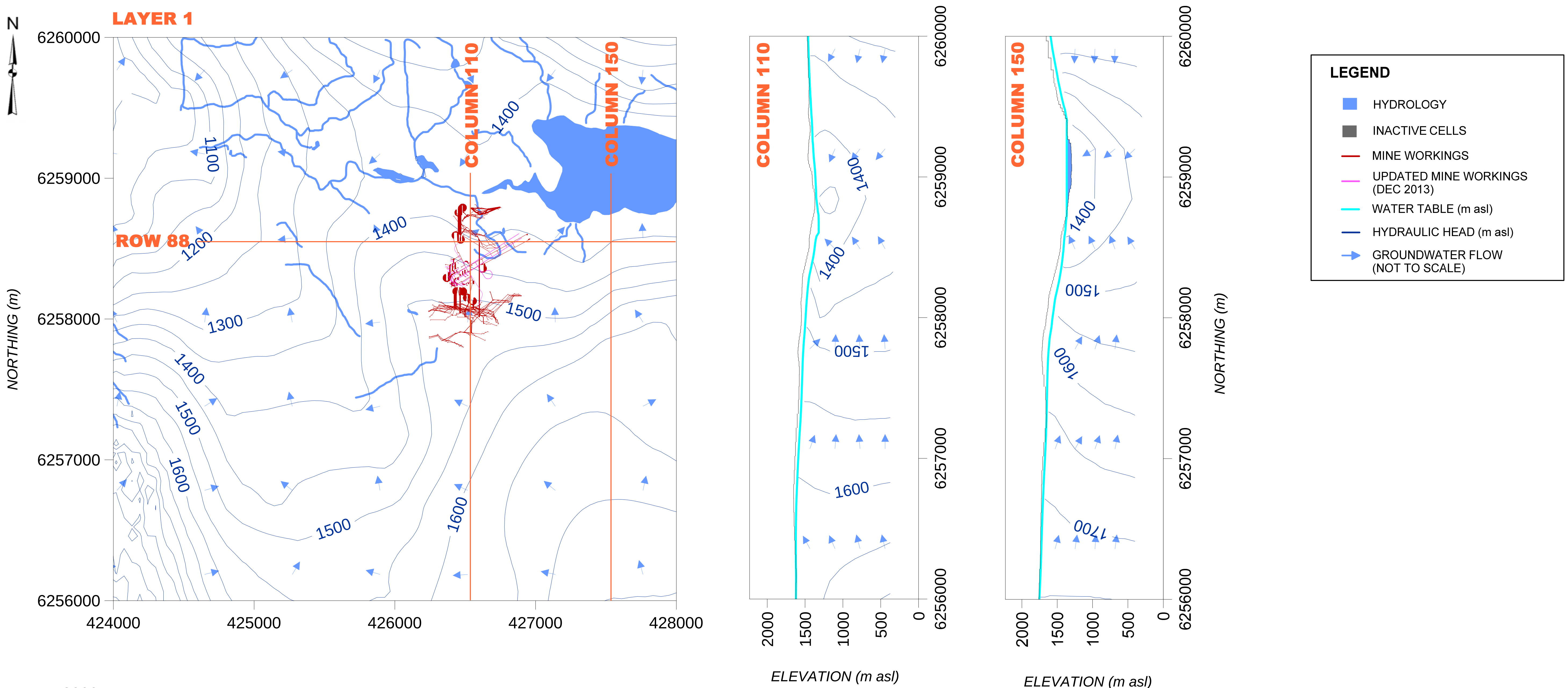
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

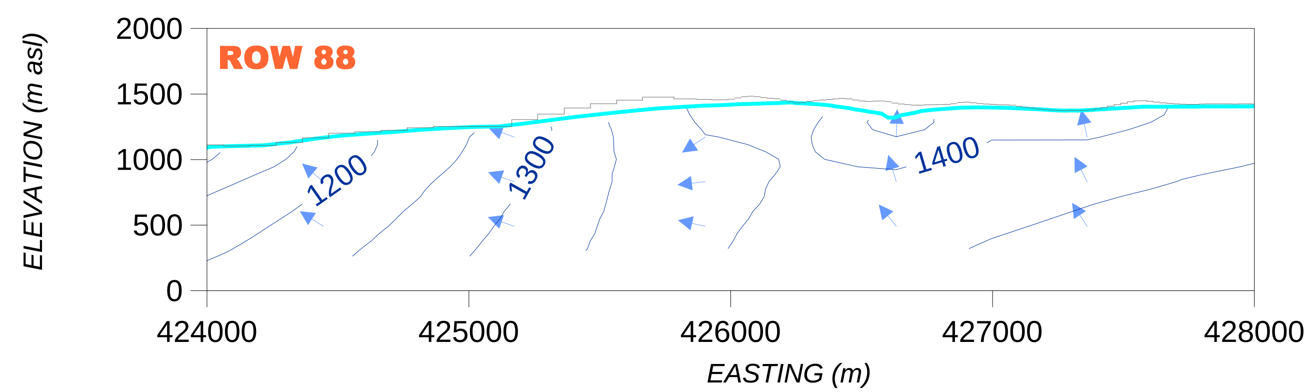
TITLE: BOUNDARY CONDITIONS - PRE-OPERATIONS SIMULATIONS

CLIENT	PROJECT No:	DWG No:	REV.
PRETIUM RESOURCES INC.	1008-010	18	1

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014





NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Cross-section vertical exaggeration 2X.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	As shown
DATE:	JUN 2014
DRAWN:	RC
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

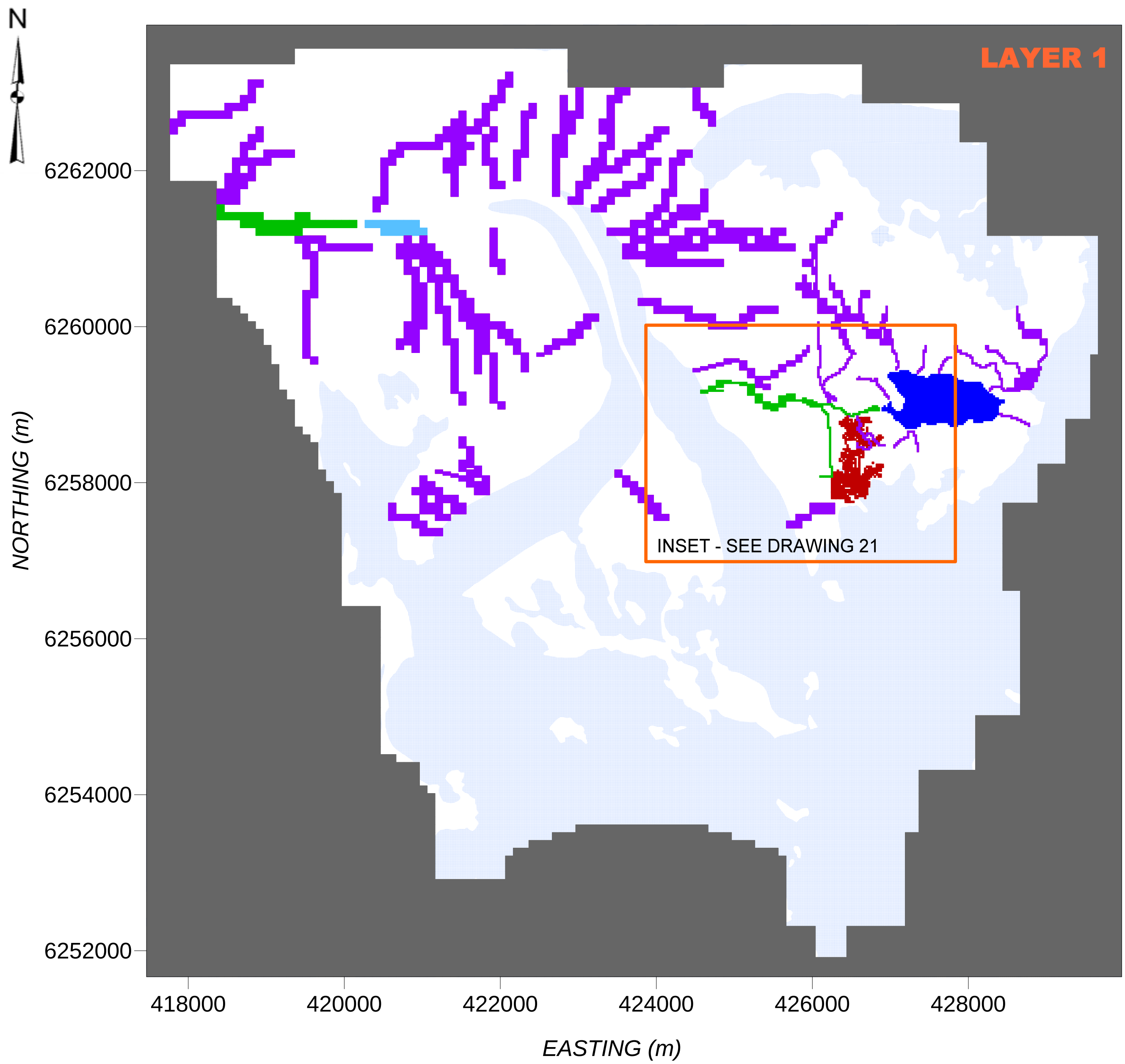
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: SIMULATED GROUNDWATER ELEVATION CONTOURS PRE-OPERATIONS

PROJECT No.:	DWG No.:	REV.:
1008-010	19	0

N:\BGC\PROJECTS\1008 PRETIUM\010 EA 2013\002 HYDROGEOLOGY\09 REPORTING\02 EA MODELING REPORT\02 DRAWINGS

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

GENERAL HEAD BOUNDARY	INACTIVE CELLS	DRAIN - STREAMS
CONSTANT HEAD BOUNDARY	DRAIN - MINE WORKINGS	RIVER - STREAMS

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Underground workings (drains) projected to surface and represented for all years of mining operations.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

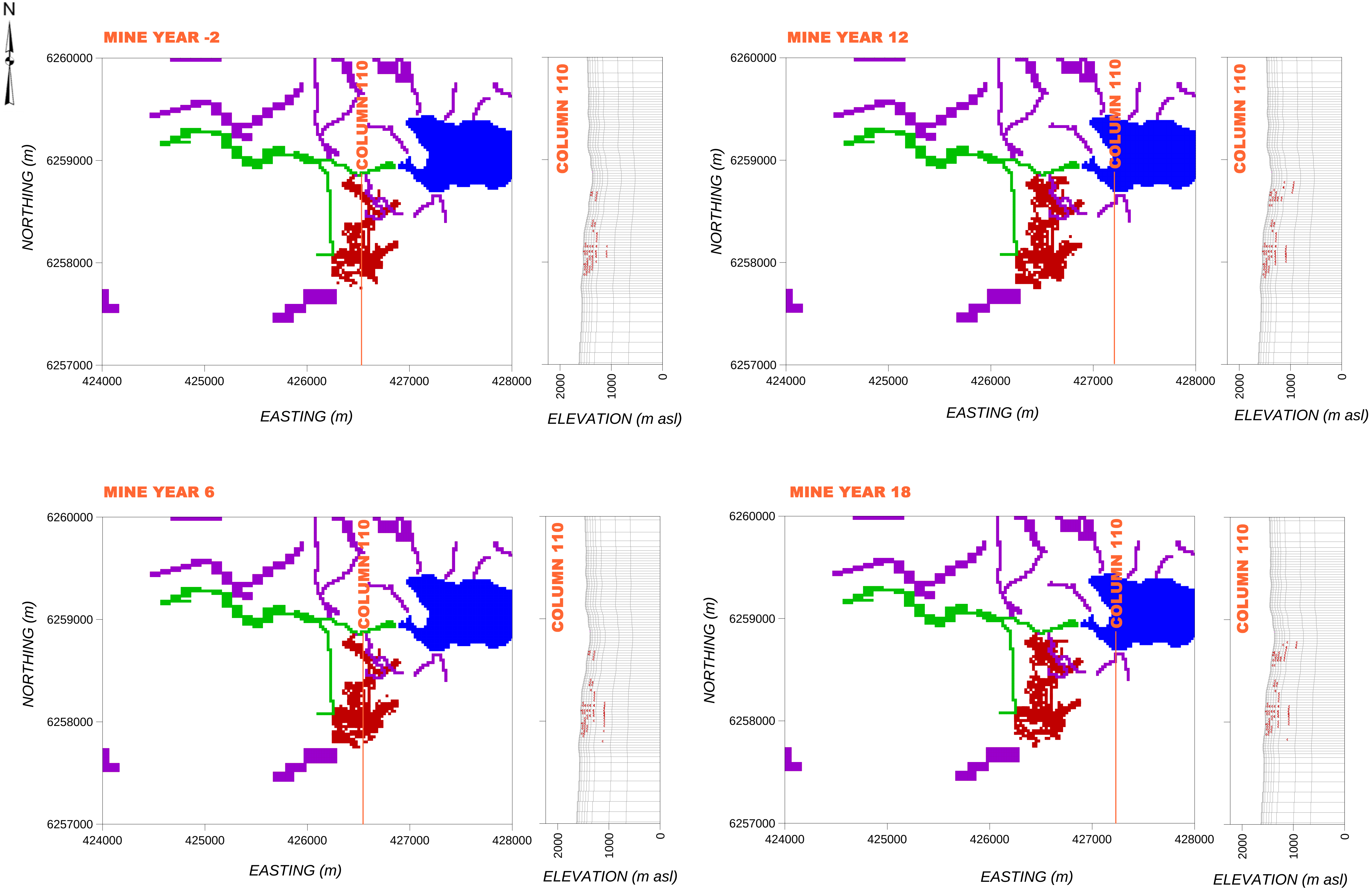
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: BOUNDARY CONDITIONS - MINING OPERATIONS SIMULATIONS

CLIENT: PRETIUM RESOURCES INC.	PROJECT No: 1008-010	DWG No: 20	REV. 1

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

GENERAL HEAD BOUNDARY
RIVER BOUNDARY - STREAMS
DRAIN BOUNDARY - STREAMS
DRAIN BOUNDARIES
UNDERGROUND MINE - X-SECTIONS
UNDERGROUND MINE - PLAN VIEW

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Cross-section vertical exaggeration 2X.
3. Underground workings (drains) projected to surface on plan view drawings.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	As shown
DATE:	JUN 2014
DRAWN:	RC
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

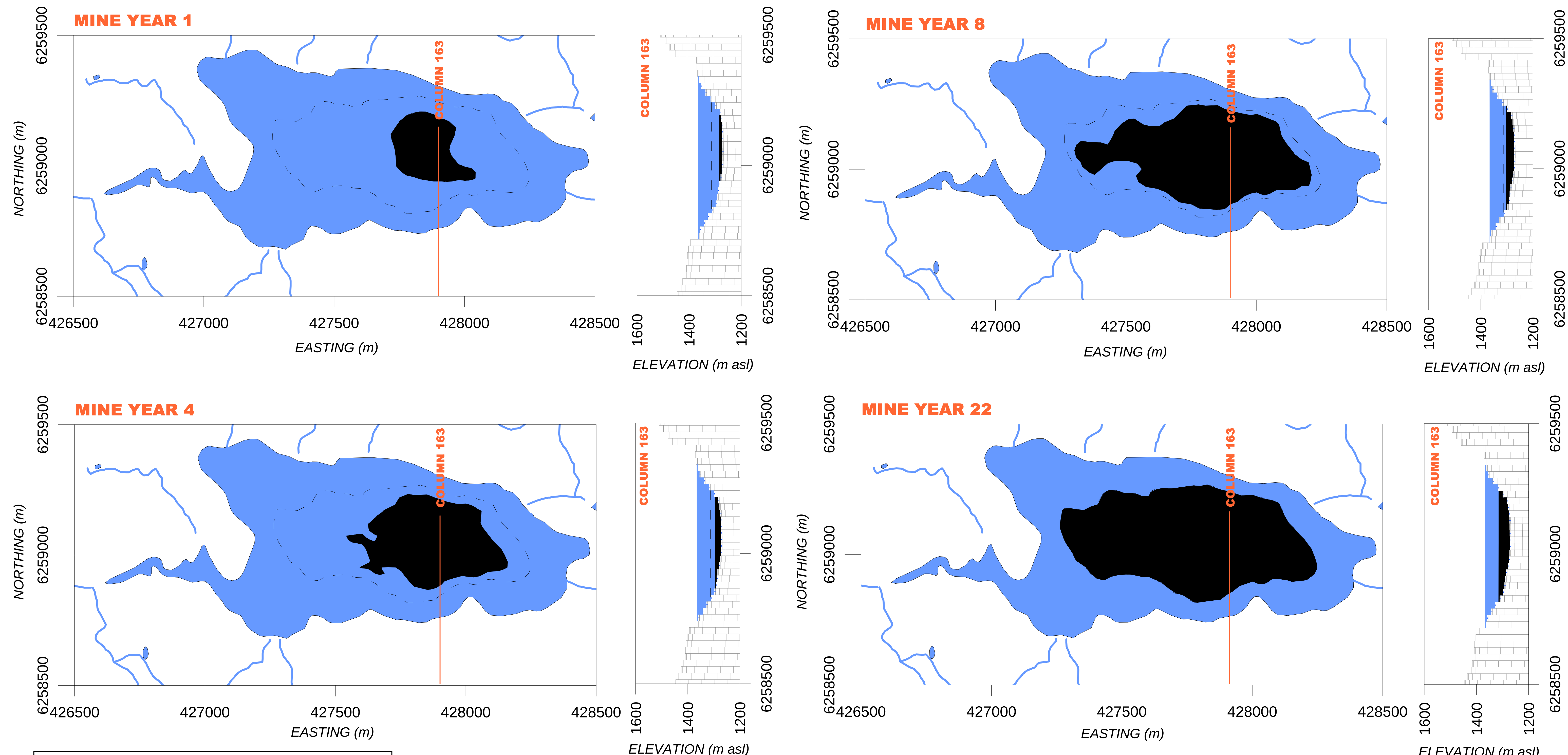
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MINING OPERATIONS - UNDERGROUND WORKINGS (SELECTED YEARS)

PROJECT No.:	DWG No.:	REV.:
1008-010	21	1

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

- BRUCEJACK LAKE AND STREAMS
- EXTENT OF PROPOSED TAILINGS DEPOSITION
- EXTENT OF GHB CONDUCTANCE MODIFICATION

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Cross-section vertical exaggeration 1X.
3. Tailings elevations approximately 1283 m asl in YEAR 1, 1295 m asl in YEAR 4, 1303 m asl in YEAR 8, and 1314 m asl in YEAR 22.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	RC
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

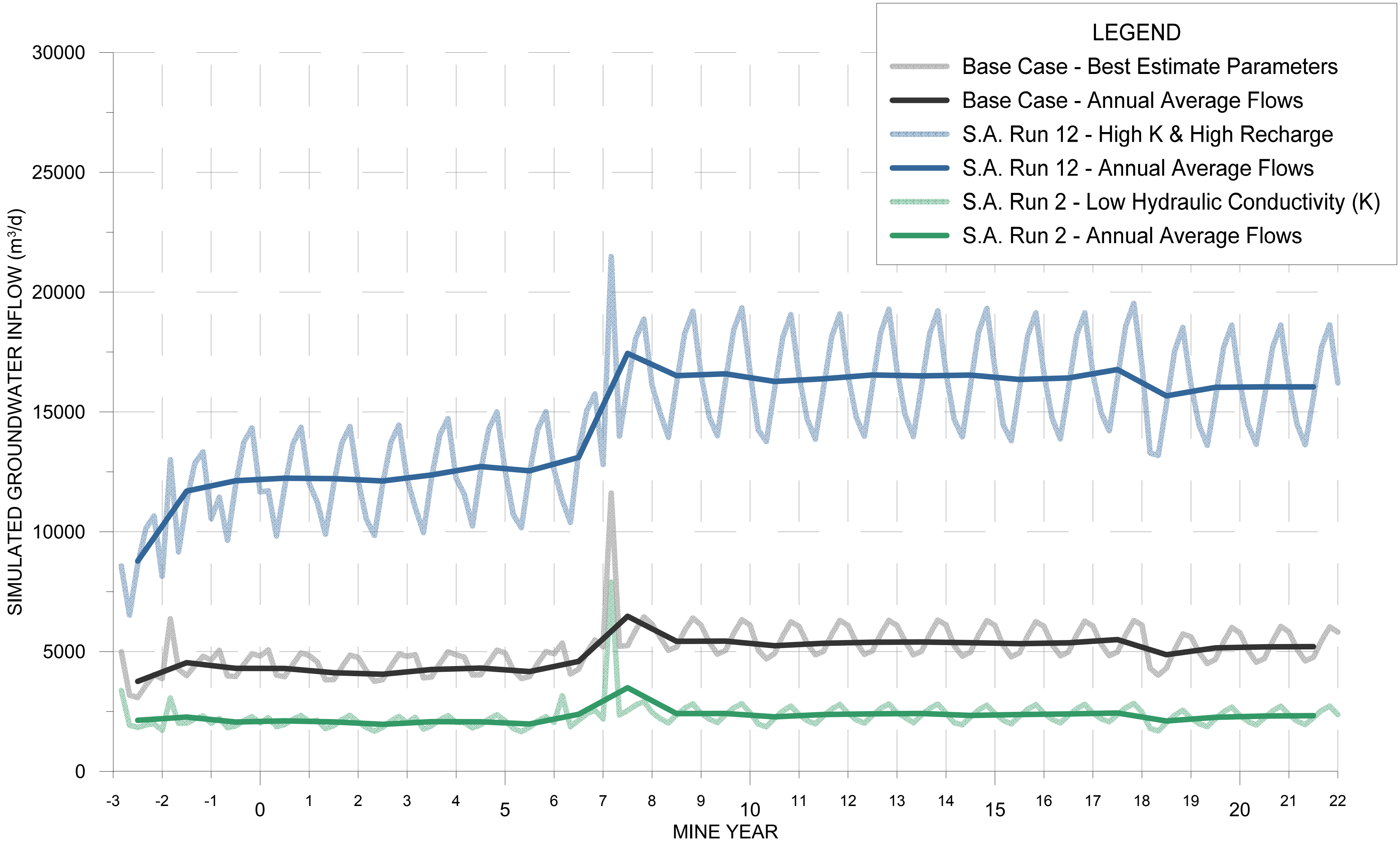
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MINING OPERATIONS - BRUCEJACK LAKE GHB (SELECTED YEARS)

PROJECT No.:	FIG No.:	REV.:
1008-010	22	0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

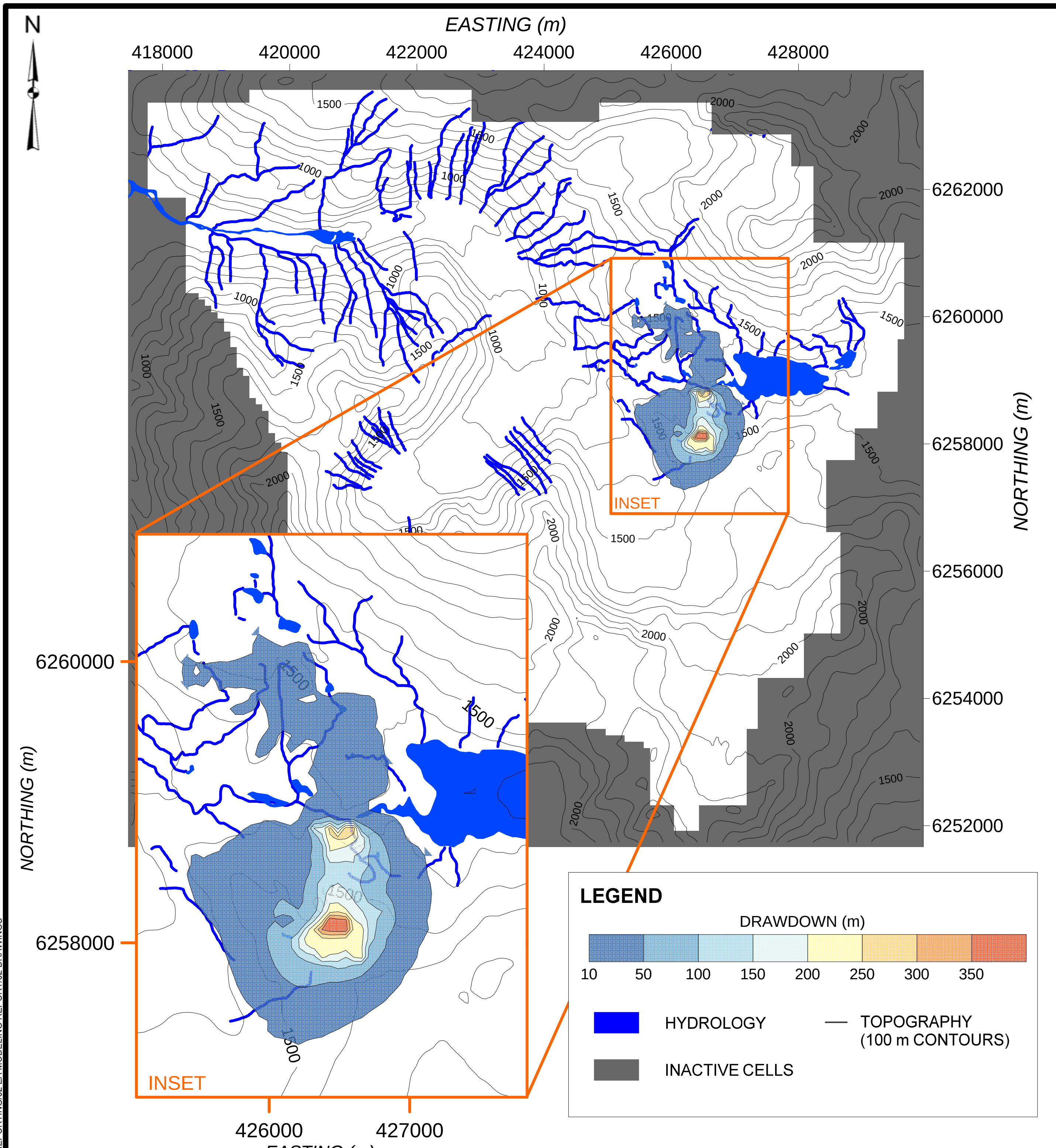
N:/BGC/PROJECTS/1008 PRETIUM/010 EA 2013/002 HYDROGEOLOGY/09 REPORTING/02 EA MODELING REPORT/02 DRAWINGS



SCALE: N/A	DESIGNED: DP	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: JUN 2014	CHECKED: CM		TITLE: SIMULATED INFLOW TO UNDERGROUND WORKINGS
DRAWN: DP	APPROVED: TC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / FIG No. 23 / REV. 0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED MAY 2014

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/02 EA Modeling Report/02 Drawings



NOTE: 1. Model coordinates UTM NAD83 Zone 9N.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	RC	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

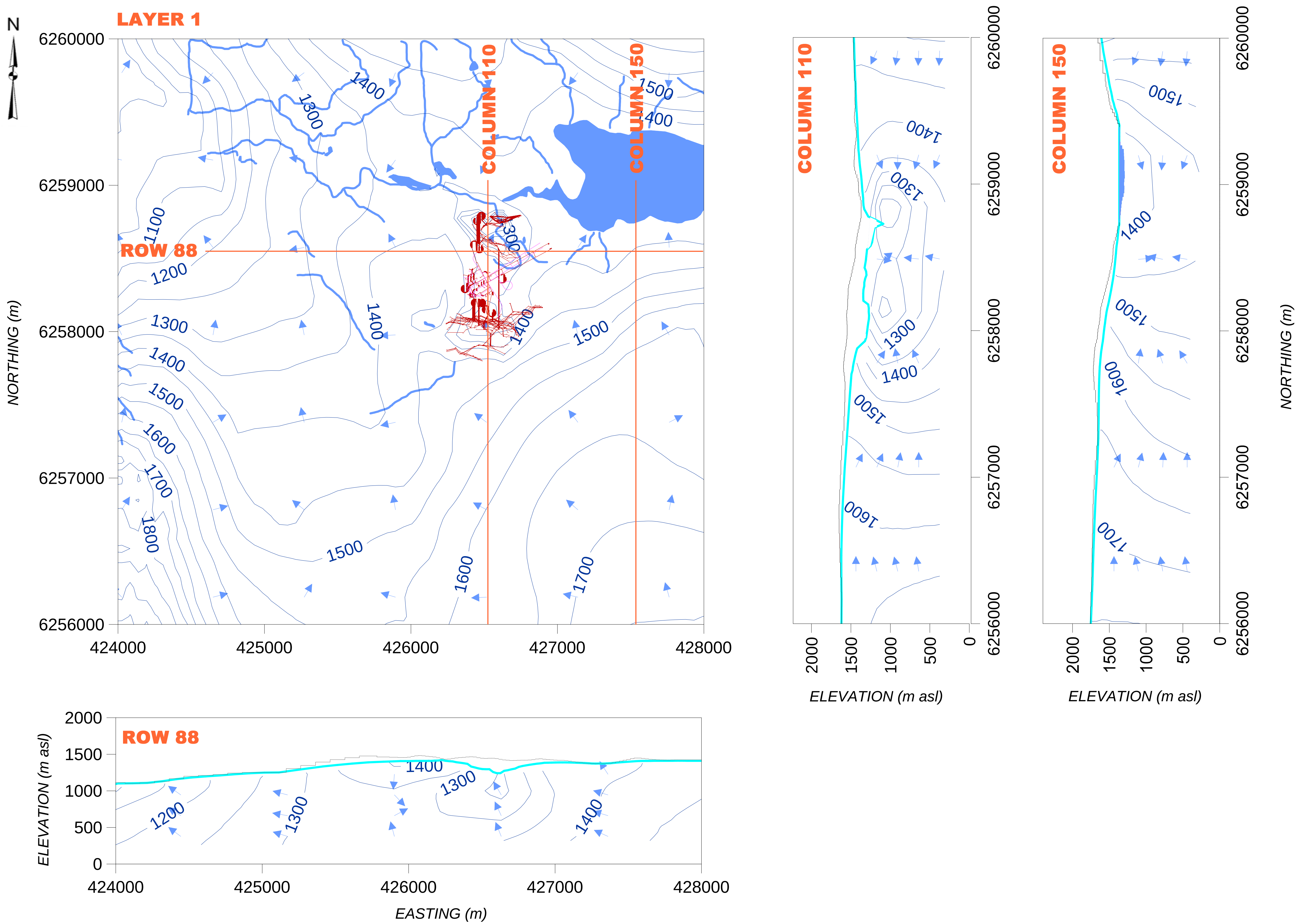
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MAXIMUM SIMULATED DRAWDOWN
YEAR 12 OF MINING OPERATIONS

CLIENT: PRETIUM RESOURCES INC.	PROJECT No: 1008-010	DWG No: 24	REV. 0

N:/BGC/PROJECTS/1008 PRETIUM/010 EA 2013/002 HYDROGEOLOGY/09 REPORTING/02 EA MODELING REPORT/02 DRAWINGS

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

- HYDROLOGY
- INACTIVE CELLS
- MINE WORKINGS
- UPDATED MINE WORKINGS (DEC 2013)
- WATER TABLE (m asl)
- HYDRAULIC HEAD (m asl)
- GROUNDWATER FLOW (NOT TO SCALE)

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Cross-section vertical exaggeration 2X.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	RC
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

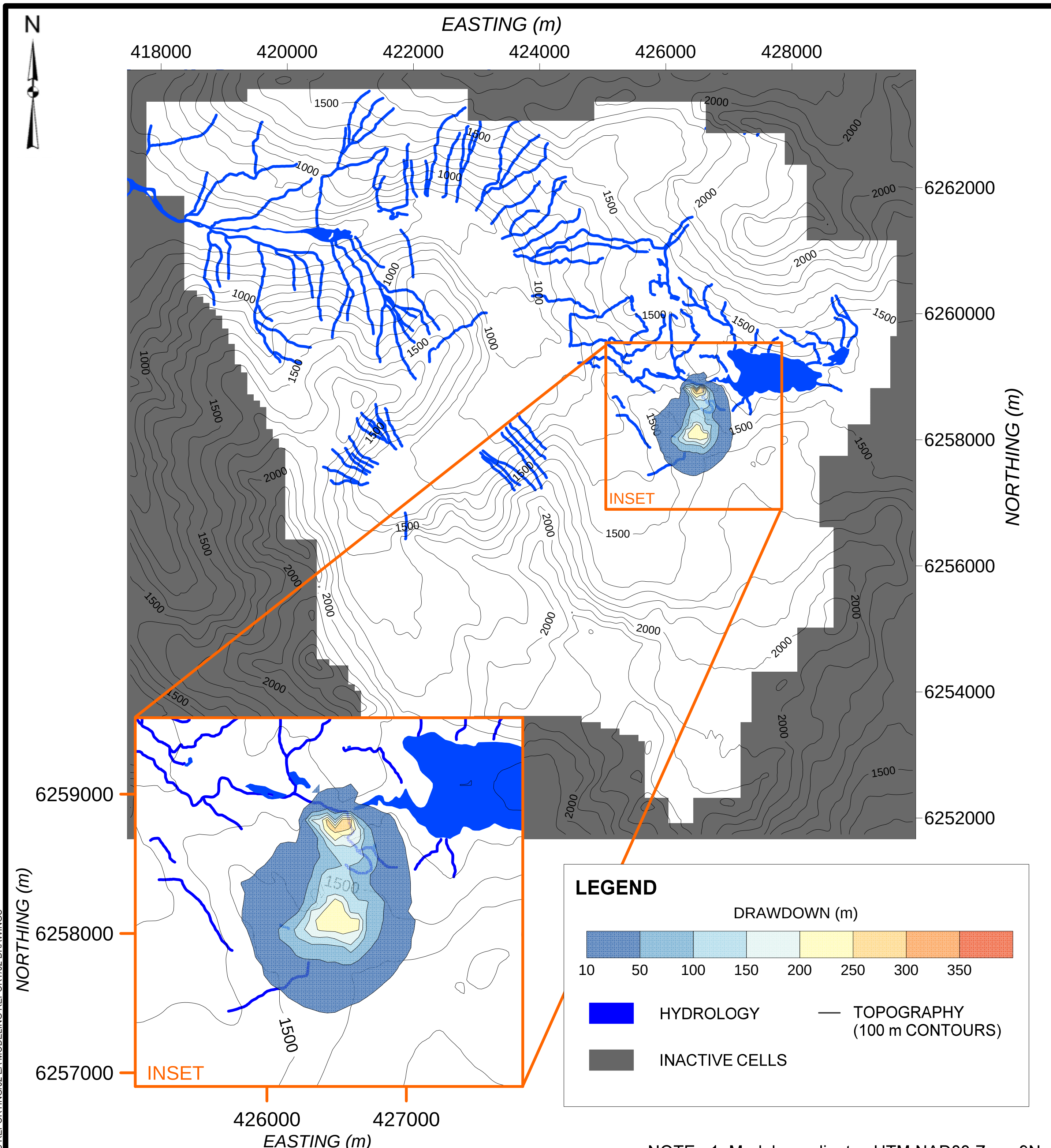
PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SIMULATED GROUNDWATER ELEVATION CONTOURS
END OF MINE LIFE

PROJECT No.:	DWG No.:	REV.:
1008-010	25	0

N:/BGC/PROJECTS/1008 PRETIUM/010 EA 2013/002 HYDROGEOLOGY/09 REPORTING/02 EA MODELING REPORT/02 DRAWINGS

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



NOTE: 1. Model coordinates UTM NAD83 Zone 9N.

SCALE: AS SHOWN	DESIGNED: DP
DATE: JUN 2014	CHECKED: CM
DRAWN: RC	APPROVED: TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

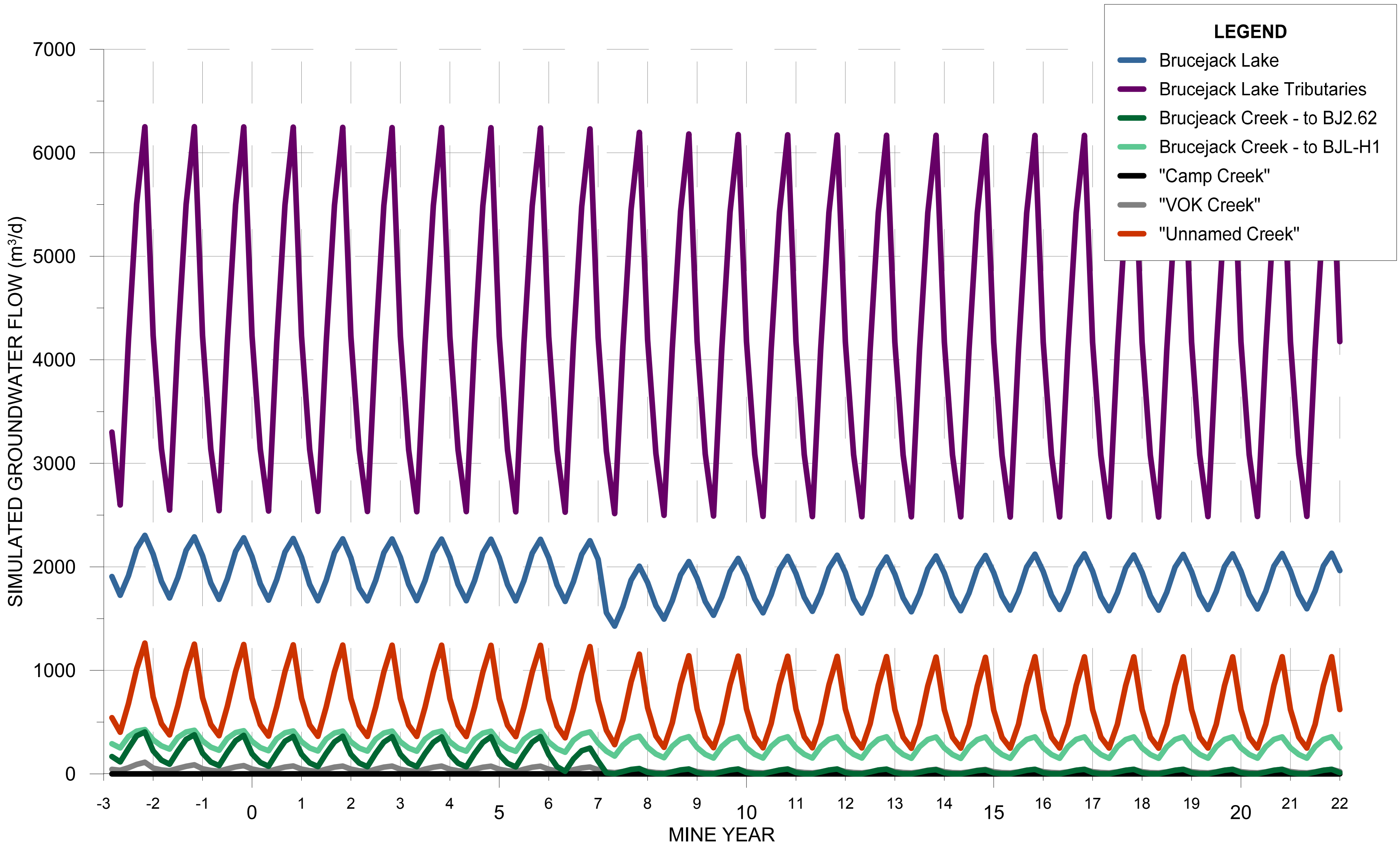
TITLE: SIMULATED DRAWDOWN
END OF MINE LIFE

CLIENT: PRETIUM RESOURCES INC.

PROJECT No:	DWG No:	REV.
1008-010	26	0

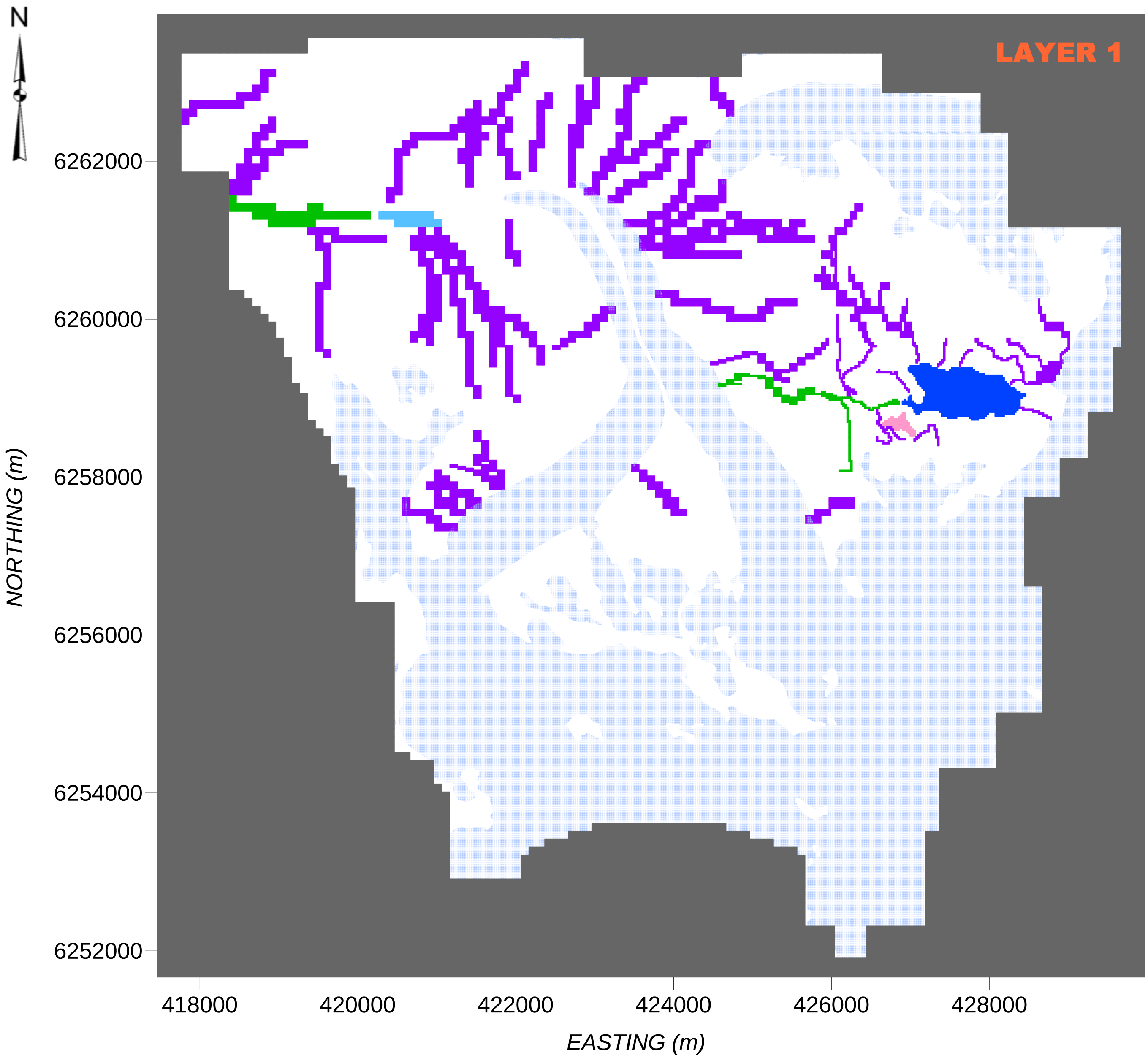
N:/BGC/PROJECTS/1008 PRETIUM/010 EA 2013/002 HYDROGEOLOGY/09 REPORTING/02 EA MODELING REPORT/02 DRAWINGS

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



SCALE: N/A	DESIGNED: DP	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: JUN 2014	CHECKED: CM		TITLE: MINING OPERATIONS - SIMULATED FLOW TO RECEPTORS
DRAWN: DP	APPROVED: TC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / FIG No. 27 / REV. 0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

GENERAL HEAD BOUNDARY	INACTIVE CELLS	DRAIN - STREAMS
CONSTANT HEAD BOUNDARY	GLACIERS	RIVER - STREAMS
DRAIN - BEDROCK CUT		

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	RC	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

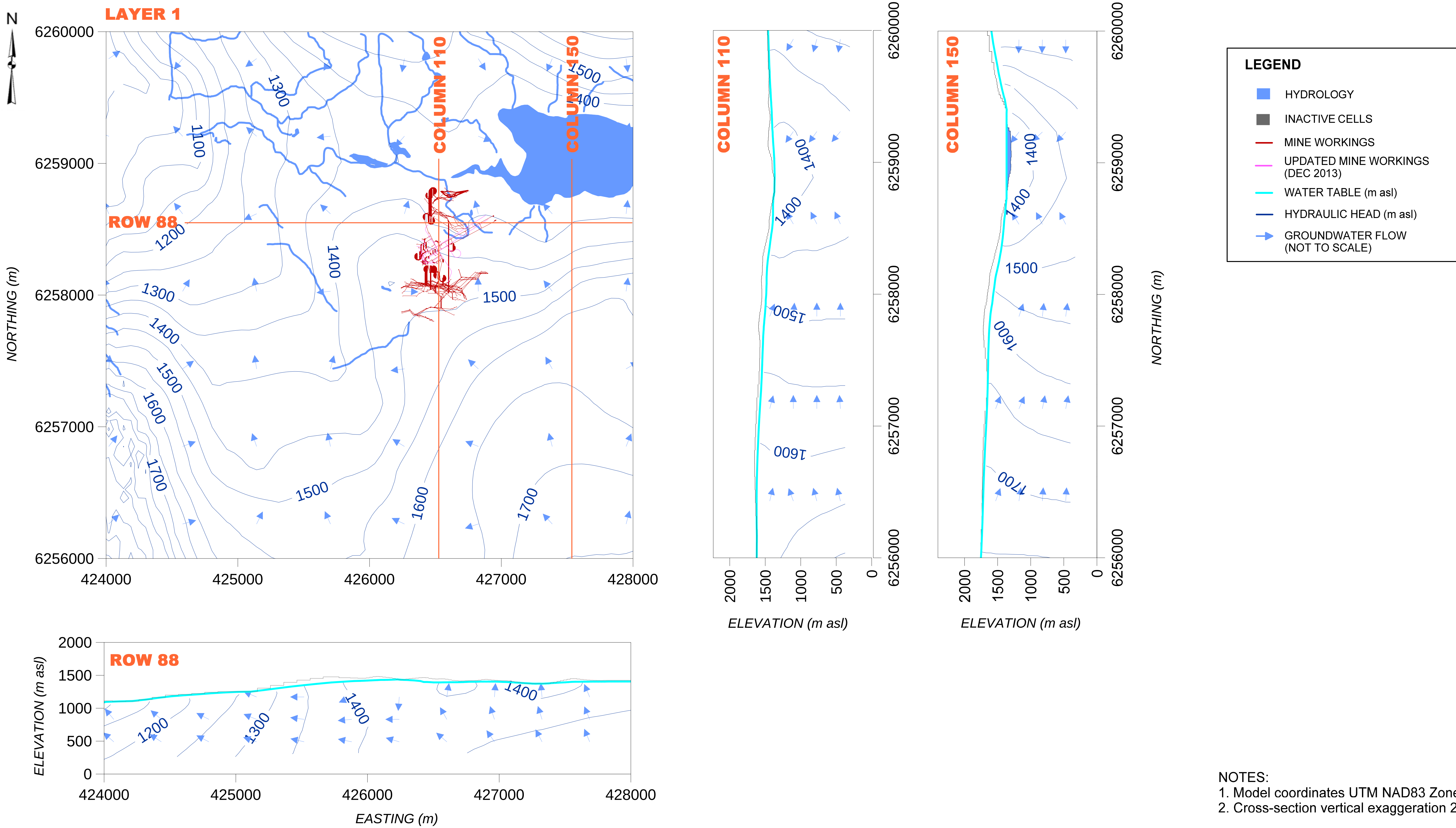
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE: BOUNDARY CONDITIONS - POST CLOSURE SIMULATIONS

CLIENT	PROJECT No:	DWG No:	REV.
PRETIUM RESOURCES INC.	1008-010	28	1

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings



NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Cross-section vertical exaggeration 2X.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	RC
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

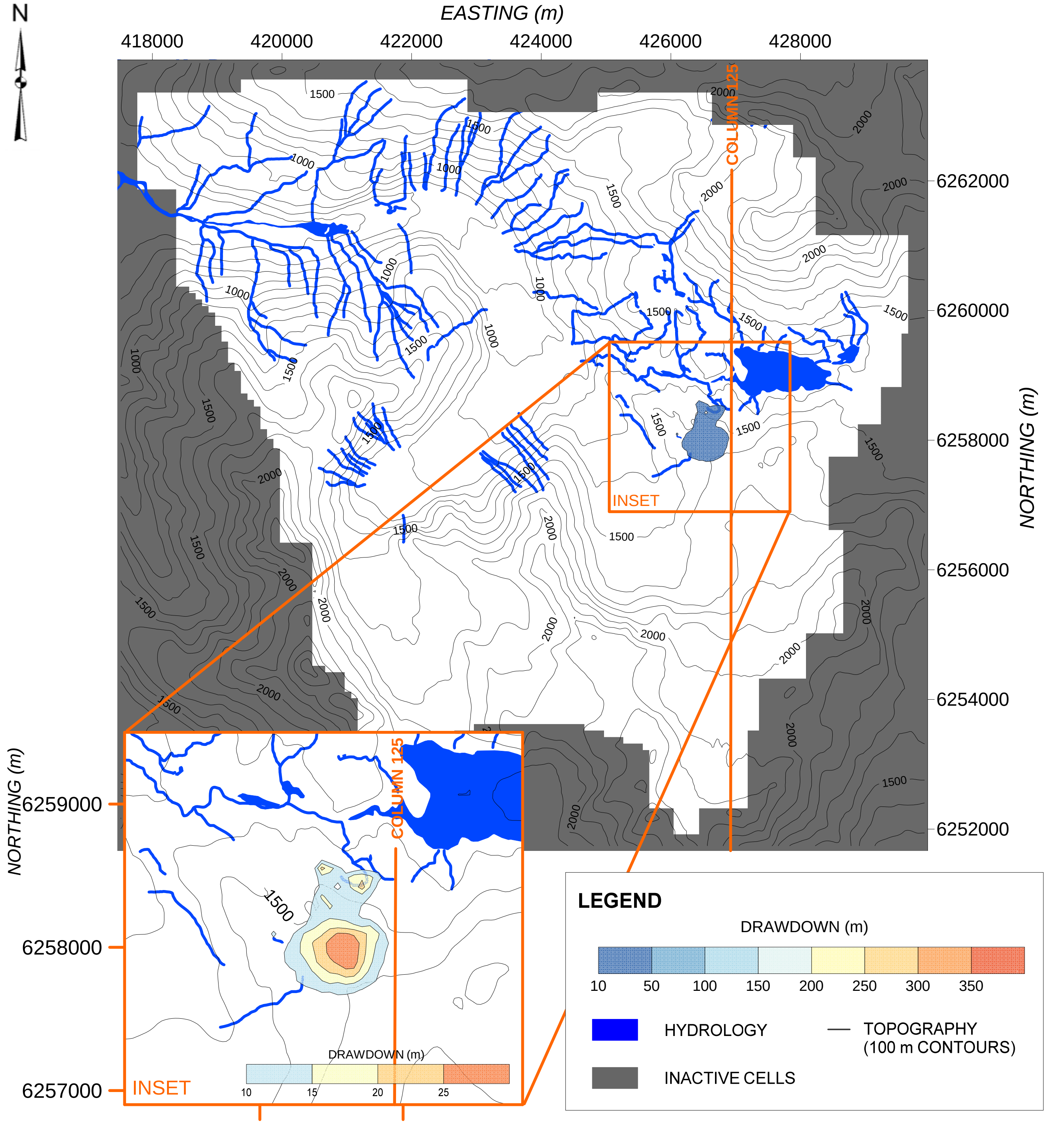
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: SIMULATED GROUNDWATER ELEVATION CONTOURS POST CLOSURE

PROJECT No.:	DWG No.:	REV.:
1008-010	29	0

N:\BGC\PROJECTS\1008 PRETIUM\010 EA 2013\002 HYDROGEOLOGY\09 REPORTING\02 EA MODELING REPORT\02 DRAWINGS

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



NOTES:

1. Model coordinates UTM NAD83 Zone 9N.
2. Column 125 cross-section used for sensitivity analysis (Drawing 34).

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	RC	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

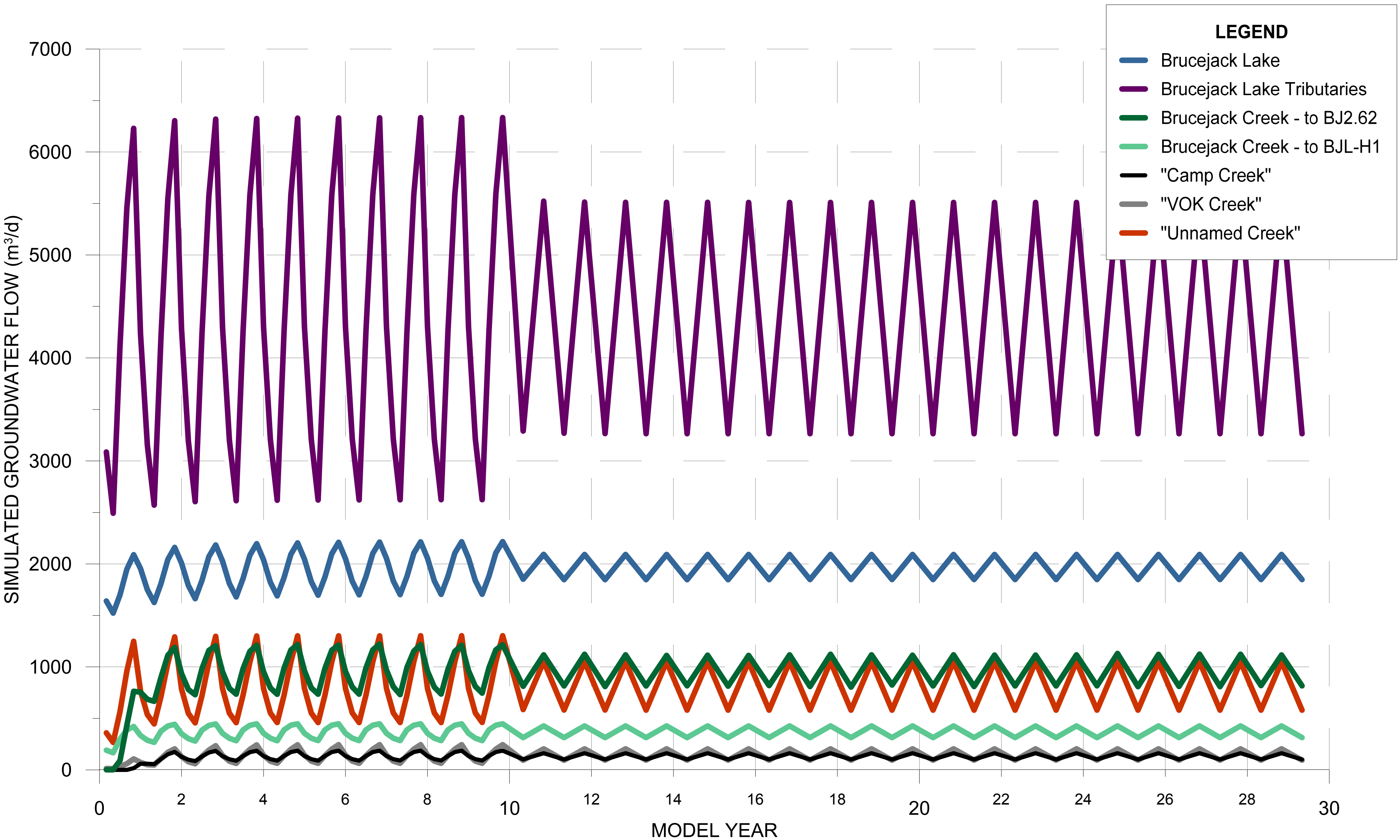
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: SIMULATED DRAWDOWN POST-CLOSURE

CLIENT: PRETIUM RESOURCES INC.	PROJECT No: 1008-010	DWG No: 30	REV. 0

N:/BGC/PROJECTS/1008 PRETIUM/010 EA 2013/002 HYDROGEOLOGY/09 REPORTING/02 EA MODELING REPORT/02 DRAWINGS

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



SCALE: N/A	DESIGNED: DP		
DATE: JUN 2014	CHECKED: CM		
DRAWN: DP	APPROVED: TC		

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

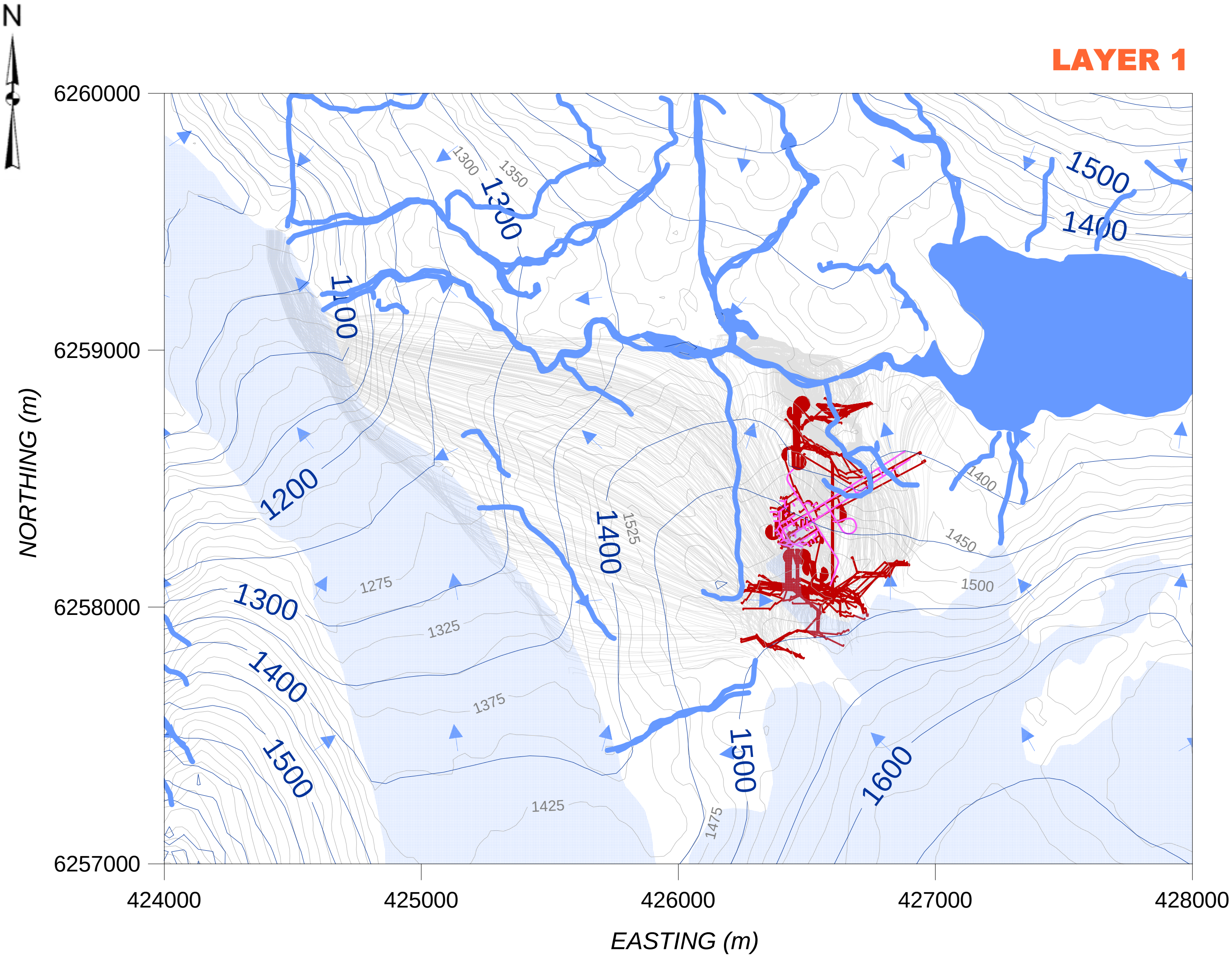
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: POST-CLOSURE - SIMULATED FLOW TO RECEPTORS

PROJECT No.	FIG No.	REV.
1008-010	31	0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

LAYER 1



LEGEND

- HYDRAULIC HEAD (m asl)
- GROUNDWATER FLOW (NOT TO SCALE)
- GROUNDWATER FLOW PATHS
- LAKES AND STREAMS
- GLACIERS
- PROPOSED UNDERGROUND WORKINGS (FEB 2013)
- PROPOSED UNDERGROUND UPDATE (DEC 2013)

NOTES:
1. Model coordinates UTM NAD83 Zone 9N; see Drawing 20 for inset location within the RSA.
2. Groundwater flow paths determined using MODPATH particle tracking for the steady-state post-closure simulation.
3. Underground workings and groundwater flow paths projected to ground surface.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

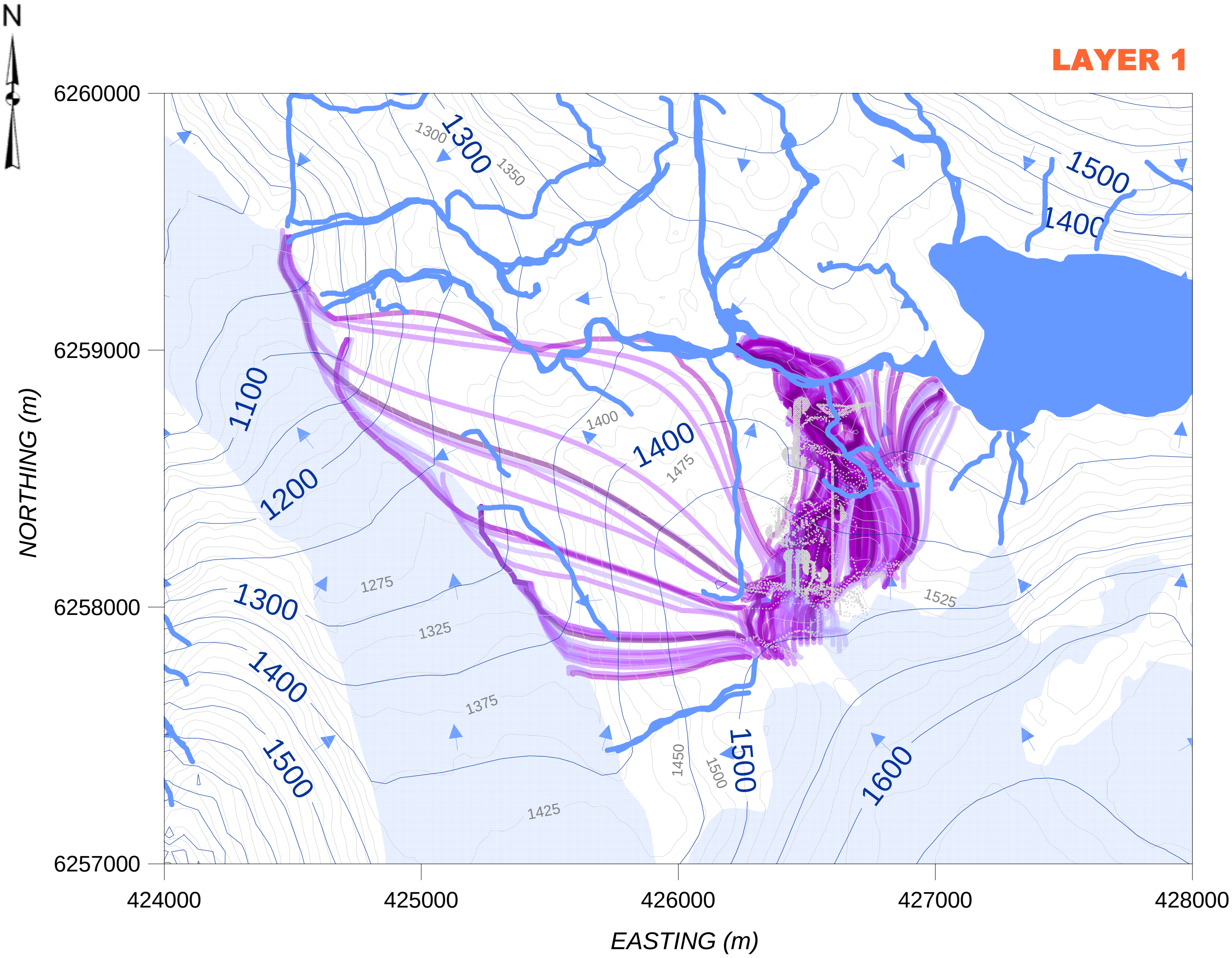
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: POST-CLOSURE GROUNDWATER FLOW PATHS FROM MODEL CELLS CONTAINING UNDERGROUND WORKINGS

CLIENT	PROJECT No:	DWG No:	REV.
PRETIUM RESOURCES INC.	1008-010	32A	0

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

—	HYDRAULIC HEAD (m asl)	■	LAKES AND STREAMS
→	GROUNDWATER FLOW (NOT TO SCALE)	■	GLACIERS
- -	PROPOSED UNDERGROUND WORKINGS	■	LAYER 1 FLOW PATHS
—	TOPOGRAPHIC CONTOUR (m asl) 25 m CONTOUR INTERVAL	■	LAYER 2 FLOW PATHS
		■	LAYER 3 FLOW PATHS
		■	LAYER 4 FLOW PATHS

NOTES:
1. Model coordinates UTM NAD83 Zone 9N; see Drawing 20 for inset location within the RSA.
2. Groundwater flow paths determined using MODPATH particle tracking for the steady-state post-closure simulation; Underground workings in model layers 1-4 represent potentially unsaturated mine workings (i.e., above the water table).
3. Underground workings and groundwater flow paths projected to ground surface.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

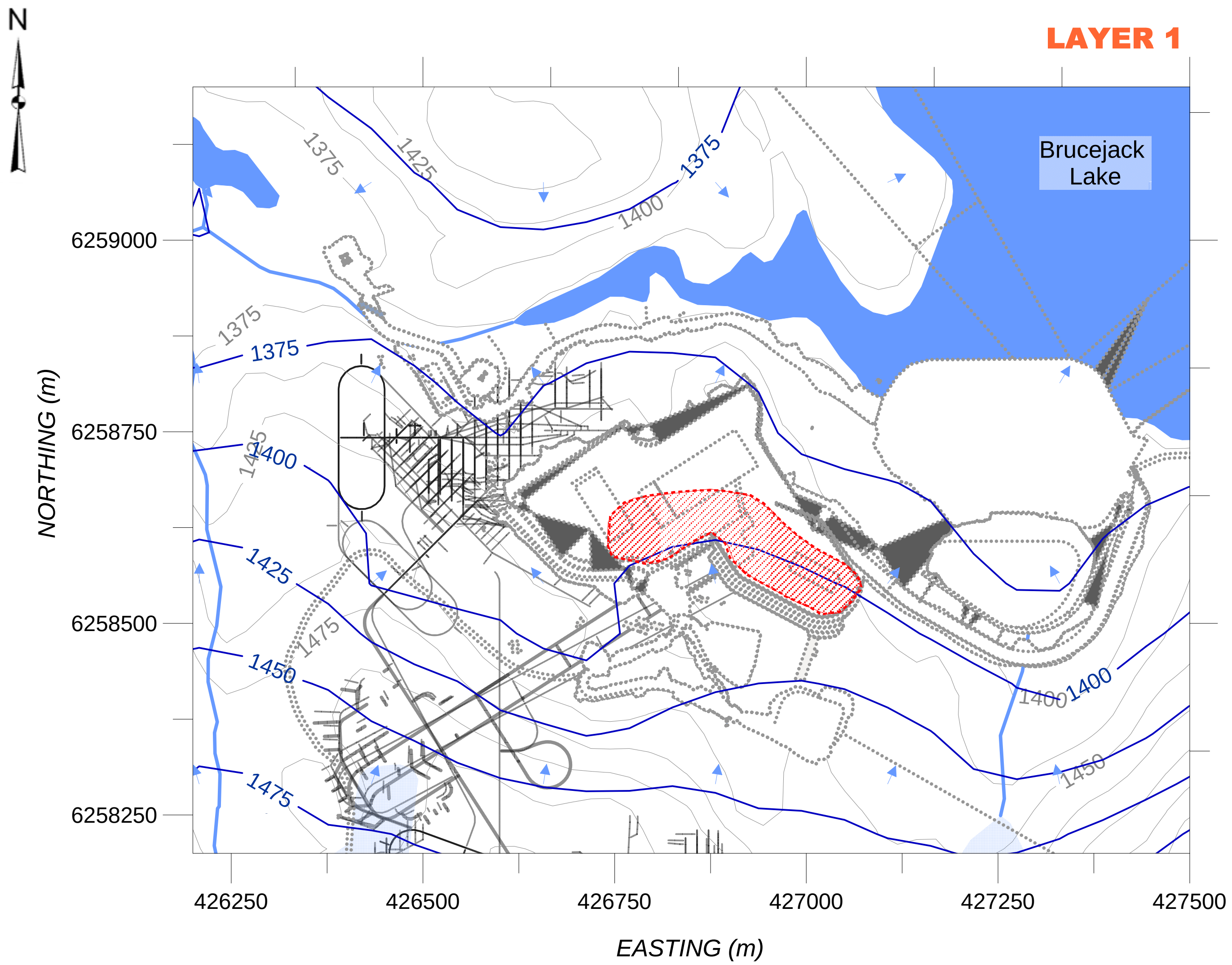
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: POST-CLOSURE GROUNDWATER FLOW PATHS FROM UNDERGROUND WORKING CELLS IN MODEL LAYERS 1 - 4

CLIENT	PROJECT No:	DWG No:	REV.
PRETIUM RESOURCES INC.	1008-010	32B	0

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

- TOPOGRAPHIC CONTOUR (m asl) 25 m CONTOUR INTERVAL
- BRUCEJACK DECOMMISSIONED PLANT SITE
- HYDRAULIC HEAD (m asl)
- GROUNDWATER FLOW (NOT TO SCALE)
- GLACIERS
- PROPOSED UNDERGROUND WORKINGS
- LAKES AND STREAMS
- PREDICTED ZONE OF POST-CLOSURE GROUNDWATER DISCHARGE

NOTES:
1. Model coordinates UTM NAD83 Zone 9N.
2. Underground workings projected to ground surface; See Drawing 03 for detailed Brucejack Project Site Plan.

SCALE:	AS SHOWN	DESIGNED:	DP
DATE:	JUN 2014	CHECKED:	CM
DRAWN:	DP	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

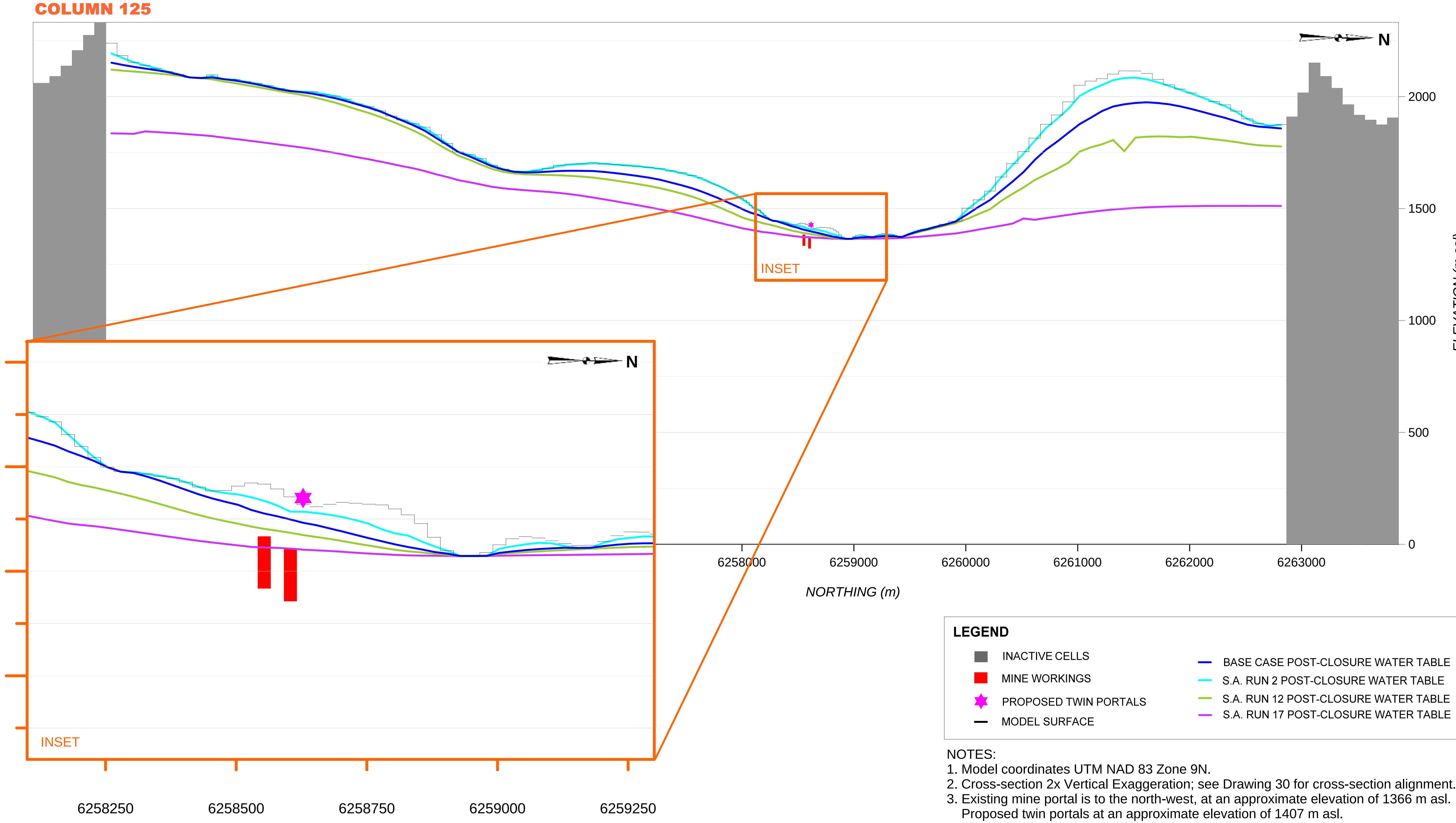
TITLE: PREDICTED POST-CLOSURE GROUNDWATER DISCHARGE PLANT SITE AREA

CLIENT: PRETIUM RESOURCES INC.

PROJECT No:	DWG No:	REV.
1008-010	33	0

N:/Projects/1008 Pretium/010 EA 2013/002 Hydrogeology/09 Reporting/ 02 EA Modeling Report/02 Drawings

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014



LEGEND

- INACTIVE CELLS
- MINE WORKINGS
- PROPOSED TWIN PORTALS
- MODEL SURFACE
- BASE CASE POST-CLOSURE WATER TABLE
- S.A. RUN 2 POST-CLOSURE WATER TABLE
- S.A. RUN 12 POST-CLOSURE WATER TABLE
- S.A. RUN 17 POST-CLOSURE WATER TABLE

NOTES:
1. Model coordinates UTM NAD 83 Zone 9N.
2. Cross-section 2x Vertical Exaggeration; see Drawing 30 for cross-section alignment.
3. Existing mine portal is to the north-west, at an approximate elevation of 1366 m asl. Proposed twin portals at an approximate elevation of 1407 m asl.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	AS SHOWN
DATE:	JUN 2014
DRAWN:	RC
DESIGNED:	DP
CHECKED:	CM
APPROVED:	TC

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: SIMULATED WATER TABLES IN CROSS-SECTION SELECT SENSITIVITY RUNS

PROJECT No.:	FIG No.:	REV.:
1008-010	34	0

N:\BGC\PROJECTS\1008 PRETIUM\010 EA 2013\002 HYDROGEOLOGY\09 REPORTING\02 EA MODELING REPORT\02 DRAWINGS

DWG TO BE READ WITH BGC MEMO TITLED "BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT - NUMERICAL HYDROGEOLOGIC MODEL" DATED JUN 2014

APPENDIX A
HYDRAULIC CONDUCTIVITY DATA SUMMARY

Table A-1. Packer Test Data Summary & Hydraulic Conductivity (K) Estimates

Monitoring Well / Borehole ID	Easting[1] (m)	Northing (m)	Elevation (m asl)	Plunge / Trend (°)	Test No.	Test Interval					Depth to Midpt (m bgs)	Discons/ Faults[2]	Simplified Geology[3]	K Estimate (m/s)
						From (mah)	To (mah)	From (m bgs)	To (m bgs)	Interval (m)				
Constant Head Packer Tests														
SU-77	426,599	6,258,328	1,507.16	64	1	67.5	96.6	60.8	87.0	26.2	73.9	DIS 1	SEDIMENTARY	1.2E-07
				63	2	174.2	203.3	155.7	181.7	26.0	168.7	FAULT	SEDIMENTARY	4.7E-07
				63	3	308.3	337.4	274.1	300.0	25.9	287.1	STK	METAMORPHIC	1.5E-08
SU-82	426,510	6,258,042	1,541.57	59	1	97.2	127.1	83.7	109.4	25.7	96.6	FAULT	METAMORPHIC	7.8E-08
SU-88	426,572	6,258,921	1,389.77	76	1	55.3	84.4	53.8	82.0	28.3	67.9	STK	VOLCANIC	7.9E-08
DH-BGC12-19	426,567	6,258,826	1,365.04	-75 / 131	3	313.0	317.6	302.3	306.8	4.4	304.6	STK	IGNEOUS/INTRUSIVE	3.3E-07
					4	401.4	425.8	387.7	411.3	23.6	399.5	STK	SEDIMENTARY	3.9E-08
DH-BGC12-20	426,552	6,258,607	1,419.00	-76 / 222	1	33.2	50.0	32.2	48.5	16.3	40.4	FAULT	SEDIMENTARY/HYDROTHERMAL	3.9E-07
					3	240.5	264.9	233.4	257.0	23.7	245.2	STK	SEDIMENTARY	1.7E-07
DH-BGC12-21	426,406	6,258,223	1,499.00	-75 / 145	1	36.6	50.6	35.4	48.9	13.5	42.1	STK	IGNEOUS/INTRUSIVE	1.6E-07
					2	131.4	148.1	126.9	143.1	16.1	135.0	DIS 1	IGNEOUS/INTRUSIVE	3.5E-08
					3	228.9	248.6	221.1	240.1	19.0	230.6	STK	IGNEOUS/INTRUSIVE	[4]
					4	331.0	349.3	319.7	337.4	17.7	328.6	FAULT	SEDIMENTARY	3.8E-08
					5[5]	417.9	437.7	403.7	422.8	19.1	413.2	DIS 2	SEDIMENTARY	1.7E-06
DH-BGC12-22	426,481	6,257,936	1,539.76	-75 / 036	1	50.9	61.6	49.2	59.5	10.3	54.3	FAULT	SEDIMENTARY	1.9E-08
					2	258.2	271.9	249.4	262.6	13.2	256.0	STK	VOLCANIC	1.2E-07
					3	361.8	381.6	349.5	368.6	19.1	359.0	STK	SEDIMENTARY/HYDROTHERMAL	4.3E-08
DH-BGC12-23	426,503	6,257,856	1,583.69	-70 / 271	1	189.6	210.0	178.2	197.4	19.2	187.8	STK	SEDIMENTARY	3.8E-07
					2	308.5	331.3	289.9	311.3	21.5	300.6	STK	IGNEOUS/INTRUSIVE	8.6E-09
					4	531.0	550.3	498.9	517.2	18.2	508.0	FAULT	IGNEOUS/INTRUSIVE	2.0E-08
DH-BGC12-24	426,646	6,257,878	1,547.61	-68 / 002	1	292.6	306.3	271.3	284.0	12.7	277.7	STK	SEDIMENTARY	3.1E-08
					2	384.1	406.9	356.1	377.3	21.2	366.7	STK	SEDIMENTARY	2.7E-08
					3	432.8	458.7	401.3	425.3	24.0	413.3	STK	SEDIMENTARY	1.9E-08
					4	460.3	470.9	426.7	436.6	9.9	431.7	FAULT	SEDIMENTARY	6.7E-08
DH-BGC12-25	426,350	6,258,086	1,527.77	-45 / 176	1	198.7	212.5	140.5	150.2	9.7	145.4	DIS 2	SEDIMENTARY	3.3E-08
					2	238.7	255.4	168.8	180.6	11.9	174.7	DIS 2	SEDIMENTARY	3.9E-07
DH-BGC12-32	426,981	6,258,578	1,410.76	-75 / 240	1	30.2	50.0	29.2	48.3	19.1	38.7	STK	SEDIMENTARY	1.8E-07
DH-BGC12-33	427,073	6,258,623	1,392.65	-75 / 095	1	14.0	30.8	13.5	29.7	16.2	21.6	FAULT	VOLCANIC	1.4E-06
DH-BGC12-34	427,046	6,258,650	1,395.96	-75 / 244	1	14.6	31.4	14.1	30.3	16.2	22.2	STK	VOLCANIC	4.6E-07
DH-BGC12-35	427,021	6,258,692	1,389.40	-75 / 154	1	16.2	32.9	15.6	31.8	16.2	23.7	FAULT	SEDIMENTARY	1.5E-07
MW-BGC12-BJ-4B	427,031	6,258,752	1,390.43	-	1	93.6	98.1	93.2	97.8	4.6	95.5	FAULT	SEDIMENTARY	2.0E-07
					2	78.7	81.7	78.4	81.4	3.0	79.9	FAULT	SEDIMENTARY	[4]
MW-BGC12-BJ-6B	427,097	6,258,982	1,379.56	-	1	66.8	78.3	66.8	78.3	11.5	72.6	STK	VOLCANIC	2.6E-08
					2	48.7	51.8	48.7	51.8	3.1	50.2	STK	VOLCANIC	1.5E-07
MW-BGC12-BJ-8A	426,106	6,258,818	1,403.38	-	1	18.6	23.1	18.6	23.1	4.6	20.8	FAULT	IGNEOUS/INTRUSIVE	4.4E-06
					2	48.7	53.1	48.7	53.1	4.5	50.9	DIS 2	IGNEOUS/INTRUSIVE	8.1E-08
					3	63.7	68.1	63.7	68.1	4.5	65.9	FAULT	IGNEOUS/INTRUSIVE	2.6E-07
					4	87.6	92.1	87.6	92.1	4.6	89.8	FAULT	IGNEOUS/INTRUSIVE	4.6E-06
MW-BGC12-BJ-9A	426,465	6,258,361	1,514.40	-	1a[6]	25.1	29.7	25.1	29.7	4.6	27.4	STK	IGNEOUS/INTRUSIVE	3.7E-08
					1	36.5	41.0	36.5	41.0	4.5	38.8	STK	IGNEOUS/INTRUSIVE	9.8E-08
					2	75.5	80.0	75.5	80.0	4.5	77.8	STK	IGNEOUS/INTRUSIVE	2.8E-07

Table A-1. Packer Test Data Summary & Hydraulic Conductivity (K) Estimates

Monitoring Well / Borehole ID	Easting[(1)] (m)	Northing (m)	Elevation (m asl)	Plunge / Trend (°)	Test No.	Test Interval From (mah)	Test Interval To (mah)	Test Interval From (m bgs)	Test Interval To (m bgs)	Interval (m)	Depth to Midpt (m bgs)	Discons/ Faults[(2)]	Simplified Geology[(3)]	K Estimate (m/s)
Constant Head Packer Tests (Cont'd)														
MW-BGC12-BJ-10A	426,989	6,258,341	1,445.59	-	1	15.7	20.3	15.7	20.3	4.6	18.0	STK	VOLCANIC	7.1E-08
					2	42.7	50.3	42.7	50.3	7.6	46.5	STK	VOLCANIC	1.4E-08
MW-BGC12-BJ-11B	426,299	6,258,595	1,432.96	-	1	12.7	17.4	12.7	17.4	4.7	15.0	STK	IGNEOUS/INTRUSIVE	(4)
					2	34.0	38.6	34.0	38.6	4.6	36.3	FAULT	IGNEOUS/INTRUSIVE	4.0E-07
					3	46.2	53.8	46.2	53.8	7.7	50.0	FAULT	IGNEOUS/INTRUSIVE	6.5E-07
MW-BGC12-BJ-12A	426,509	6,257,807	1,579.19	-	1	48.0	50.0	48.0	50.0	2.0	49.0	STK	IGNEOUS/INTRUSIVE	1.8E-06
					2	66.0	70.5	66.0	70.5	4.5	68.3	FAULT	IGNEOUS/INTRUSIVE	1.8E-06
Falling Head Packer Tests														
SU-82	426,510	6,258,042	1,541.57	59	2	219.9	249.0	189.4	214.5	25.1	202.0	STK	VOLCANIC	4.3E-06
DH-BGC12-19	426,567	6,258,826	1,365.04	-75 / 131	1	50.9	55.5	49.2	53.6	4.4	51.4	FAULT	SEDIMENTARY	1.6E-07
					2	215.5	220.1	208.2	212.6	4.4	210.4	FAULT	SEDIMENTARY	2.6E-07
DH-BGC12-20	426,552	6,258,607	1,419.00	-76 / 222	2	127.7	149.0	123.9	144.6	20.7	134.2	DIS 1	SEDIMENTARY	1.7E-08
					4	380.7	403.6	369.4	391.6	22.2	380.5	STK	SEDIMENTARY	6.4E-08
DH-BGC12-23	426,503	6,257,856	1,583.69	-70 / 271	3	491.3	513.0	461.7	482.0	20.3	471.9	FAULT	IGNEOUS/INTRUSIVE	9.4E-07
MW-BGC12-BJ-6B	427,097	6,258,982	1,379.56	-	3	12.7	15.8	12.7	15.8	3.1	14.2	STK	VOLCANIC	(4)
MW-BGC12-BJ-10A	426,989	6,258,341	1,445.59	-	3	54.7	62.3	54.7	62.3	7.6	58.5	FAULT	VOLCANIC	6.2E-07

Notes:
1. Drill hole coordinates and elevations for the DH- and MW-series holes provided by Pretium from professional surveys in NAD83 UTM Zone 9N, with the exception of DH-BGC12-20 and -21 which are from a handheld GPS and are limited to the accuracy of that tool.
2. "Discons" refers to discontinuities observed during core logging; "STK" indicates stick rock, "DIS1" indicates observation of 1 discontinuity, "DIS2" indicates observation of 2 or more discontinuities, "FAULT" indicates observation of a fault zone.
3. Simplified geology represents the most prevalent geologic material encountered over the packer interval within a borehole, based on core logging completed by BGC and Pretium staff.
4. Incomplete packer test due to failure of packer to seat properly (MW-BGC12-BJ-4B, MW-BGC12-BJ-11B), or insufficient flow (DH-BGC12-21, MW-BGC12-BJ-6B).
5. Unable to achieve pressure required for a constant head test or falling head test. Estimated K represents minimum possible hydraulic conductivity for the interval, derived from estimates of flow at 0 psi.
6. First attempt at MW-BGC12-BJ-9A was drilled using an HQ3 drill head, and was abandoned prior to completion of the hole. Packer test 1a was completed prior to abandonment, and may overestimate hydraulic conductivity due to potential aperture dilation at the highest pressure interval of the packer test.

APPENDIX B
PACKER TEST ANALYSES

Hole #: **DH-BGC12-19**
Test #: **1**

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Calculation Input Parameters

Top of Packer Test Interval (mah):	50.9
Bottom of Packer Test Interval (mah):	55.5
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	53
Stickup Height (mah):	2.13
Pressure Gauge Height (m above ground):	2.13
Depth to Water Table (mah):	23.35
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

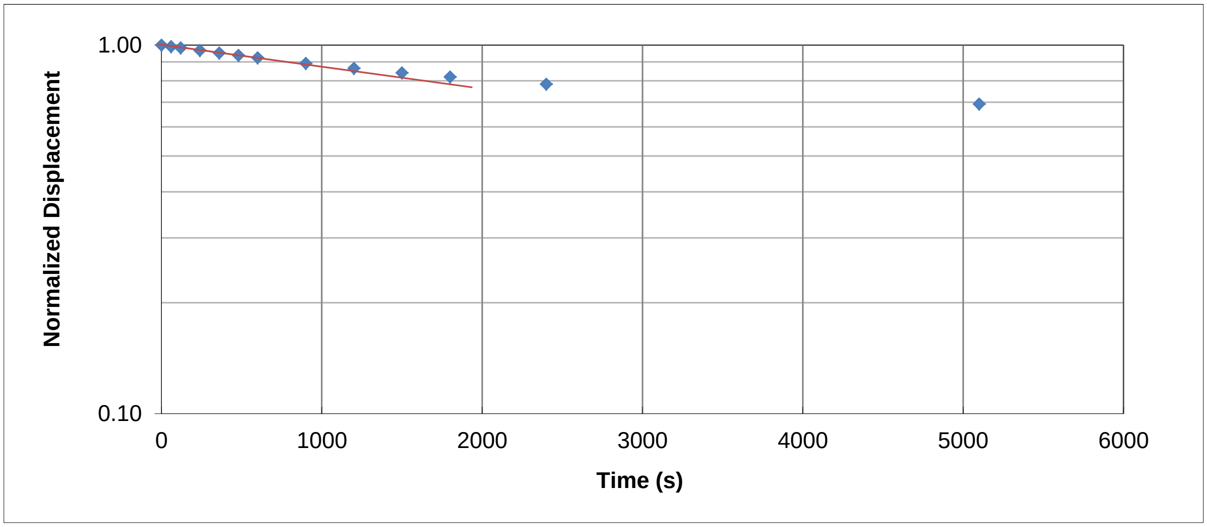
* mah indicates "meters along hole"

$$K = \frac{\pi r^2 \times \ln(L/r)}{T_0 \times 2\pi L}$$

Time (s)	Depth to Water (mah)	Normalized Displacement
0	0.30	1.00
60	0.51	0.99
120	0.69	0.98
240	1.06	0.97
360	1.41	0.95
480	1.74	0.94
600	2.05	0.92
900	2.78	0.89
1200	3.41	0.87
1500	3.96	0.84
1800	4.46	0.82
2400	5.29	0.78
5100	7.40	0.69

From Hvorslev Solution T_0 = -(600 s) / ln(0.92)
= 7195.83

Hydraulic Conductivity (m/s) **K =** **1.6E-07**



Hole #: **DH-BGC12-19**
Test #: **2**

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Calculation Input Parameters

Top of Packer Test Interval (mah):	215.5
Bottom of Packer Test Interval (mah):	220.1
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	218
Stickup Height (mah):	2.13
Pressure Gauge Height (m above ground):	2.13
Depth to Water Table (mah):	23.16
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

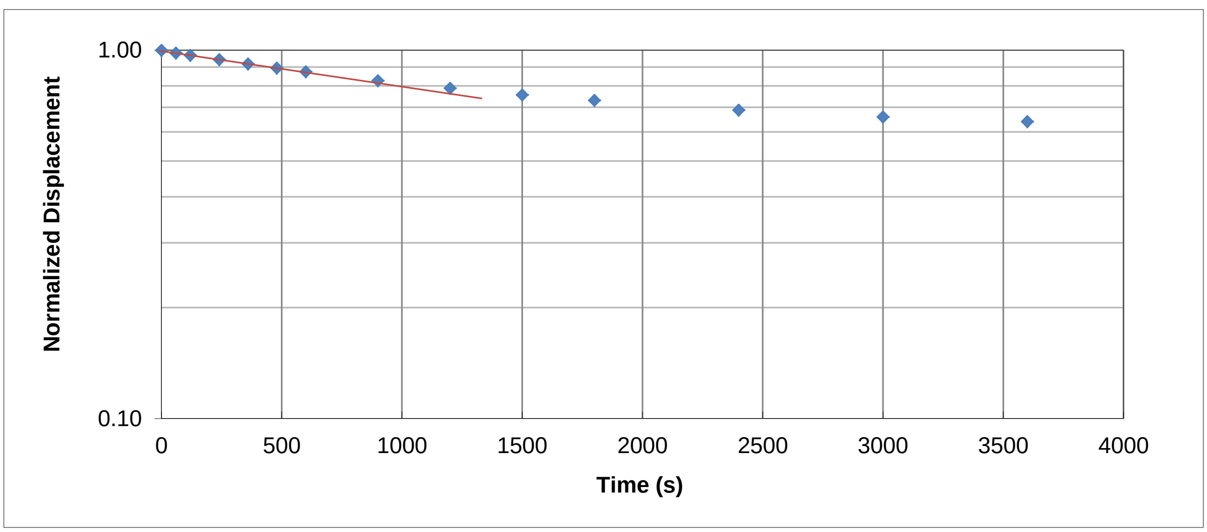
* mah indicates "meters along hole"

$$K = \frac{\pi r^2 \times \ln(L/r)}{T_0 \times 2\pi L}$$

Time (s)	Depth to Water (mah)	Normalized Displacement
0	0.30	1.00
60	0.70	0.98
120	1.00	0.97
240	1.60	0.94
360	2.17	0.92
480	2.70	0.90
600	3.18	0.87
900	4.25	0.83
1200	5.13	0.79
1500	5.87	0.76
1800	6.45	0.73
2400	7.43	0.69
3000	8.09	0.66
3600	8.52	0.64

From Hvorslev Solution T_0 = -(480 s) / ln(0.90)
= 4555.79

Hydraulic Conductivity (m/s) **K = 2.6E-07**



Hole #: **DH-BGC12-19**
Test #: **3**

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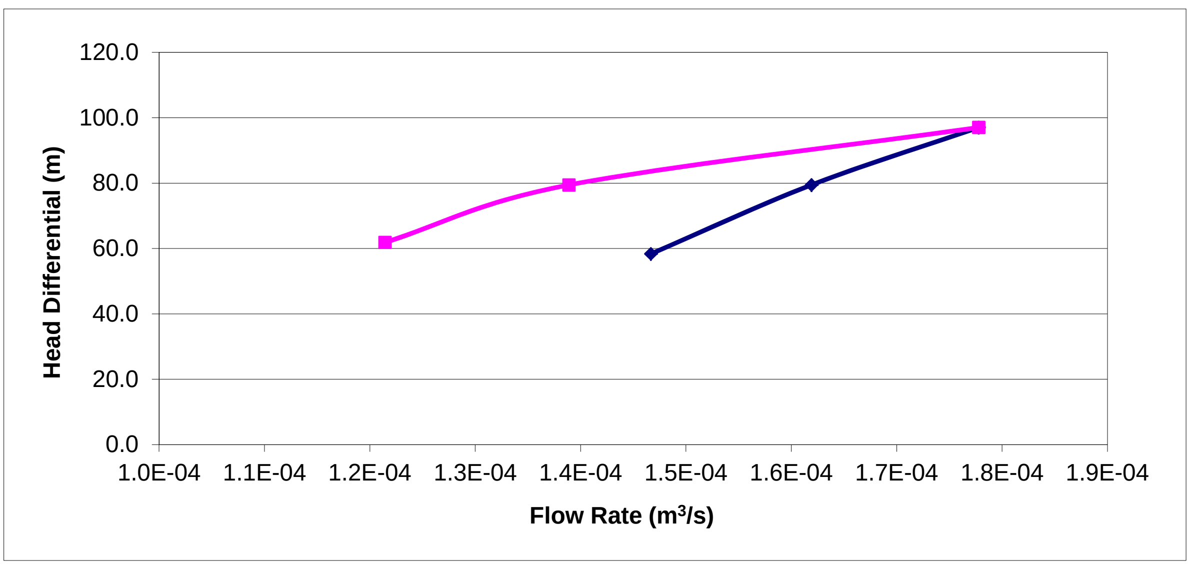
Calculation Input Parameters

Top of Packer Test Interval (mah):	313.0
Bottom of Packer Test Interval (mah):	317.6
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	315
Stickup Height (mah):	2.13
Assumed Pressure Gauge Height (m above ground):	2.13
Depth to Water Table (mah):	27.58
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
45.0	1.5E-04	31.6	58.4	4.1E-07
75.0	1.6E-04	52.7	79.4	3.3E-07
100.0	1.8E-04	70.3	97.0	3.0E-07
75.0	1.4E-04	52.7	79.4	2.8E-07
50.0	1.2E-04	35.2	61.9	3.2E-07
			Geo Mean	**3.3.E-07**



Hole #: **DH-BGC12-19**
Test #: **4**

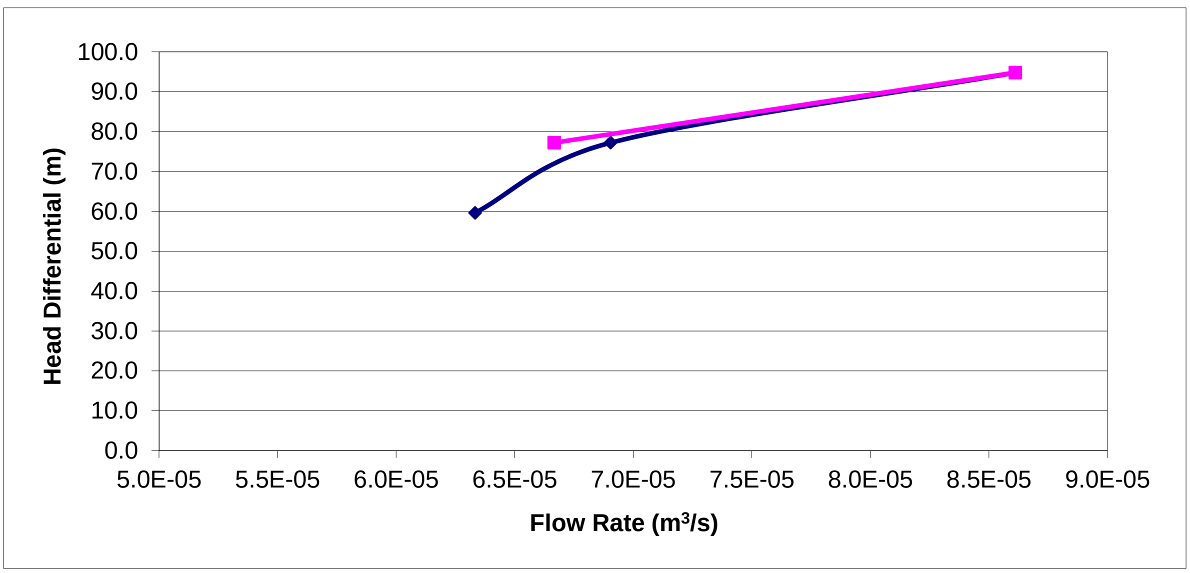
Calculation Input Parameters

Top of Packer Test Interval (mah):	401.4
Bottom of Packer Test Interval (mah):	425.8
L: Length of Test Interval (mah)	24.4
Test Interval Midpoint (mah):	414
Stickup Height (mah):	2.13
Assumed Pressure Gauge Height (m above ground):	2.13
Depth to Water Table (mah):	25.27
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
50.0	6.3E-05	35.2	59.6	4.4E-08
75.0	6.9E-05	52.7	77.2	3.7E-08
100.0	8.6E-05	70.3	94.8	3.8E-08
75.0	6.7E-05	52.7	77.2	3.6E-08
			Geo Mean	**3.9.E-08**



Hole #: **DH-BGC12-20**
Test #: **1**

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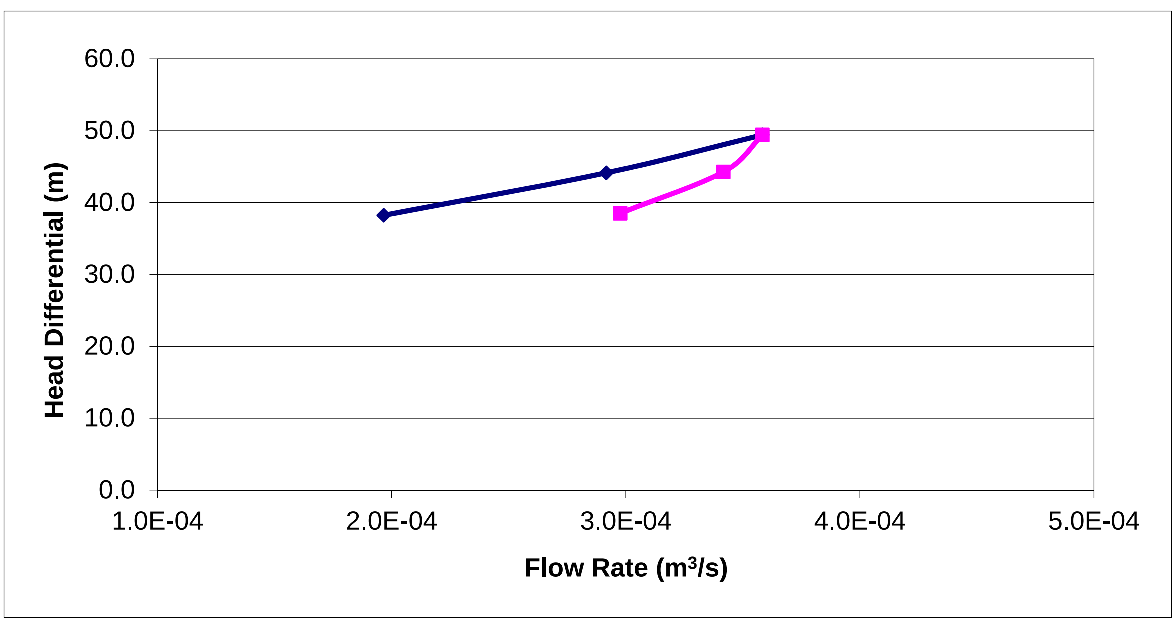
Calculation Input Parameters

Top of Packer Test Interval (mah):	33.2
Bottom of Packer Test Interval (mah):	50.0
L: Length of Test Interval (mah)	16.8
Test Interval Midpoint (mah):	42
Stickup Height (mah):	1.83
Pressure Gauge Height (m above ground):	1.83
Depth to Water Table (mah):	28.04
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	76

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.6	2.0E-04	11.0	38.2	2.9E-07
24.0	2.9E-04	16.9	44.1	3.8E-07
31.5	3.6E-04	22.1	49.4	4.1E-07
24.2	3.4E-04	17.0	44.3	4.4E-07
16.0	3.0E-04	11.2	38.5	4.4E-07
			Geo Mean	**3.9.E-07**



Hole #: DH-BGC12-20
Test #: 2

BGC ENGINEERING INC.
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Calculation Input Parameters

Top of Packer Test Interval (mah):	127.7
Bottom of Packer Test Interval (mah):	149.0
L: Length of Test Interval (mah)	21.3
Test Interval Midpoint (mah):	138
Stickup Height (mah):	1.83
Pressure Gauge Height (m above ground):	1.83
Depth to Water Table (mah):	40.54
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	76

* mah indicates "meters along hole"

$$K = \frac{\pi r^2 \times \ln(L/r)}{T_0 \times 2\pi L}$$

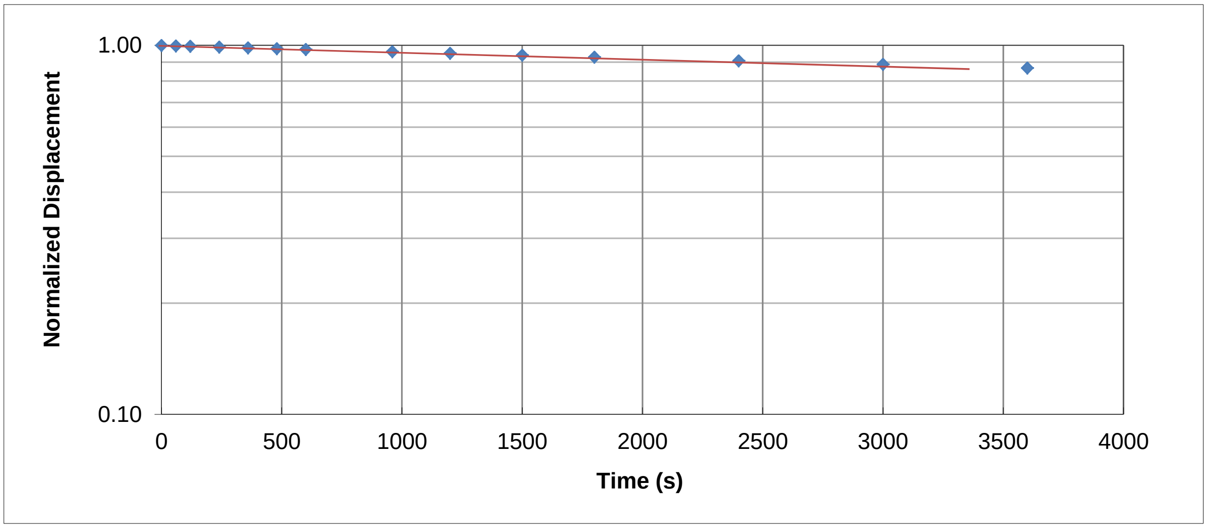
Time (s)	Depth to Water (mah)	Normalized Displacement
0	0.73	1.00
60	0.85	1.00
120	0.94	0.99
240	1.14	0.99
360	1.34	0.98
480	1.54	0.98
600	1.73	0.97
960	2.28	0.96
1200	2.65	0.95
1500	3.10	0.94
1800	3.53	0.93
2400	4.37	0.91
3000	5.18	0.89
3600	5.96	0.87

From Hvorslev Solution

T_0 = -(600 s) / ln(0.97)
= 19698.48

Hydraulic Conductivity (m/s)

K = 1.7E-08



Hole #: **DH-BGC12-20**
Test #: **3**

BGC ENGINEERING INC.
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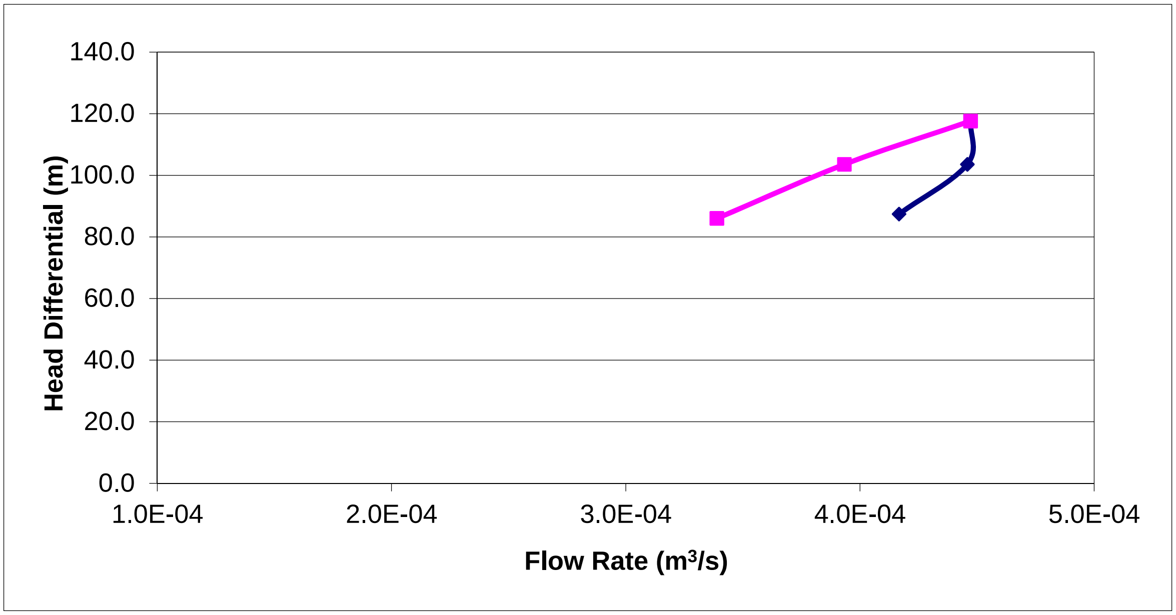
Calculation Input Parameters

Top of Packer Test Interval (mah):	240.5
Bottom of Packer Test Interval (mah):	264.9
L: Length of Test Interval (mah)	24.4
Test Interval Midpoint (mah):	253
Stickup Height (mah):	1.83
Pressure Gauge Height (m above ground):	1.83
Depth to Water Table (mah):	52.32
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	76

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
52.0	4.2E-04	36.6	87.4	2.0E-07
75.0	4.5E-04	52.7	103.6	1.8E-07
95.0	4.5E-04	66.8	117.6	1.6E-07
75.0	3.9E-04	52.7	103.6	1.6E-07
50.0	3.4E-04	35.2	86.0	1.6E-07
			Geo Mean	**1.7.E-07**



Hole #: **DH-BGC12-20**
Test #: **4**

BGC ENGINEERING INC.
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Calculation Input Parameters

Top of Packer Test Interval (mah):	380.7
Bottom of Packer Test Interval (mah):	403.6
L: Length of Test Interval (mah)	22.9
Test Interval Midpoint (mah):	392
Stickup Height (mah):	1.83
Pressure Gauge Height (m above ground):	1.83
Depth to Water Table (mah):	24.29
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	76

* mah indicates "meters along hole"

$$K = \frac{\pi r^2 \times \ln(L/r)}{T_0 \times 2\pi L}$$

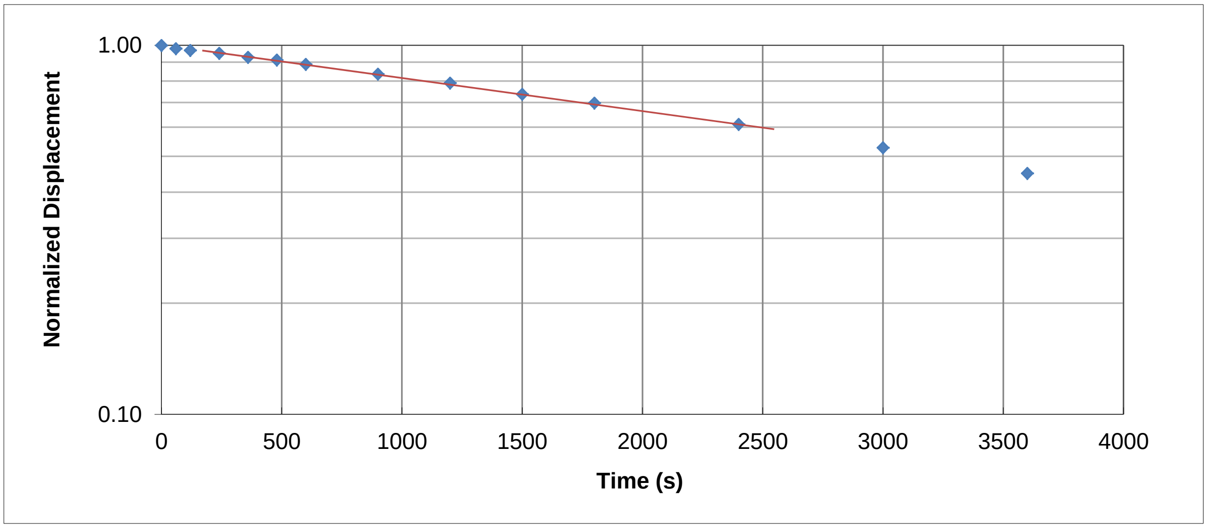
Time (s)	Depth to Water (mah)	Normalized Displacement
0	0.45	1.00
60	0.92	0.98
120	1.19	0.97
240	1.60	0.95
360	2.16	0.93
480	2.53	0.91
600	3.10	0.89
900	4.36	0.84
1200	5.44	0.79
1500	6.71	0.74
1800	7.65	0.70
2400	9.73	0.61
3000	11.70	0.53
3600	13.57	0.45

From Hvorslev Solution

T_0 = -(1500 s) / ln(0.74)
= 4981.65

Hydraulic Conductivity (m/s)

K = **6.4E-08**



Hole #: DH-BGC12-21
Test #: 1

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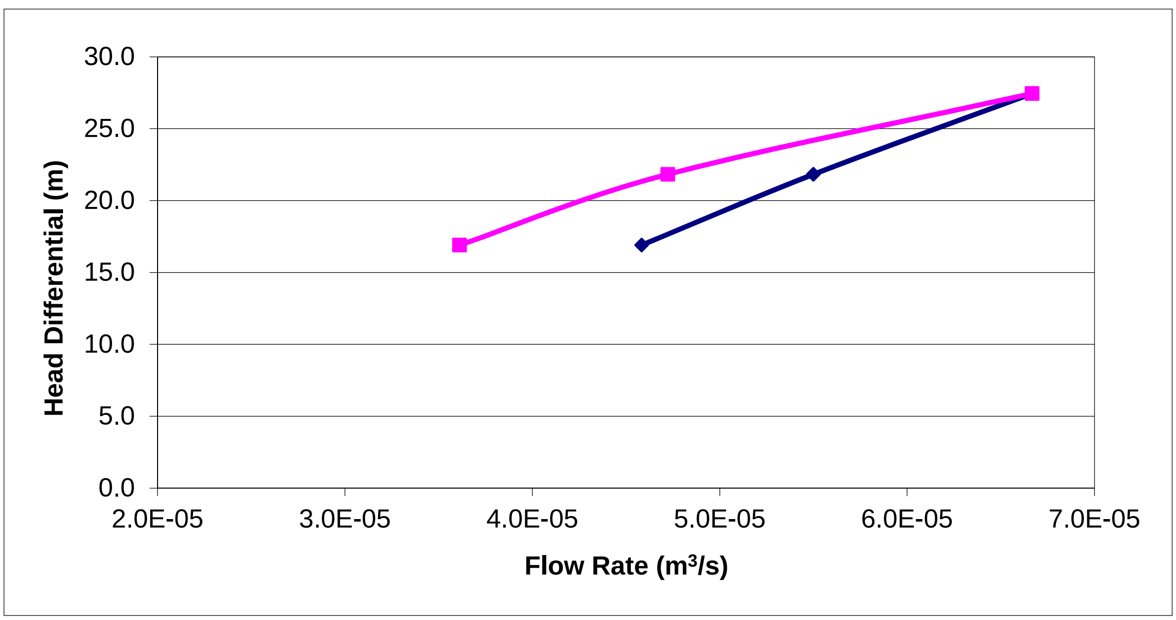
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Top of Packer Test Interval (mah):	36.6
Bottom of Packer Test Interval (mah):	50.6
L: Length of Test Interval (mah)	14.0
Test Interval Midpoint (mah):	44
Stickup Height (mah):	2.67
Pressure Gauge Height (m above ground):	1.92
Assumed Depth to Water Table (mah):	7.26
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.0	4.6E-05	10.5	16.9	1.8E-07
22.0	5.5E-05	15.5	21.8	1.7E-07
30.0	6.7E-05	21.1	27.4	1.6E-07
22.0	4.7E-05	15.5	21.8	1.4E-07
15.0	3.6E-05	10.5	16.9	1.4E-07
			Geo Mean	**1.6.E-07**



Hole #: **DH-BGC12-21**
Test #: **2**

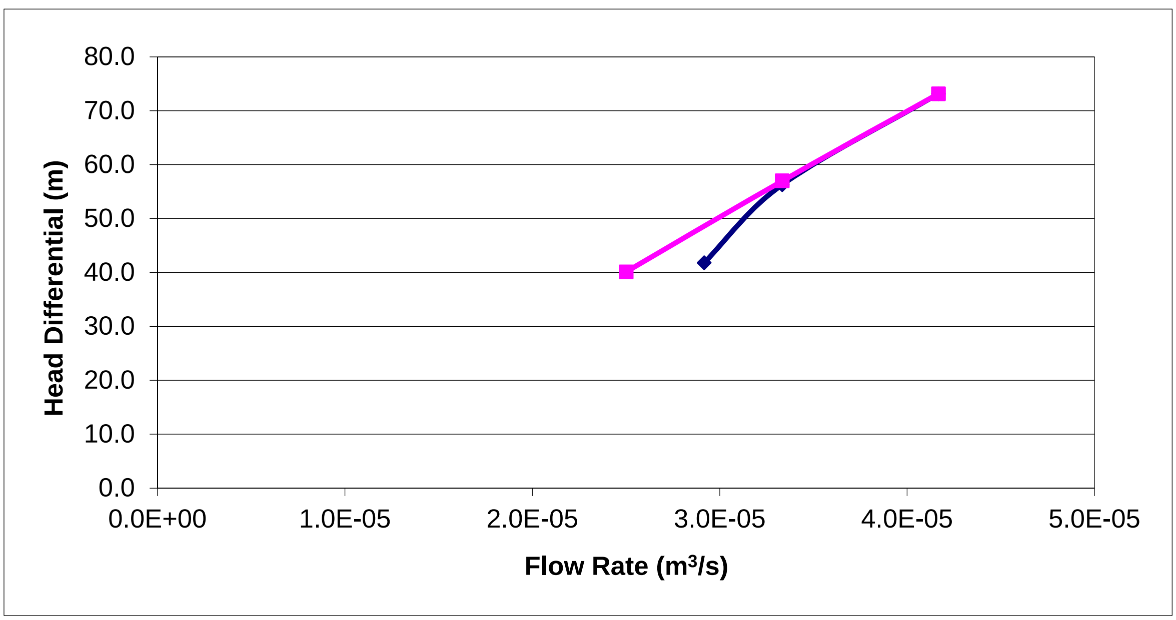
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Top of Packer Test Interval (mah):	131.4
Bottom of Packer Test Interval (mah):	148.1
L: Length of Test Interval (mah)	16.8
Test Interval Midpoint (mah):	140
Stickup Height (mah):	2.67
Pressure Gauge Height (m above ground):	1.92
Depth to Water Table (mah):	7.26
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
50.4	2.9E-05	35.4	41.8	4.0E-08
71.0	3.3E-05	49.9	56.3	3.4E-08
95.0	4.2E-05	66.8	73.2	3.3E-08
72.0	3.3E-05	50.6	57.0	3.3E-08
48.0	2.5E-05	33.7	40.1	3.6E-08
			Geo Mean	**3.5.E-08**



Hole #: **DH-BGC12-21**
Test #: **3**

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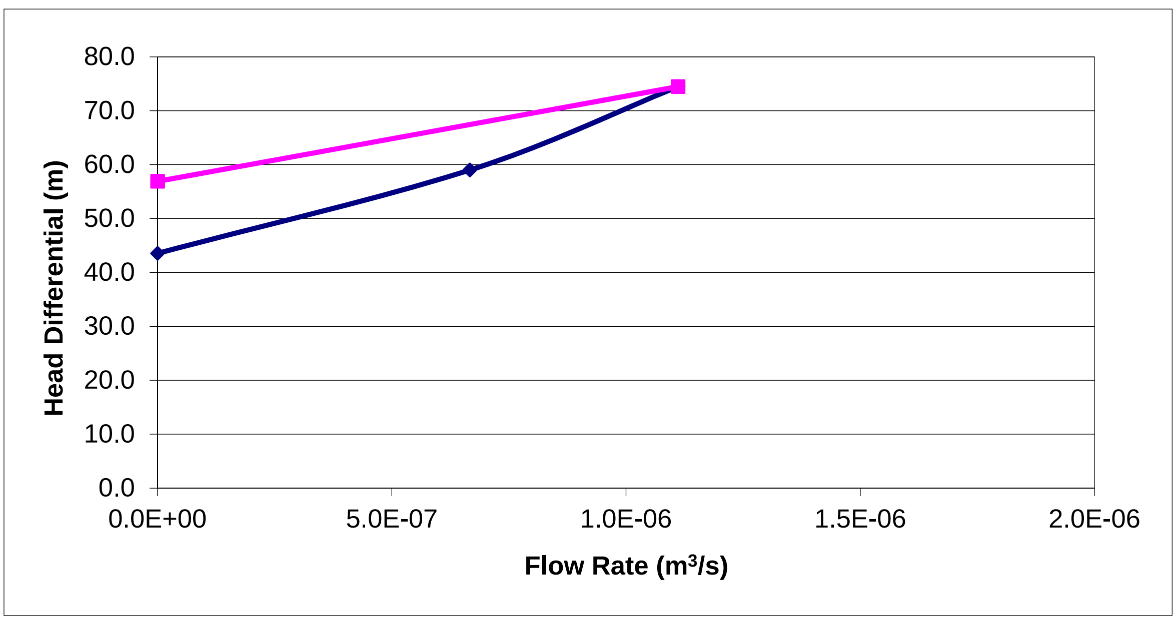
Calculation Input Parameters

Top of Packer Test Interval (mah):	228.9
Bottom of Packer Test Interval (mah):	248.6
L: Length of Test Interval (mah)	19.7
Test Interval Midpoint (mah):	239
Stickup Height (mah):	2.67
Pressure Gauge Height (m above ground):	1.92
Depth to Water Table (mah):	4.99
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
56.0	0.0E+00	39.4	43.5	0.0E+00
78.0	6.7E-07	54.8	59.0	5.6E-10
100.0	1.1E-06	70.3	74.5	7.5E-10
75.0	0.0E+00	52.7	56.9	0.0E+00
			Geo Mean	**#NUM!**



Hole #: DH-BGC12-21
Test #: 4

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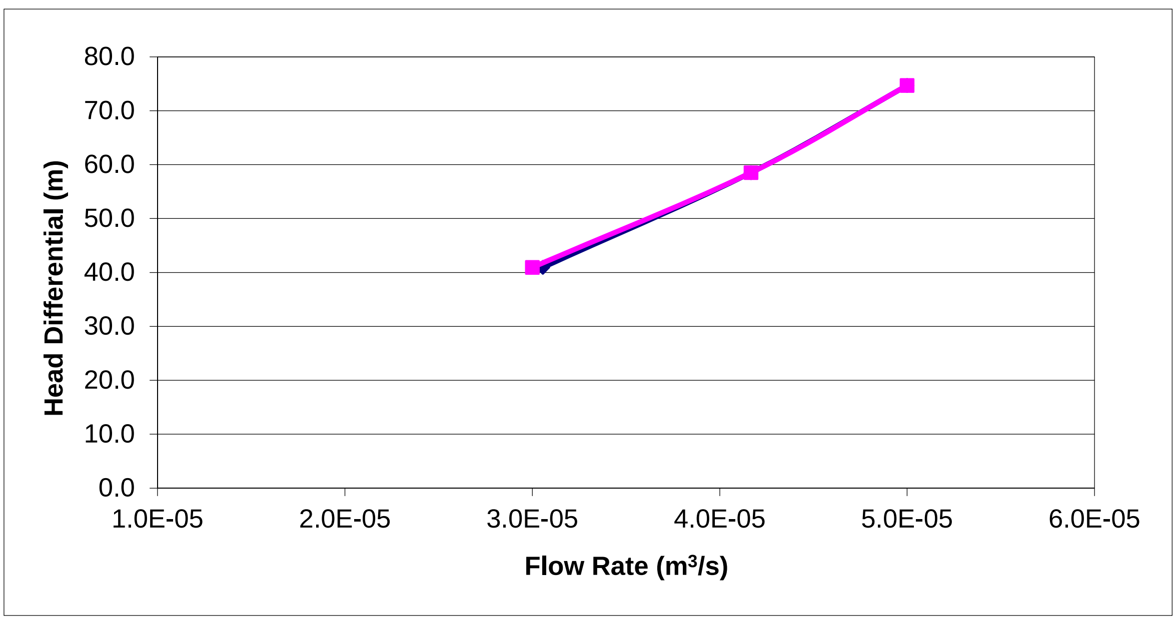
Calculation Input Parameters

Top of Packer Test Interval (mah):	331.0
Bottom of Packer Test Interval (mah):	349.3
L: Length of Test Interval (mah)	18.3
Test Interval Midpoint (mah):	340
Stickup Height (mah):	2.70
Pressure Gauge Height (m above ground):	2.00
Depth to Water Table (mah):	6.61
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
50.0	3.1E-05	35.2	40.9	4.0E-08
75.0	4.2E-05	52.7	58.5	3.8E-08
98.0	5.0E-05	68.9	74.7	3.6E-08
75.0	4.2E-05	52.7	58.5	3.8E-08
50.0	3.0E-05	35.2	40.9	3.9E-08
			Geo Mean	**3.8.E-08**



Hole #: **DH-BGC12-21**
Test #: **5**

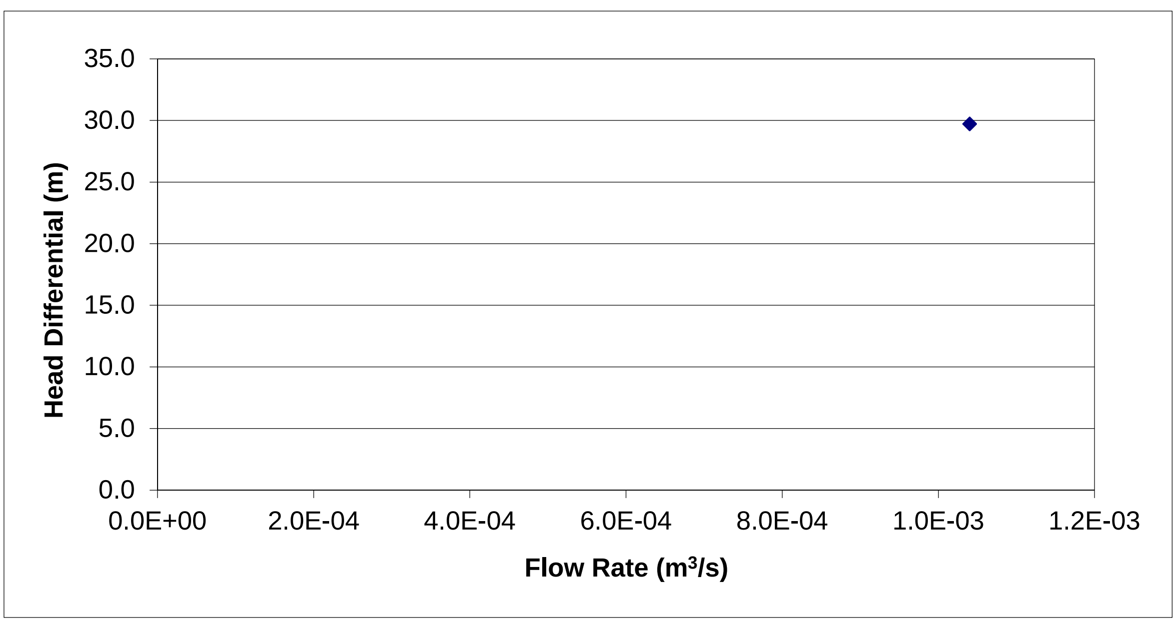
Calculation Input Parameters

Top of Packer Test Interval (mah):	417.9
Bottom of Packer Test Interval (mah):	437.7
L: Length of Test Interval (mah)	19.8
Test Interval Midpoint (mah):	428
Stickup Height (mah):	2.68
Pressure Gauge Height (m above ground):	3.11
Depth to Water Table (mah):	30.23
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
0.0	1.0E-03	0.0	29.7	1.7E-06
			Geo Mean	



Hole #: DH-BGC12-22
Test #: 1

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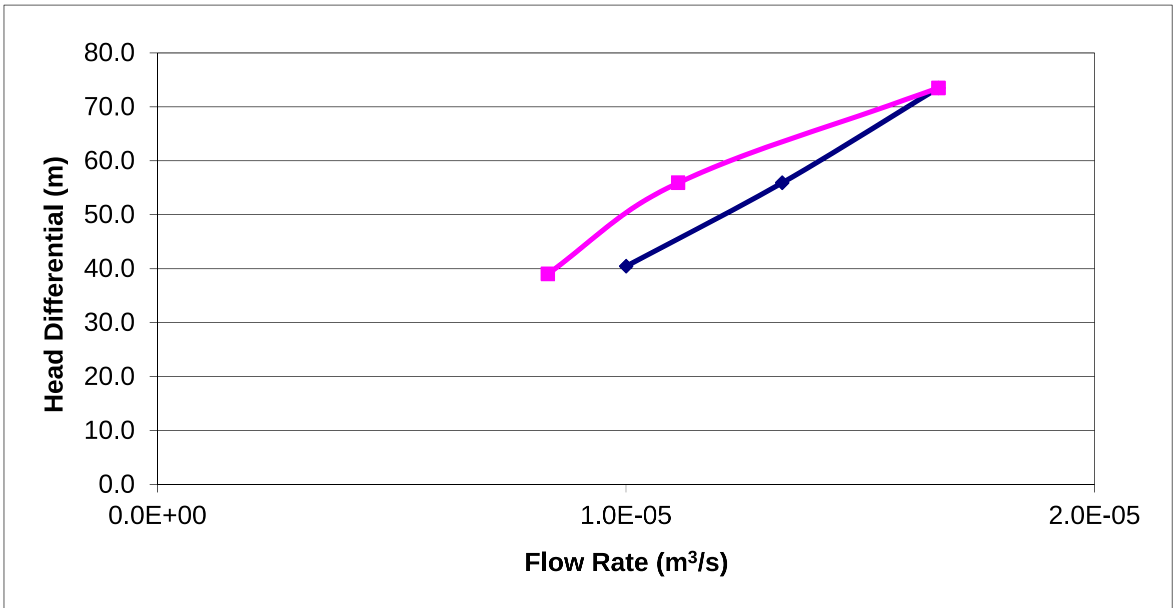
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Top of Packer Test Interval (mah):	50.9
Bottom of Packer Test Interval (mah):	61.6
L: Length of Test Interval (mah)	10.7
Test Interval Midpoint (mah):	56
Stickup Height (mah):	4.02
Pressure Gauge Height (m above ground):	3.05
Depth to Water Table (mah):	4.16
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
53.0	1.0E-05	37.3	40.5	2.0E-08
75.0	1.3E-05	52.7	55.9	2.0E-08
100.0	1.7E-05	70.3	73.5	1.9E-08
75.0	1.1E-05	52.7	55.9	1.6E-08
51.0	8.3E-06	35.9	39.0	1.8E-08
			Geo Mean	**1.9.E-08**



Hole #: **DH-BGC12-22**
Test #: **2**

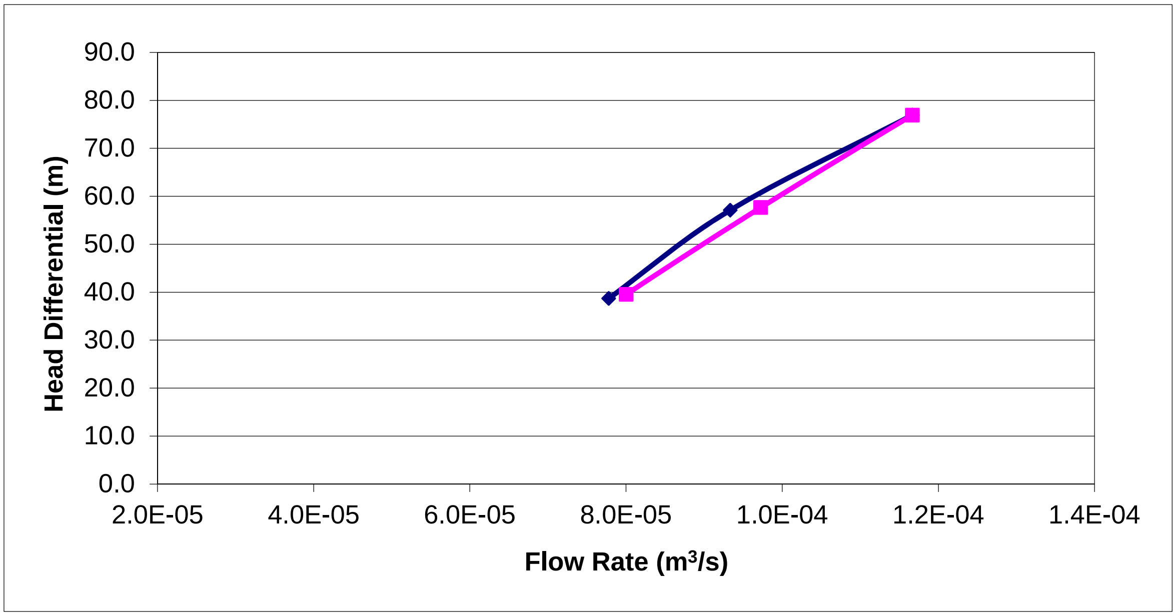
Calculation Input Parameters

Top of Packer Test Interval (mah):	258.2
Bottom of Packer Test Interval (mah):	271.9
L: Length of Test Interval (mah)	13.7
Test Interval Midpoint (mah):	265
Stickup Height (mah):	4.02
Pressure Gauge Height (m above ground):	2.96
Depth to Water Table (mah):	4.46
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
50.2	7.8E-05	35.3	38.7	1.4E-07
76.4	9.3E-05	53.7	57.1	1.1E-07
104.6	1.2E-04	73.5	76.9	1.0E-07
77.2	9.7E-05	54.3	57.6	1.1E-07
51.4	8.0E-05	36.2	39.5	1.4E-07
			Geo Mean	**1.2.E-07**



Hole #: **DH-BGC12-22**
Test #: **3**

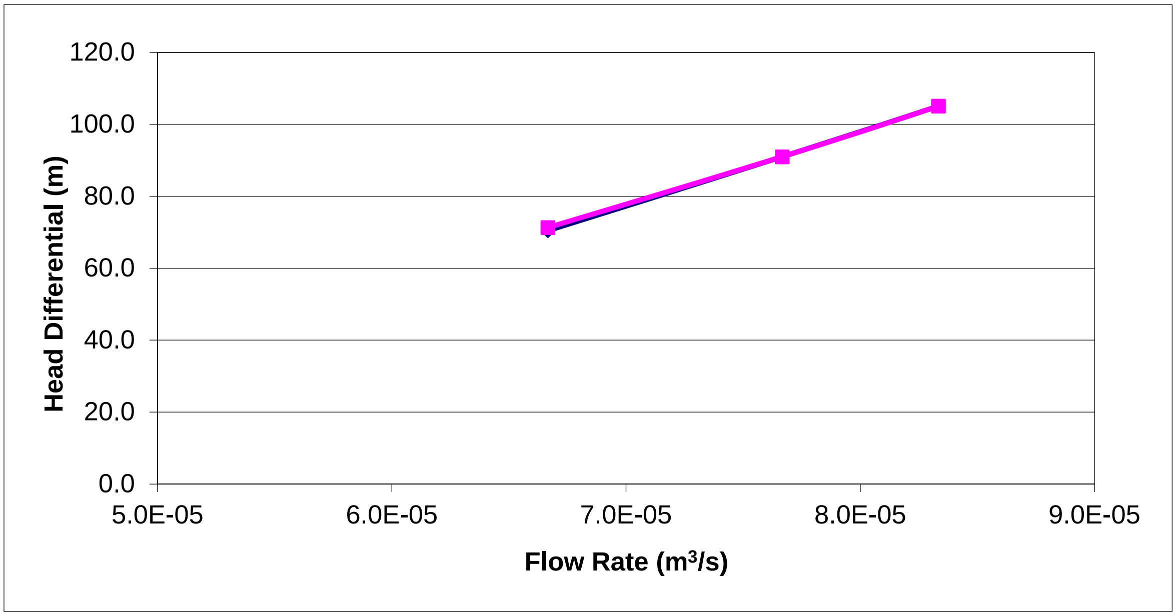
Calculation Input Parameters

Top of Packer Test Interval (mah):	361.8
Bottom of Packer Test Interval (mah):	381.6
L: Length of Test Interval (mah)	19.8
Test Interval Midpoint (mah):	372
Stickup Height (mah):	4.02
Pressure Gauge Height (m above ground):	3.50
Depth to Water Table (mah):	37.80
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
48.8	6.7E-05	34.3	70.4	4.7E-08
78.0	7.7E-05	54.8	91.0	4.2E-08
98.0	8.3E-05	68.9	105.0	4.0E-08
78.0	7.7E-05	54.8	91.0	4.2E-08
50.0	6.7E-05	35.2	71.3	4.7E-08
			Geo Mean	**4.3.E-08**



Hole #: **DH-BGC12-23**
Test #: **1**

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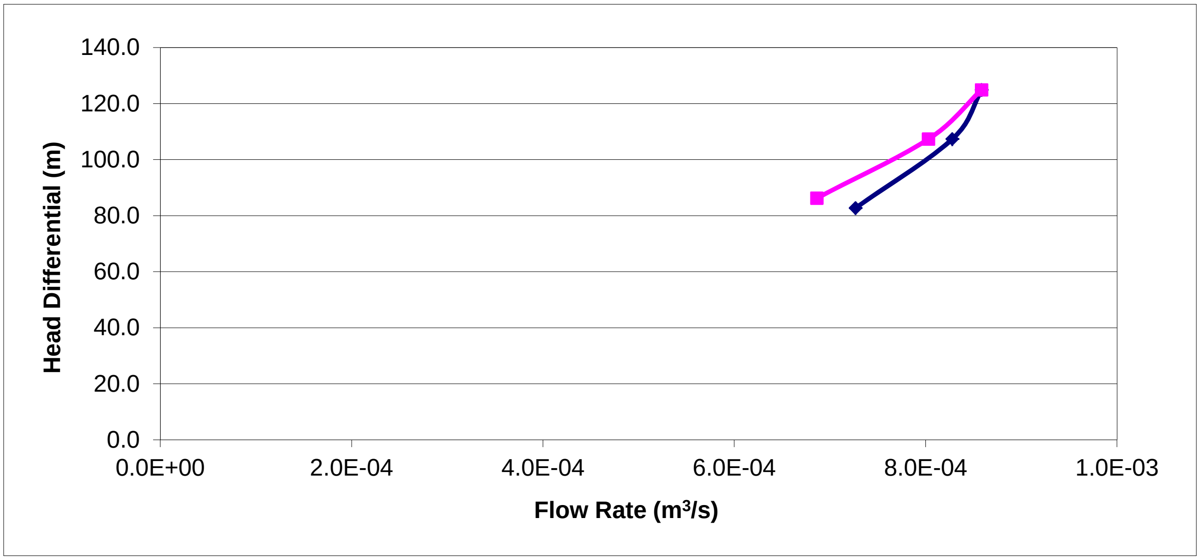
Calculation Input Parameters

Top of Packer Test Interval (mah):	189.6
Bottom of Packer Test Interval (mah):	210.0
L: Length of Test Interval (mah)	20.4
Test Interval Midpoint (mah):	200
Assumed Stickup Height (mah):	2.50
Assumed Pressure Gauge Height (m above ground):	1.40
Depth to Water Table (mah):	59.13
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	70

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
40.0	7.3E-04	28.1	82.7	4.4E-07
75.0	8.3E-04	52.7	107.3	3.8E-07
100.0	8.6E-04	70.3	124.9	3.4E-07
75.0	8.0E-04	52.7	107.3	3.7E-07
45.0	6.9E-04	31.6	86.3	3.9E-07
			Geo Mean	**3.8.E-07**



Hole #: **DH-BGC12-23**
Test #: **2**

BGC ENGINEERING INC.
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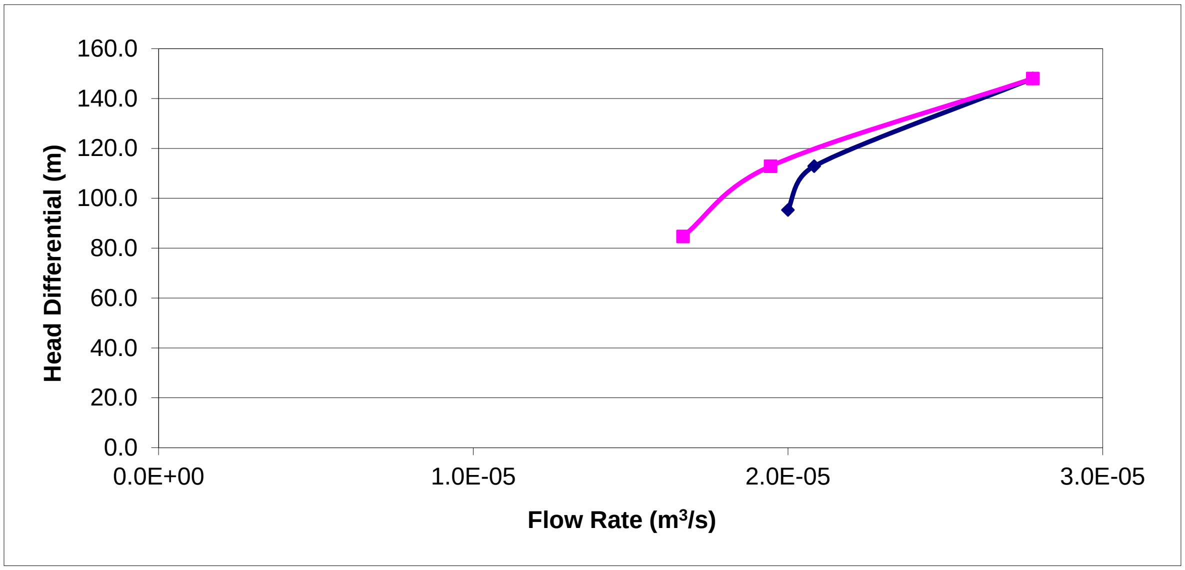
Calculation Input Parameters

Top of Packer Test Interval (mah):	308.5
Bottom of Packer Test Interval (mah):	331.3
L: Length of Test Interval (mah)	22.9
Test Interval Midpoint (mah):	320
Stickup Height (mah):	2.50
Pressure Gauge Height (m above ground):	1.40
Depth to Water Table (mah):	31.37
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	70

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
95.0	2.0E-05	66.8	95.3	9.5E-09
120.0	2.1E-05	84.4	112.9	8.3E-09
170.0	2.8E-05	119.5	148.1	8.5E-09
120.0	1.9E-05	84.4	112.9	7.8E-09
80.0	1.7E-05	56.2	84.8	8.9E-09
			Geo Mean	**8.6.E-09**



Hole #: **DH-BGC12-23**
Test #: **3**

BGC ENGINEERING INC.
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Calculation Input Parameters

Top of Packer Test Interval (mah):	491.3
Bottom of Packer Test Interval (mah):	513.0
L: Length of Test Interval (mah)	21.6
Test Interval Midpoint (mah):	502
Stickup Height (mah):	2.50
Pressure Gauge Height (m above ground):	2.50
Depth to Water Table (mah):	54.51
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	70

* mah indicates "meters along hole"

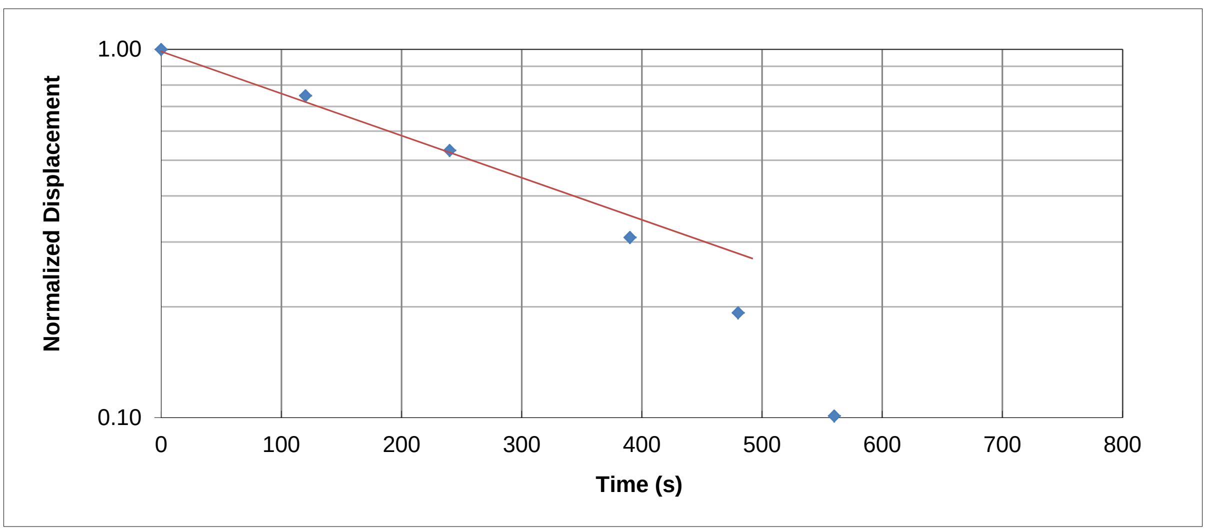
$$K = \frac{\pi r^2 \times \ln(L/r)}{T_0 \times 2\pi L}$$

Time (s)	Depth to Water (mah)	Normalized Displacement
0	0.00	1.00
120	13.67	0.75
240	25.49	0.53
390	37.67	0.31
480	44.00	0.19
560	49.00	0.10
612	52.00	0.05
669	55.00	-0.01

From Hvorslev Solution

T_0 = -(240 s) / ln(0.53)
= 378.03

Hydraulic Conductivity (m/s) **K =** **9.1E-07**



Hole #: **DH-BGC12-23**
Test #: **3**

BGC ENGINEERING INC.
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Calculation Input Parameters

Top of Packer Test Interval (mah):	491.3
Bottom of Packer Test Interval (mah):	513.0
L: Length of Test Interval (mah)	21.6
Test Interval Midpoint (mah):	502
Stickup Height (mah):	2.50
Pressure Gauge Height (m above ground):	2.50
Depth to Water Table (mah):	54.51
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	70

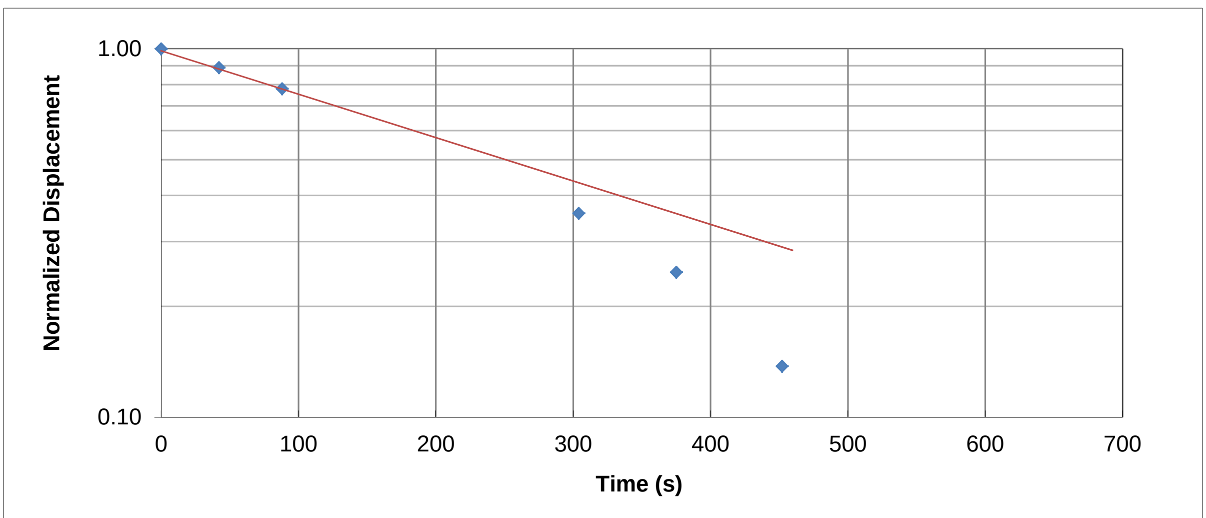
* mah indicates "meters along hole"

$$K = \frac{\pi r^2 \times \ln(L/r)}{T_0 \times 2\pi L}$$

Time (s)	Depth to Water (mah)	Normalized Displacement
0	0.00	1.00
42	6.00	0.89
88	12.00	0.78
304	35.00	0.36
375	41.00	0.25
452	47.00	0.14
572	55.00	-0.01

From Hvorslev Solution T_0 = -(88 s) / ln(0.78)
= 354.18

Hydraulic Conductivity (m/s) K = **9.7E-07**



Hole #: **DH-BGC12-23**
Test #: **3**

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Calculation Input Parameters

Top of Packer Test Interval (mah):	491.3
Bottom of Packer Test Interval (mah):	513.0
L: Length of Test Interval (mah)	21.6
Test Interval Midpoint (mah):	502
Stickup Height (mah):	2.50
Pressure Gauge Height (m above ground):	2.50
Depth to Water Table (mah):	54.51
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	70

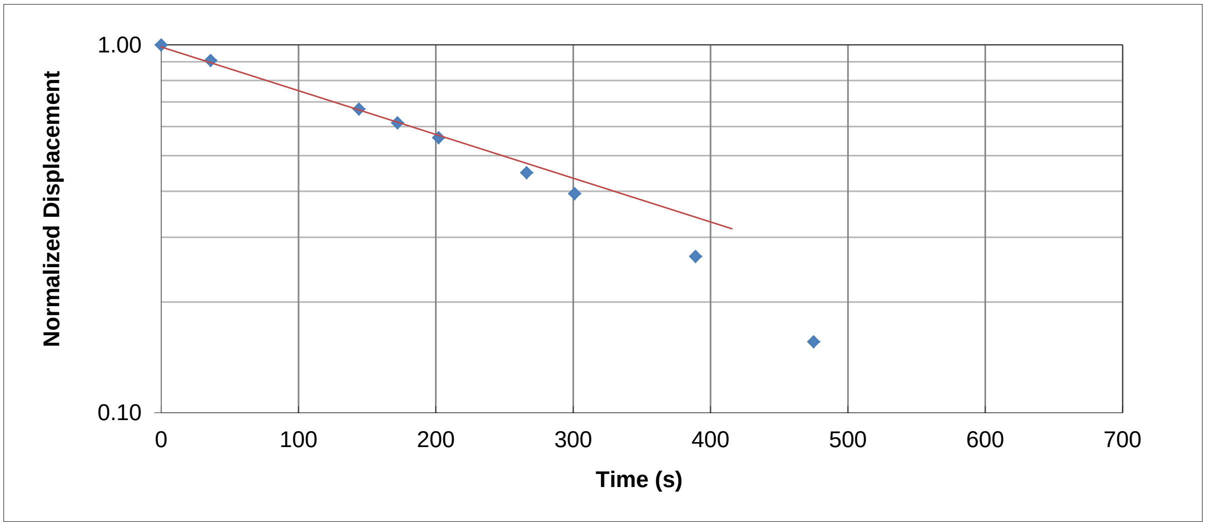
* mah indicates "meters along hole"

$$K = \frac{\pi r^2 \times \ln(L/r)}{T_0 \times 2\pi L}$$

Time (s)	Depth to Water (mah)	Normalized Displacement
0	0.00	1.00
36	5.00	0.91
144	18.00	0.67
172	21.00	0.61
202	24.00	0.56
266	30.00	0.45
301	33.00	0.39
389	40.00	0.27
475	46.00	0.16
570	52.00	0.05
624	55.00	-0.01

From Hvorslev Solution T_0 = -(144 s) / ln(0.67)
= 359.57

Hydraulic Conductivity (m/s) **K = 9.5E-07**



Hole #: **DH-BGC12-23**
Test #: **4**

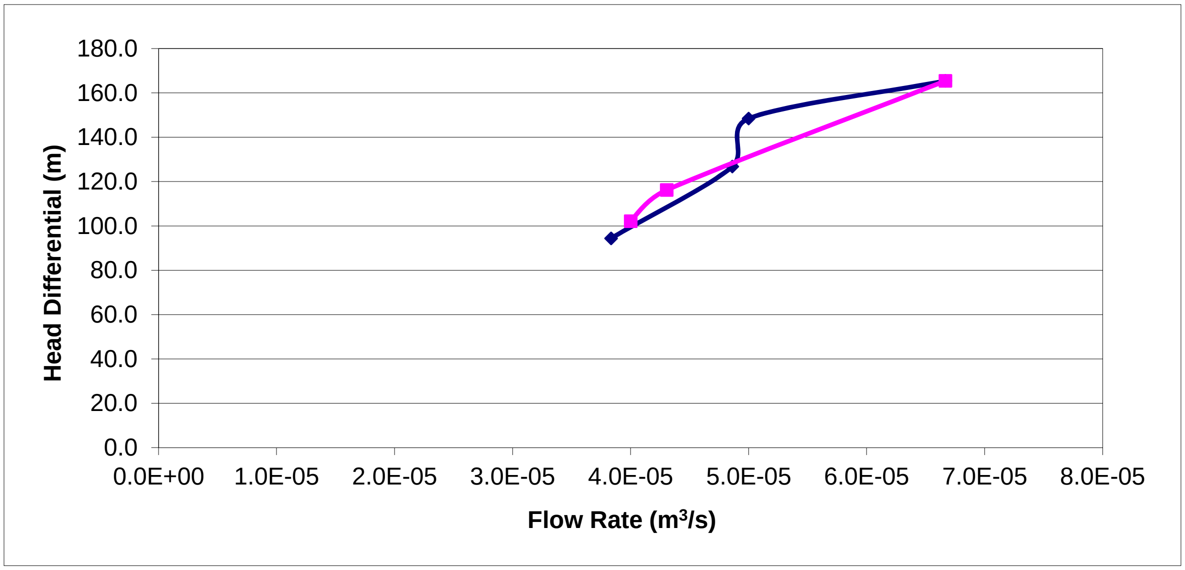
Calculation Input Parameters

Top of Packer Test Interval (mah):	531.0
Bottom of Packer Test Interval (mah):	550.3
L: Length of Test Interval (mah)	19.4
Test Interval Midpoint (mah):	541
Stickup Height (mah):	2.40
Pressure Gauge Height (m above ground):	1.20
Assumed Depth to Water Table (mah):	50.00
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	70

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
69.0	3.8E-05	48.5	94.4	2.1E-08
115.0	4.9E-05	80.9	126.8	2.0E-08
145.8	5.0E-05	102.5	148.5	1.7E-08
170.0	6.7E-05	119.5	165.5	2.1E-08
100.0	4.3E-05	70.3	116.2	1.9E-08
80.0	4.0E-05	56.2	102.2	2.0E-08
			Geo Mean	**2.0.E-08**



Hole #: DH-BGC12-24
Test #: 1

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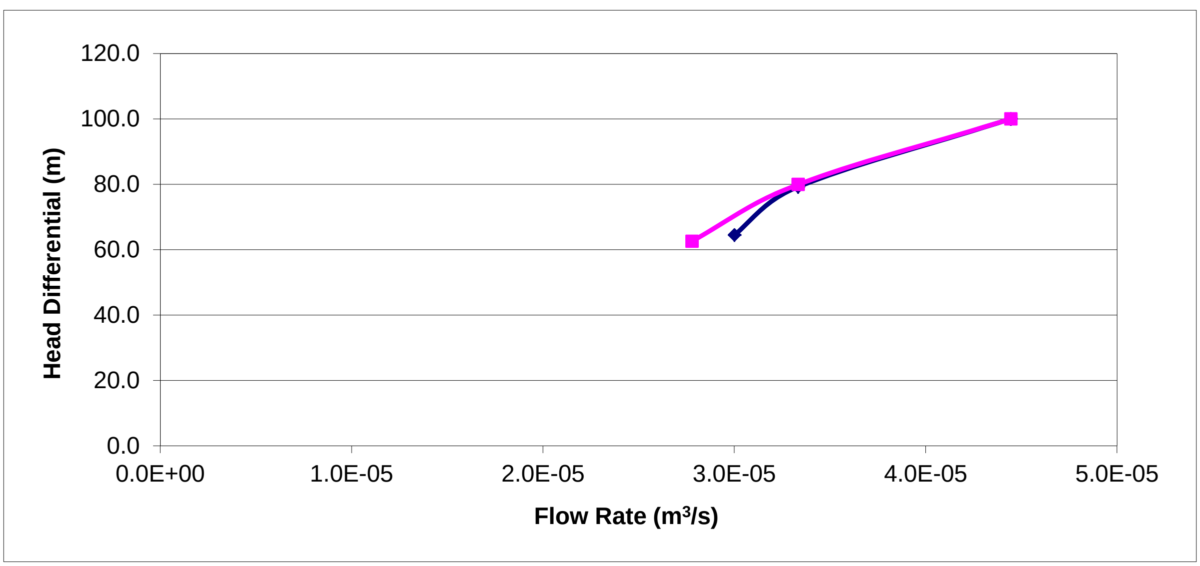
Calculation Input Parameters

Top of Packer Test Interval (mah):	292.6
Bottom of Packer Test Interval (mah):	306.3
L: Length of Test Interval (mah)	13.7
Test Interval Midpoint (mah):	299
Stickup Height (mah):	2.21
Pressure Gauge Height (m above ground):	1.83
Depth to Water Table (mah):	28.88
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	68

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
54.0	3.0E-05	38.0	64.5	3.2E-08
75.0	3.3E-05	52.7	79.3	2.9E-08
104.5	4.4E-05	73.5	100.0	3.1E-08
76.0	3.3E-05	53.4	80.0	2.9E-08
51.3	2.8E-05	36.1	62.6	3.1E-08
			Geo Mean	**3.1.E-08**



Hole #: **DH-BGC12-24**
Test #: **2**

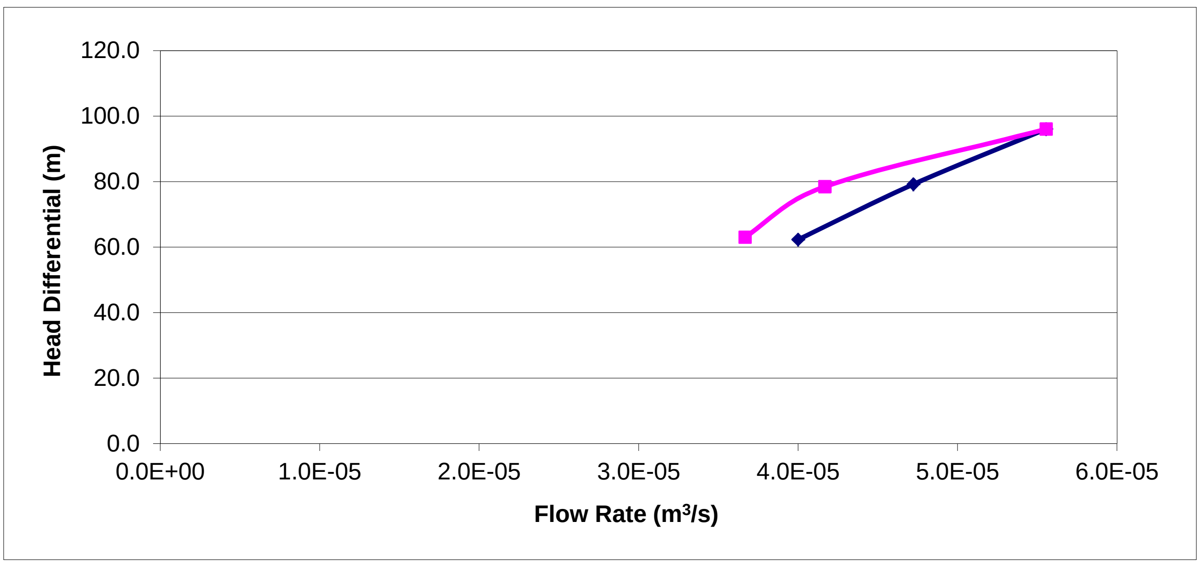
Calculation Input Parameters

Top of Packer Test Interval (mah):	384.1
Bottom of Packer Test Interval (mah):	406.9
L: Length of Test Interval (mah)	22.9
Test Interval Midpoint (mah):	395
Stickup Height (mah):	2.21
Pressure Gauge Height (m above ground):	1.96
Depth to Water Table (mah):	27.89
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	68

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
52.0	4.0E-05	36.6	62.3	2.9E-08
76.0	4.7E-05	53.4	79.2	2.7E-08
100.0	5.6E-05	70.3	96.1	2.6E-08
75.0	4.2E-05	52.7	78.5	2.4E-08
53.0	3.7E-05	37.3	63.0	2.7E-08
			Geo Mean	**2.7.E-08**



Hole #: **DH-BGC12-24**
Test #: **3**

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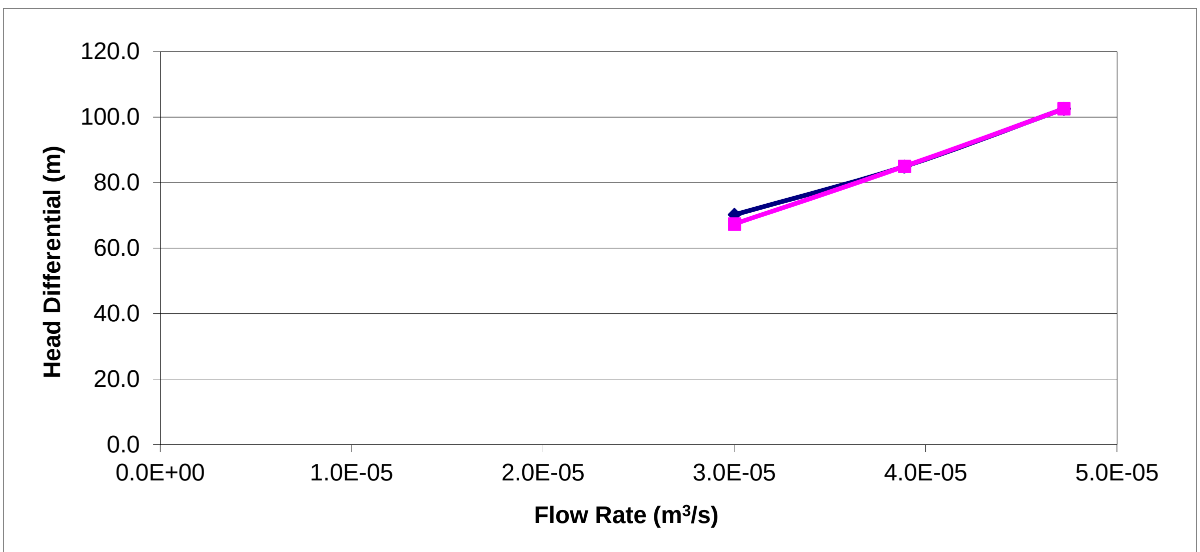
Calculation Input Parameters

Top of Packer Test Interval (mah):	432.8
Bottom of Packer Test Interval (mah):	458.7
L: Length of Test Interval (mah)	25.9
Test Interval Midpoint (mah):	446
Stickup Height (mah):	2.21
Pressure Gauge Height (m above ground):	1.85
Depth to Water Table (mah):	35.00
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	68

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
54.0	3.0E-05	38.0	70.2	1.8E-08
75.0	3.9E-05	52.7	85.0	1.9E-08
100.0	4.7E-05	70.3	102.6	1.9E-08
75.0	3.9E-05	52.7	85.0	1.9E-08
50.0	3.0E-05	35.2	67.4	1.8E-08
			Geo Mean	**1.9.E-08**



Hole #: **DH-BGC12-24**
Test #: **4**

BGC ENGINEERING INC.
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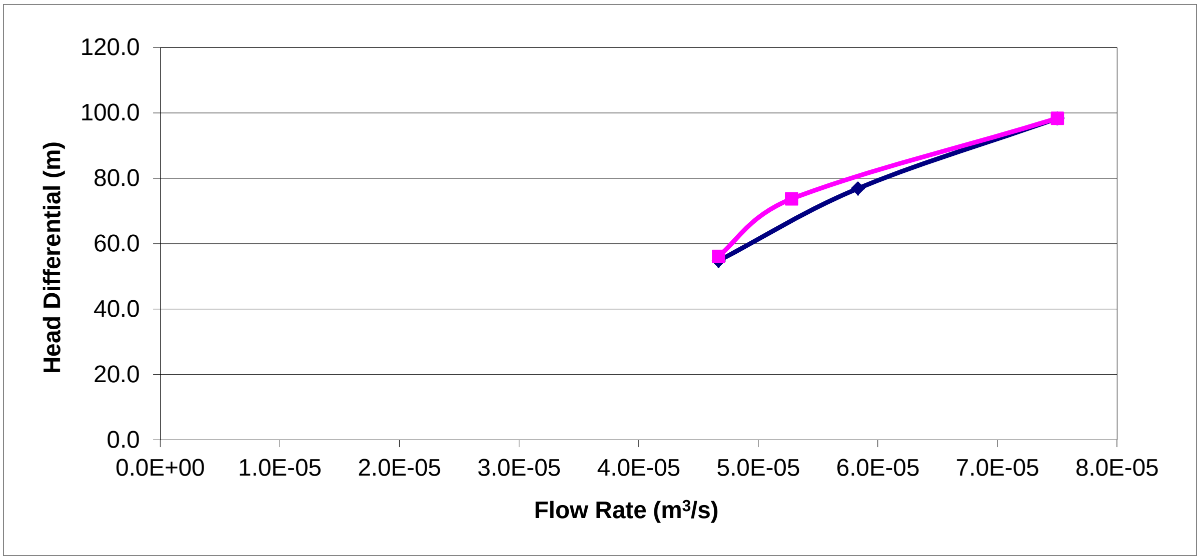
Calculation Input Parameters

Top of Packer Test Interval (mah):	460.3
Bottom of Packer Test Interval (mah):	470.9
L: Length of Test Interval (mah)	10.7
Test Interval Midpoint (mah):	466
Stickup Height (mah):	2.25
Pressure Gauge Height (m above ground):	1.70
Depth to Water Table (mah):	23.09
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	68

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s)	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
48.0	4.7E-05	33.7	54.8	7.3E-08
79.5	5.8E-05	55.9	76.9	6.5E-08
110.0	7.5E-05	77.3	98.4	6.5E-08
75.0	5.3E-05	52.7	73.8	6.1E-08
50.0	4.7E-05	35.2	56.2	7.1E-08
			Geo Mean	**6.7.E-08**



Hole #: **DH-BGC12-25**
Test #: **1**

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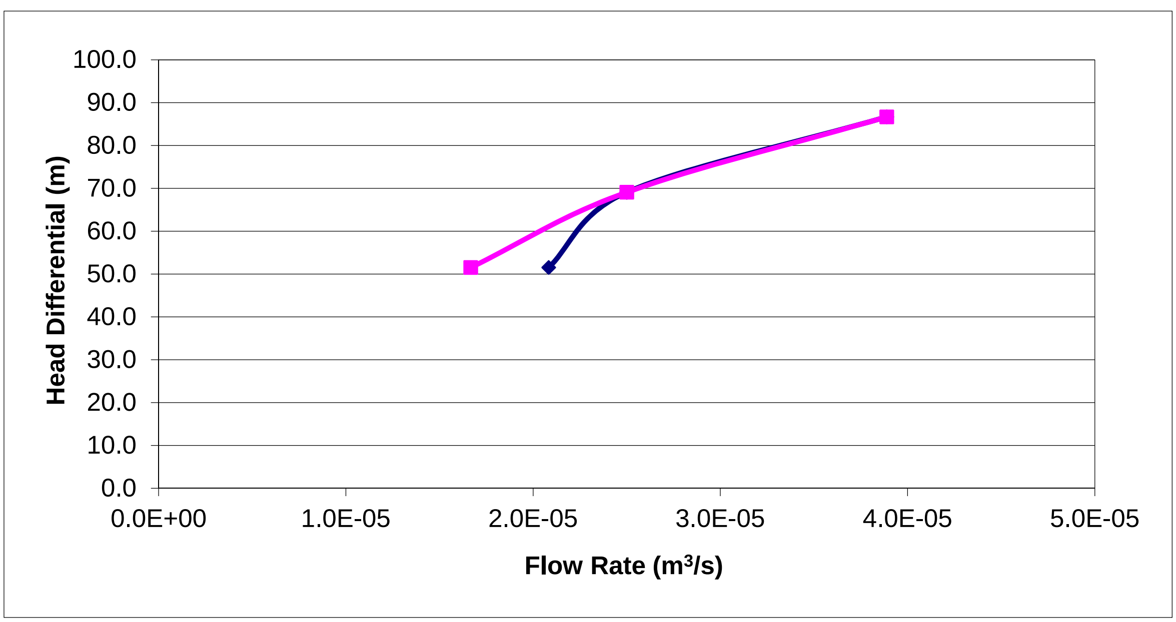
Calculation Input Parameters

Top of Packer Test Interval (mah):	198.7
Bottom of Packer Test Interval (mah):	212.5
L: Length of Test Interval (mah)	13.7
Test Interval Midpoint (mah):	206
Stickup Height (mah):	2.88
Pressure Gauge Height (m above ground):	2.03
Depth to Water Table (mah):	23.14
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	45

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
50.0	2.1E-05	35.2	51.5	3.5E-08
75.0	2.5E-05	52.7	69.1	3.2E-08
100.0	3.9E-05	70.3	86.7	3.9E-08
75.0	2.5E-05	52.7	69.1	3.2E-08
50.0	1.7E-05	35.2	51.5	2.8E-08
			Geo Mean	**3.3.E-08**



Hole #: DH-BGC12-25
Test #: 2

BGC ENGINEERING INC.
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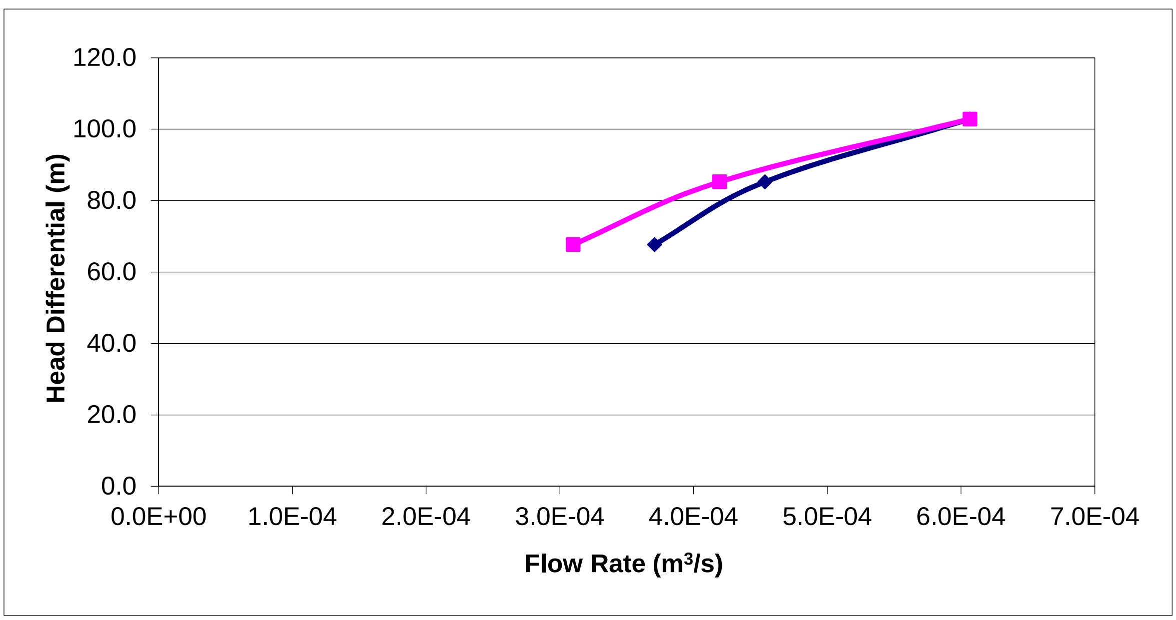
Calculation Input Parameters

Top of Packer Test Interval (mah):	238.7
Bottom of Packer Test Interval (mah):	255.4
L: Length of Test Interval (mah)	16.8
Test Interval Midpoint (mah):	247
Stickup Height (mah):	2.86
Pressure Gauge Height (m above ground):	1.60
Depth to Water Table (mah):	46.60
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	45

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
50.0	3.7E-04	35.2	67.7	4.1E-07
75.0	4.5E-04	52.7	85.3	3.9E-07
100.0	6.1E-04	70.3	102.8	4.4E-07
75.0	4.2E-04	52.7	85.3	3.6E-07
50.0	3.1E-04	35.2	67.7	3.4E-07
			Geo Mean	**3.9.E-07**



Hole #: DH-BGC12-32
Test #: 1

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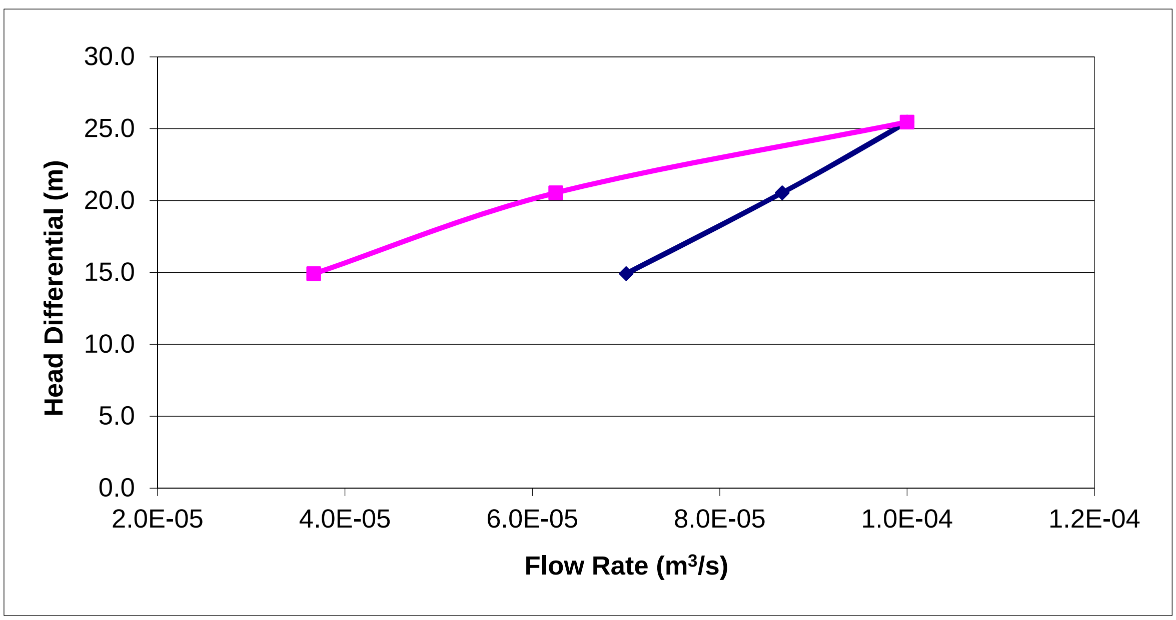
Calculation Input Parameters

Top of Packer Test Interval (mah):	30.2
Bottom of Packer Test Interval (mah):	50.0
L: Length of Test Interval (mah)	19.8
Test Interval Midpoint (mah):	40
Stickup Height (mah):	2.03
Pressure Gauge Height (m above ground):	2.03
Depth to Water Table (mah):	4.45
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.0	7.0E-05	10.5	14.9	2.3E-07
23.0	8.7E-05	16.2	20.5	2.1E-07
30.0	1.0E-04	21.1	25.5	2.0E-07
23.0	6.3E-05	16.2	20.5	1.5E-07
15.0	3.7E-05	10.5	14.9	1.2E-07
			Geo Mean	**1.8.E-07**



Hole #: **DH-BGC12-33**
Test #: **1**

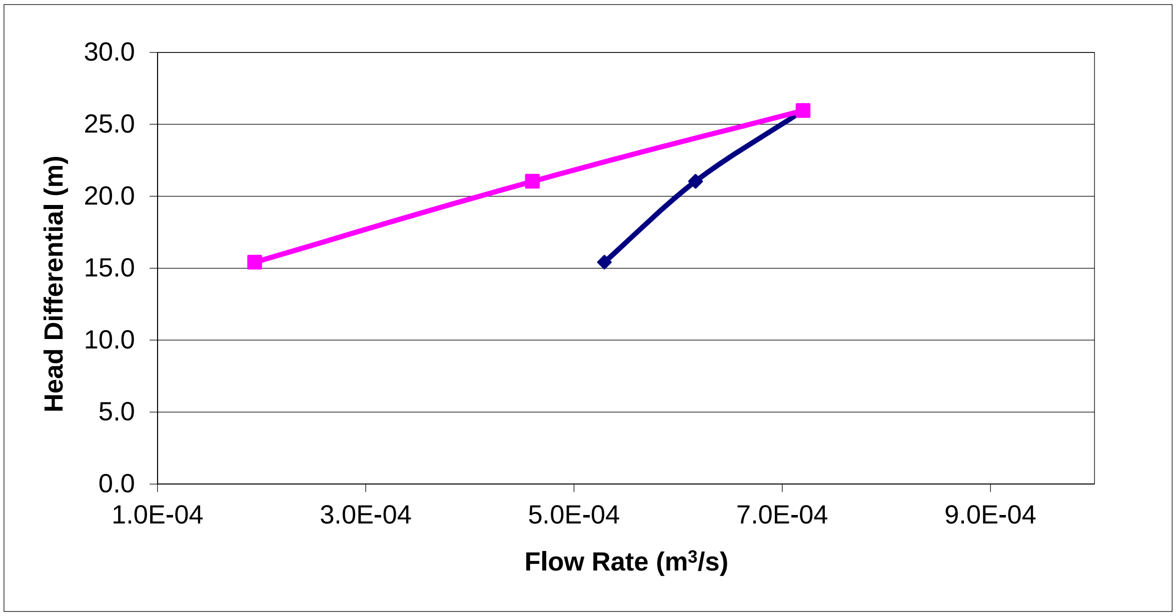
Calculation Input Parameters

Top of Packer Test Interval (mah):	14.0
Bottom of Packer Test Interval (mah):	30.8
L: Length of Test Interval (mah)	16.8
Test Interval Midpoint (mah):	22
Stickup Height (mah):	2.22
Pressure Gauge Height (m above ground):	2.22
Depth to Water Table (mah):	4.96
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.0	5.3E-04	10.5	15.4	2.0E-06
23.0	6.2E-04	16.2	21.0	1.7E-06
30.0	7.2E-04	21.1	26.0	1.6E-06
23.0	4.6E-04	16.2	21.0	1.3E-06
15.0	1.9E-04	10.5	15.4	7.2E-07
			Geo Mean	**1.4.E-06**



Hole #: DH-BGC12-34
Test #: 1

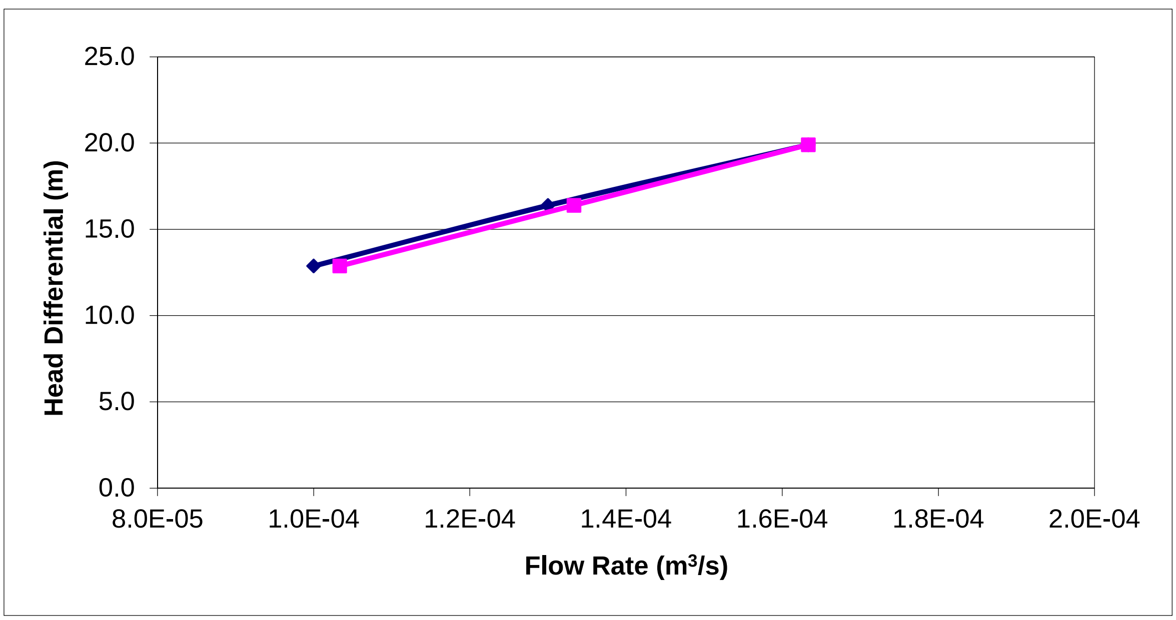
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Top of Packer Test Interval (mah):	14.6
Bottom of Packer Test Interval (mah):	31.4
L: Length of Test Interval (mah)	16.8
Test Interval Midpoint (mah):	23
Stickup Height (mah):	1.95
Pressure Gauge Height (m above ground):	1.95
Depth to Water Table (mah):	5.98
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
10.0	1.0E-04	7.0	12.9	4.4E-07
15.0	1.3E-04	10.5	16.4	4.5E-07
20.0	1.6E-04	14.1	19.9	4.7E-07
15.0	1.3E-04	10.5	16.4	4.7E-07
10.0	1.0E-04	7.0	12.9	4.6E-07
			Geo Mean	**4.6.E-07**



Hole #: **DH-BGC12-35**
Test #: **1**

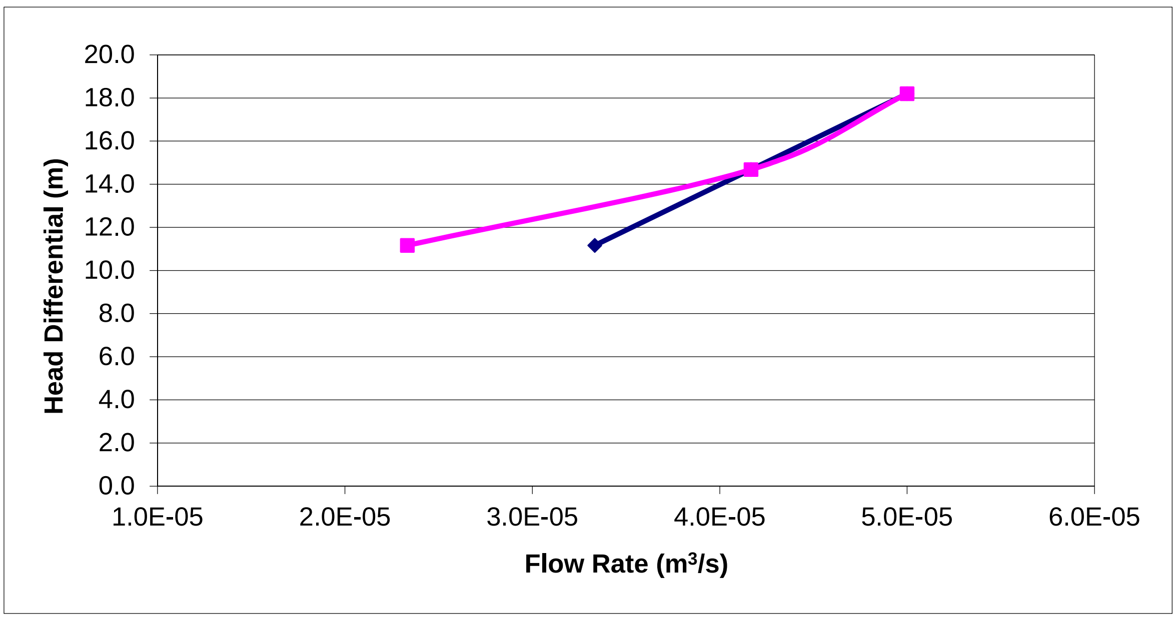
Calculation Input Parameters

Top of Packer Test Interval (mah):	16.2
Bottom of Packer Test Interval (mah):	32.9
L: Length of Test Interval (mah)	16.8
Test Interval Midpoint (mah):	25
Stickup Height (mah):	3.34
Pressure Gauge Height (m above ground):	3.34
Depth to Water Table (mah):	4.16
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	75

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
10.0	3.3E-05	7.0	11.2	1.7E-07
15.0	4.2E-05	10.5	14.7	1.6E-07
20.0	5.0E-05	14.1	18.2	1.6E-07
15.0	4.2E-05	10.5	14.7	1.6E-07
10.0	2.3E-05	7.0	11.2	1.2E-07
			Geo Mean	**1.5.E-07**



Hole #: **MW-BGC12-BJ-4B**
Test #: **1**

BGC ENGINEERING INC.
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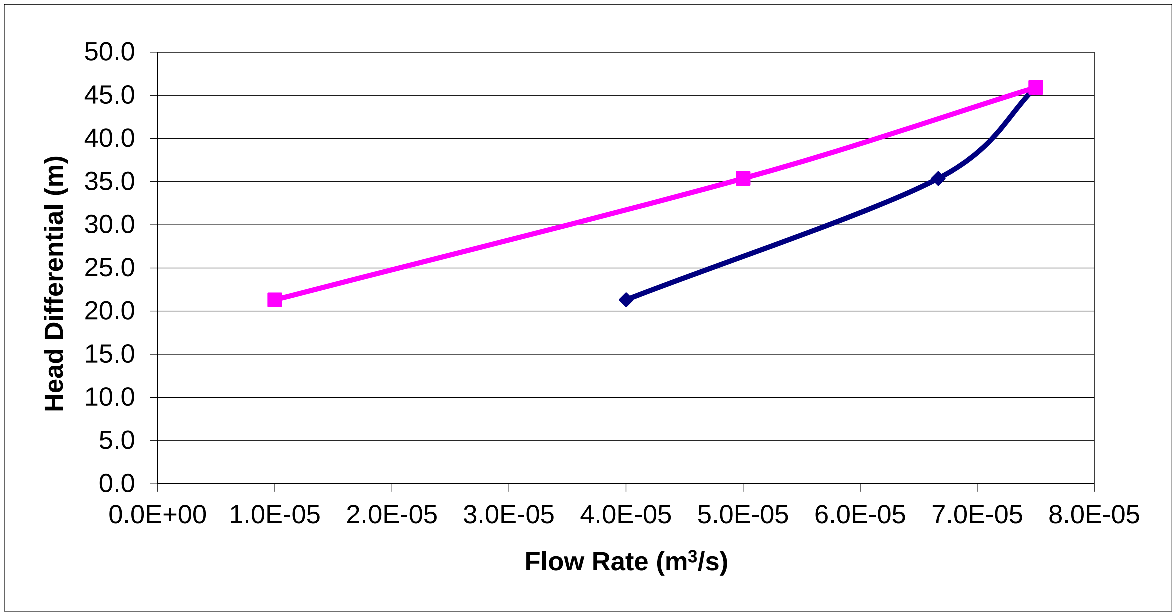
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Top of Packer Test Interval (mah):	93.6
Bottom of Packer Test Interval (mah):	98.1
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	96
Stickup Height (mah):	2.03
Pressure Gauge Height (m above ground):	0.94
Depth to Water Table (mah):	1.30
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	85

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
30.0	4.0E-05	21.1	21.3	2.8E-07
50.0	6.7E-05	35.2	35.4	2.8E-07
65.0	7.5E-05	45.7	45.9	2.5E-07
50.0	5.0E-05	35.2	35.4	2.1E-07
30.0	1.0E-05	21.1	21.3	7.1E-08
			Geo Mean	**2.0.E-07**



Hole #: **MW-BGC12-BJ-6B**
Test #: **1**

BGC ENGINEERING INC.
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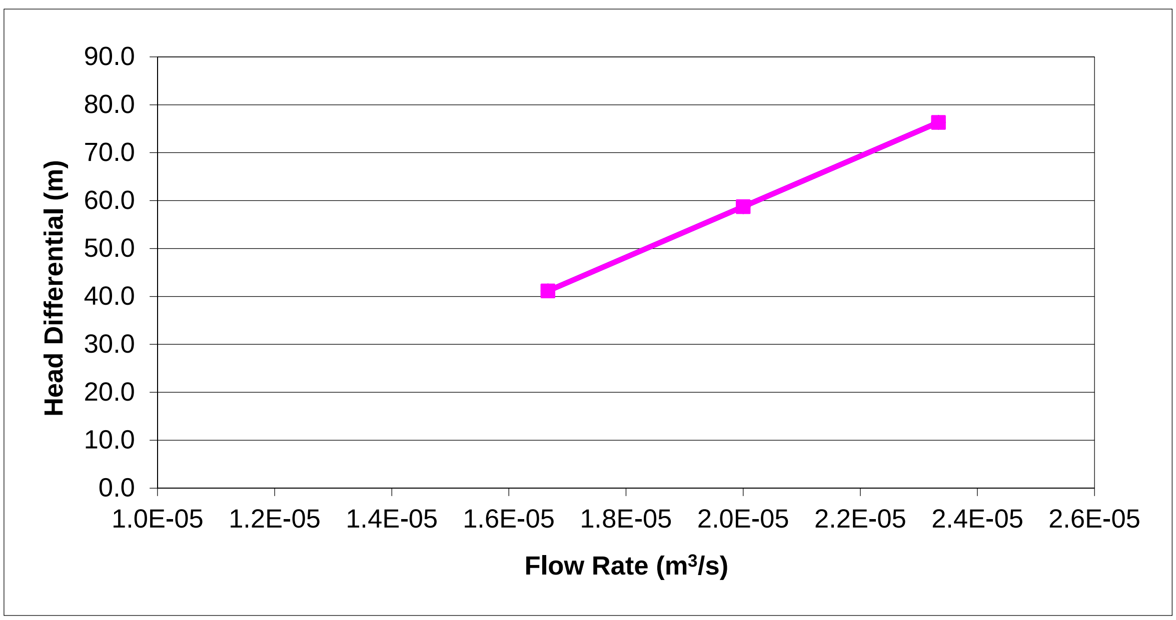
Calculation Input Parameters

Top of Packer Test Interval (mah):	66.8
Bottom of Packer Test Interval (mah):	78.3
L: Length of Test Interval (mah)	11.5
Test Interval Midpoint (mah):	73
Stickup Height (mah):	1.90
Pressure Gauge Height (m above ground):	1.40
Depth to Water Table (mah):	6.50
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
50.0	1.7E-05	35.2	41.2	2.9E-08
75.0	2.0E-05	52.7	58.7	2.5E-08
100.0	2.3E-05	70.3	76.3	2.2E-08
75.0	2.0E-05	52.7	58.7	2.5E-08
50.0	1.7E-05	35.2	41.2	2.9E-08
			Geo Mean	**2.6.E-08**



Hole #: **MW-BGC12-BJ-6B**
Test #: **2**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

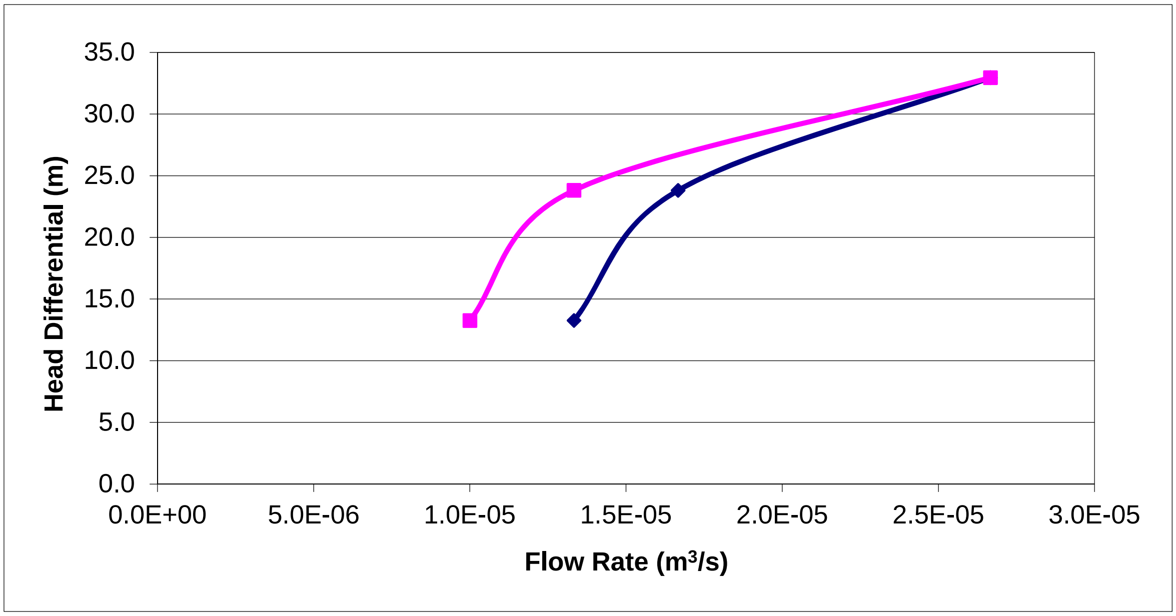
Calculation Input Parameters

Top of Packer Test Interval (mah):	48.7
Bottom of Packer Test Interval (mah):	51.8
L: Length of Test Interval (mah)	3.1
Test Interval Midpoint (mah):	50
Stickup Height (mah):	1.70
Pressure Gauge Height (m above ground):	1.40
Depth to Water Table (mah):	6.53
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
10.0	1.3E-05	7.0	13.3	2.0E-07
25.0	1.7E-05	17.6	23.8	1.4E-07
38.0	2.7E-05	26.7	32.9	1.7E-07
25.0	1.3E-05	17.6	23.8	1.1E-07
10.0	1.0E-05	7.0	13.3	1.5E-07
			Geo Mean	**1.5.E-07**



Hole #: **MW-BGC12-BJ-8A**
Test #: **1**

BGC ENGINEERING INC.
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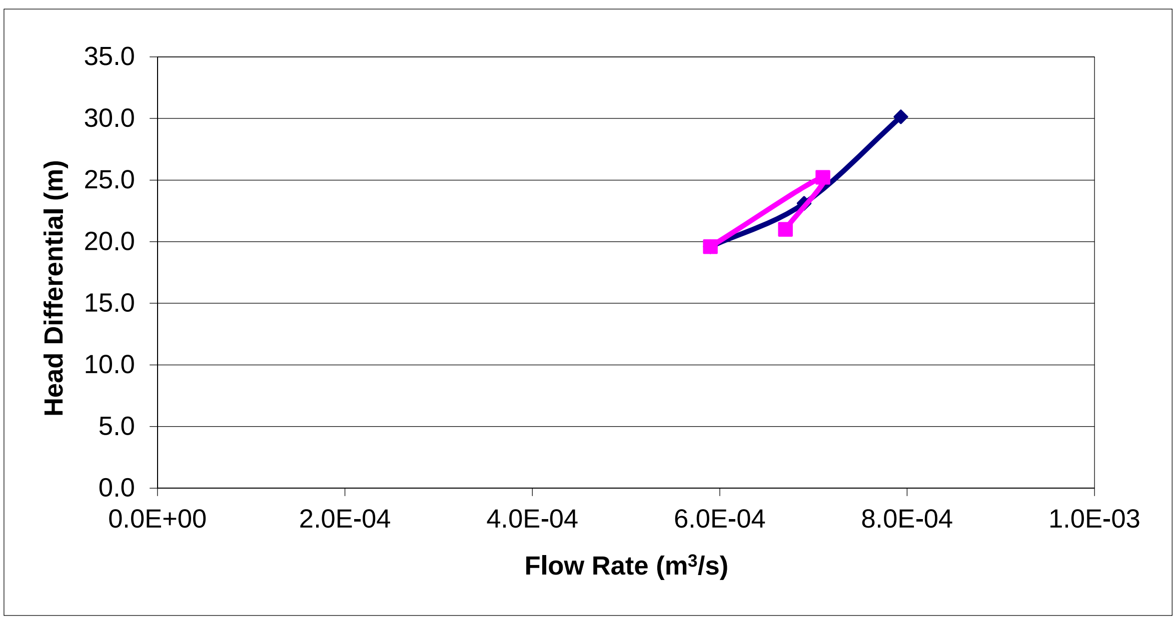
Calculation Input Parameters

Top of Packer Test Interval (mah):	18.6
Bottom of Packer Test Interval (mah):	23.1
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	21
Stickup Height (mah):	1.94
Pressure Gauge Height (m above ground):	0.80
Depth to Water Table (mah):	13.70
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
25.0	7.9E-04	17.6	30.1	3.9E-06
15.0	6.9E-04	10.5	23.1	4.5E-06
10.0	5.9E-04	7.0	19.6	4.5E-06
18.0	7.1E-04	12.7	25.2	4.2E-06
12.0	6.7E-04	8.4	21.0	4.8E-06
			Geo Mean	**4.4.E-06**



Hole #: MW-BGC12-BJ-8A
Test #: 2

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

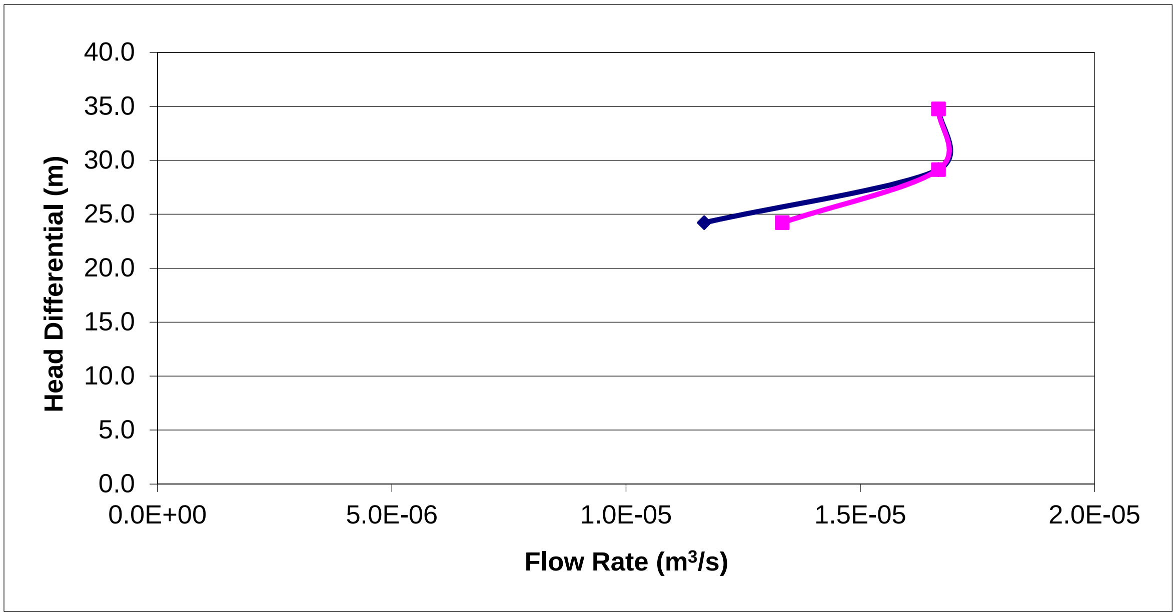
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Top of Packer Test Interval (mah):	48.7
Bottom of Packer Test Interval (mah):	53.1
L: Length of Test Interval (mah)	4.5
Test Interval Midpoint (mah):	51
Stickup Height (mah):	1.80
Pressure Gauge Height (m above ground):	1.44
Depth to Water Table (mah):	14.03
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.0	1.2E-05	10.5	24.2	7.3E-08
22.0	1.7E-05	15.5	29.1	8.7E-08
30.0	1.7E-05	21.1	34.8	7.3E-08
22.0	1.7E-05	15.5	29.1	8.7E-08
15.0	1.3E-05	10.5	24.2	8.4E-08
			Geo Mean	**8.1.E-08**



Hole #: MW-BGC12-BJ-8A
Test #: 3

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

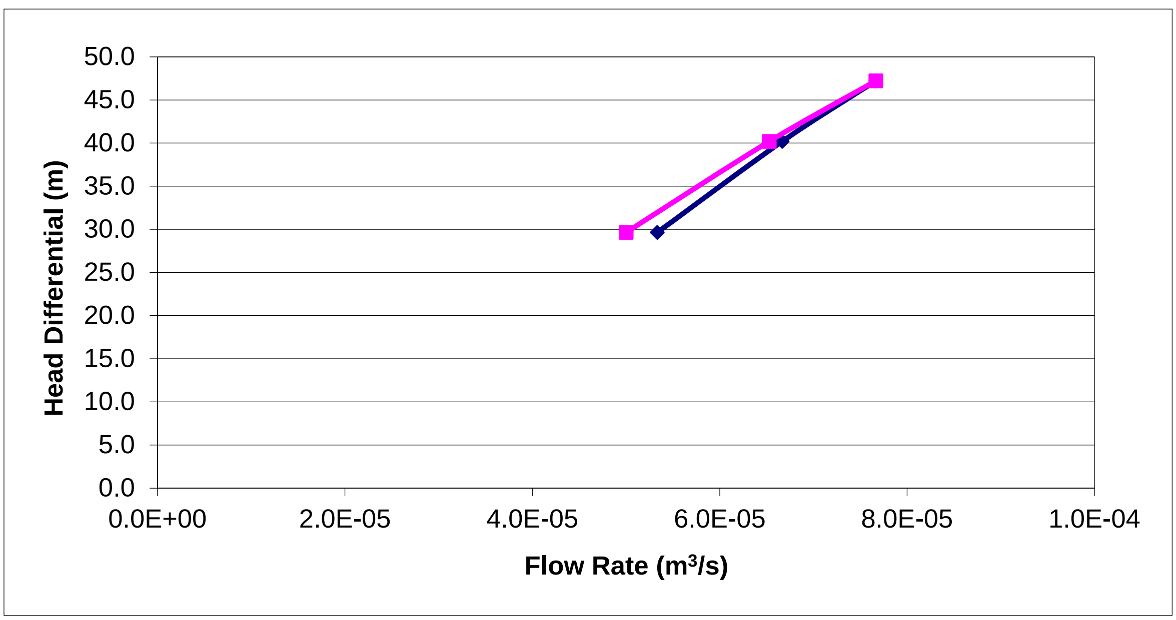
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Top of Packer Test Interval (mah):	63.7
Bottom of Packer Test Interval (mah):	68.1
L: Length of Test Interval (mah)	4.5
Test Interval Midpoint (mah):	66
Stickup Height (mah):	2.13
Pressure Gauge Height (m above ground):	1.40
Depth to Water Table (mah):	16.31
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
20.0	5.3E-05	14.1	29.6	2.7E-07
35.0	6.7E-05	24.6	40.2	2.5E-07
45.0	7.7E-05	31.6	47.2	2.5E-07
35.0	6.5E-05	24.6	40.2	2.5E-07
20.0	5.0E-05	14.1	29.6	2.6E-07
			Geo Mean	**2.6.E-07**



Hole #: **MW-BGC12-BJ-8A**
Test #: **4**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

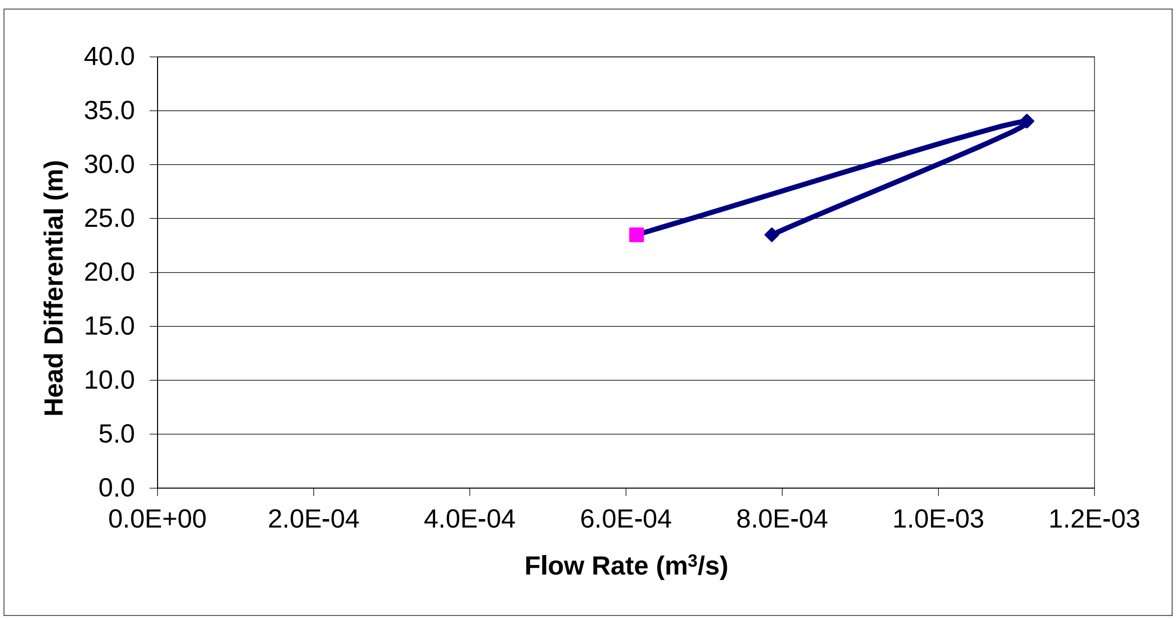
Calculation Input Parameters

Top of Packer Test Interval (mah):	87.6
Bottom of Packer Test Interval (mah):	92.1
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	90
Stickup Height (mah):	2.13
Pressure Gauge Height (m above ground):	1.40
Depth to Water Table (mah):	13.68
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.0	7.9E-04	10.5	23.5	5.0E-06
30.0	1.1E-03	21.1	34.0	4.9E-06
15.0	6.1E-04	10.5	23.5	3.9E-06
			Geo Mean	**4.6.E-06**



Hole #: MW-BGC12-BJ-9A
Test #: 1

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

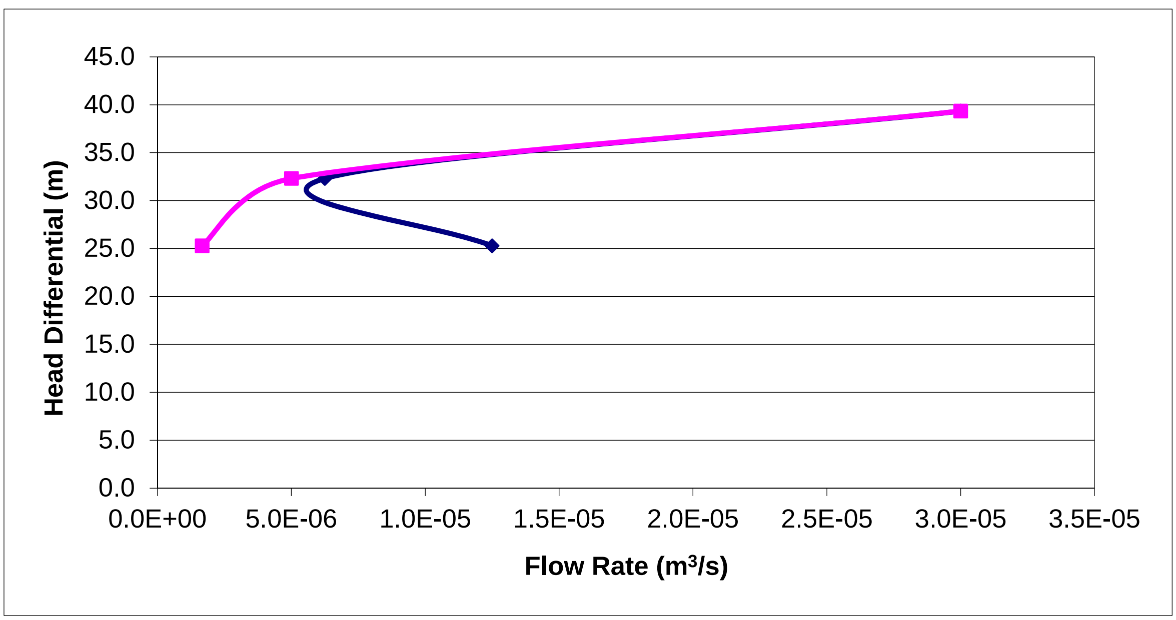
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Top of Packer Test Interval (mah):	25.1
Bottom of Packer Test Interval (mah):	29.7
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	27
Stickup Height (mah):	2.30
Pressure Gauge Height (m above ground):	1.48
Depth to Water Table (mah):	5.00
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
30.0	1.3E-05	21.1	25.3	7.8E-08
40.0	6.3E-06	28.1	32.3	3.1E-08
50.0	3.0E-05	35.2	39.3	1.2E-07
40.0	5.0E-06	28.1	32.3	2.4E-08
30.0	1.7E-06	21.1	25.3	1.0E-08
			Geo Mean	**3.7.E-08**



Hole #: **MW-BGC12-BJ-9A**
Test #: **1**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

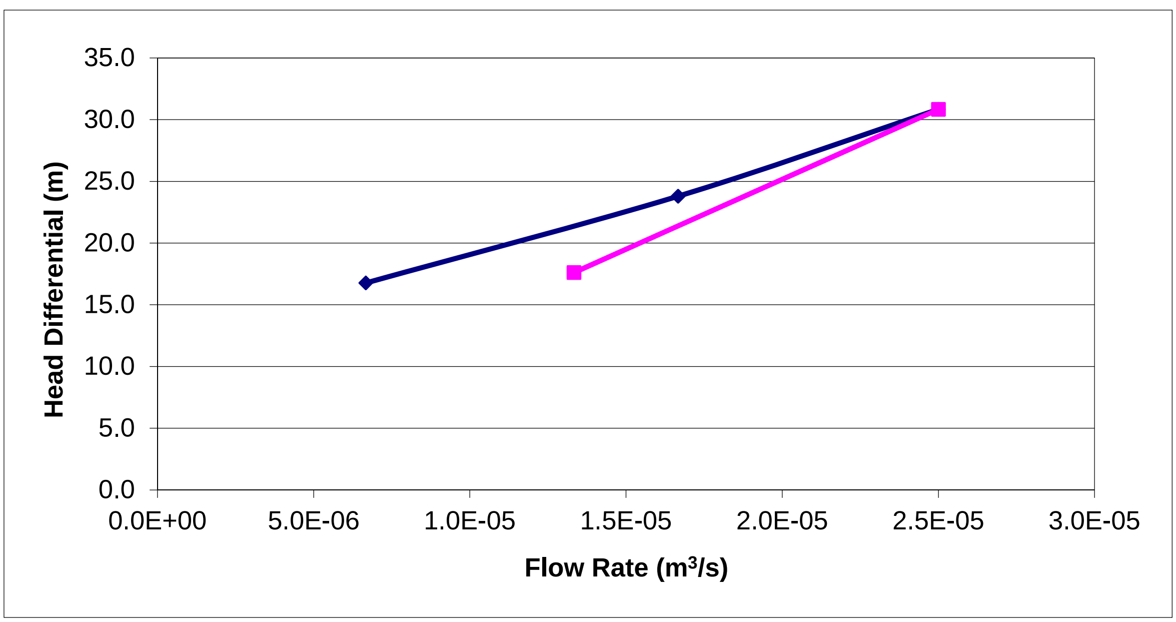
Calculation Input Parameters

Top of Packer Test Interval (mah):	36.5
Bottom of Packer Test Interval (mah):	41.0
L: Length of Test Interval (mah)	4.5
Test Interval Midpoint (mah):	39
Stickup Height (mah):	1.73
Pressure Gauge Height (m above ground):	1.60
Depth to Water Table (mah):	6.35
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.0	6.7E-06	10.5	16.8	6.1E-08
25.0	1.7E-05	17.6	23.8	1.1E-07
35.0	2.5E-05	24.6	30.8	1.2E-07
16.2	1.3E-05	11.4	17.6	1.2E-07
			Geo Mean	**9.8.E-08**



Hole #: **MW-BGC12-BJ-9A**
Test #: **2**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

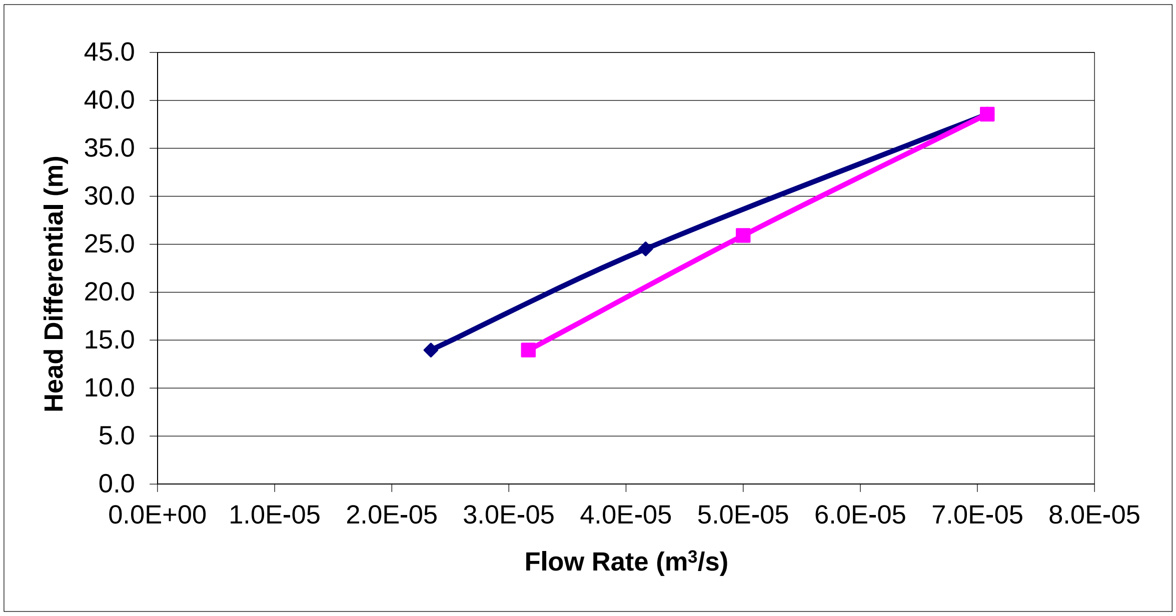
Calculation Input Parameters

Top of Packer Test Interval (mah):	75.5
Bottom of Packer Test Interval (mah):	80.0
L: Length of Test Interval (mah)	4.5
Test Interval Midpoint (mah):	78
Stickup Height (mah):	1.73
Pressure Gauge Height (m above ground):	1.60
Depth to Water Table (mah):	3.54
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.0	2.3E-05	10.5	14.0	2.5E-07
30.0	4.2E-05	21.1	24.5	2.6E-07
50.0	7.1E-05	35.2	38.6	2.8E-07
32.0	5.0E-05	22.5	25.9	2.9E-07
15.0	3.2E-05	10.5	14.0	3.4E-07
			Geo Mean	**2.8.E-07**



Hole #: **MW-BGC12-BJ-10A**
Test #: **1**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

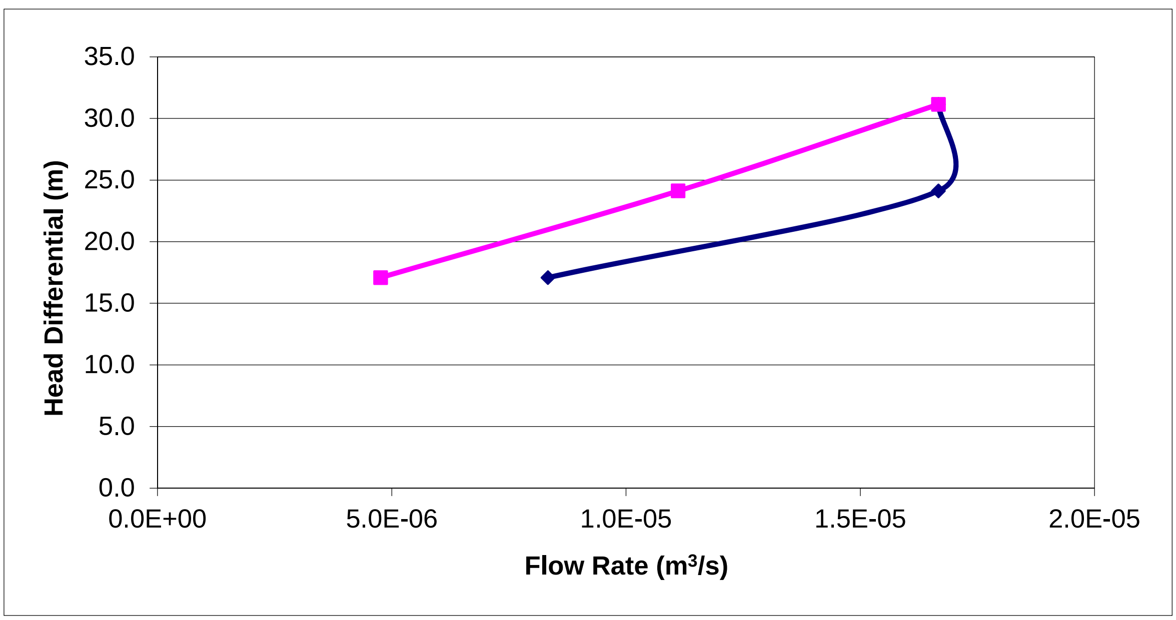
Calculation Input Parameters

Top of Packer Test Interval (mah):	15.7
Bottom of Packer Test Interval (mah):	20.3
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	18
Stickup Height (mah):	2.03
Pressure Gauge Height (m above ground):	1.22
Depth to Water Table (mah):	3.83
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
20.0	8.3E-06	14.1	17.1	7.3E-08
30.0	1.7E-05	21.1	24.1	1.0E-07
40.0	1.7E-05	28.1	31.1	8.0E-08
30.0	1.1E-05	21.1	24.1	6.9E-08
20.0	4.8E-06	14.1	17.1	4.2E-08
			Geo Mean	**7.1.E-08**



Hole #: MW-BGC12-BJ-10A
Test #: 2

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

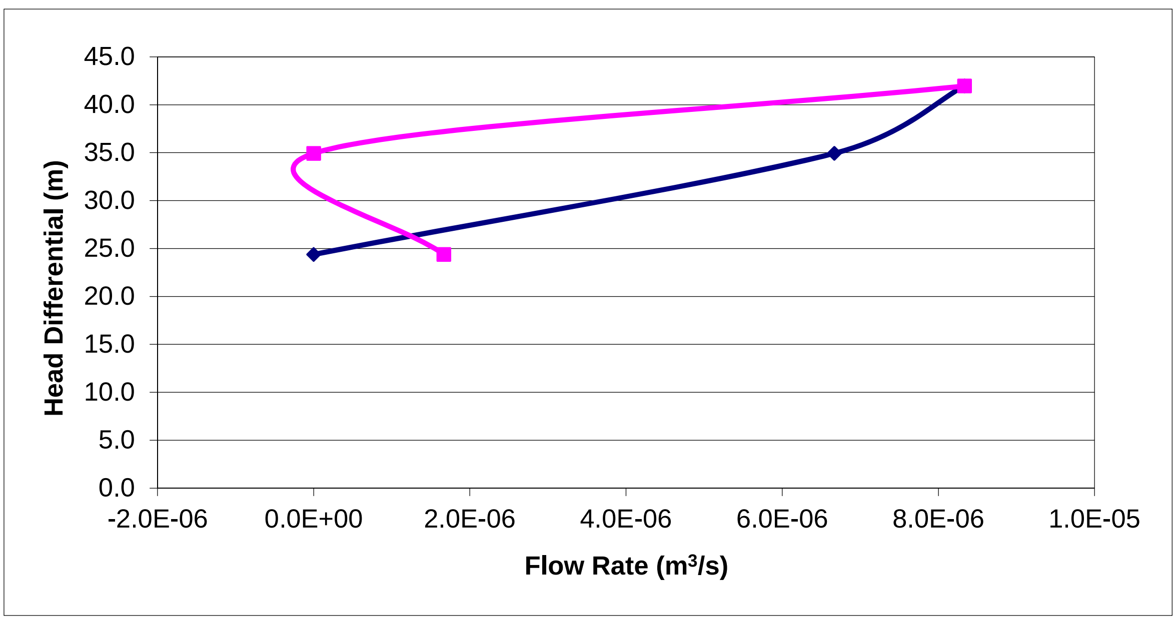
Calculation Input Parameters

Top of Packer Test Interval (mah):	42.7
Bottom of Packer Test Interval (mah):	50.3
L: Length of Test Interval (mah)	7.6
Test Interval Midpoint (mah):	47
Stickup Height (mah):	2.03
Pressure Gauge Height (m above ground):	1.22
Depth to Water Table (mah):	11.13
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
20.0	0.0E+00	14.1	24.4	0.0E+00
35.0	6.7E-06	24.6	34.9	1.9E-08
45.0	8.3E-06	31.6	42.0	2.0E-08
35.0	0.0E+00	24.6	34.9	0.0E+00
20.0	1.7E-06	14.1	24.4	6.9E-09
			Geo Mean	**1.4.E-08**



Hole #: **MW-BGC12-BJ-10A**
Test #: **3**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

Calculation Input Parameters

$$K = \frac{\pi r^2 \times \ln(L/r)}{T_0 \times 2\pi L}$$

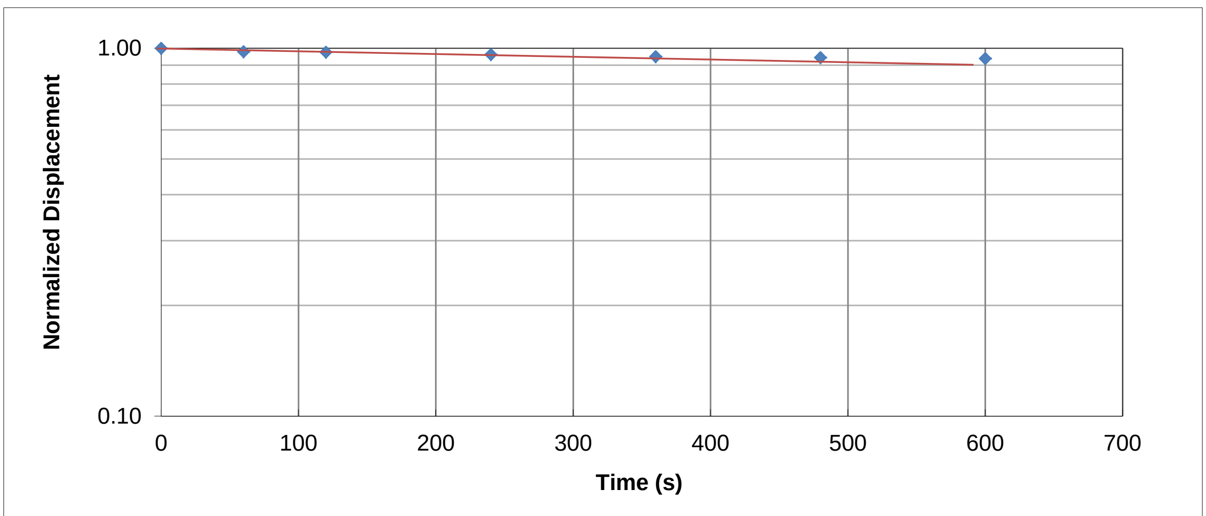
Top of Packer Test Interval (mah):	54.7
Bottom of Packer Test Interval (mah):	62.3
L: Length of Test Interval (mah)	7.6
Test Interval Midpoint (mah):	59
Stickup Height (mah):	2.03
Pressure Gauge Height (m above ground):	1.22
Depth to Water Table (mah):	3.89
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

Time (s)	Depth to Water (mah)	Normalized Displacement
0	0.49	1.00
60	0.56	0.98
120	0.57	0.98
240	0.62	0.96
360	0.66	0.95
480	0.68	0.94
600	0.70	0.94

From Hvorslev Solution T_0 = -(360 s) / ln(0.83)
= 1932.06

Hydraulic Conductivity (m/s) **K =** **6.2E-07**



Hole #: **MW-BGC12-BJ-11B**
Test #: **2**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

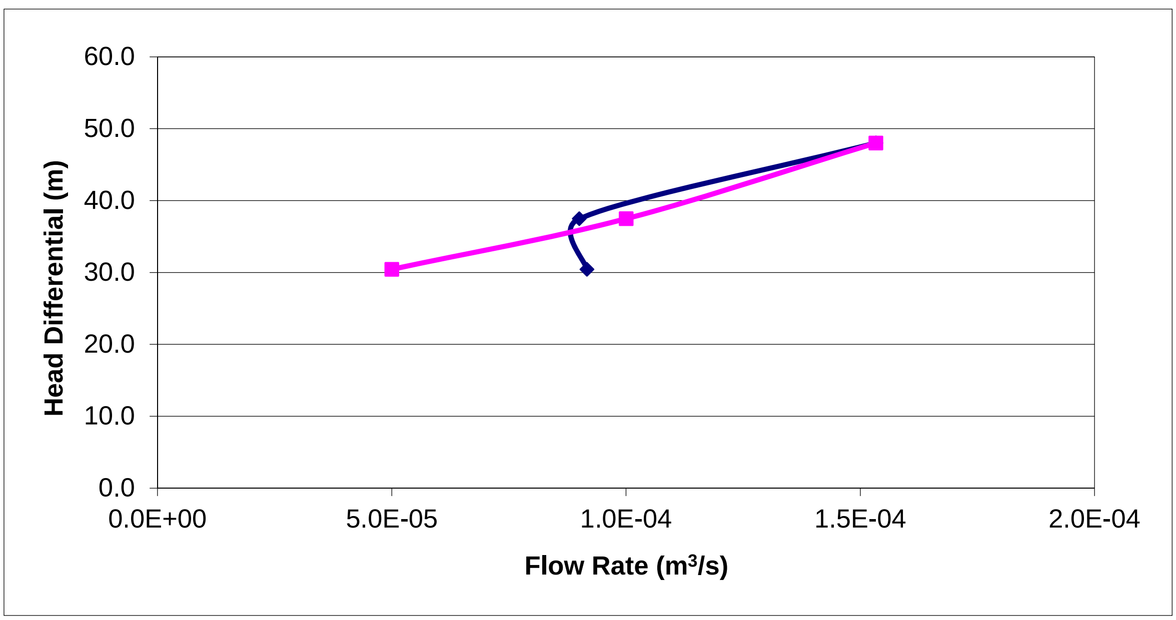
Calculation Input Parameters

Top of Packer Test Interval (mah):	34.0
Bottom of Packer Test Interval (mah):	38.6
L: Length of Test Interval (mah)	4.6
Test Interval Midpoint (mah):	36
Stickup Height (mah):	2.30
Pressure Gauge Height (m above ground):	1.86
Depth to Water Table (mah):	6.27
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
35.0	9.2E-05	24.6	30.4	4.8E-07
45.0	9.0E-05	31.6	37.5	3.8E-07
60.0	1.5E-04	42.2	48.0	5.0E-07
45.0	1.0E-04	31.6	37.5	4.2E-07
35.0	5.0E-05	24.6	30.4	2.6E-07
			Geo Mean	**4.0.E-07**



Hole #: MW-BGC12-BJ-11B
Test #: 3

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

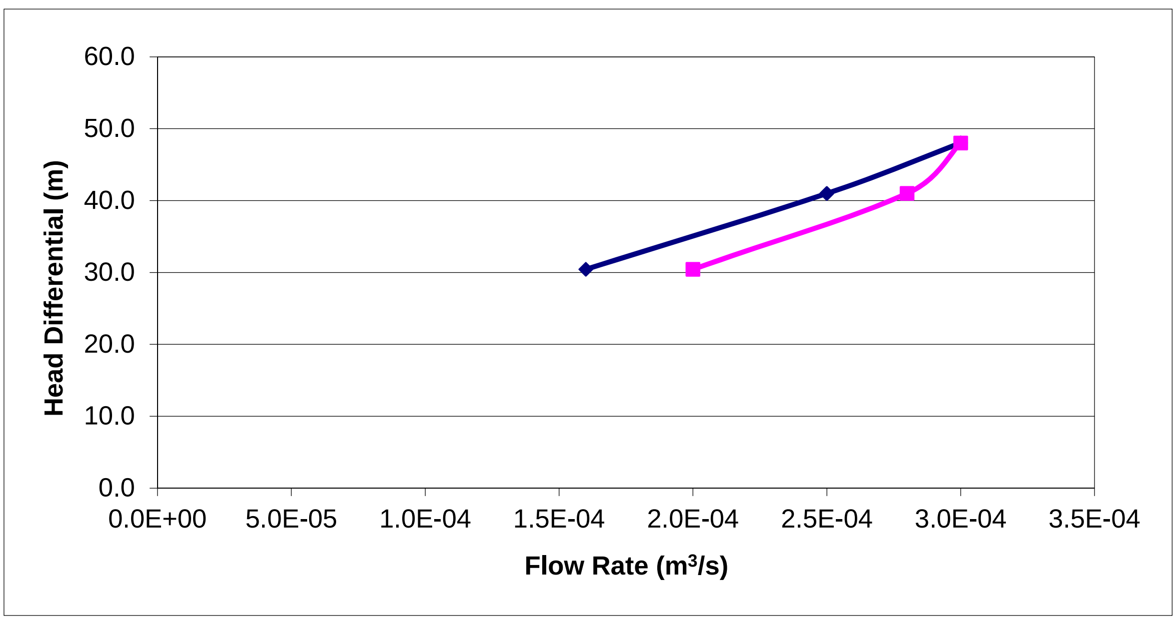
Calculation Input Parameters

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Top of Packer Test Interval (mah):	46.2
Bottom of Packer Test Interval (mah):	53.8
L: Length of Test Interval (mah)	7.7
Test Interval Midpoint (mah):	50
Stickup Height (mah):	2.30
Pressure Gauge Height (m above ground):	1.86
Depth to Water Table (mah):	6.27
Borehole Diameter (mm):	96.0
r: Borehole Radius (m):	0.048
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
35.0	1.6E-04	24.6	30.4	5.5E-07
50.0	2.5E-04	35.2	41.0	6.4E-07
60.0	3.0E-04	42.2	48.0	6.6E-07
50.0	2.8E-04	35.2	41.0	7.2E-07
35.0	2.0E-04	24.6	30.4	6.9E-07
			Geo Mean	**6.5.E-07**



Hole #: **MW-BGC12-BJ-12A**
Test #: **1**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

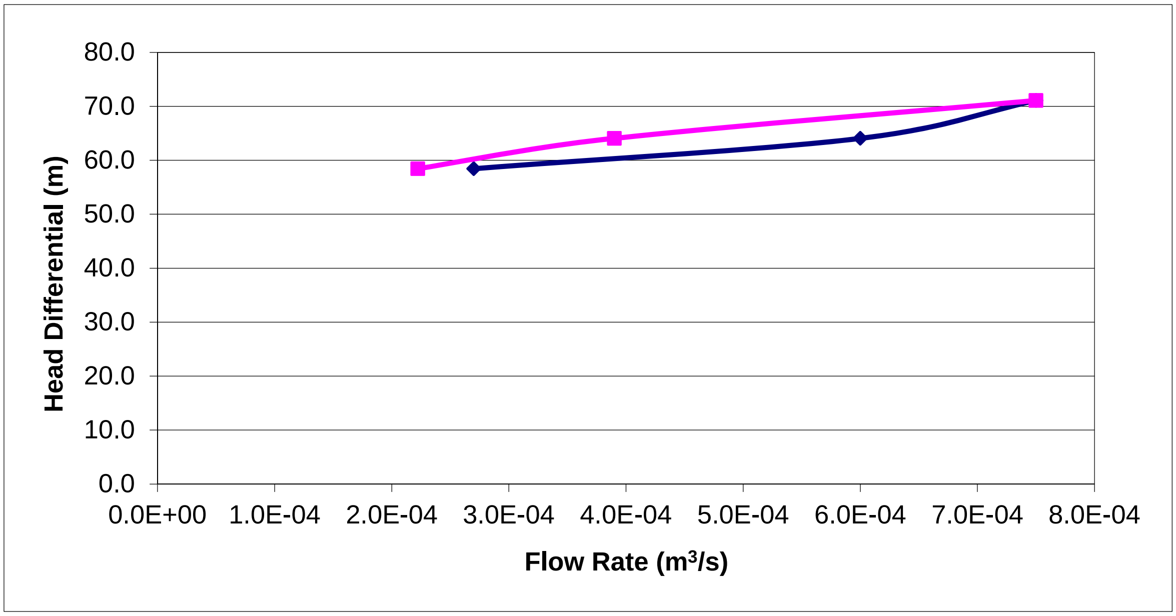
Calculation Input Parameters

Top of Packer Test Interval (mah):	48.0
Bottom of Packer Test Interval (mah):	50.0
L: Length of Test Interval (mah)	2.0
Test Interval Midpoint (mah):	49
Stickup Height (mah):	2.50
Pressure Gauge Height (m above ground):	2.50
Depth to Water Table (mah):	50.00
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L \sin(A)}{r}\right)}{2 \times \pi \times L \sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
12.0	2.7E-04	8.4	58.4	1.3E-06
20.0	6.0E-04	14.1	64.1	2.6E-06
30.0	7.5E-04	21.1	71.1	2.9E-06
20.0	3.9E-04	14.1	64.1	1.7E-06
12.0	2.2E-04	8.4	58.4	1.1E-06
			Geo Mean	**1.8.E-06**



Hole #: **MW-BGC12-BJ-12A**
Test #: **2**

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

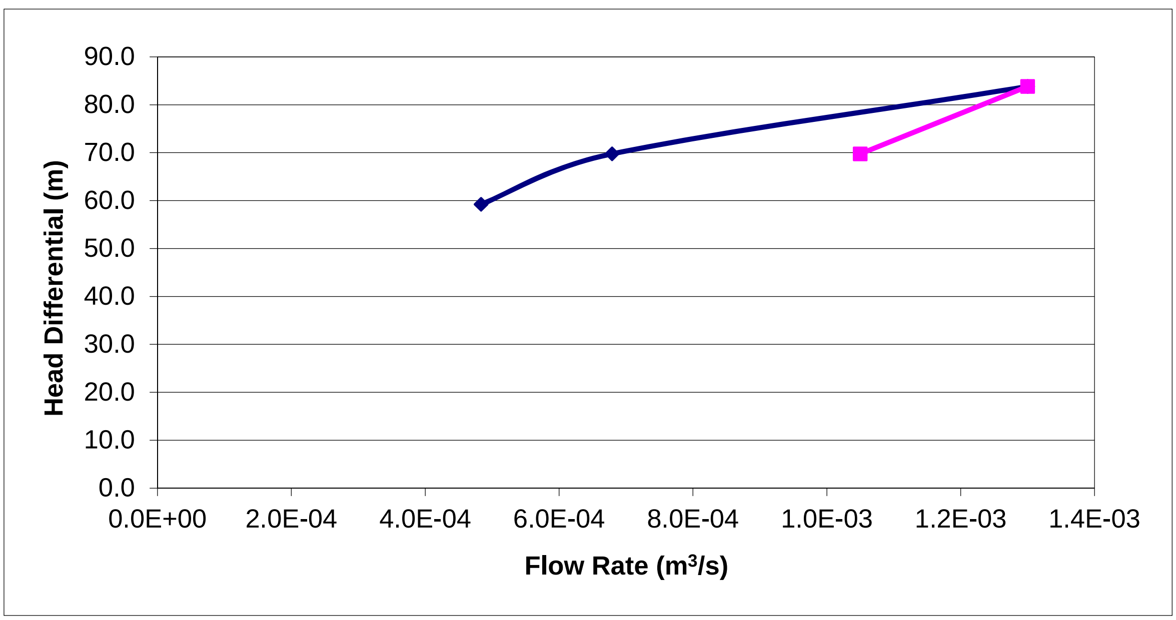
Calculation Input Parameters

Top of Packer Test Interval (mah):	66.0
Bottom of Packer Test Interval (mah):	70.5
L: Length of Test Interval (mah)	4.5
Test Interval Midpoint (mah):	68
Stickup Height (mah):	2.74
Pressure Gauge Height (m above ground):	2.44
Depth to Water Table (mah):	48.97
Borehole Diameter (mm):	122.6
r: Borehole Radius (m):	0.0613
A: Angle From Horizontal (deg):	90

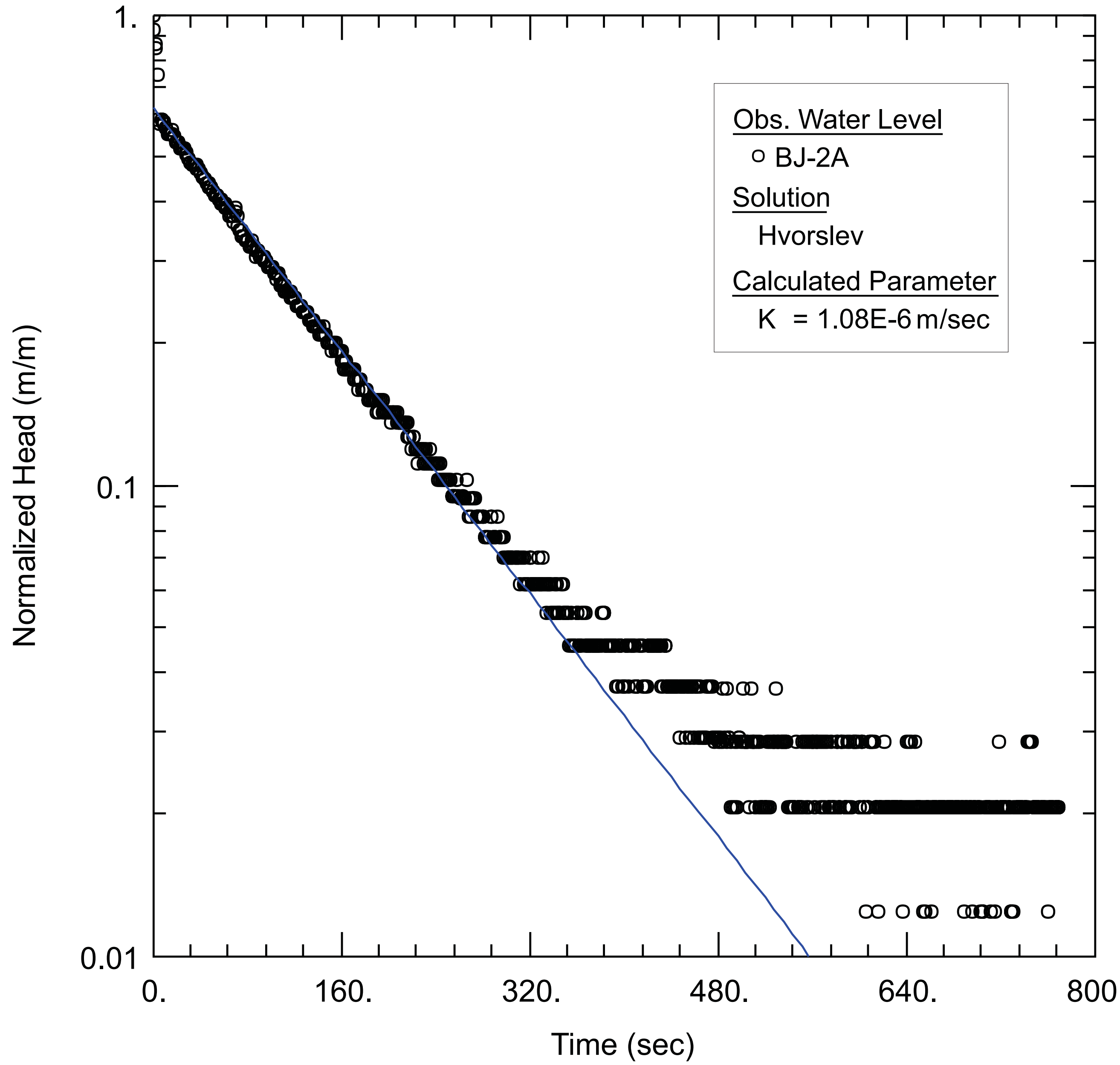
* mah indicates "meters along hole"

$$K = \frac{Q \times \ln\left(\frac{L\sin(A)}{r}\right)}{2 \times \pi \times L\sin(A) \times dH}$$

Pressure (psi)	Q: Flowrate (m^3/s):	Pressure (m of water)	dH: Head Differential (m)	K: Hydraulic Conductivity (m/s)
15.0	4.8E-04	10.5	59.2	1.2E-06
30.0	6.8E-04	21.1	69.8	1.5E-06
50.0	1.3E-03	35.2	83.8	2.4E-06
30.0	1.0E-03	21.1	69.8	2.3E-06
			Geo Mean	**1.8.E-06**



APPENDIX C
SLUG TEST ANALYSES



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DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC11-BJ-2A

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-1	0

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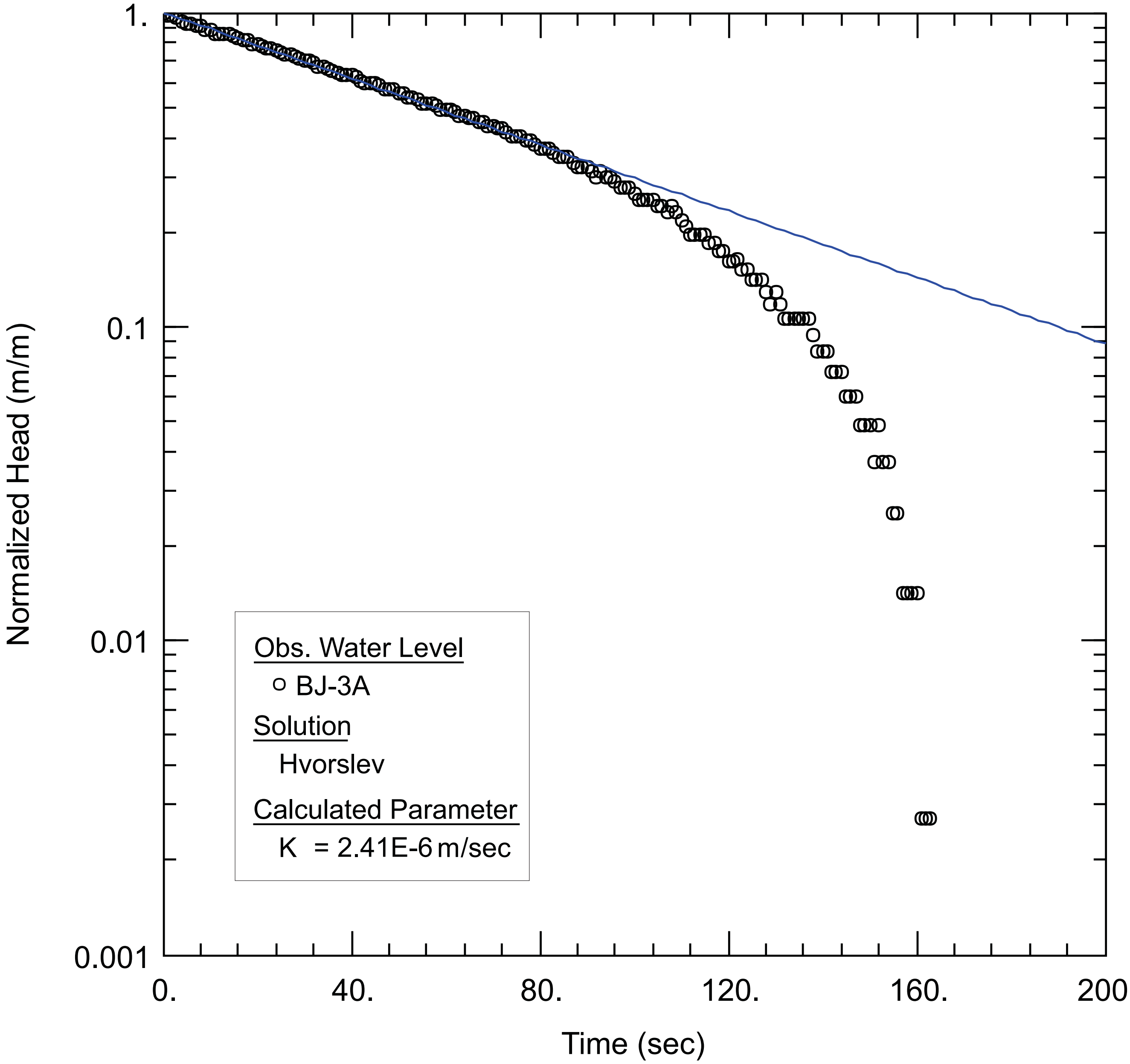
DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013



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SCALE:	NTS	DESIGNED:	LH
DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

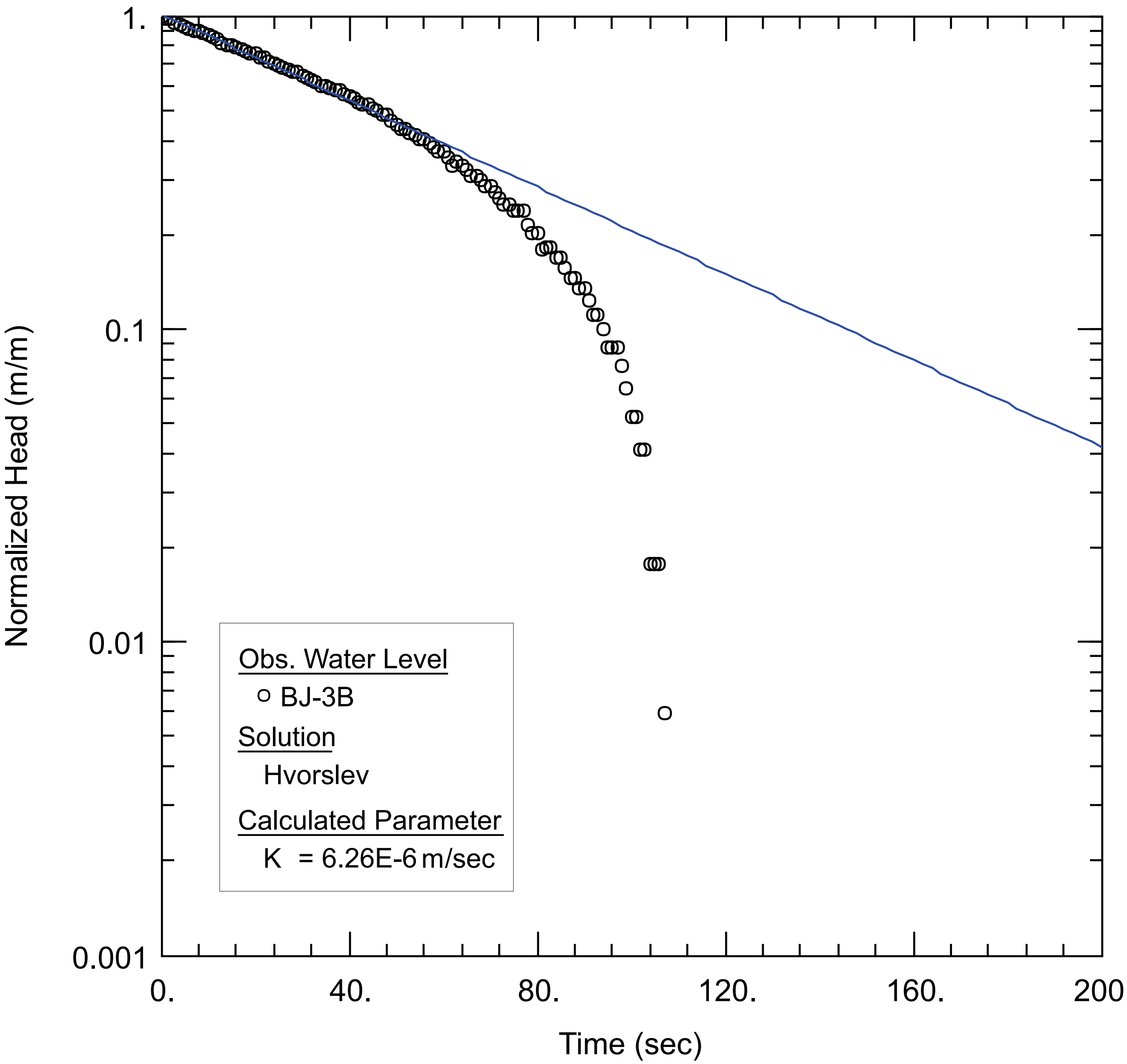
PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC11-BJ-3A

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-2	0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013



SCALE:	NTS	DESIGNED:	LH
DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT: BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

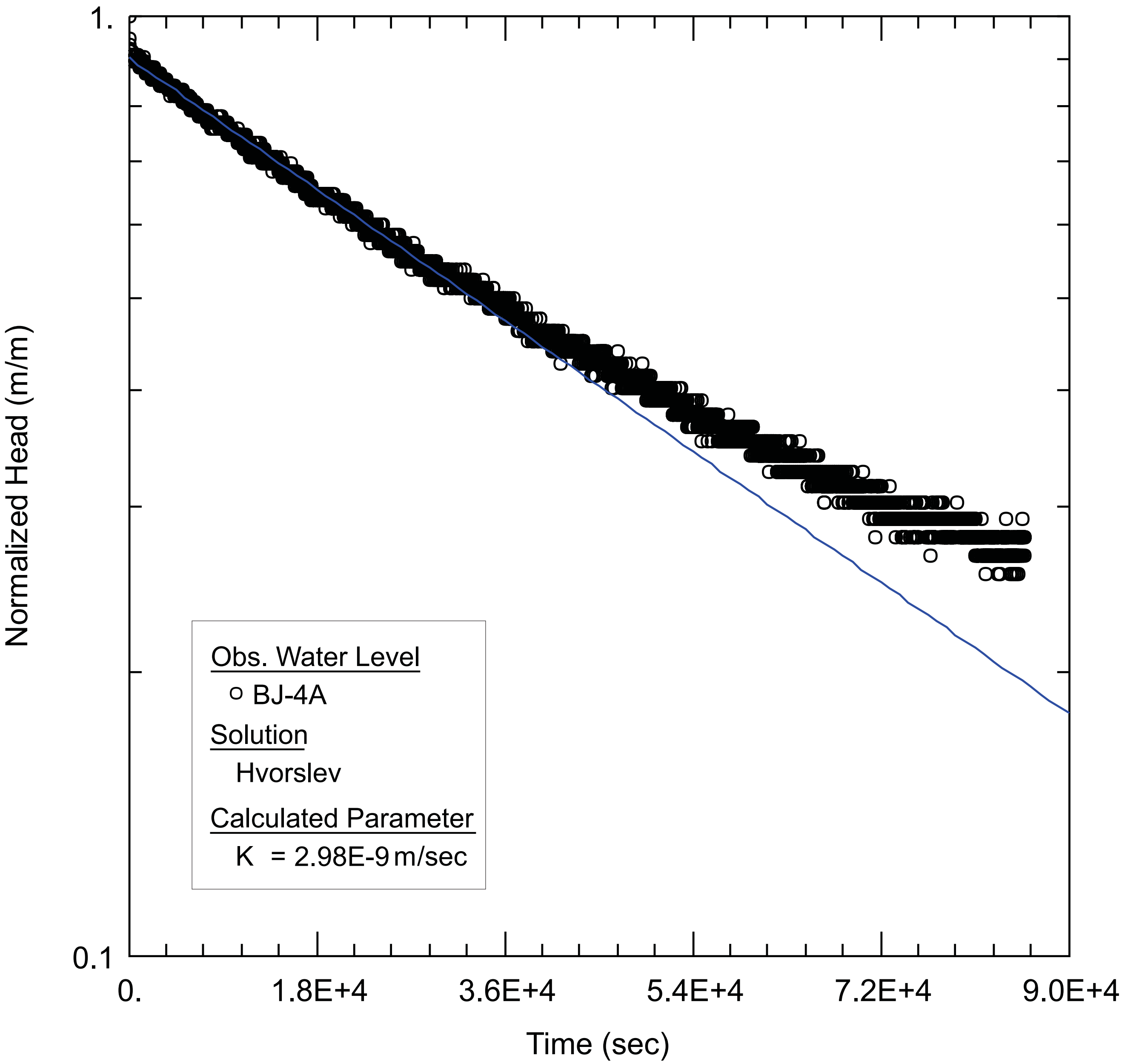
TITLE: SLUG TEST RESULTS
MW-BGC11-BJ-3B

CLIENT: PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-3	0

N:\BGC\Projects\1008 Pretium\007 Feasibility\000 SI Report\04 Appendices\Appendix H Slug Testing

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013



SCALE:	NTS	DESIGNED:	LH
DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC11-BJ-4A

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-4	0

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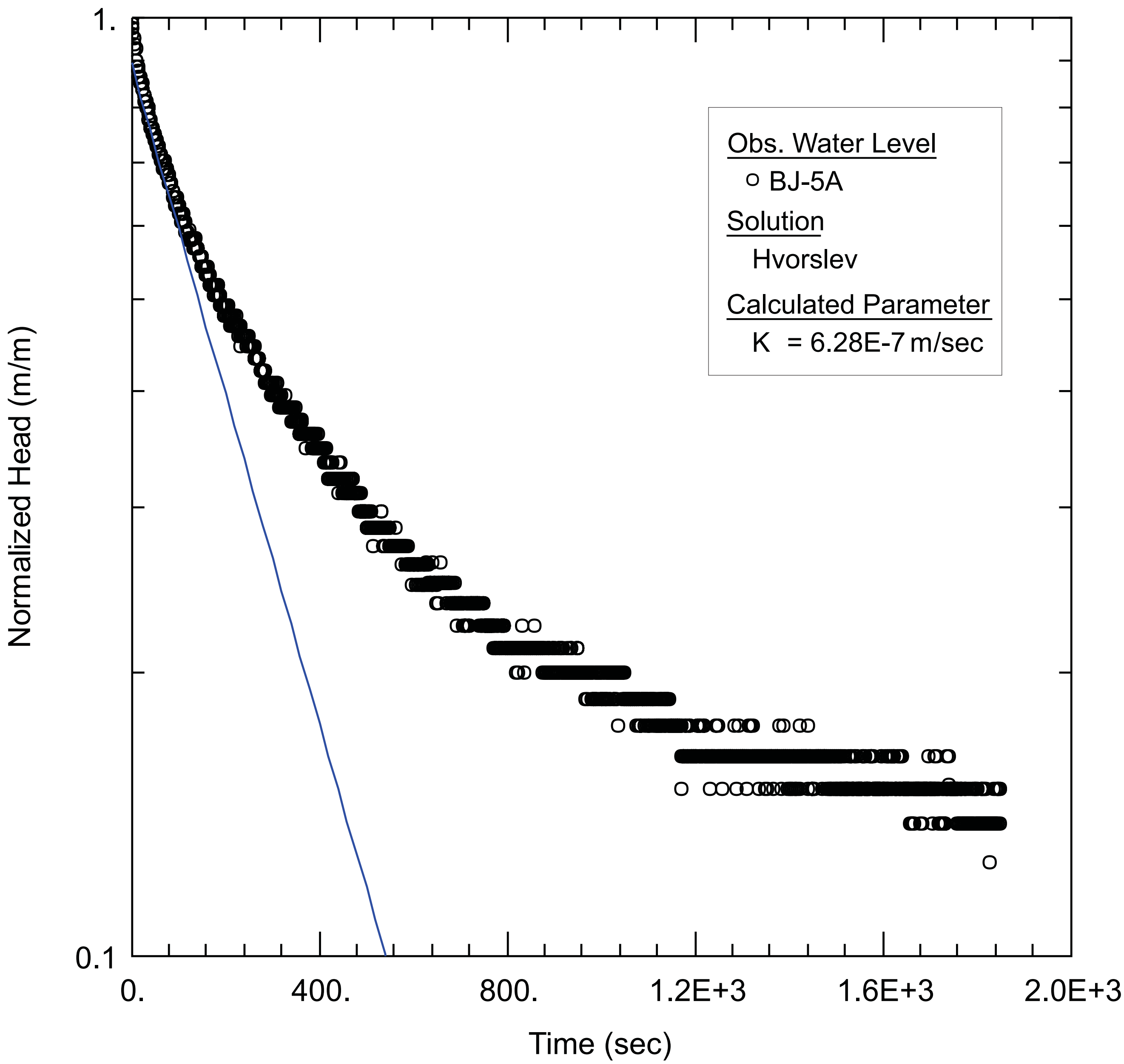
DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013



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DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC11-BJ-5A

CLIENT: PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-5	0

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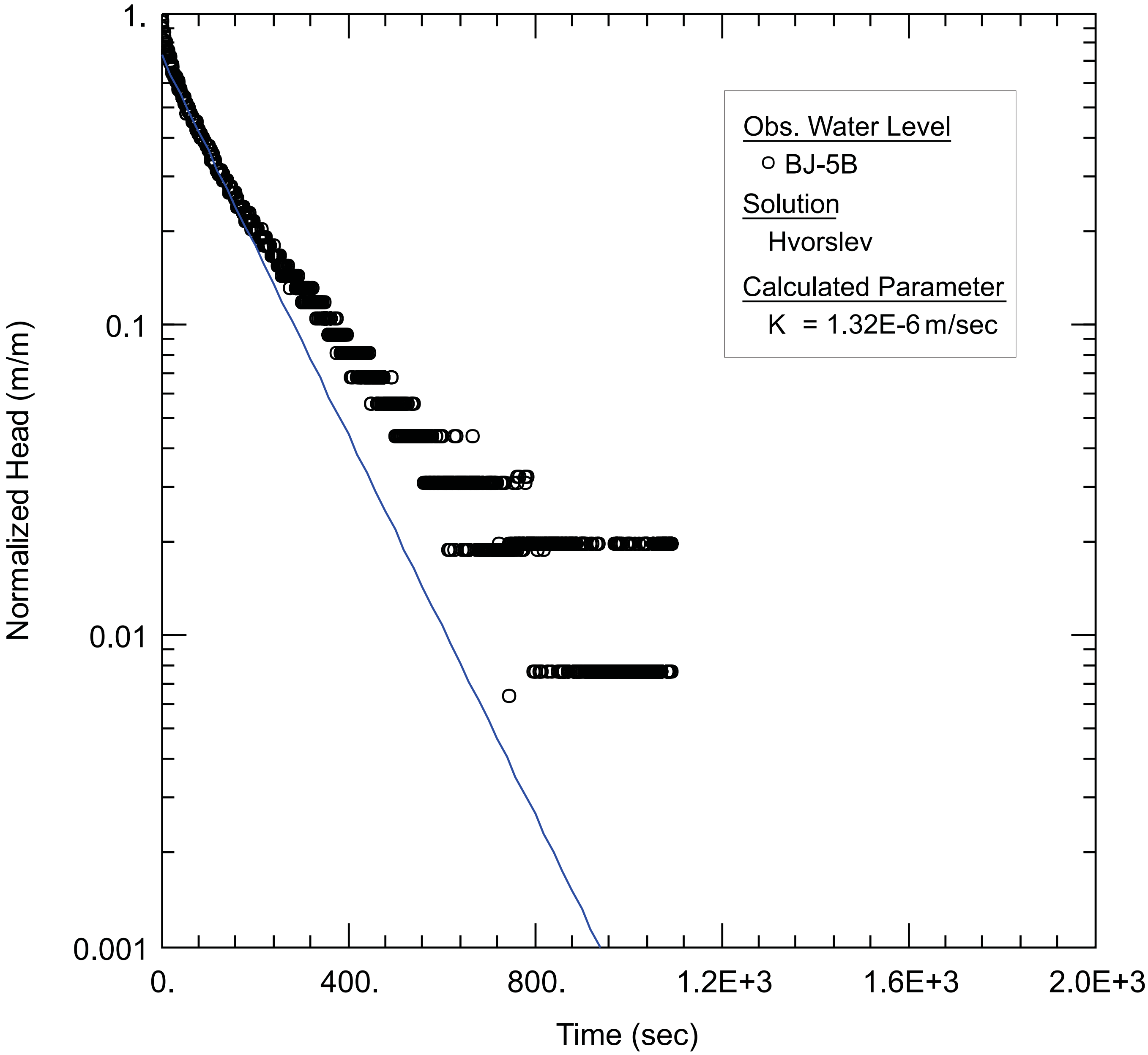

SCALE:	NTS	DESIGNED:	LH
DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC11-BJ-5B

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-6	0

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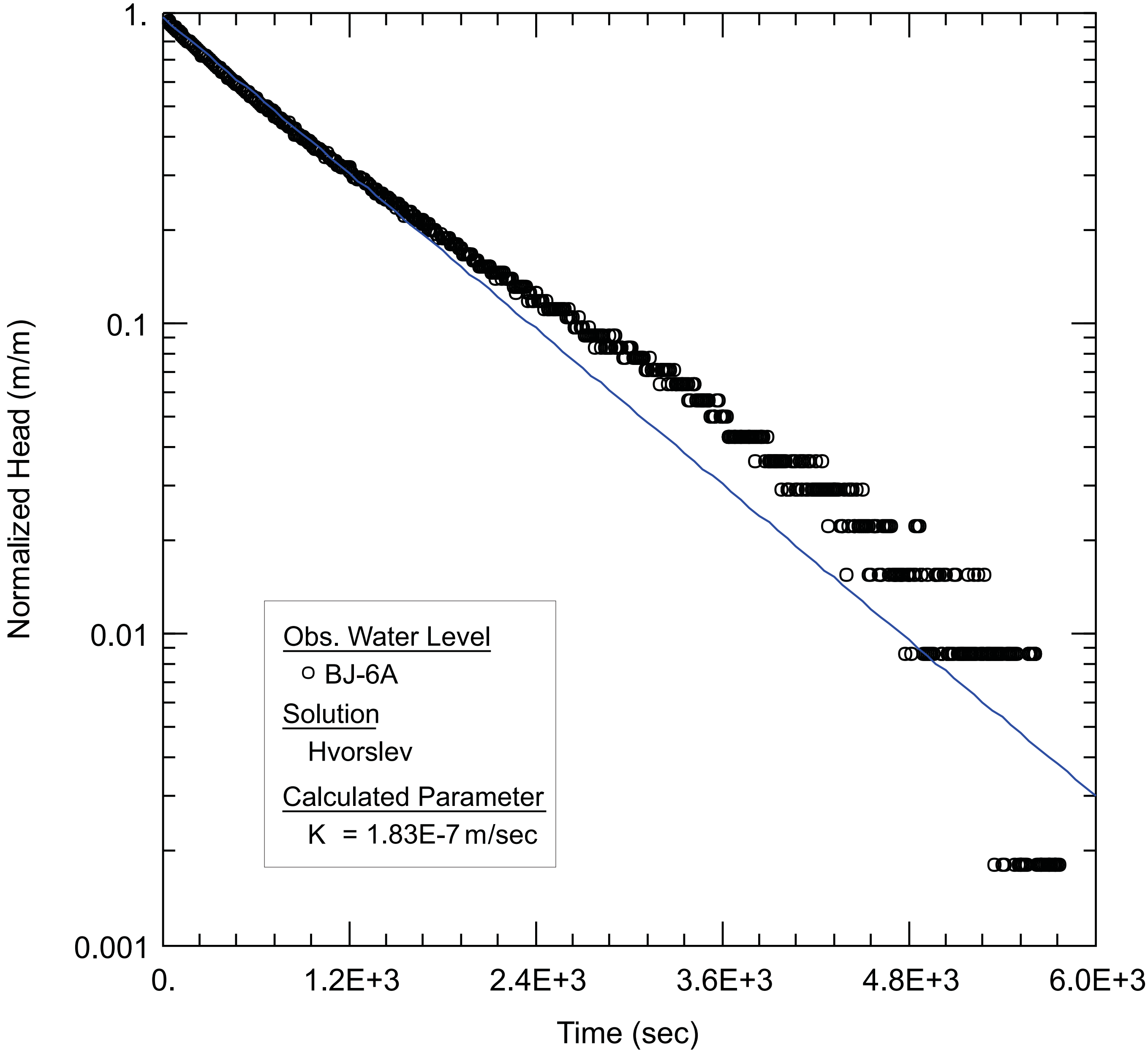

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DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

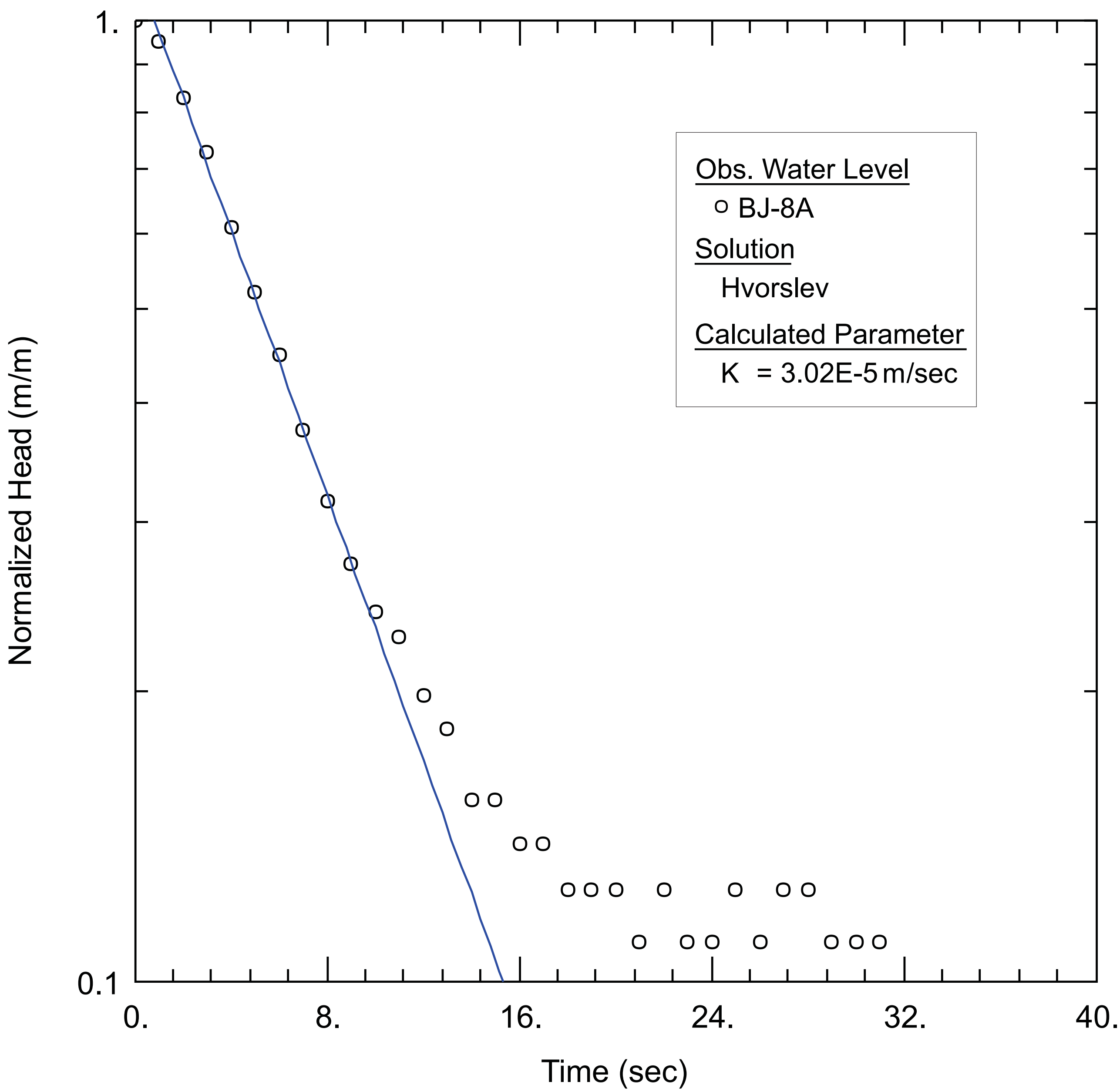
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT: BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE: SLUG TEST RESULTS
MW-BGC11-BJ-6A

CLIENT:	PROJECT No.:	DWG No.:	REV.:
PRETIUM RESOURCES INC.	1008-007	C-7	0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013



SCALE:	NTS	DESIGNED:	LH
DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-8A

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-8	0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013

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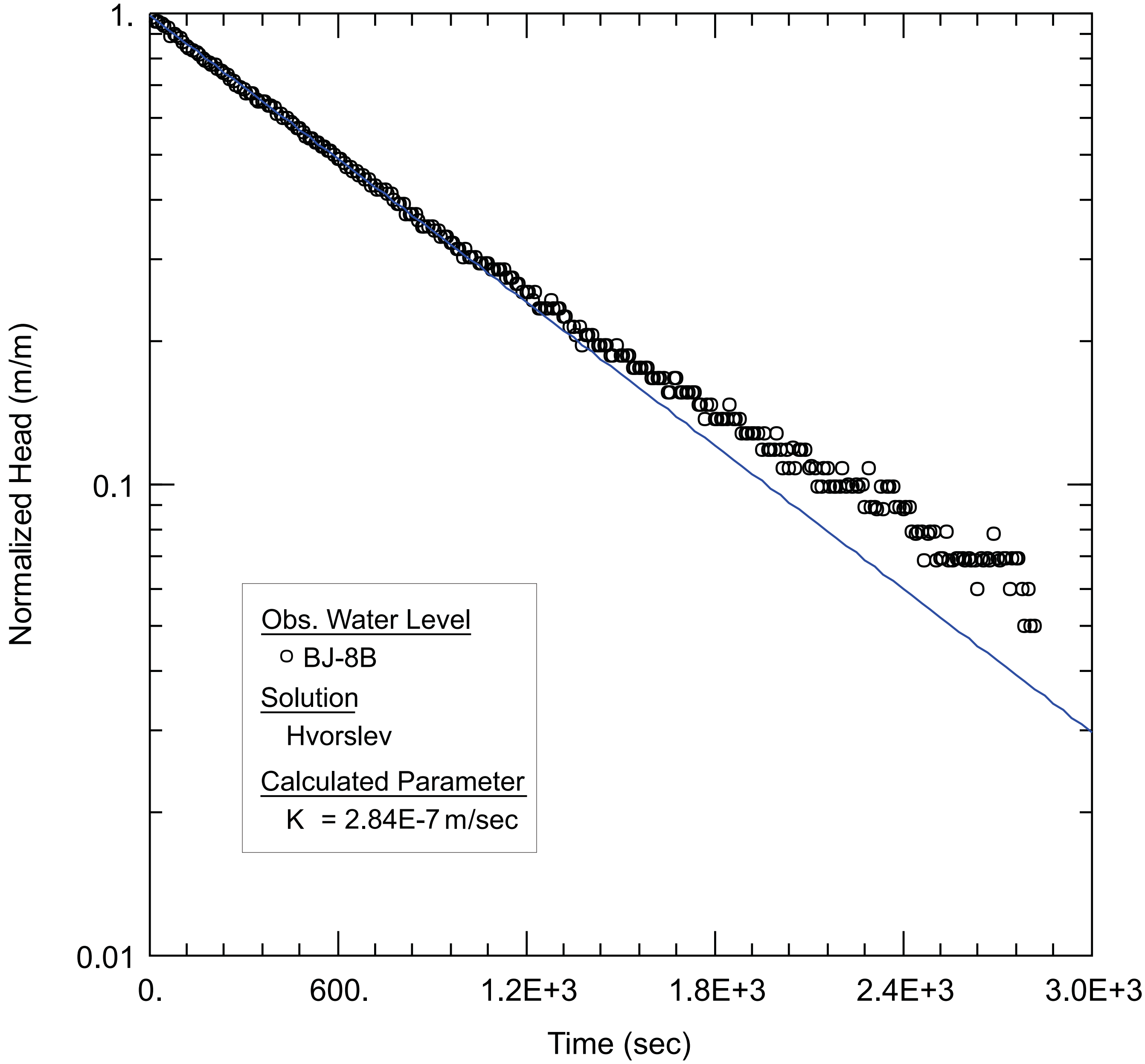

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DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-8B

CLIENT:	PROJECT No.:	DWG No.:	REV.:
PRETIUM RESOURCES INC.	1008-007	C-9	0

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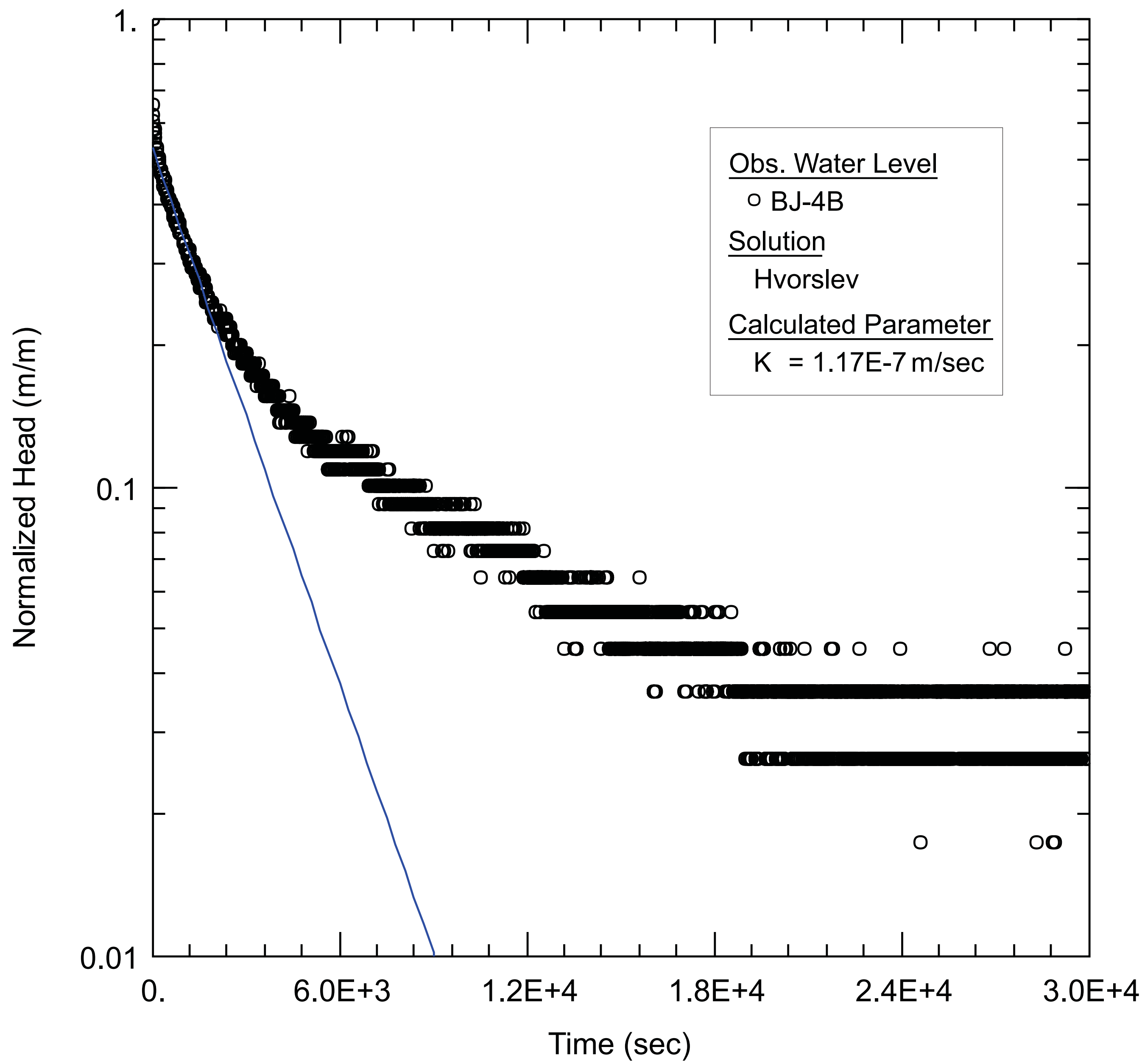

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DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-4B

CLIENT:	PROJECT No.:	DWG No.:	REV.:
PRETIUM RESOURCES INC.	1008-007	C-10	0

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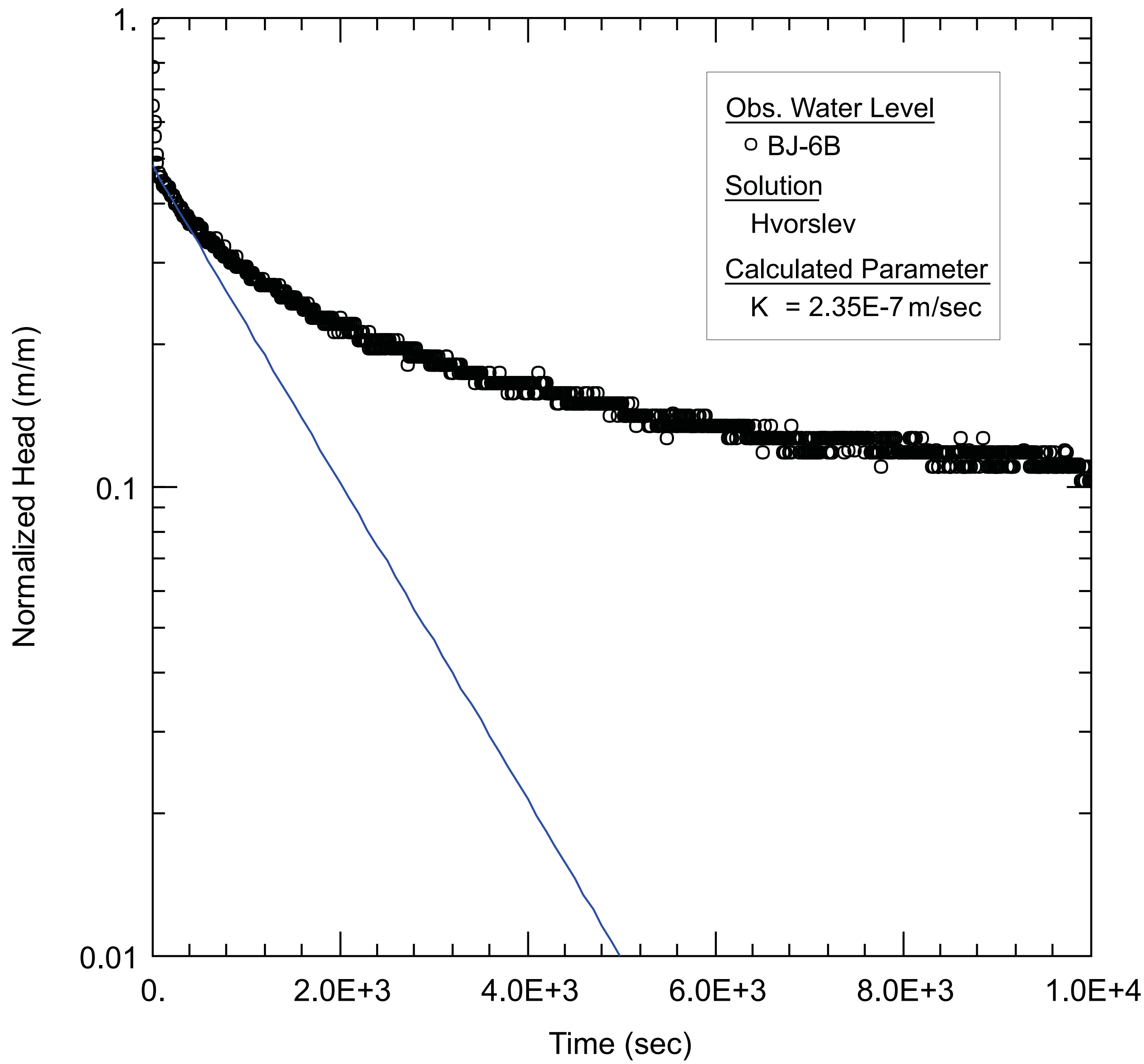

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

SCALE:	NTS	DESIGNED:	LH
DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

PROJECT: BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL

TITLE: SLUG TEST RESULTS MW-BGC12-BJ-6B

CLIENT: PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-11	0

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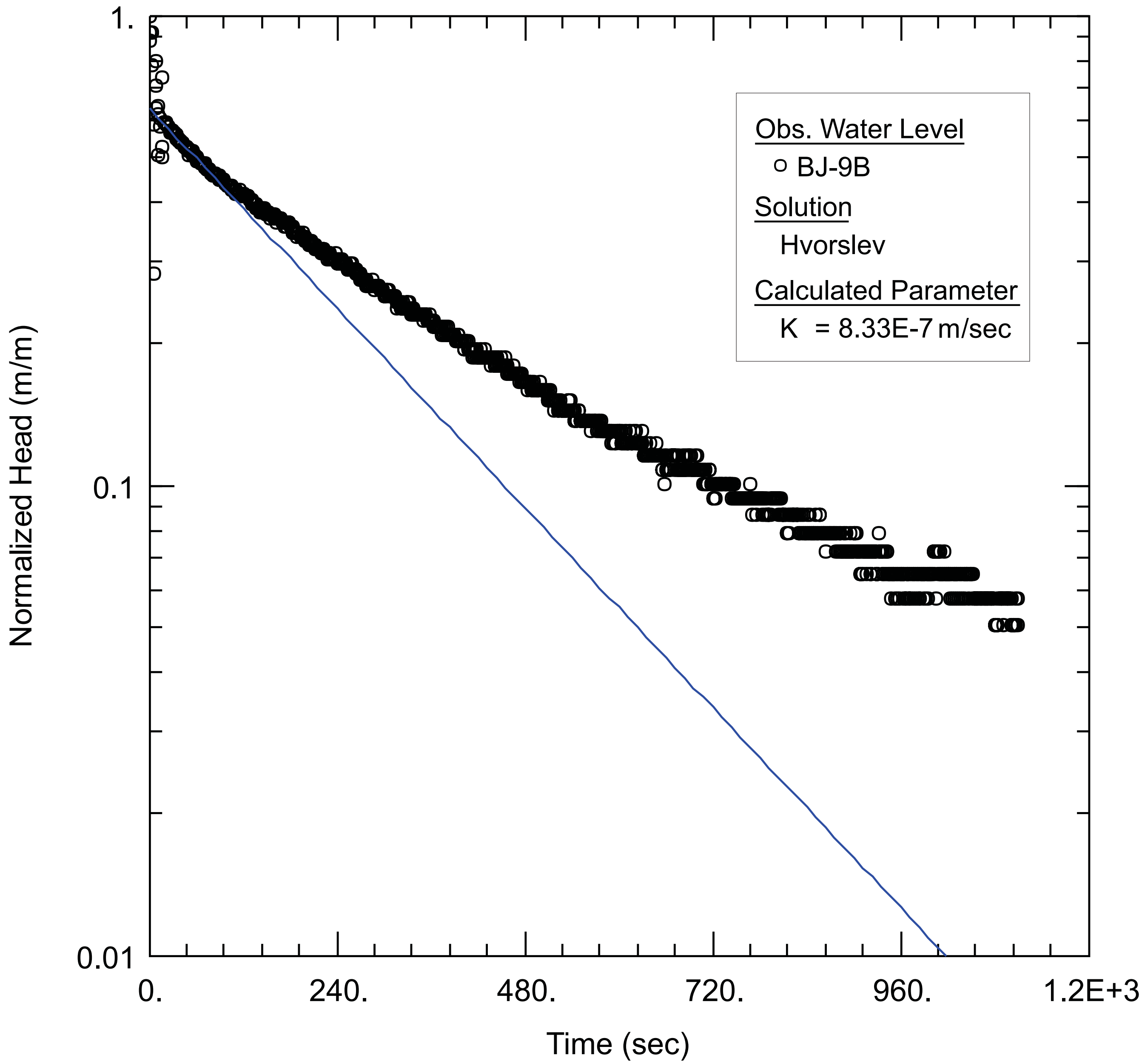
DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013



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DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-9B

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-12	0

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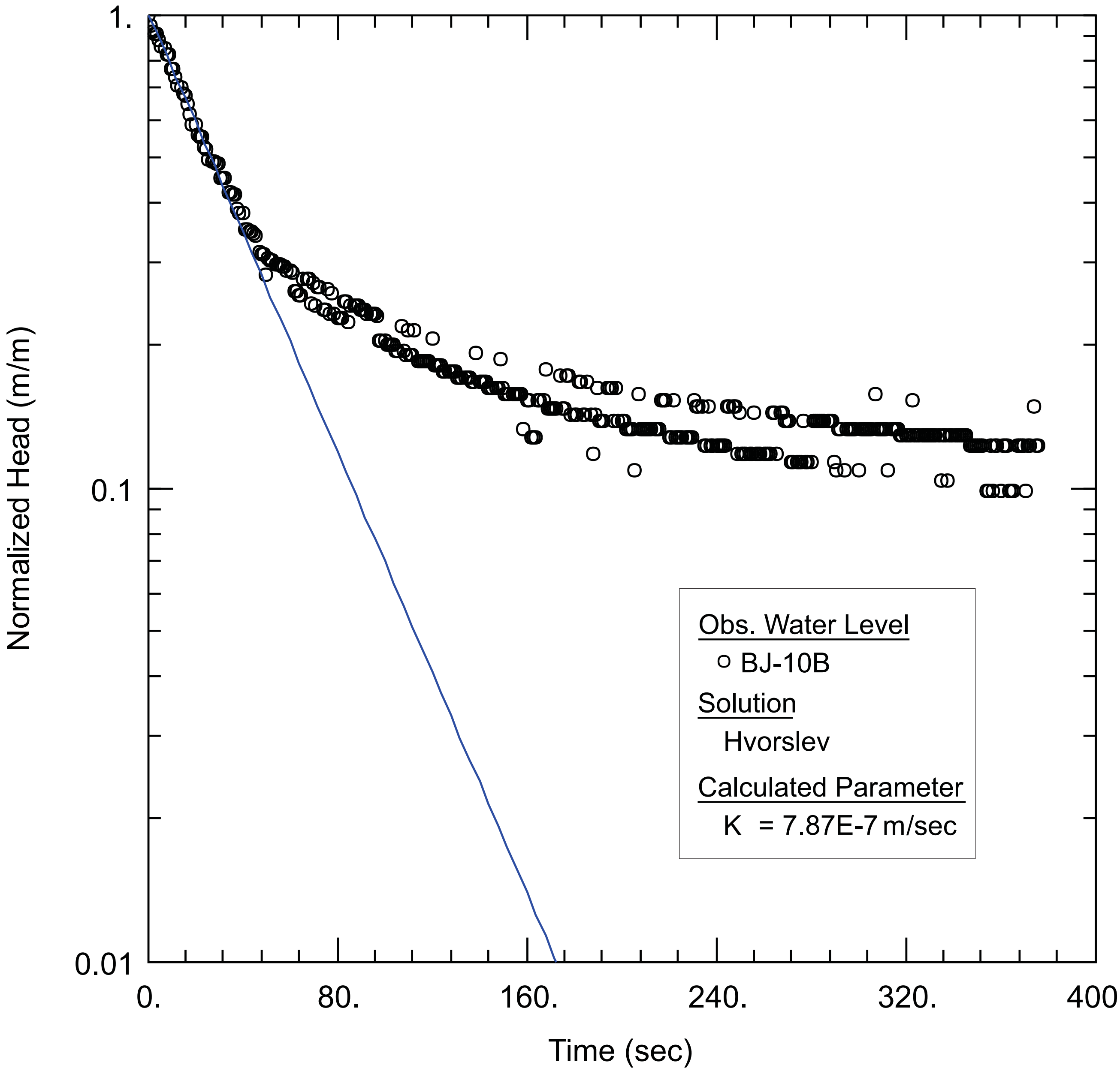

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DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-10B

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-13	0

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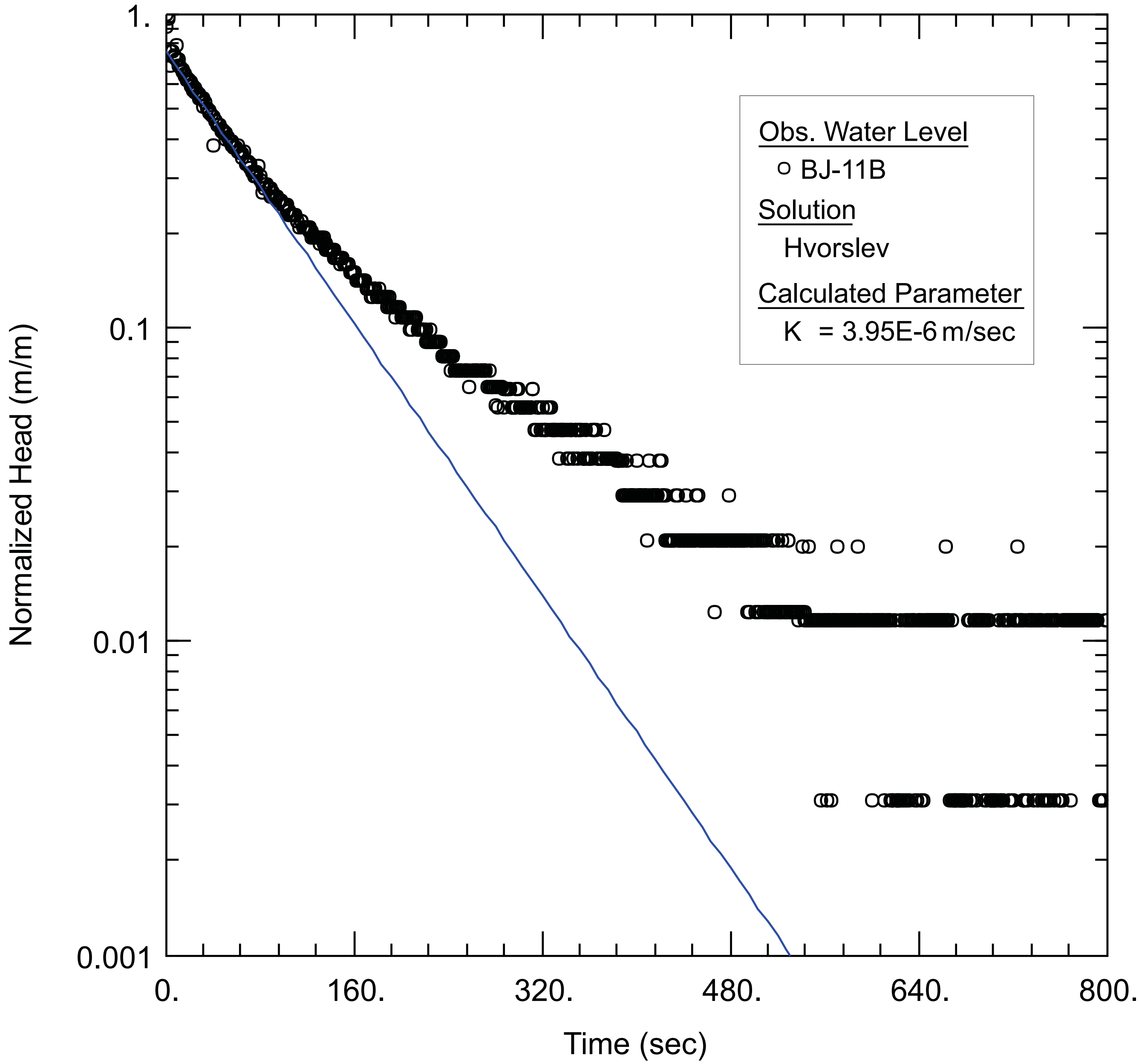

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DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-11B

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-14	0

DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013

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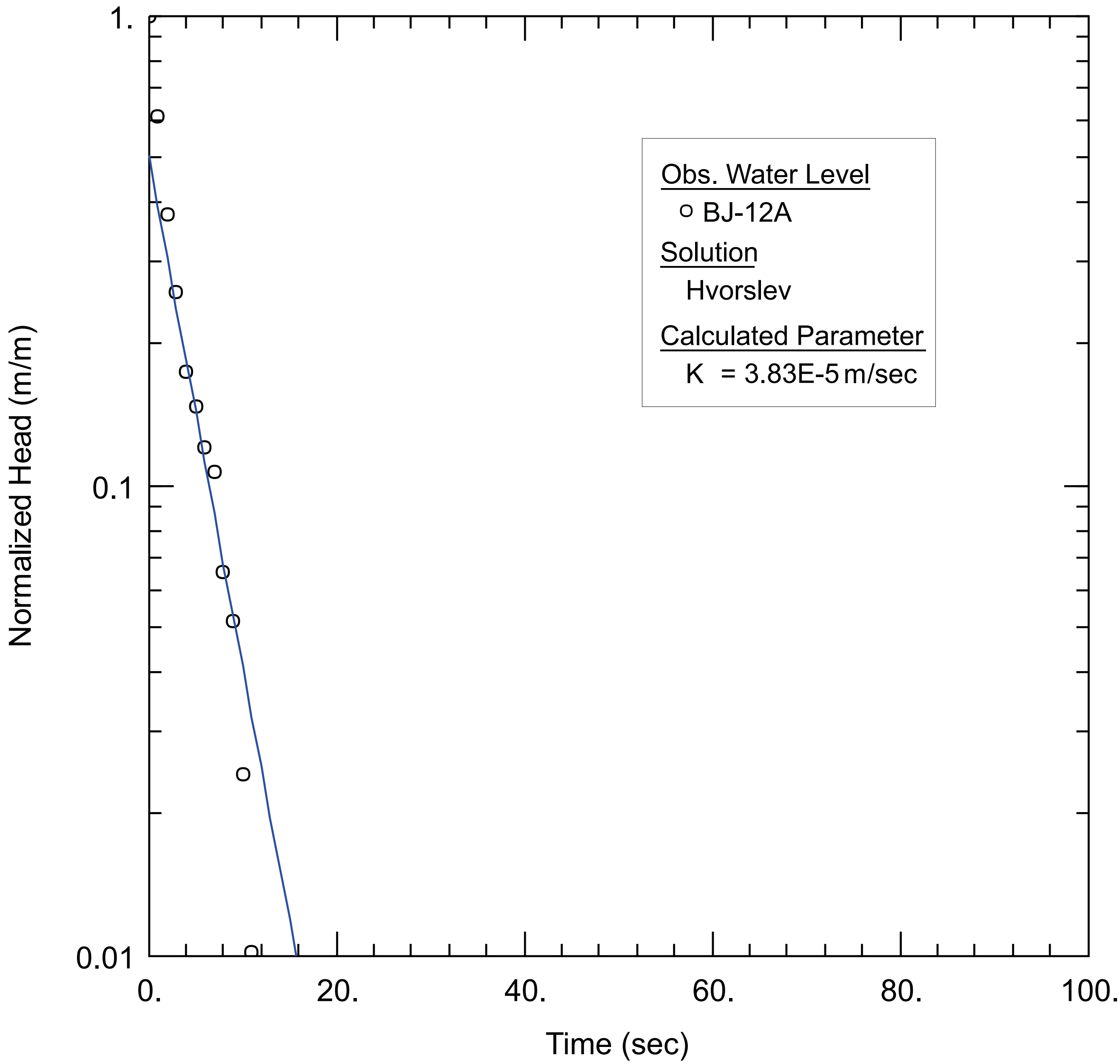

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BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-12A

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-15	0

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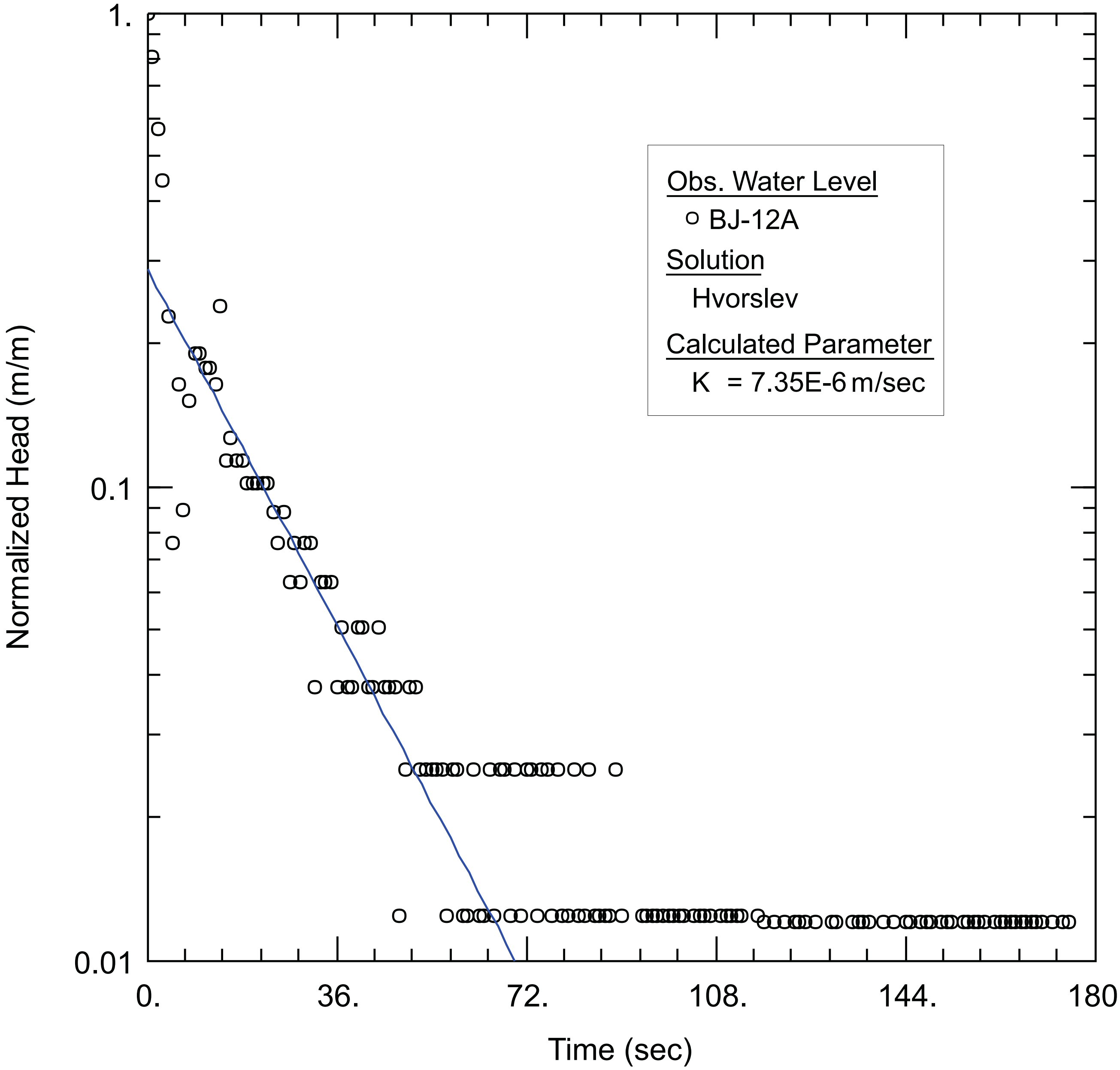

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SCALE:	NTS	DESIGNED:	LH
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DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-12A

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-16	0

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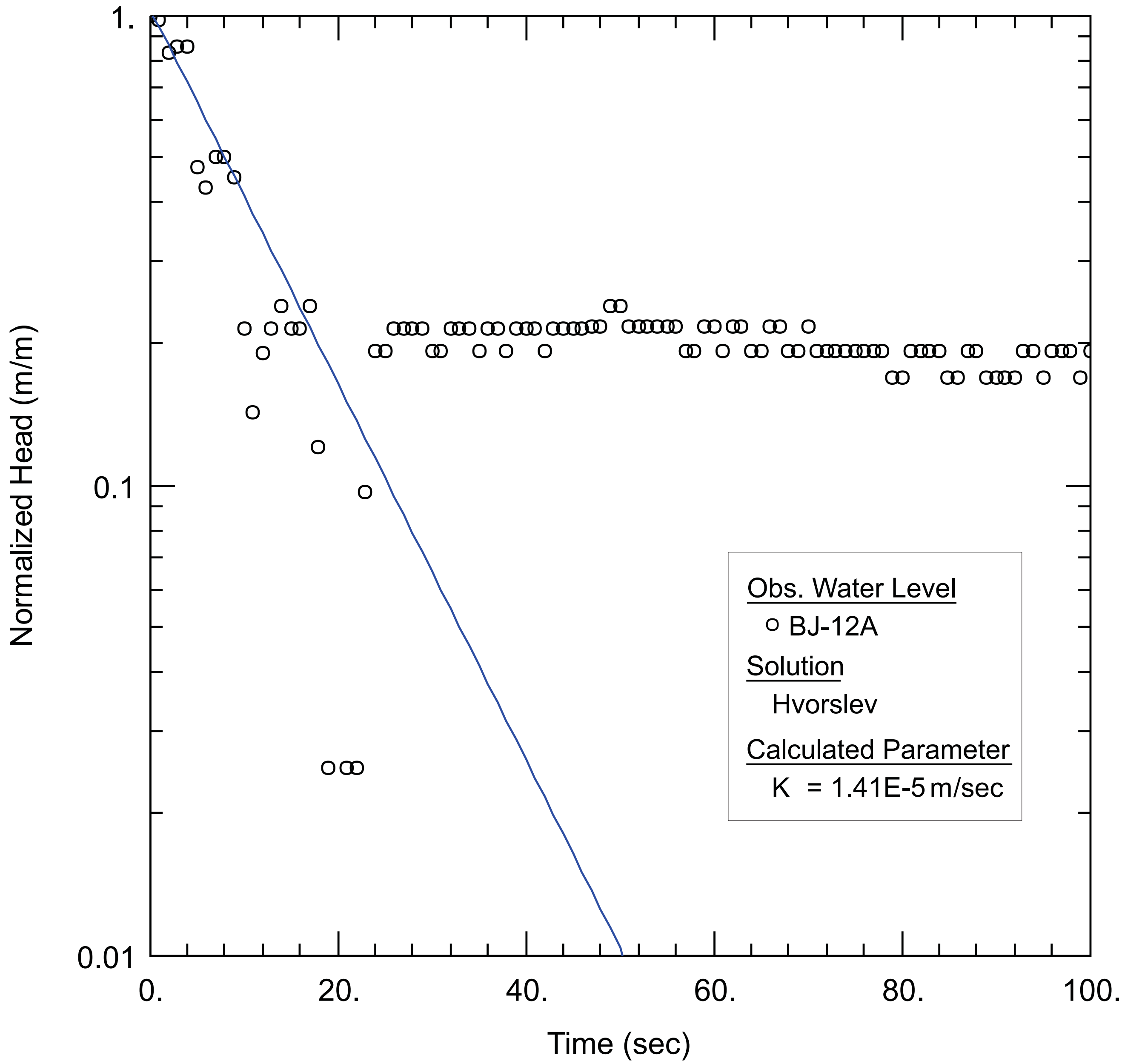

SCALE:	NTS	DESIGNED:	LH
DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-12A

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-17	0

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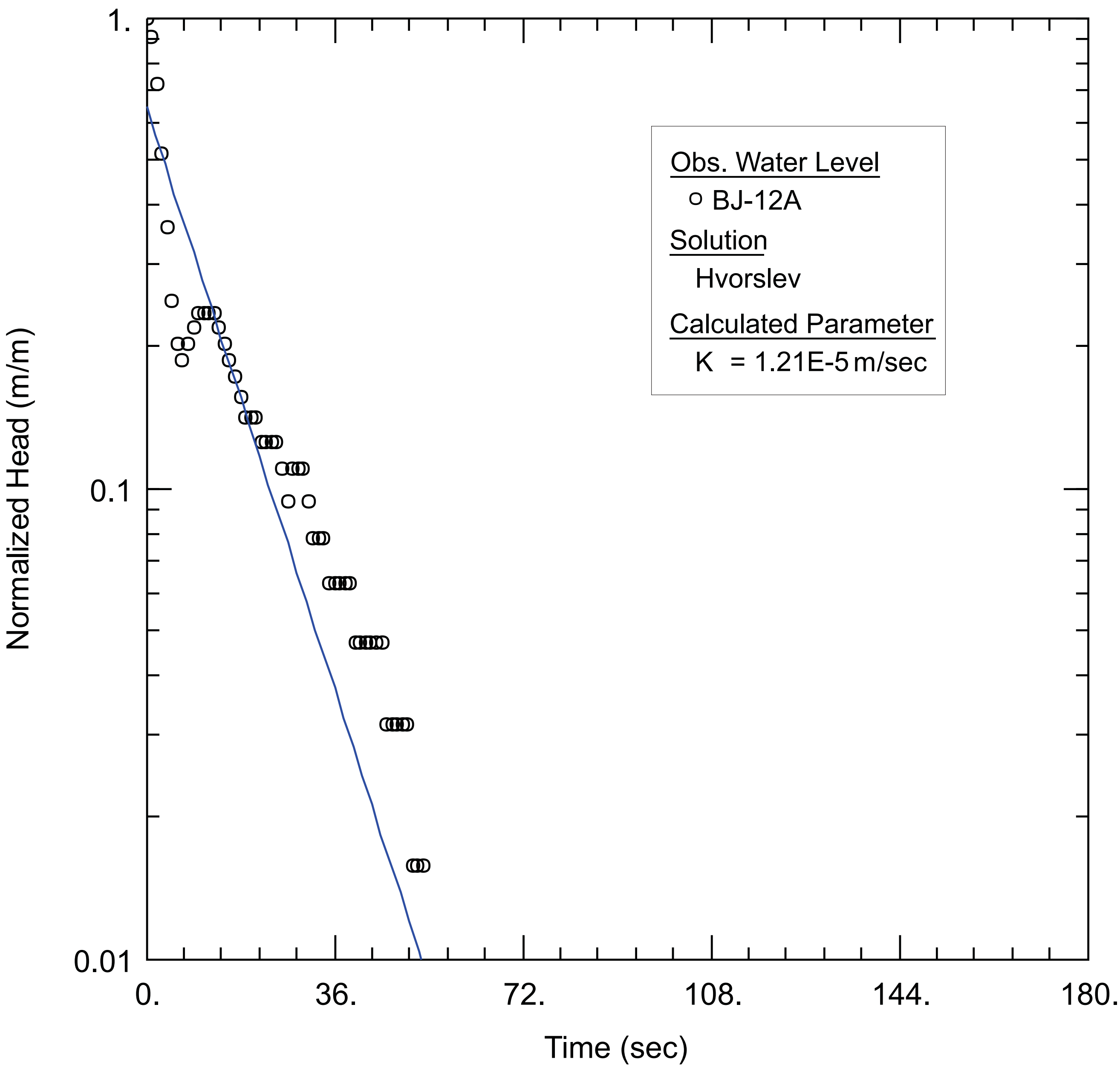

SCALE:	NTS	DESIGNED:	LH
DATE:	JUN 2013	CHECKED:	KSJ
DRAWN:	LH	APPROVED:	KSJ

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

PROJECT:
BRUCEJACK PROJECT FEASIBILITY STUDY
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SLUG TEST RESULTS
MW-BGC12-BJ-12A

CLIENT:
PRETIUM RESOURCES INC.

PROJECT No.:	DWG No.:	REV.:
1008-007	C-18	0

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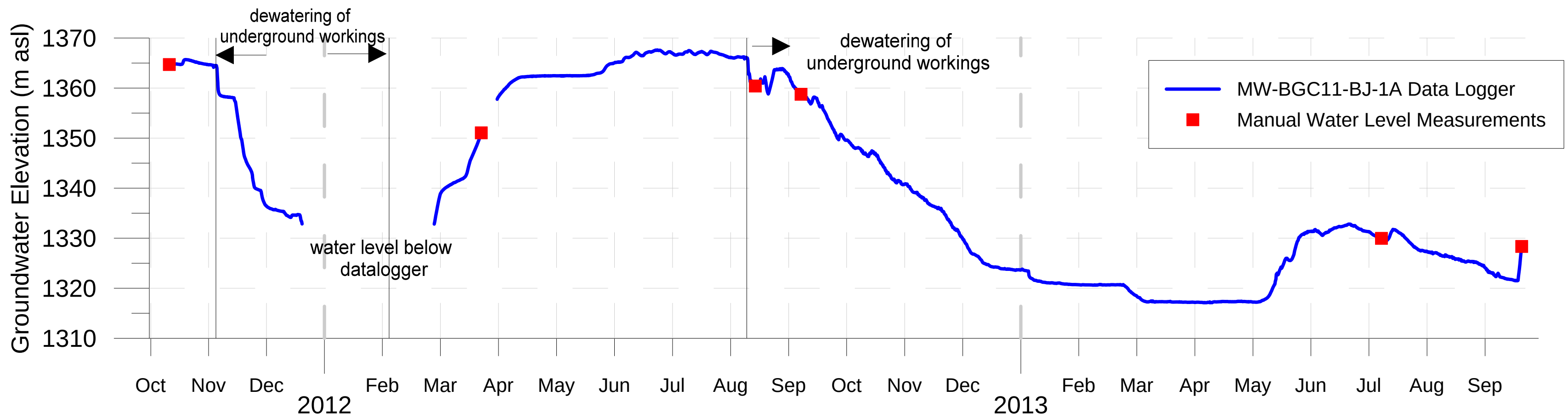
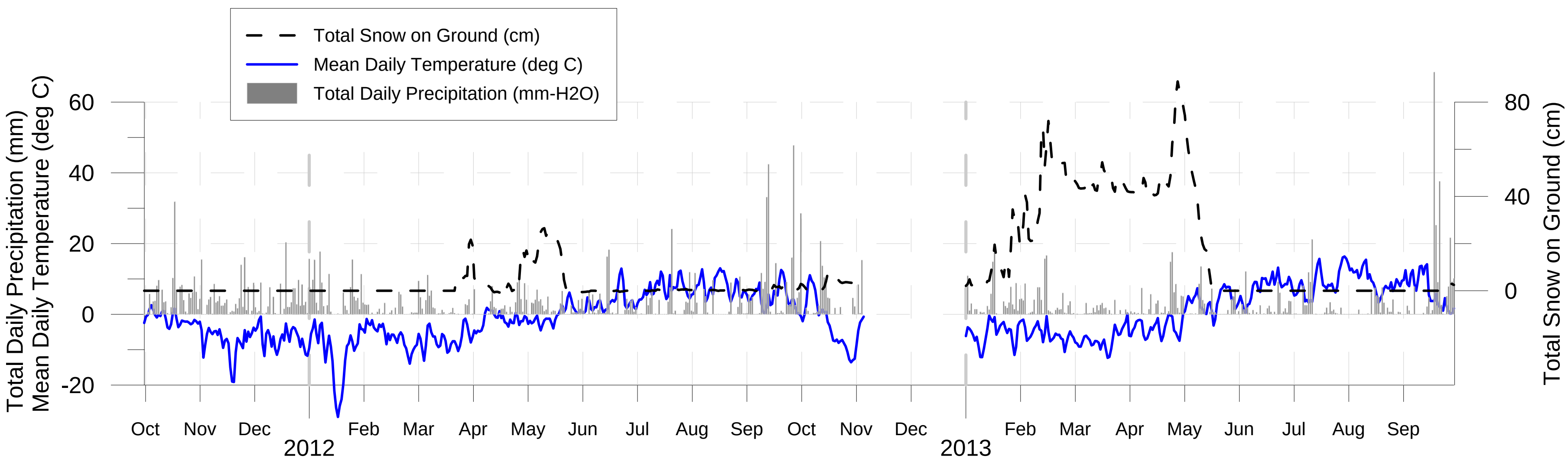
DWG TO BE READ WITH BGC REPORT TITLED "BRUCEJACK PROJECT FEASIBILITY STUDY NUMERICAL HYDROGEOLOGIC MODEL" DATED JUNE 2013

APPENDIX D
GROUNDWATER HYDROGRAPHS





Notes:
1) Well screened from 1300.92 to 1307.12 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

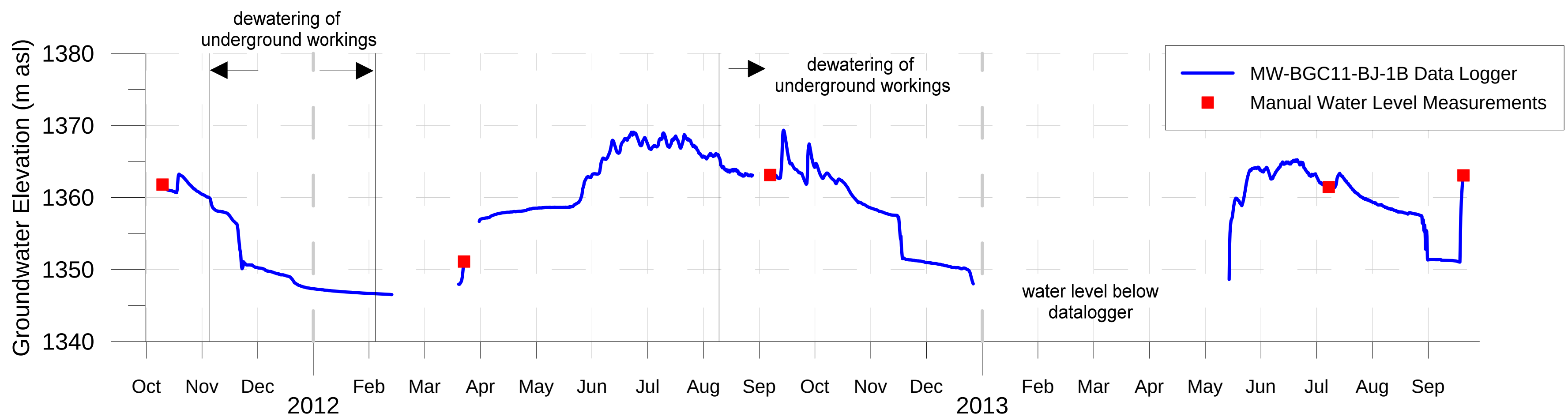
CLIENT: PRETIUM RESOURCES INC.

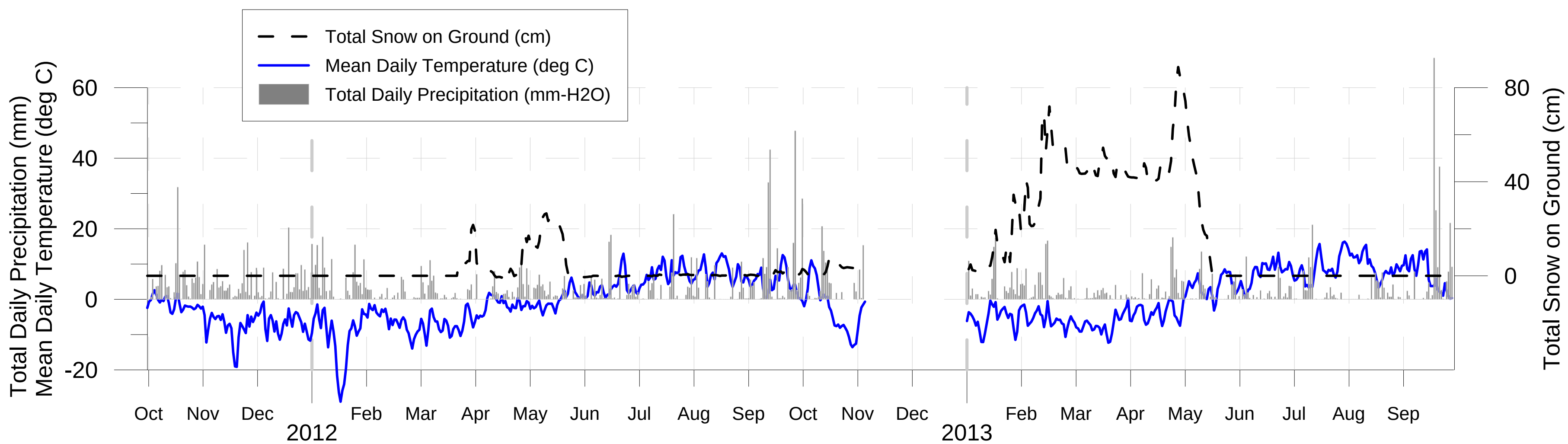
PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MW-BGC11-BJ-1A GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-1	1

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\09 Reporting\02 EA Modeling Report\04 Appendices\Appendix D - groundwater hydrographs\FILES\D1_MW-BGC12-BJ-1A\Hydrograph_MW-BGC12-BJ-1A.grf





Notes:

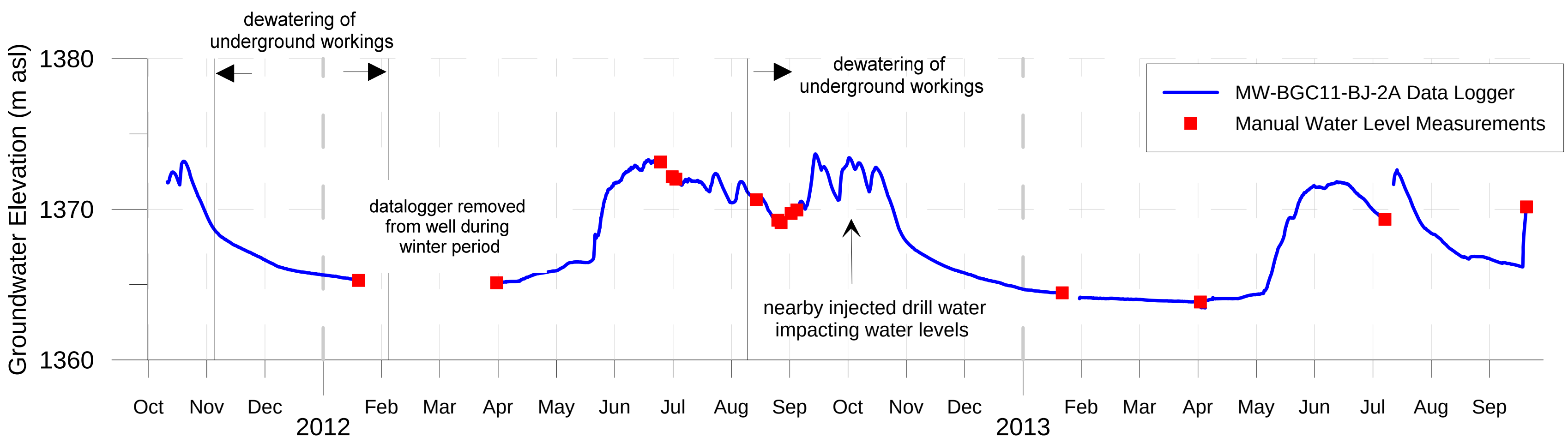
1) Well screened from 1347.32 to 1350.42 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

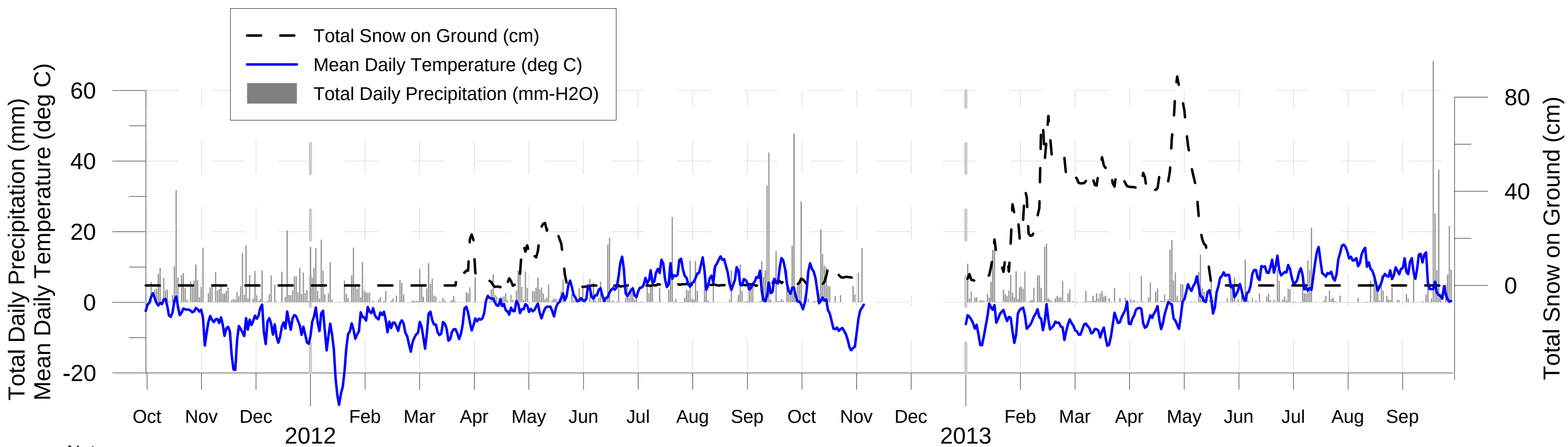
SCALE: N/A	DESIGNED: KSJ	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL	
DATE: MAY 2014	CHECKED: DP	TITLE: MW-BGC11-BJ-1B GROUNDWATER HYDROGRAPH	
DRAWN: LH, RET, BS	APPROVED: VC	PROJECT No. 1008-010	DWG No. D-2 / REV. 1

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\09 Reporting\02 EA Modeling Report\04 Appendices\Appendix D - groundwater hydrographs\FILES\D2_MW-BGC12-BJ-1B\Hydrograph_MW-BGC12-BJ-1B.grf





Notes:
1) Well screened from 1346.37 to 1352.47 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013).
No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

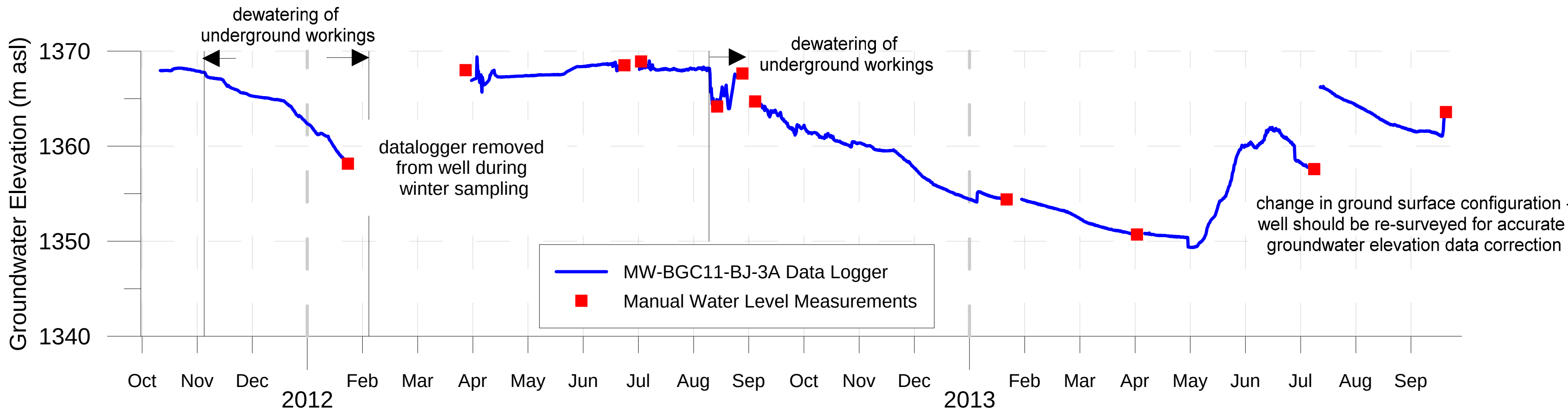
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

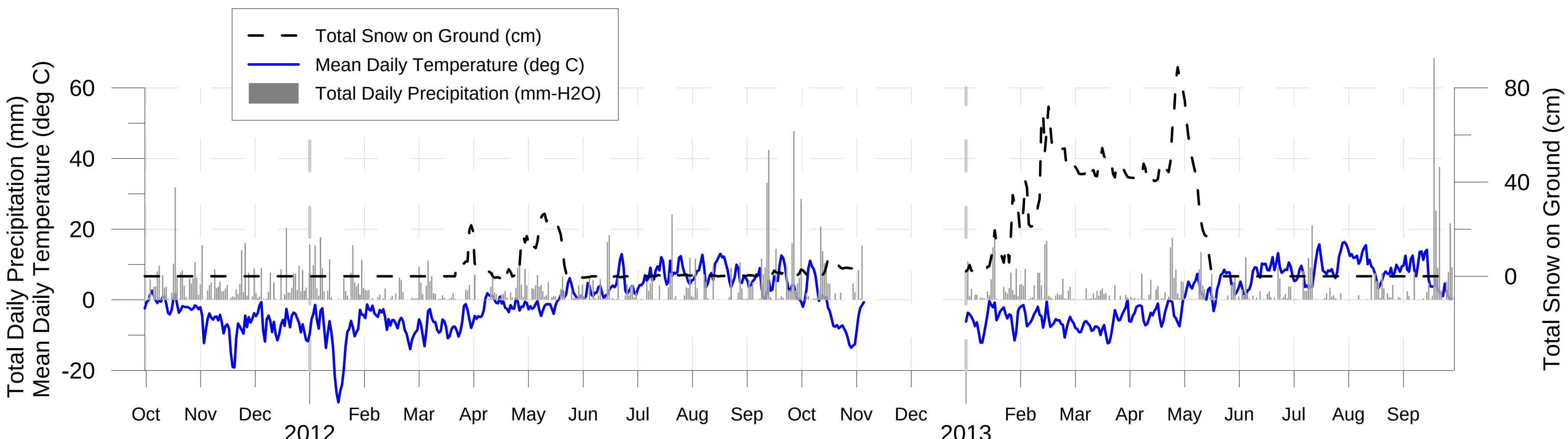
CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MW-BGC11-BJ-2A GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-3	1





Notes:
1) Well screened from 1279.33 to 1284.63 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL	
DATE: MAY 2014	CHECKED: DP	TITLE: MW-BGC11-BJ-3A GROUNDWATER HYDROGRAPH	
DRAWN: LH, RET, BS	APPROVED: VC	PROJECT No. 1008-010	DWG No. D-4 / REV. 1

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

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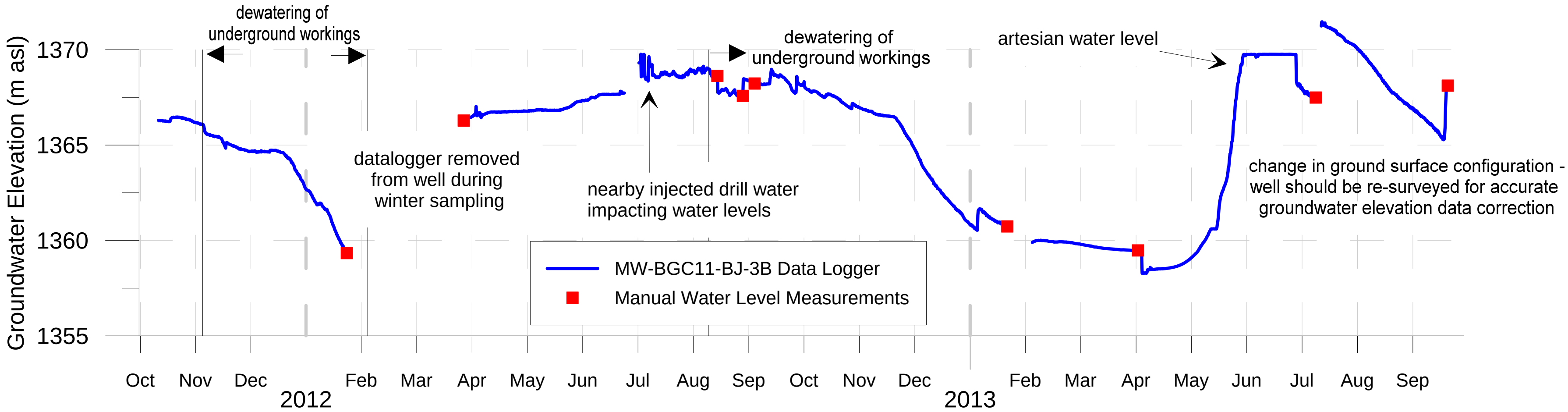

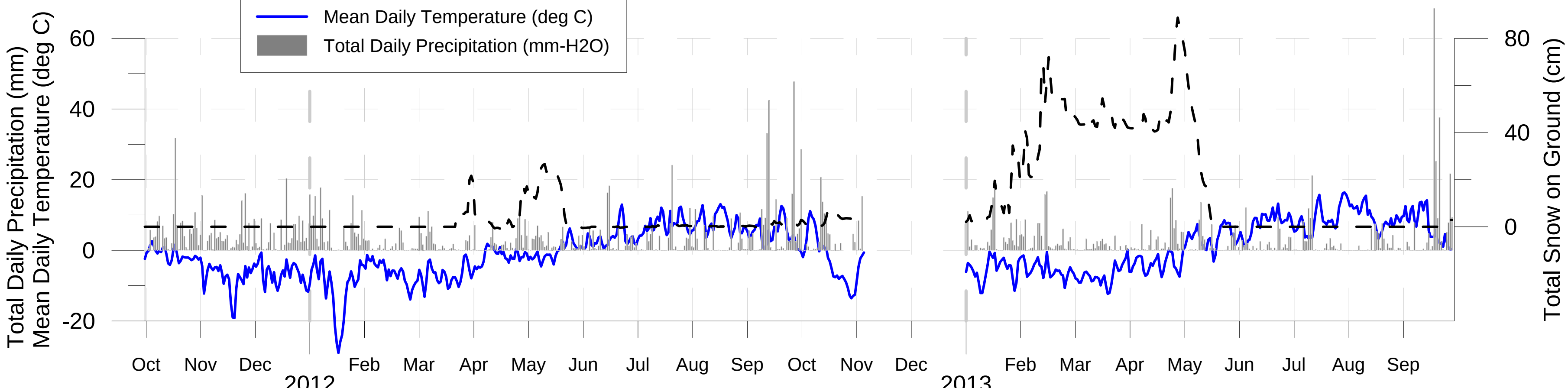

Notes:

1) Well screened from 1358.73 to 1361.73 m asl; see Appendix B for well log.

2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.

3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MW-BGC11-BJ-3B GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-5	1

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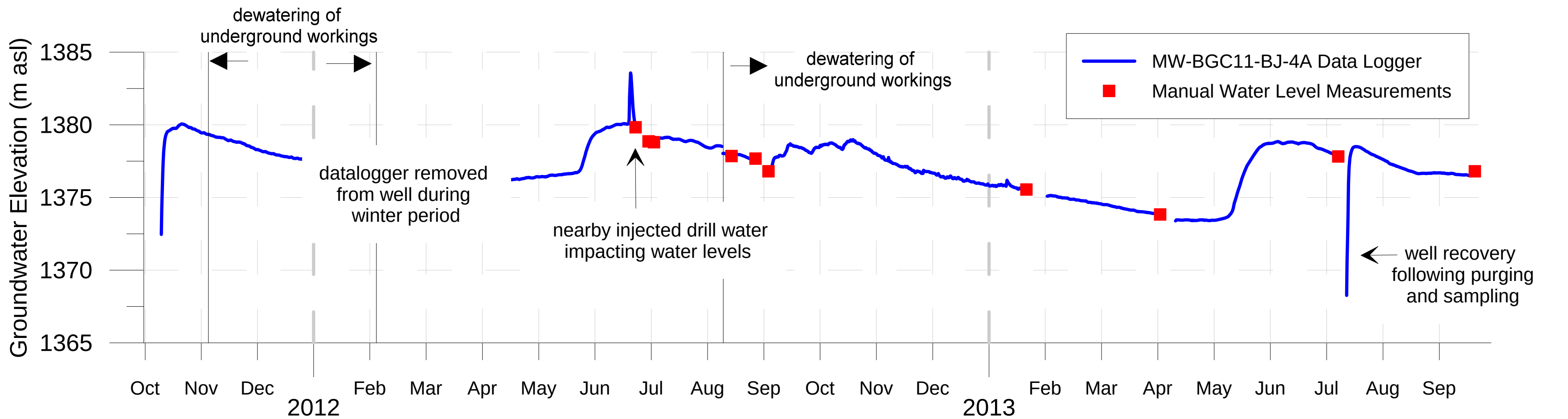
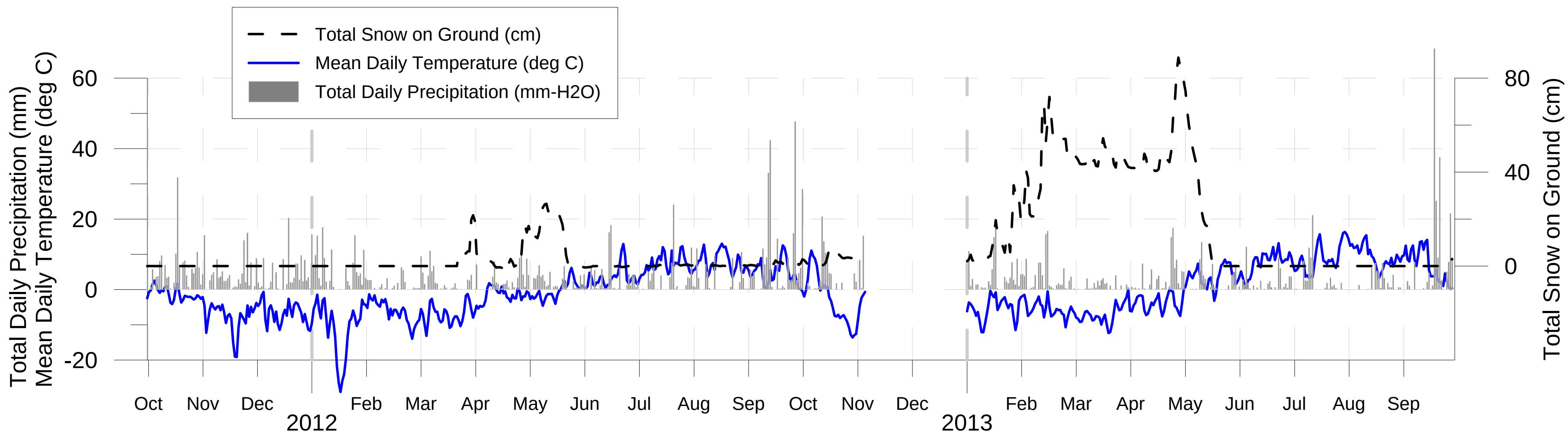




Notes:
1) Well screened from 1359.96 to 1369.16 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013).
No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

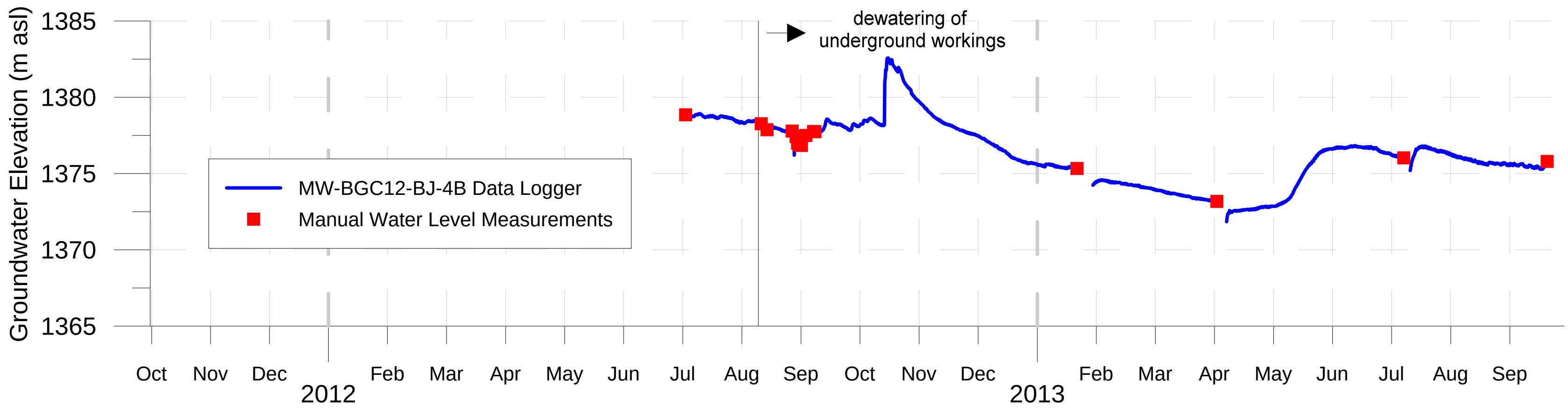
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

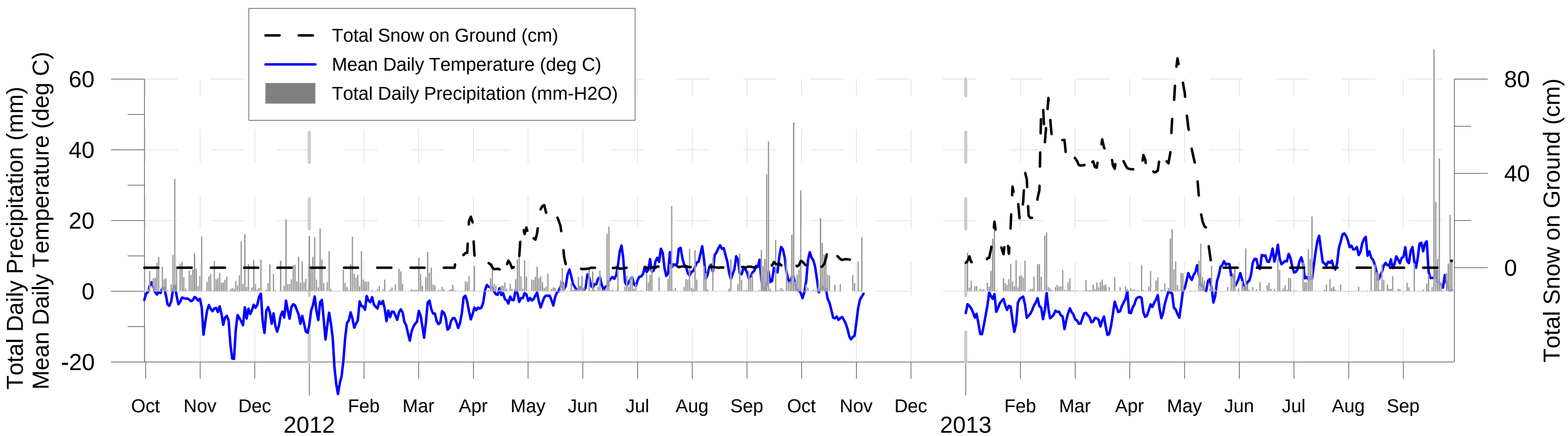
CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC11-BJ-4A
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-6	1





Notes:
1) Well screened from 1292.53 to 1295.53 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: MW-BGC12-BJ-4B GROUNDWATER HYDROGRAPH
DRAWN: LH, RET, BS	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-7 / REV. 1

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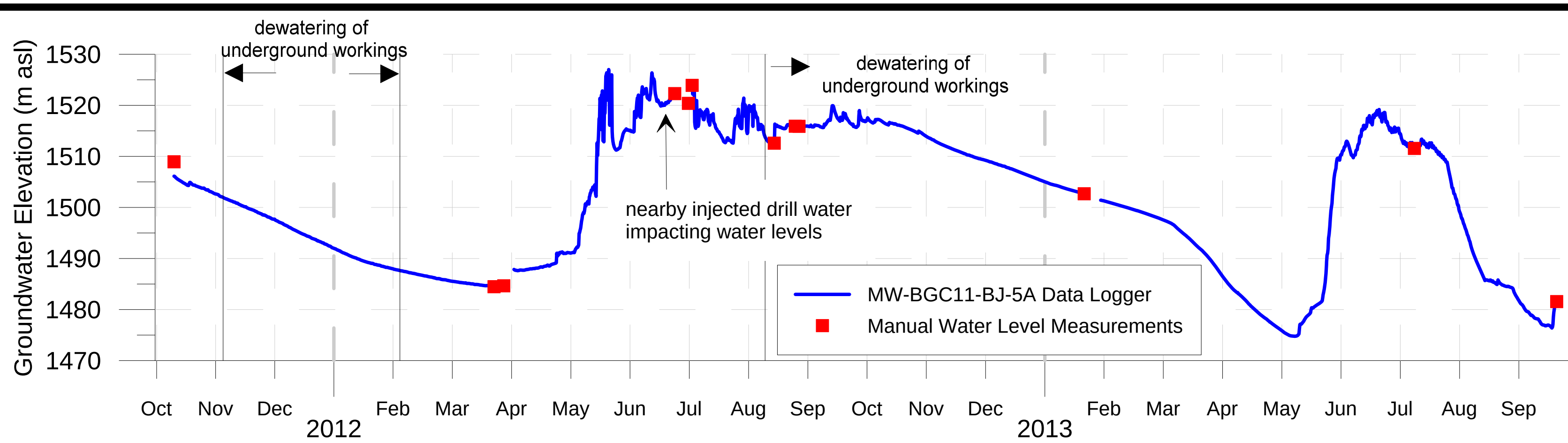

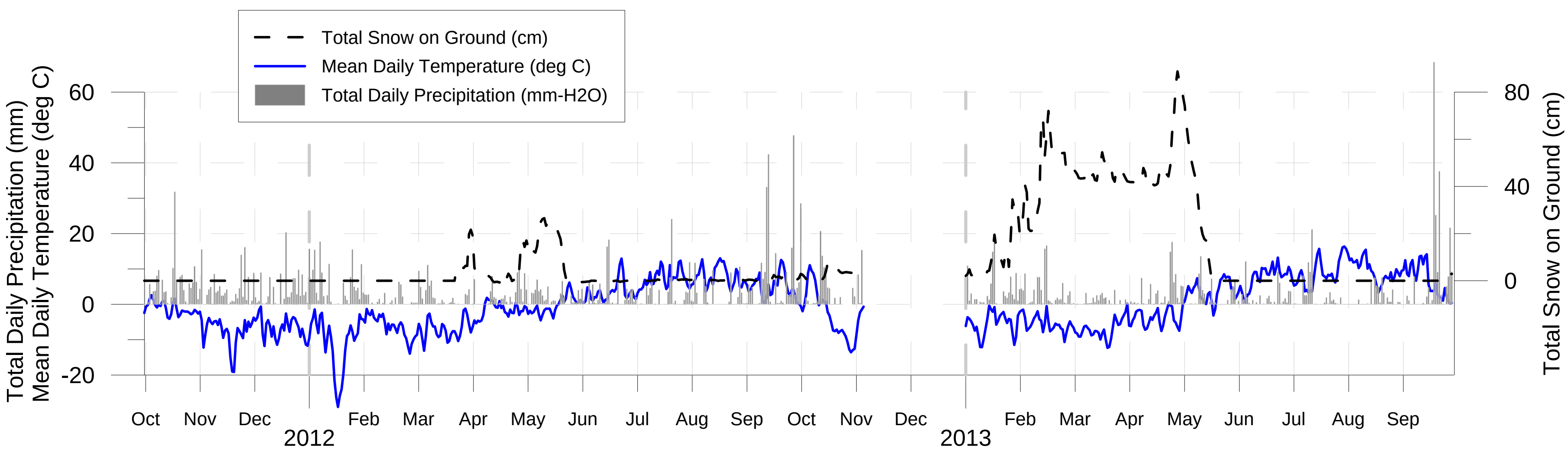

Notes:
1) Well screened from 1448.44 to 1457.54 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC11-BJ-5A
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-8	1

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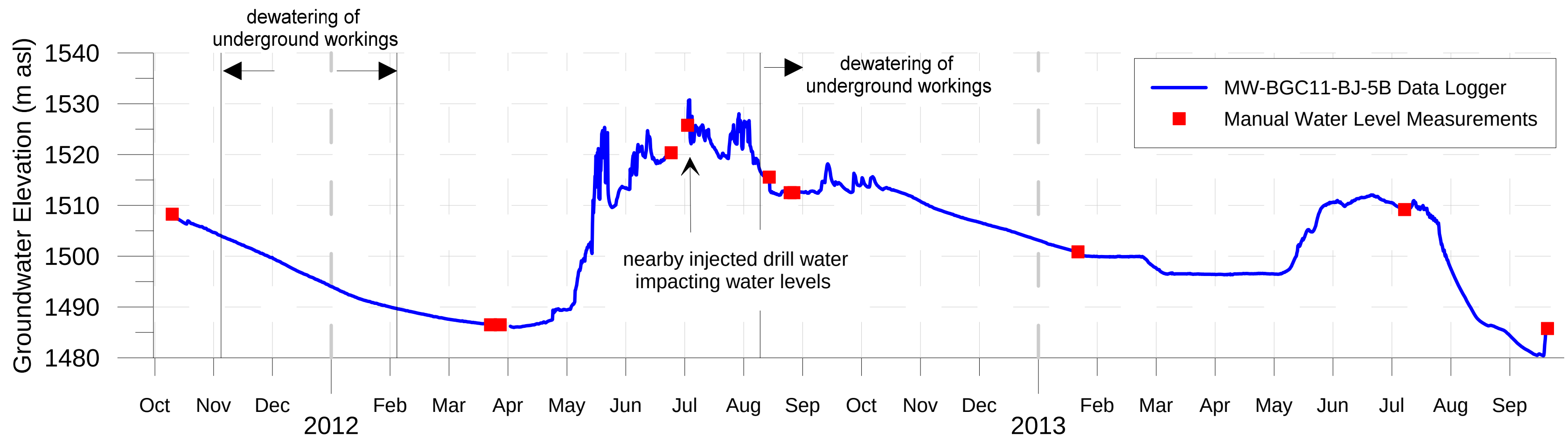
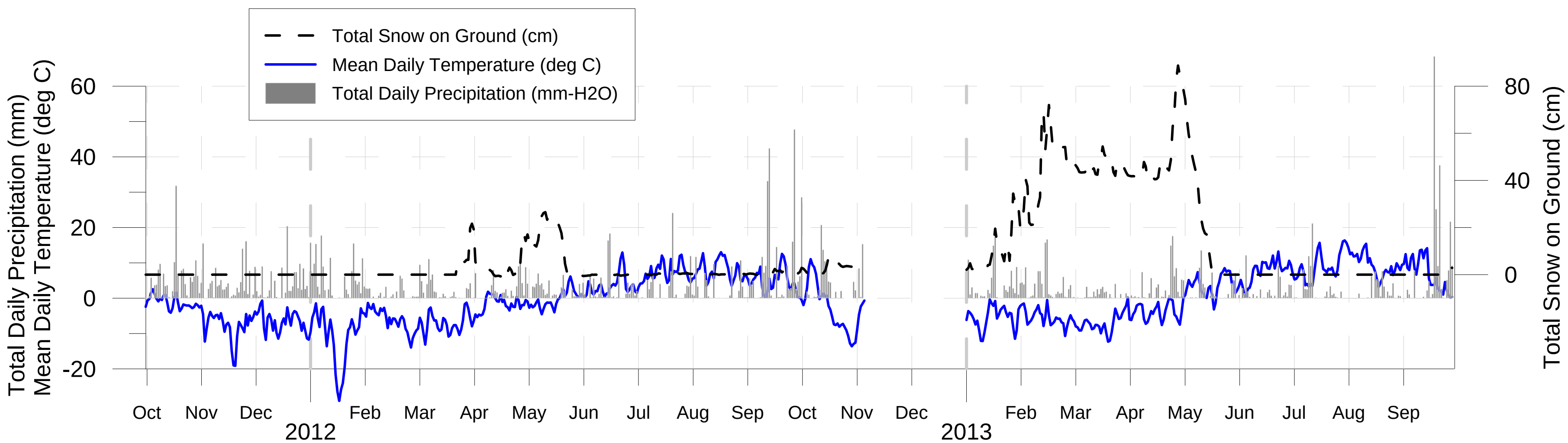
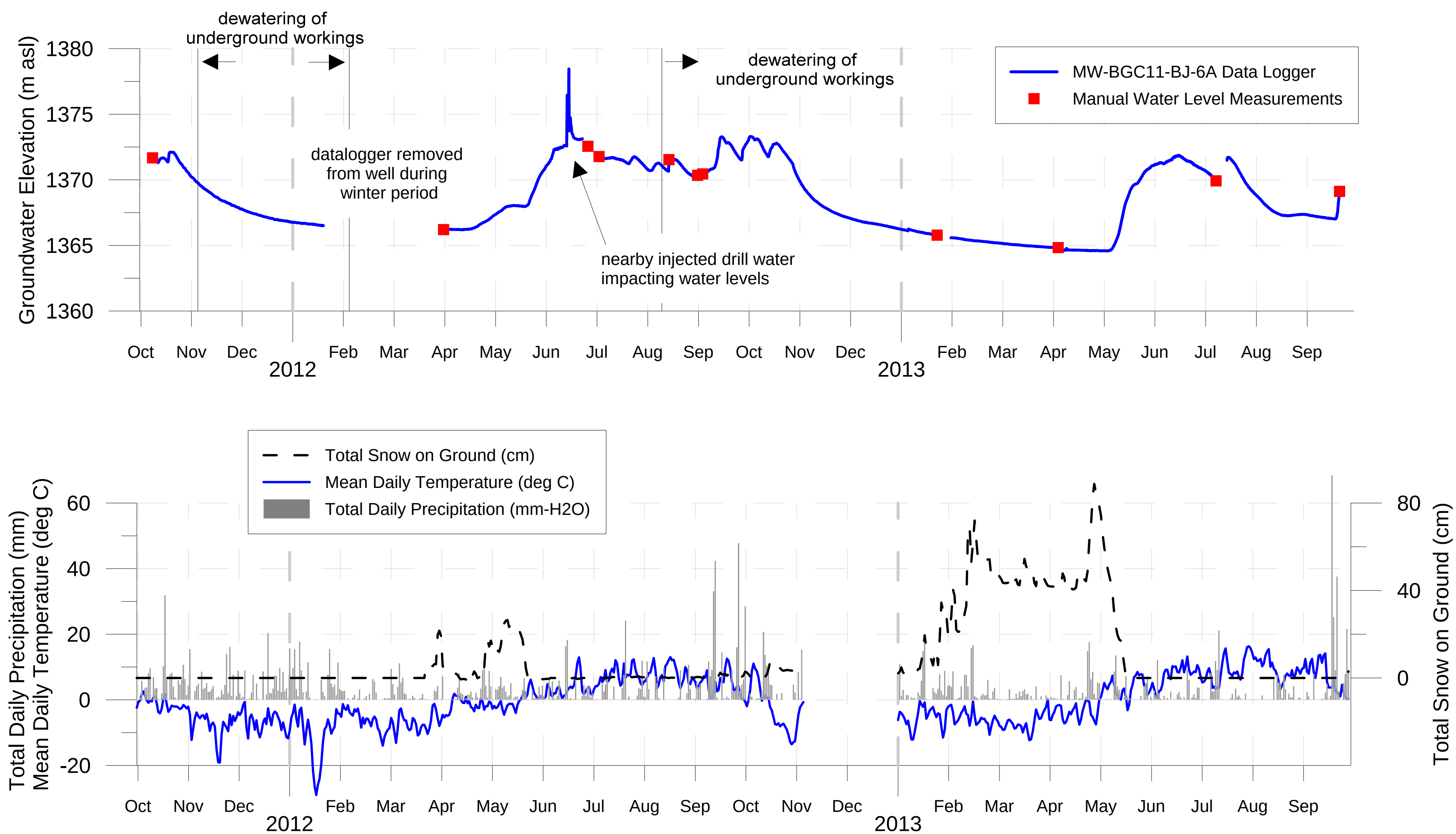




Notes:
1) Well screened from 1475.96 to 1485.16 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: MW-BGC11-BJ-5B GROUNDWATER HYDROGRAPH
DRAWN: LH, RET, BS	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-9 / REV. 1



Notes:
1) Well screened from 1349.51 to 1358.61 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ		
DATE: MAY 2014	CHECKED: DP		
DRAWN: LH, RET, BS	APPROVED: VC		

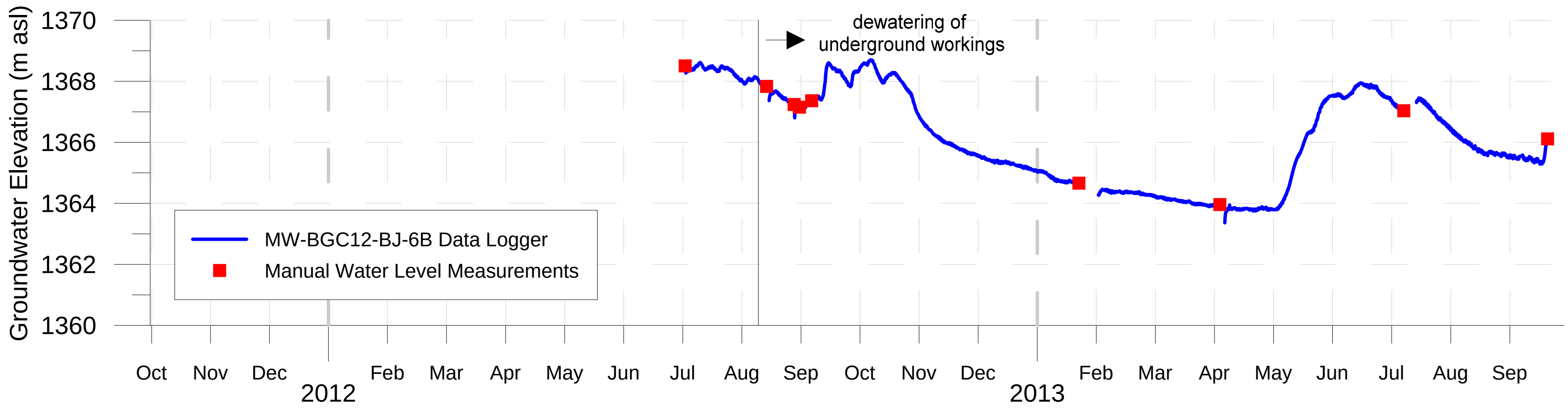
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

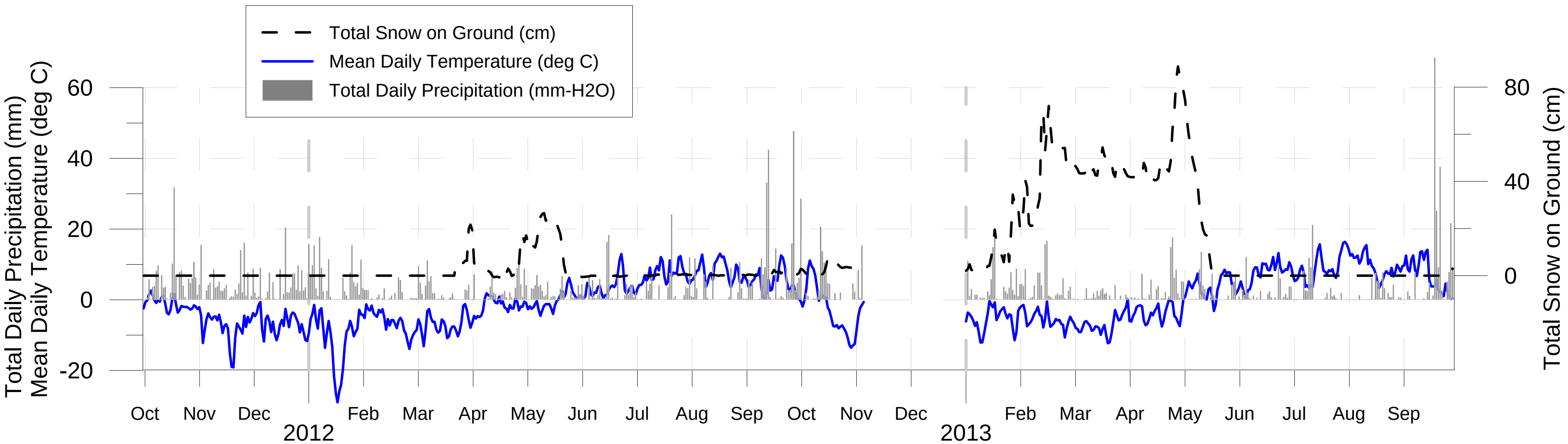
CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MW-BGC11-BJ-6A GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-10	1





Notes:
1) Well screened from 1276.26 to 1279.26 m asl, see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MW-BGC12-BJ-6B GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-11	1

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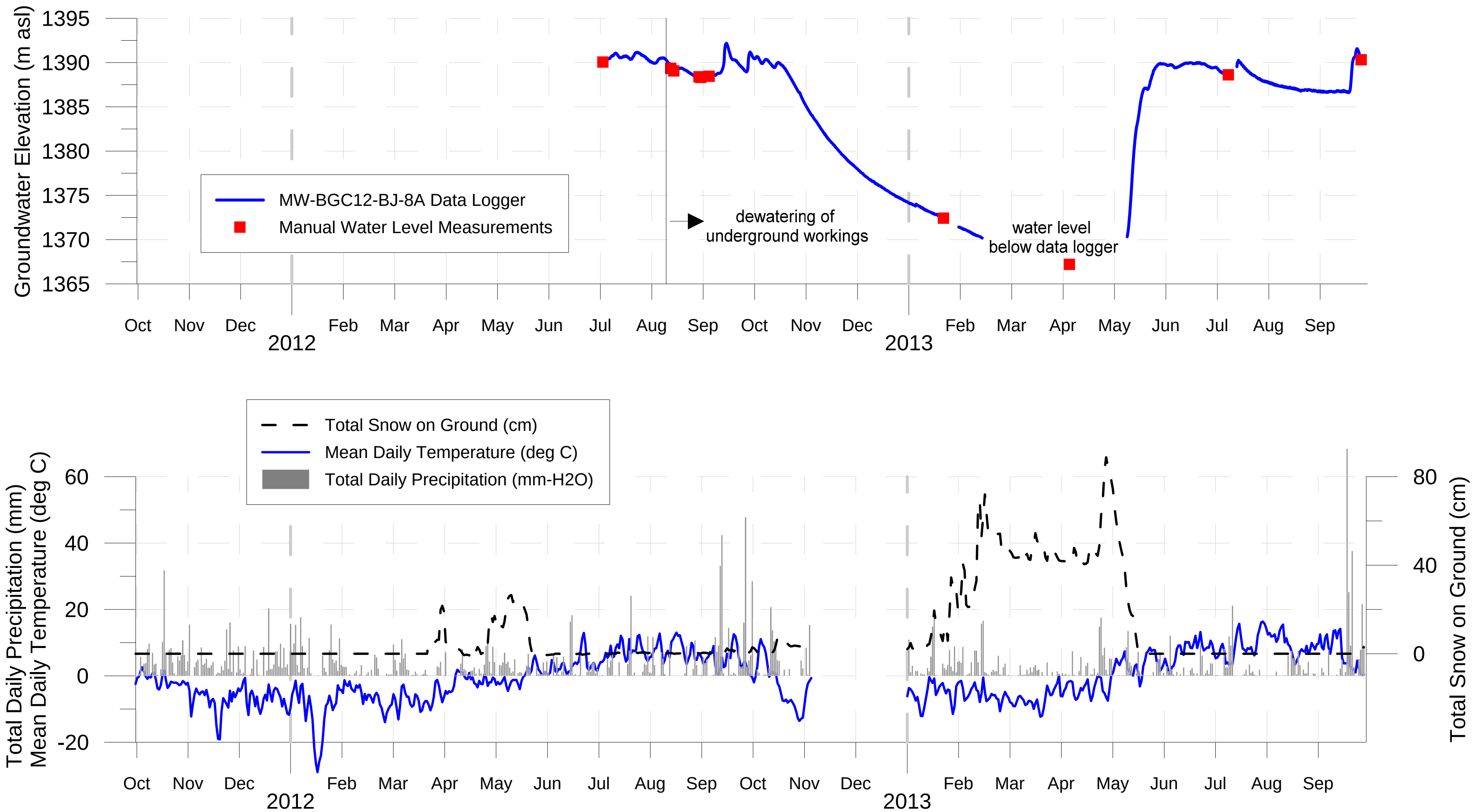

Notes:
1) Well screened from 1311.08 to 1317.18 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: MW-BGC12-BJ-8A GROUNDWATER HYDROGRAPH
DRAWN: LH, RET, BS	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-12 / REV. 1

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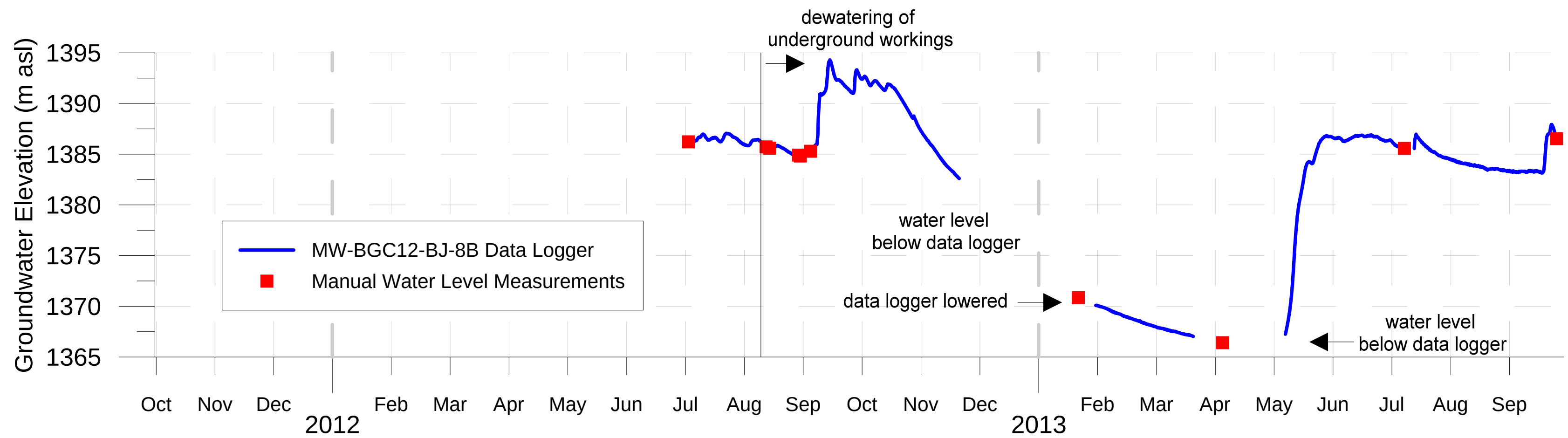

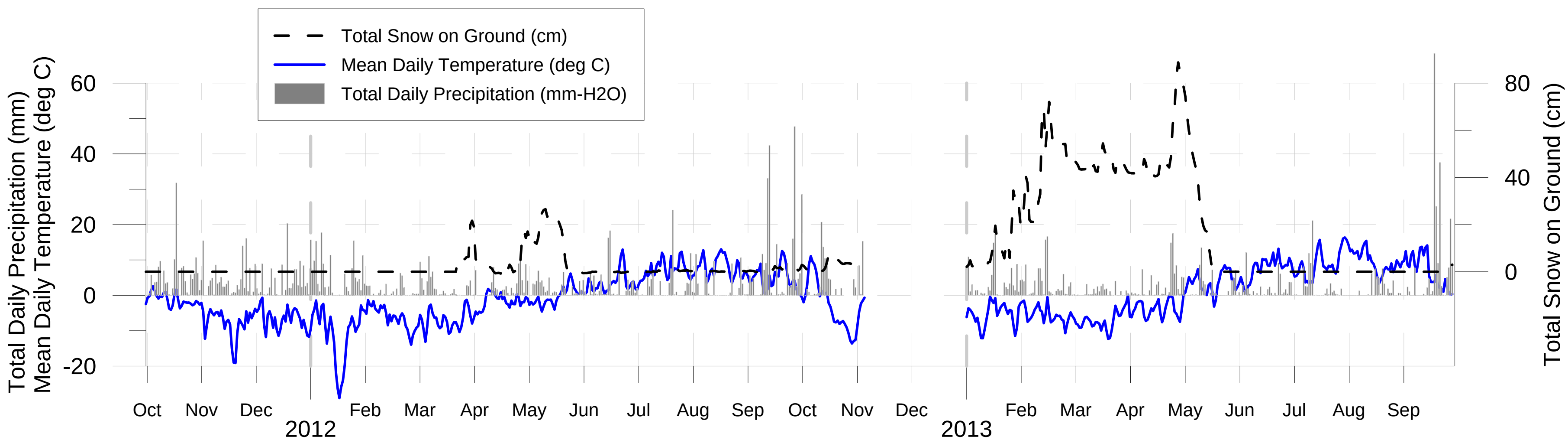

Notes:
1) Well screened from 1352.4 to 1358.5 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013).
No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: MW-BGC12-BJ-8B GROUNDWATER HYDROGRAPH
DRAWN: LH, RET, BS	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-13 / REV. 1

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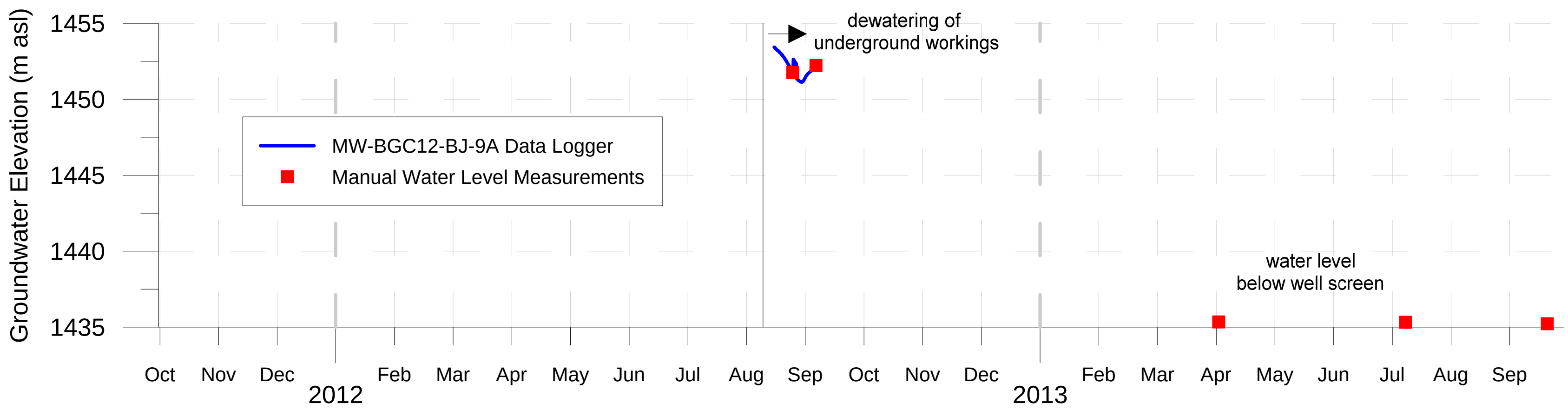

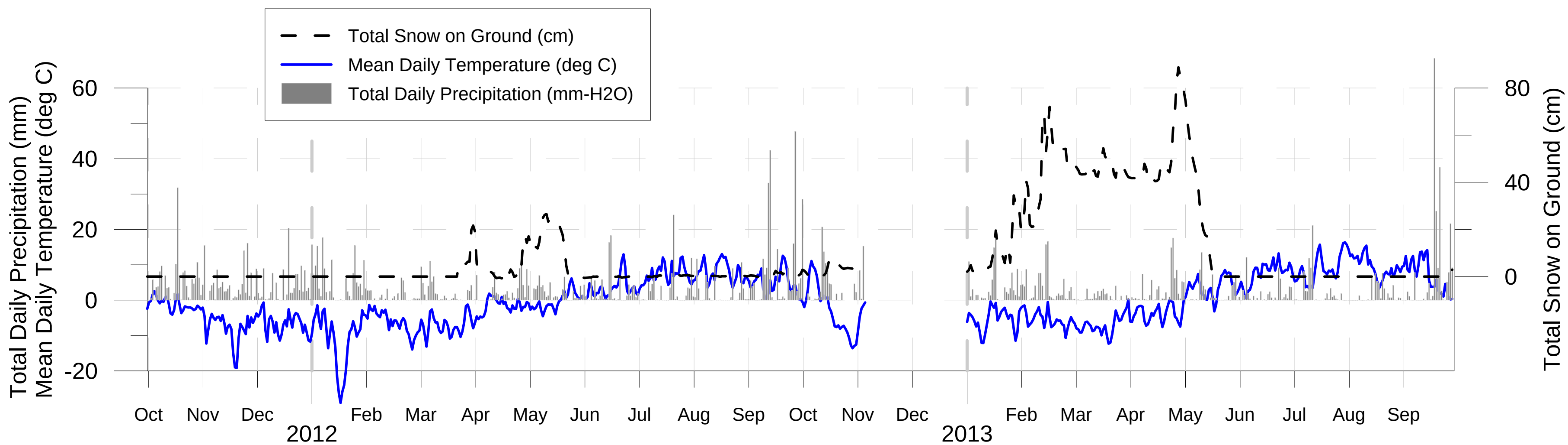

Notes:
1) Well screened from 1435.4 to 1441.5 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013).
No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-9A
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-14	1

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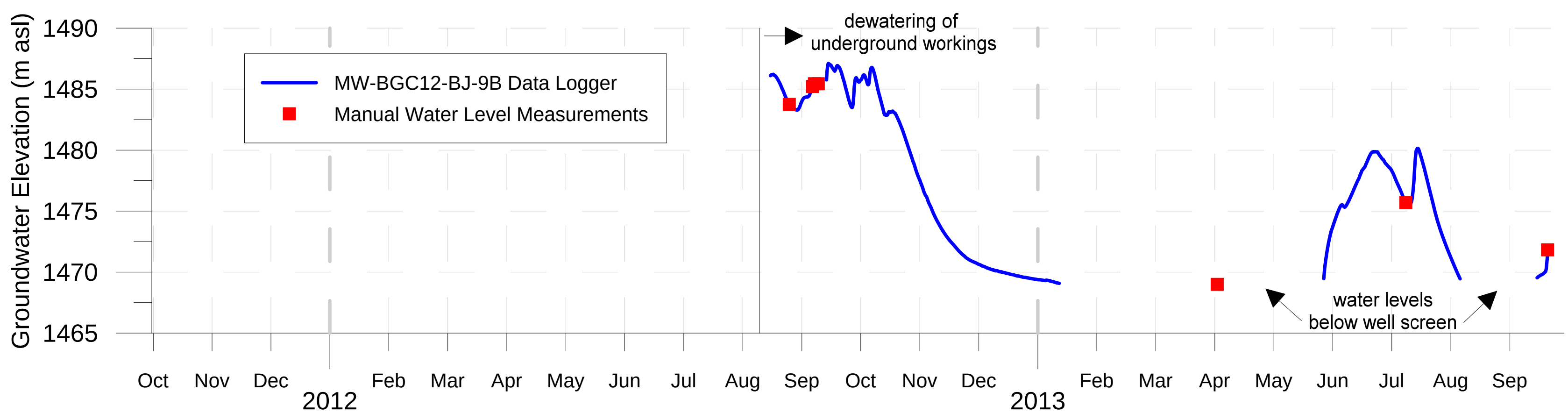

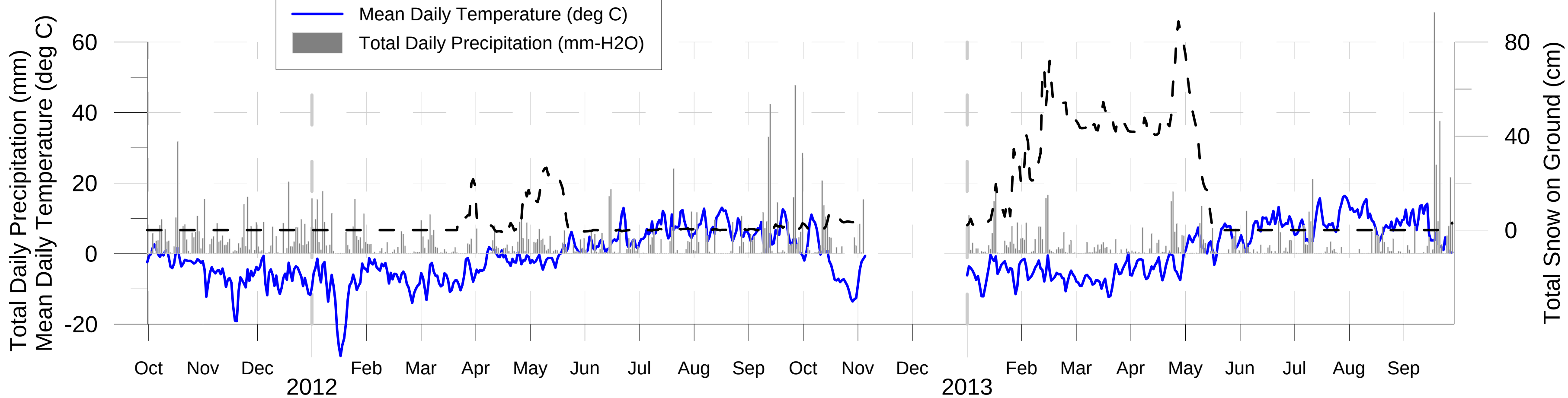

Notes:
1) Well screened from 1467.86 to 1473.96 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013).
No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-9B
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-15	1

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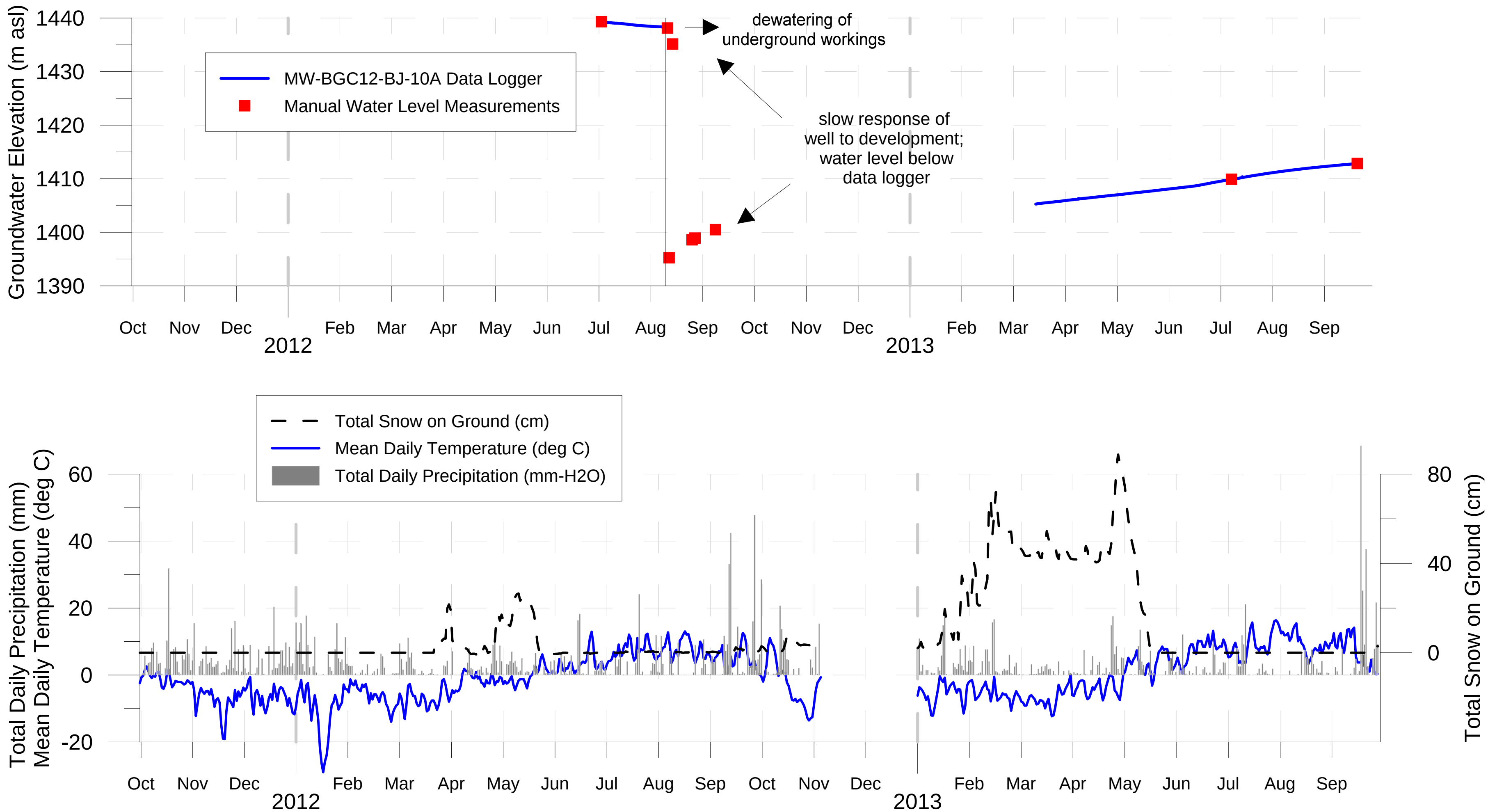

Notes:
1) Well screened from 1386.29 to 1392.39 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: MW-BGC12-BJ-10A GROUNDWATER HYDROGRAPH
DRAWN: LH, RET, BS	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-16 / REV. 1

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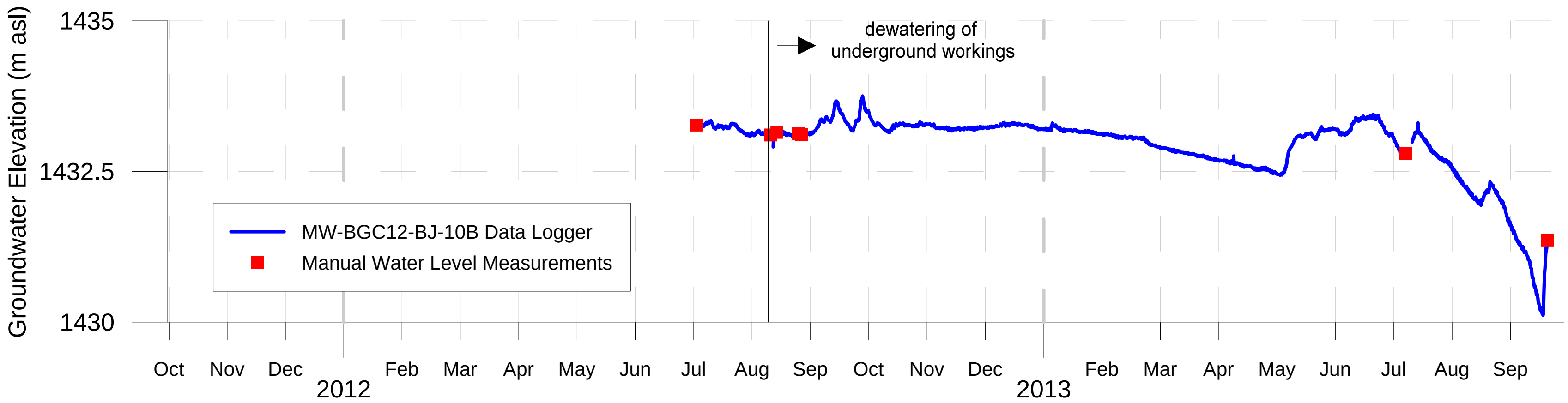

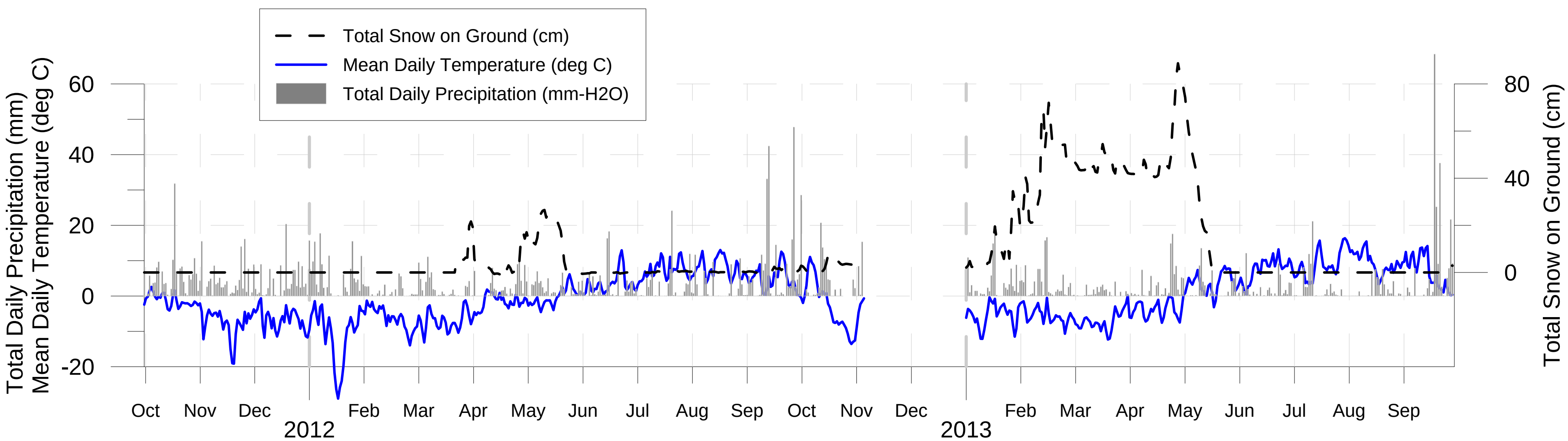

Notes:
1) Well screened from 1404.54 to 1407.54 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MW-BGC12-BJ-10B GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-17	1

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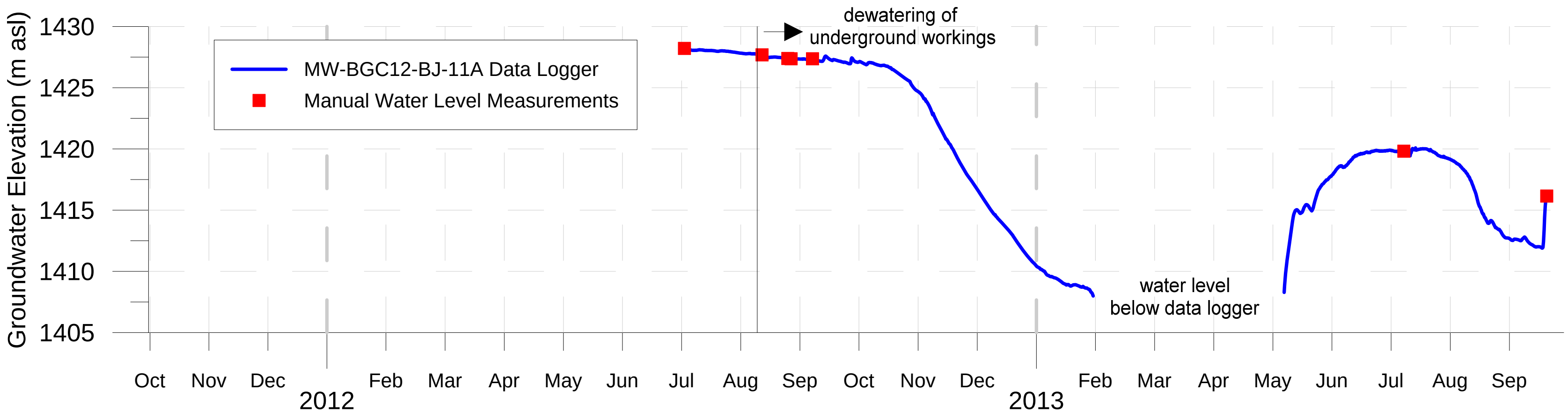

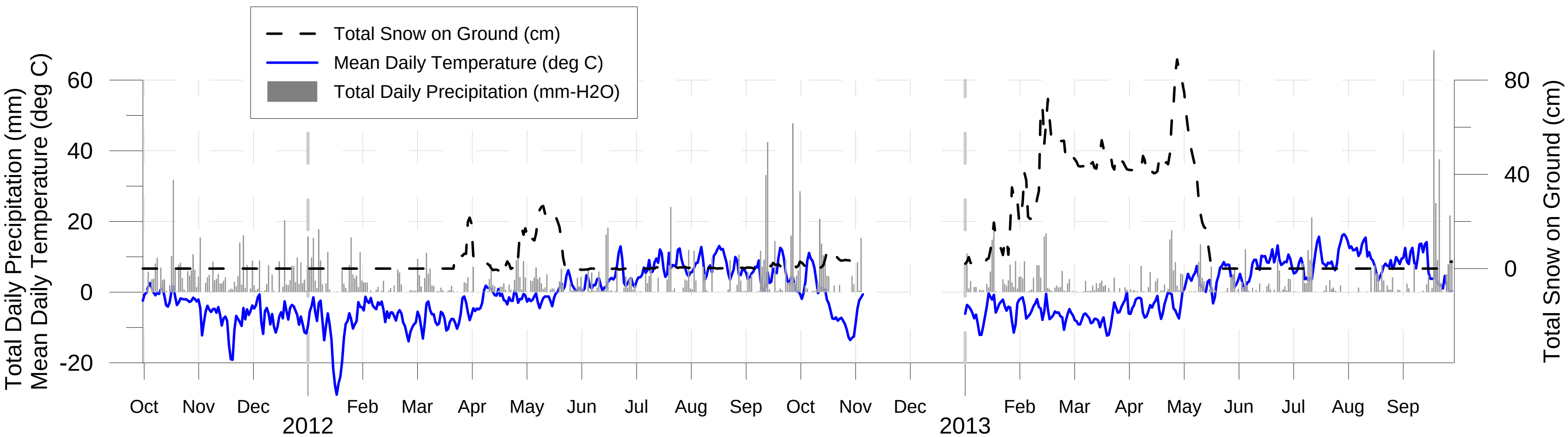

Notes:
1) Well screened from 1404.07 to 1407.07 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-11A
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-18	1

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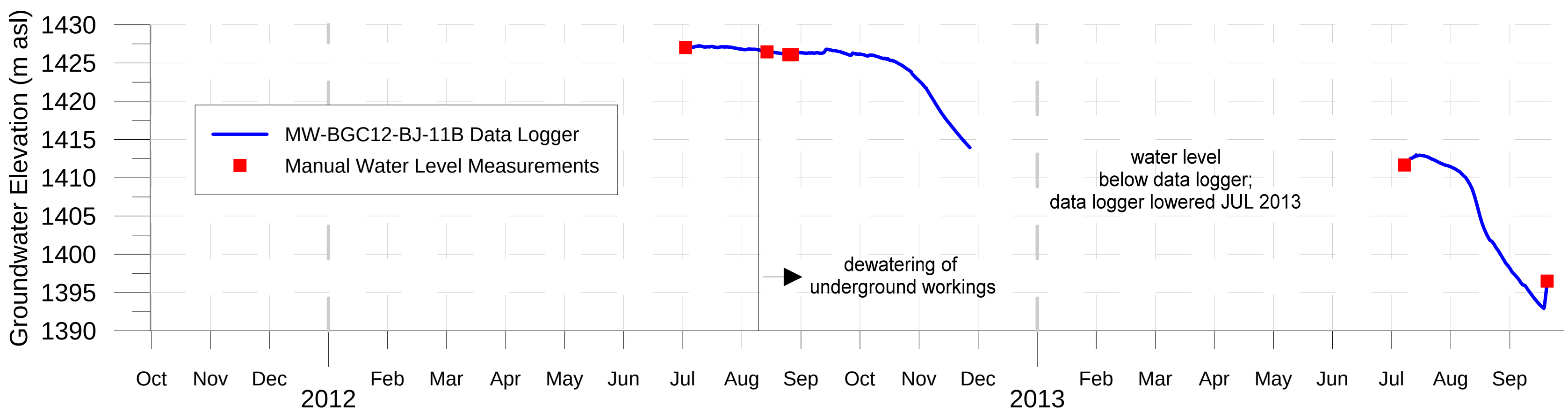
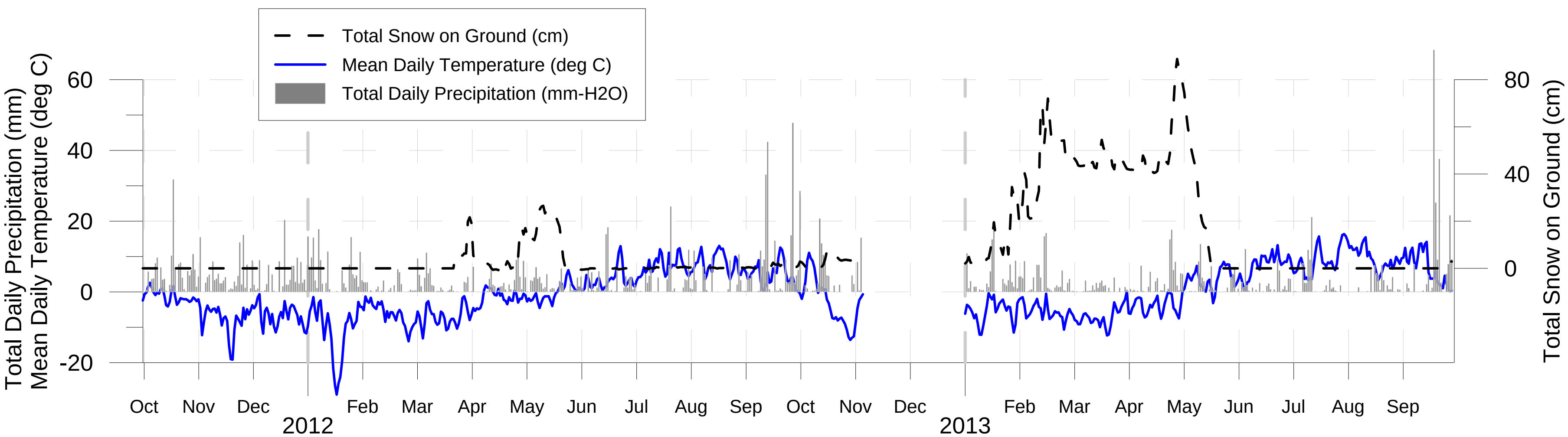
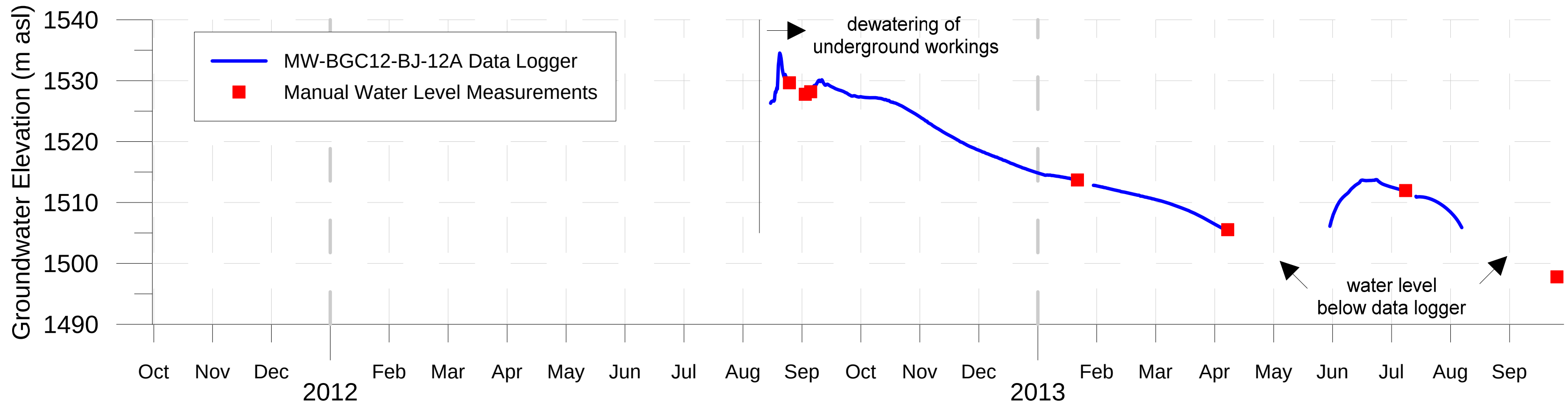
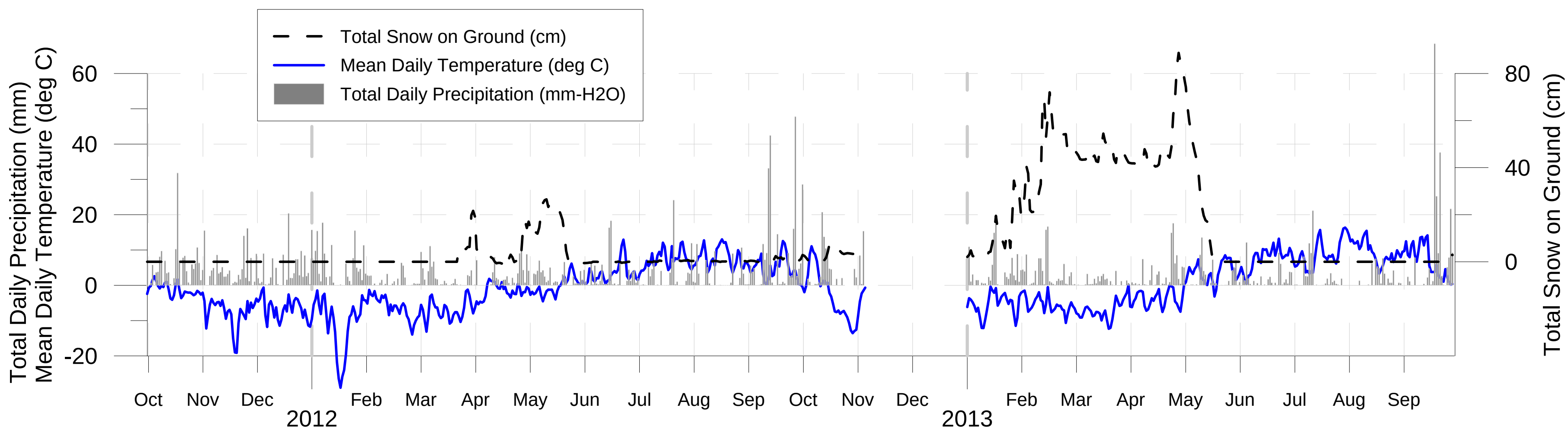




Notes:
1) Well screened from 1379.16 to 1382.26 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: MW-BGC12-BJ-11B GROUNDWATER HYDROGRAPH
DRAWN: LH, RET, BS	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-19 / REV. 1





Notes:
1) Well screened from 1485.29 to 1491.39 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC		

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-12A
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-20	1

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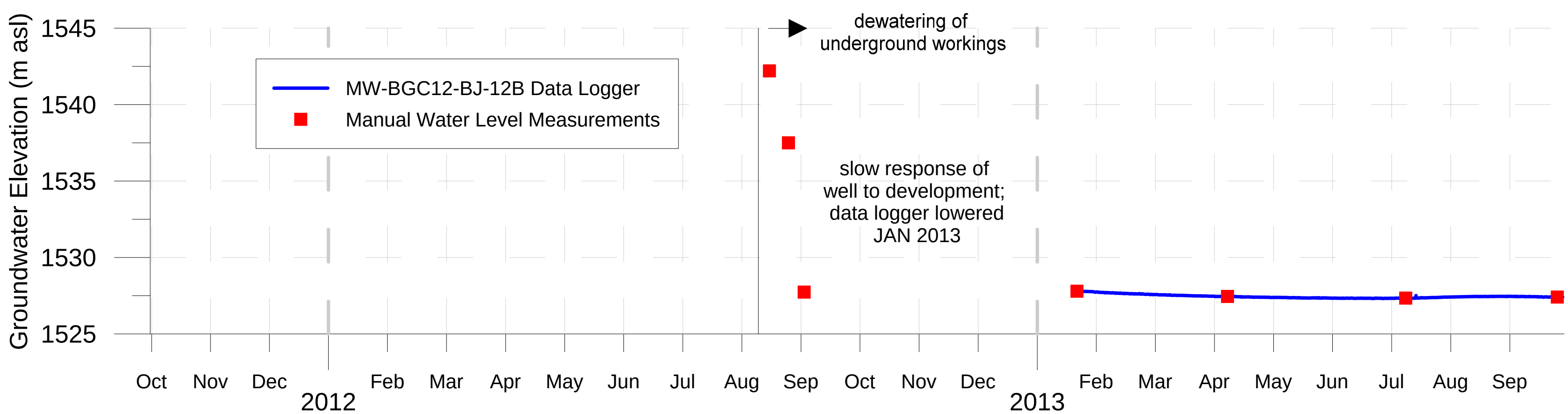

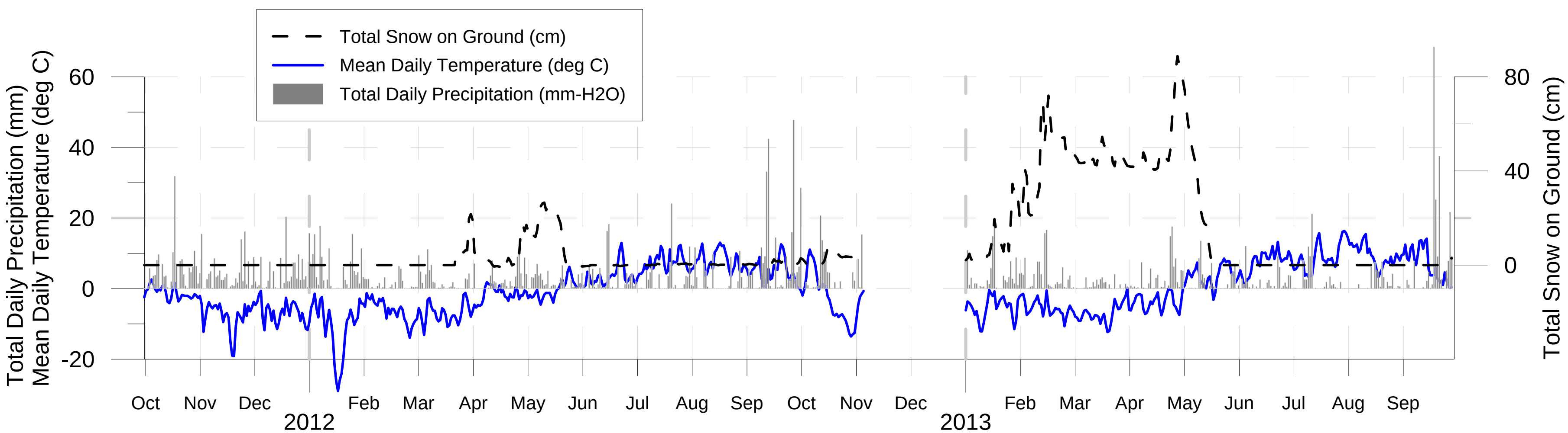

Notes:
1) Well screened from 1526.36 to 1532.46 m asl; see Appendix B for well log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: MW-BGC12-BJ-12B GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-21	1

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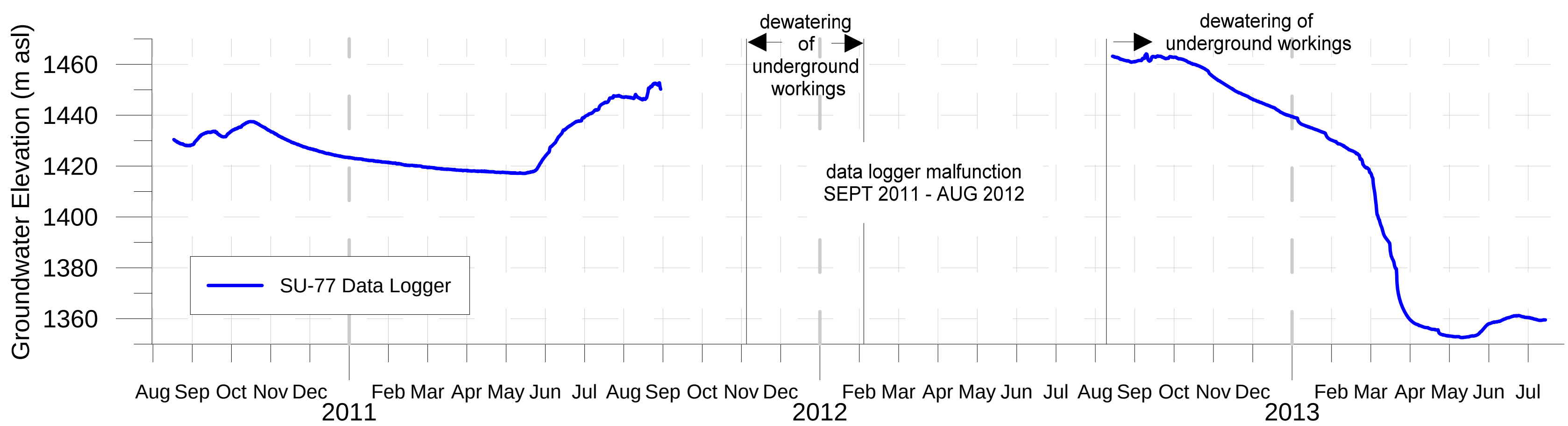

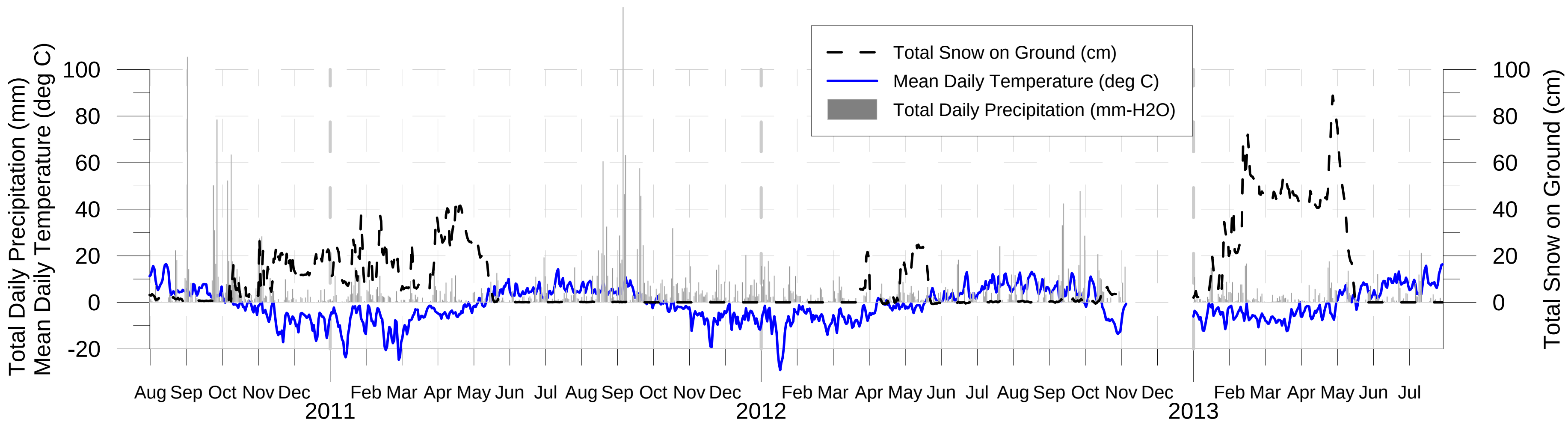

Notes:
1) VWP tip elevation at 1267.5 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: SU-77 GROUNDWATER HYDROGRAPH
DRAWN: LH, RET	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-22 / REV. 1

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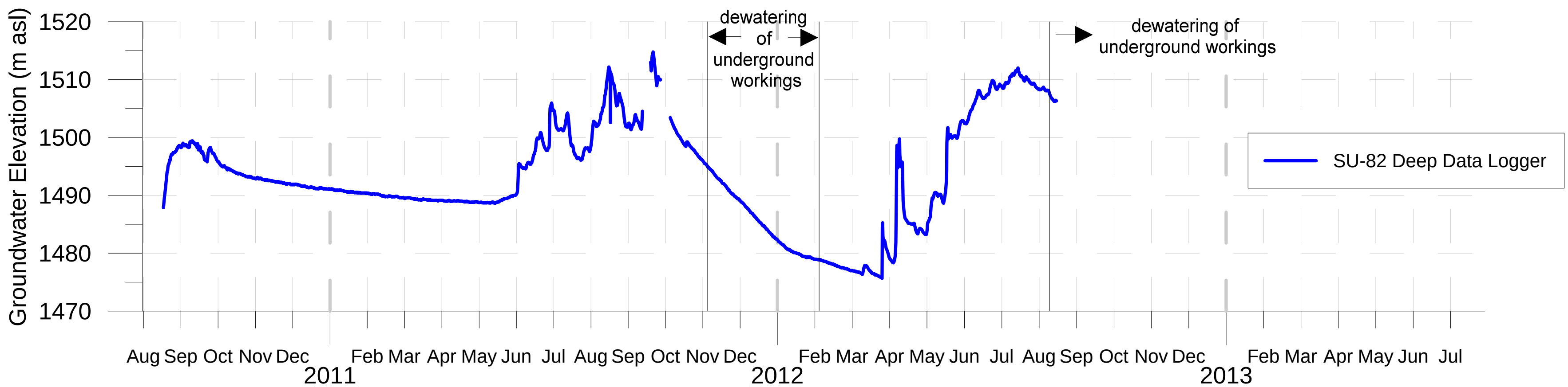

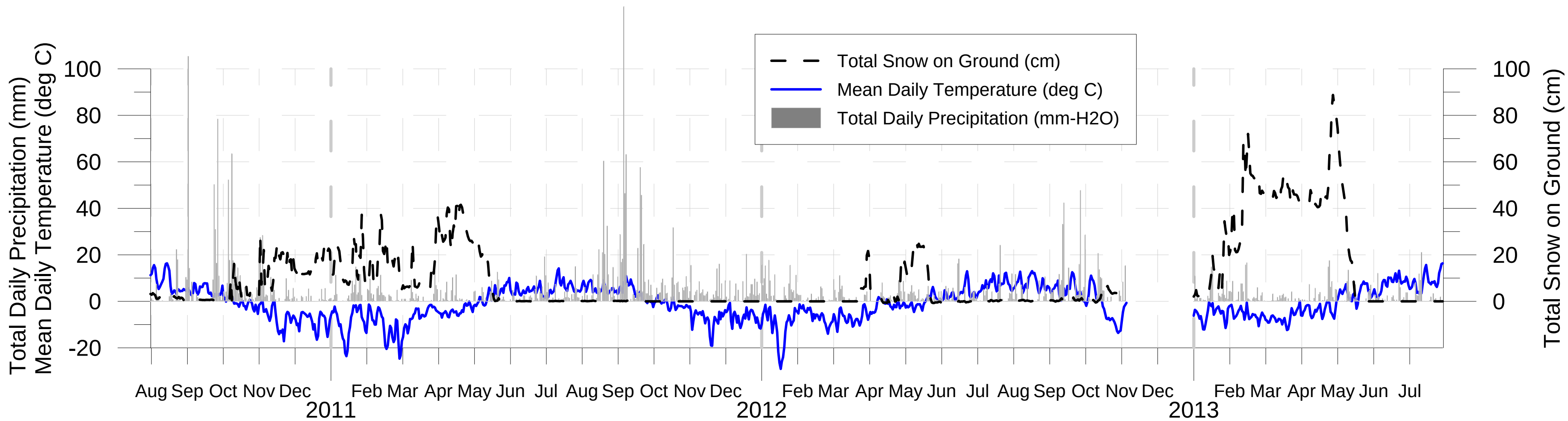

Notes:
1) VWP tip elevation at 1202.4 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET	APPROVED: VC

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CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SU-82 DEEP
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-24	1

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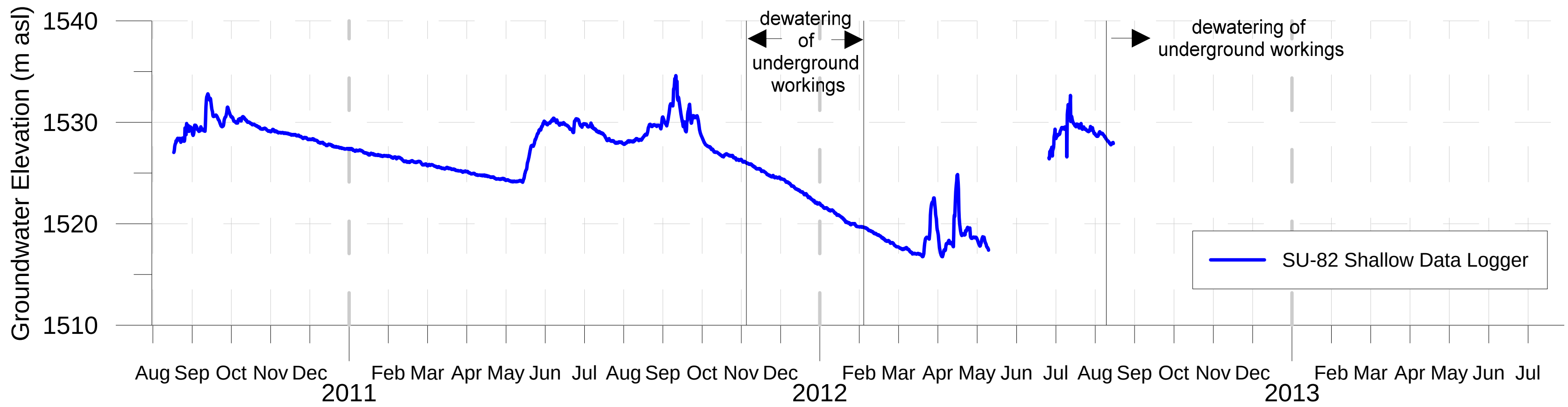

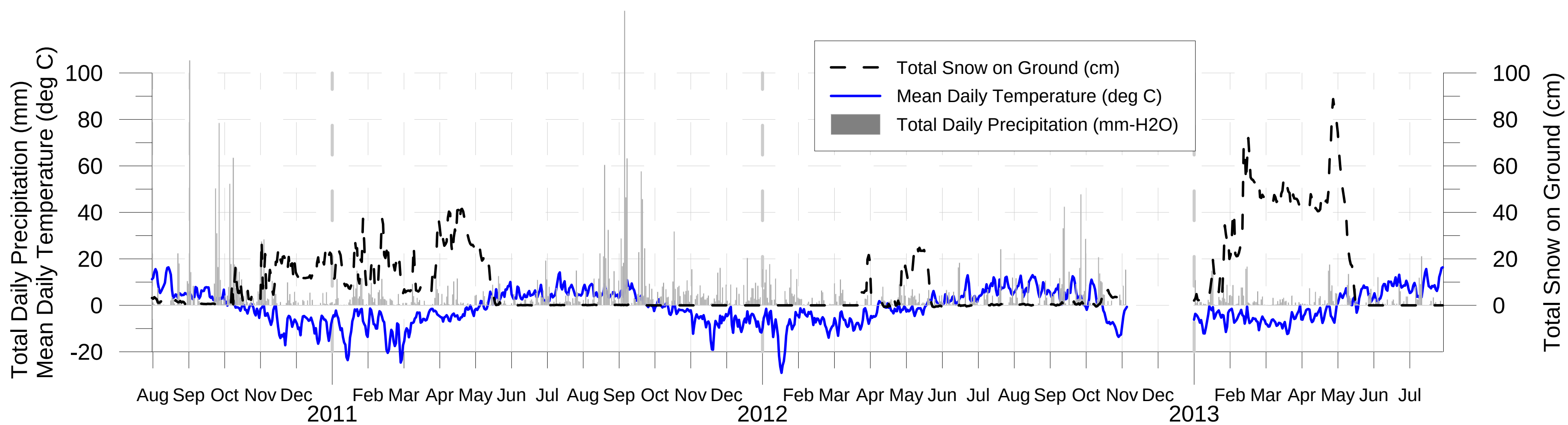

Notes:

1) VWP tip elevation at 1475.5 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: SU-82 SHALLOW GROUNDWATER HYDROGRAPH
DRAWN: LH, RET	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-23 / REV. 1

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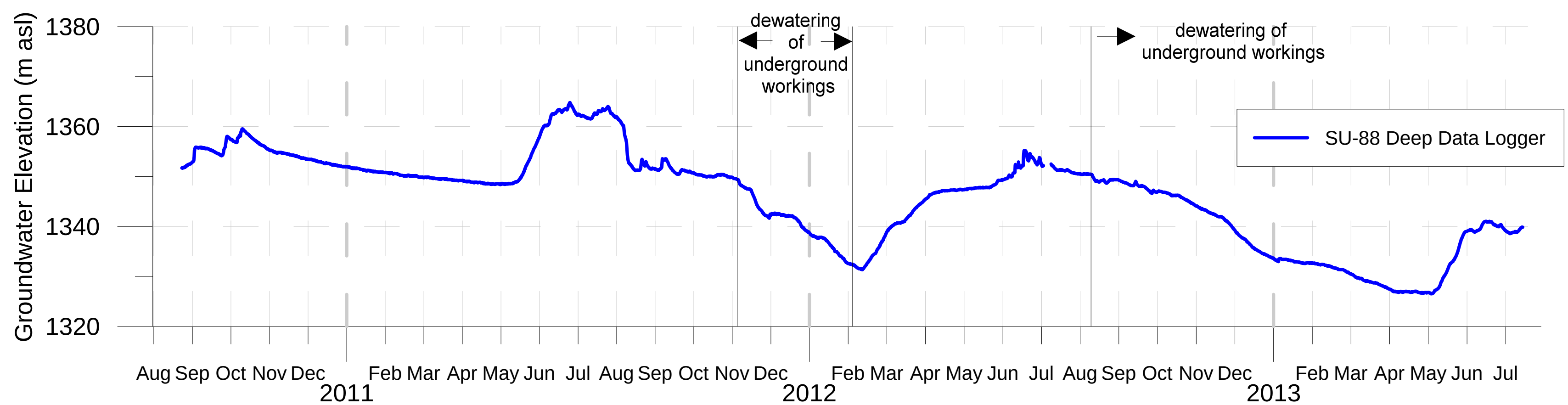

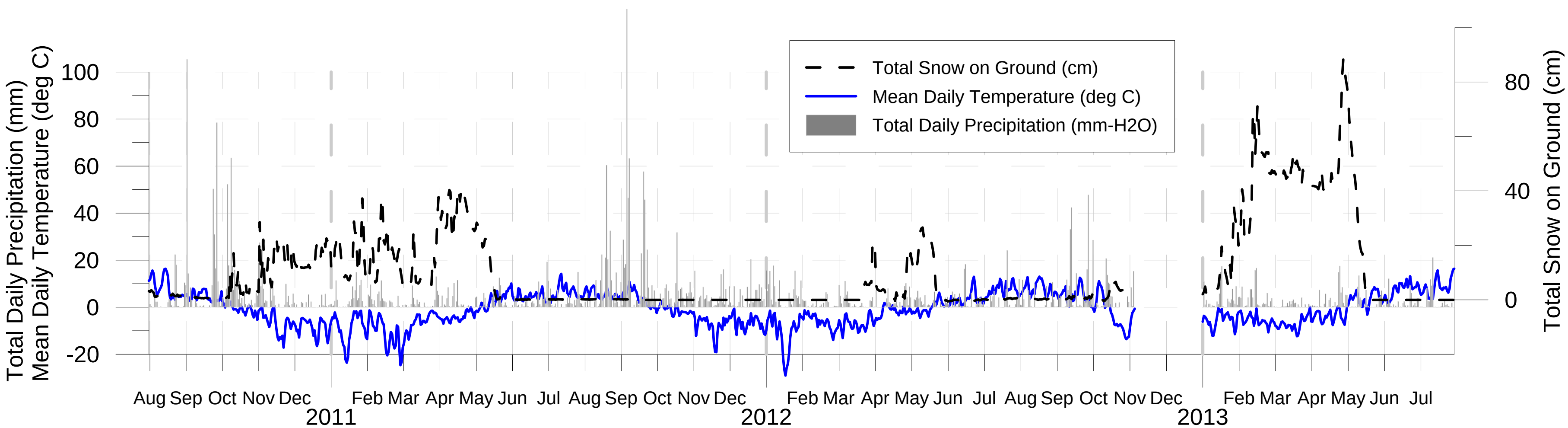

Notes:
1) VWP tip elevation at 1180.7 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: SU-88 DEEP GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-26	1

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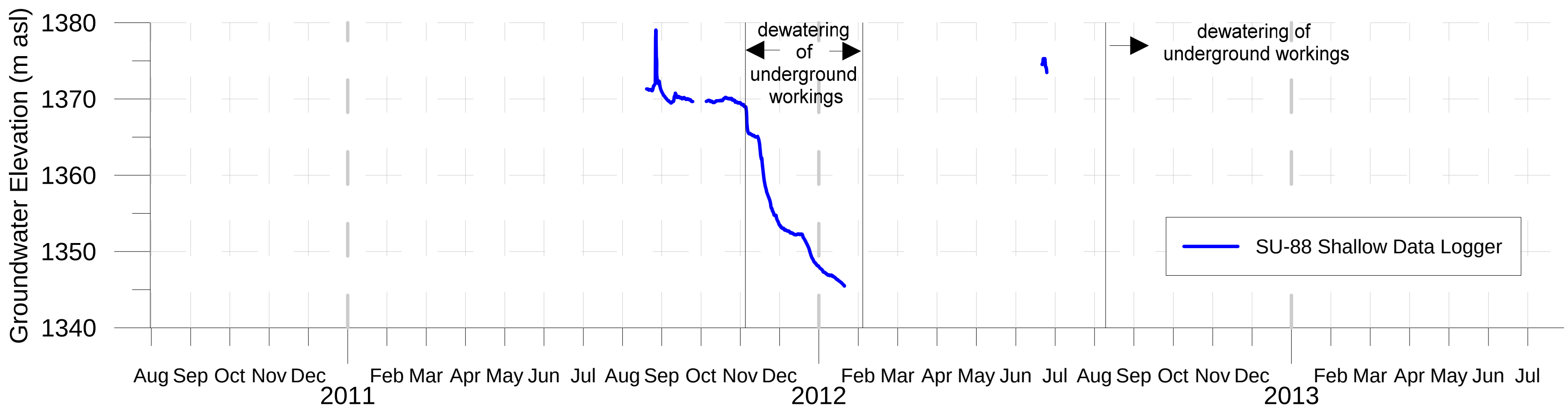

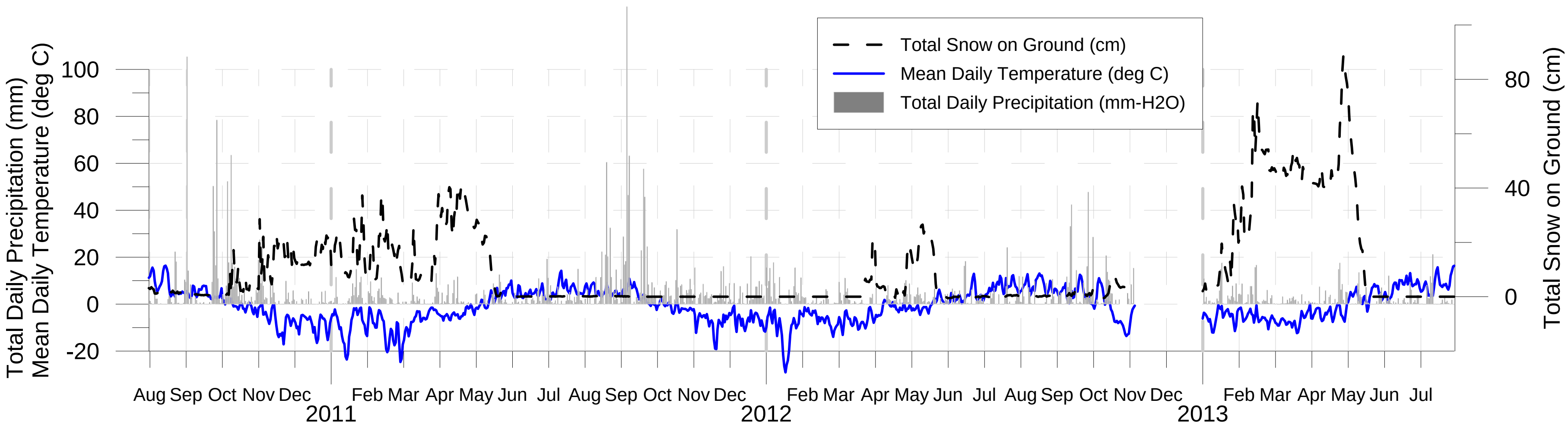

Notes:
1) VWP tip elevation at 1316.9 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Nov 2011 to Feb 2012 and Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, RET	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SU-88 SHALLOW
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-25	1

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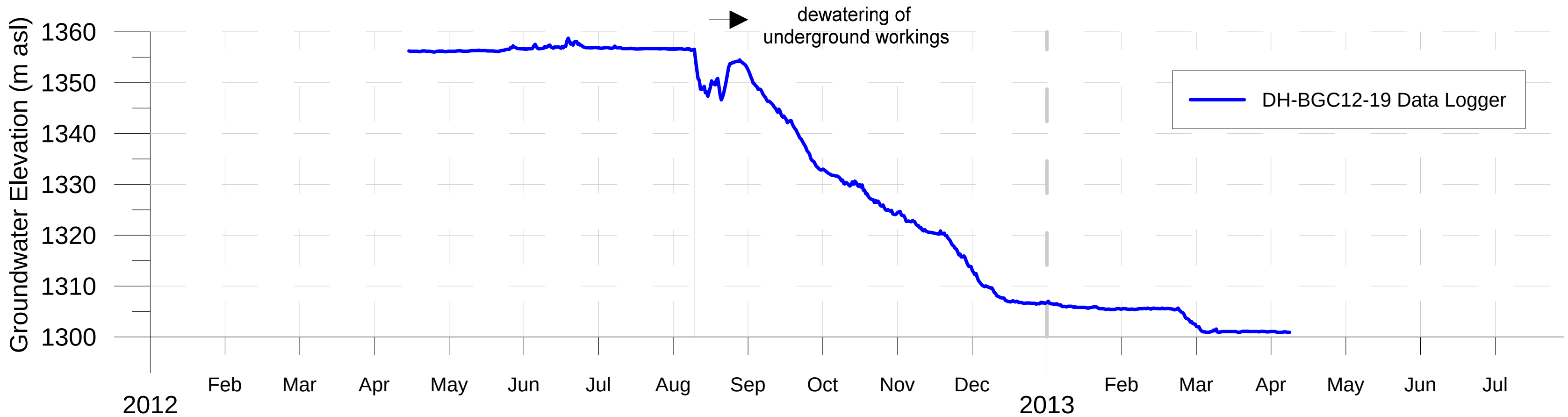

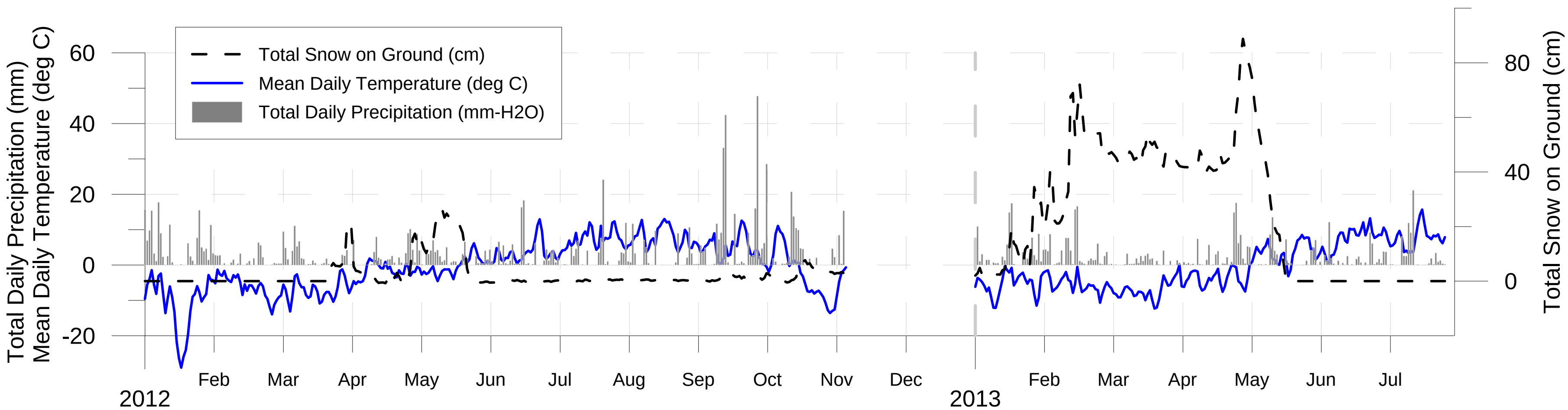

Notes:

1) VWP tip elevation at 1158.9 m asl; see Appendix C for VWP summary log.

2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.

3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A

DESIGNED: KSJ

DATE: MAY 2014

CHECKED: DP

DRAWN: LH, RET

APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: PRETIUM RESOURCES INC.

PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL

TITLE: DH-BGC12-19 GROUNDWATER HYDROGRAPH

PROJECT No.: 1008-010

DWG No.: D-27

REV.: 1

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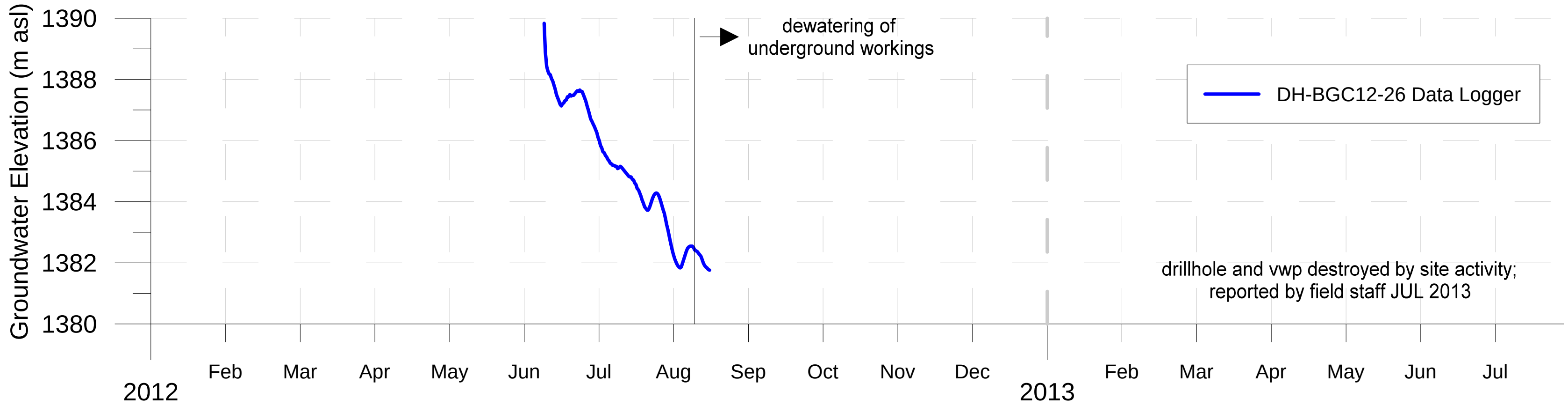

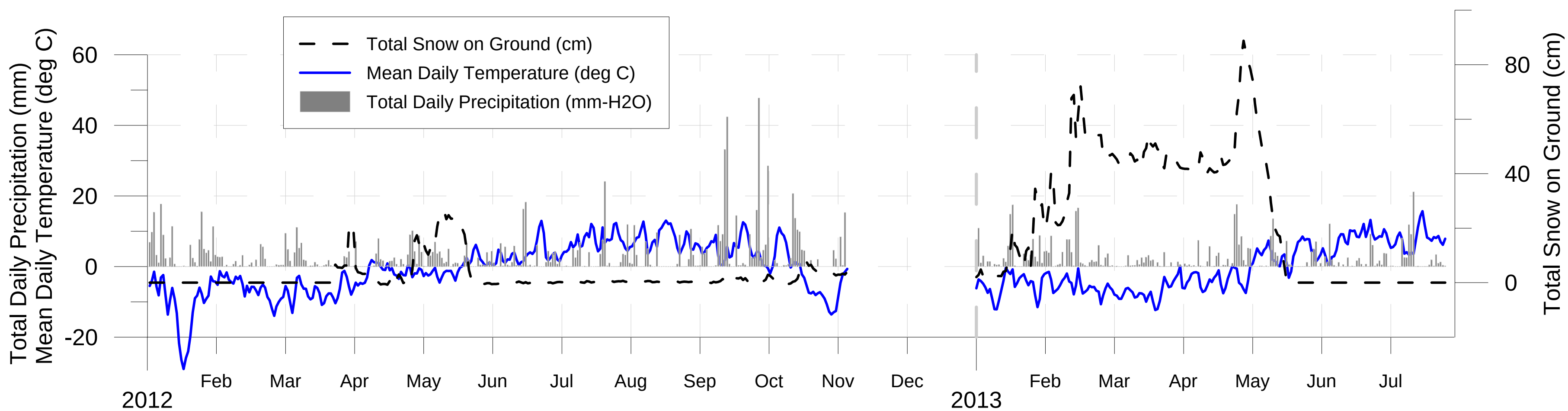

Notes:
1) VWP tip elevation at 1378.2 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: DH-BGC12-26 GROUNDWATER HYDROGRAPH
DRAWN: LH, RET	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-28 / REV. 1

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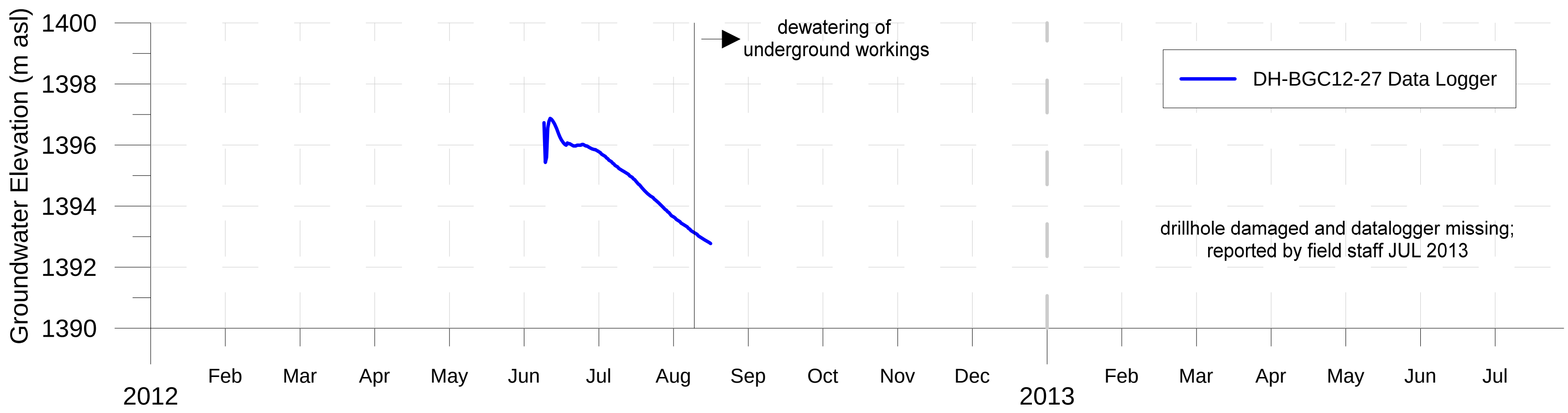

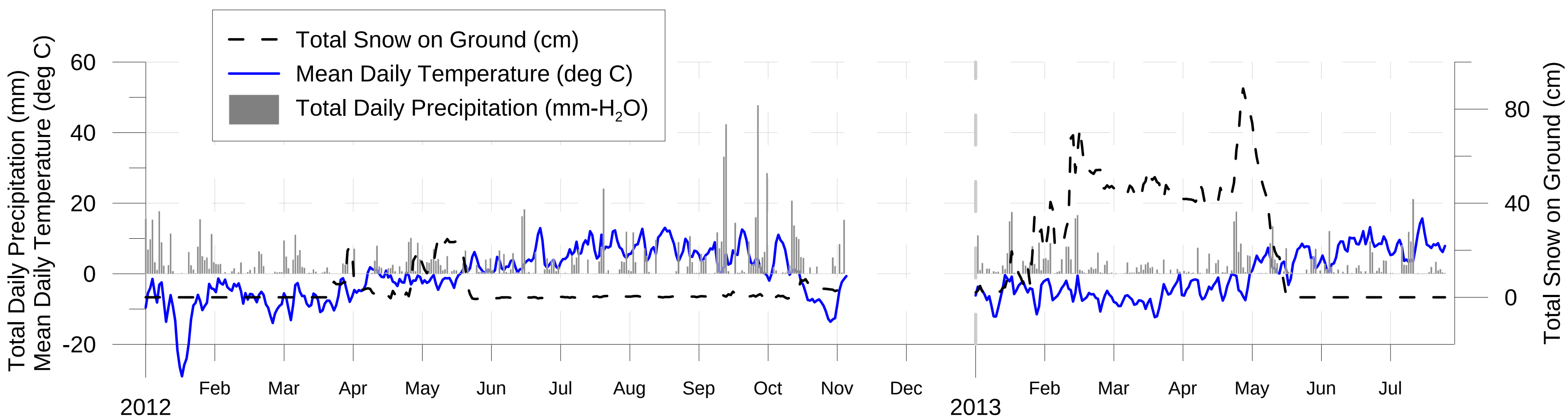

Notes:

1) VWP tip elevation at 1385.7 m asl; see Appendix C for VWP summary log.

2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.

3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: DH-BGC12-27 GROUNDWATER HYDROGRAPH
DRAWN: LH, RET	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-29 / REV. 1

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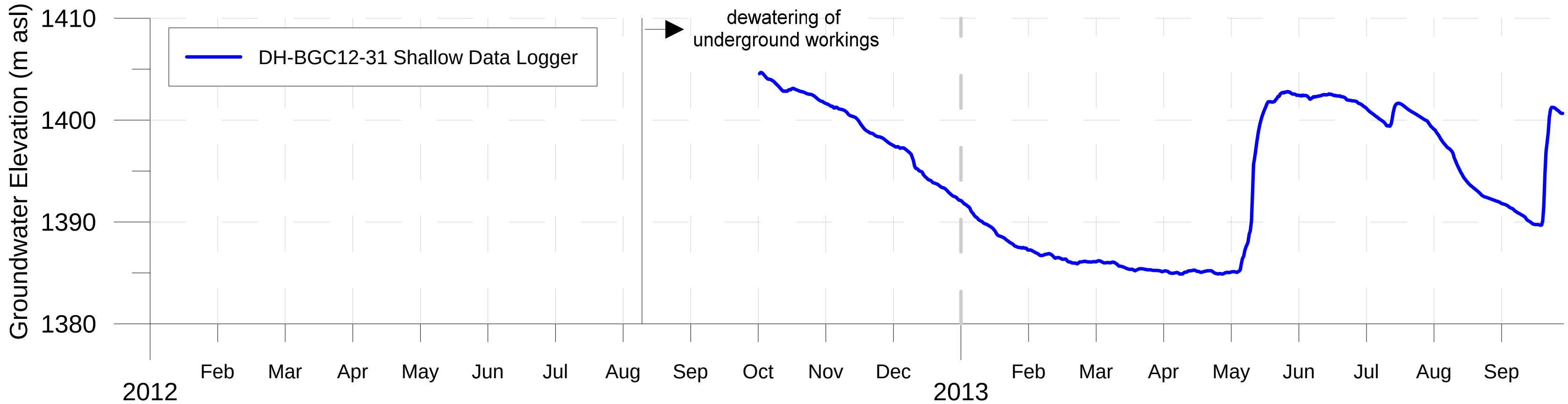
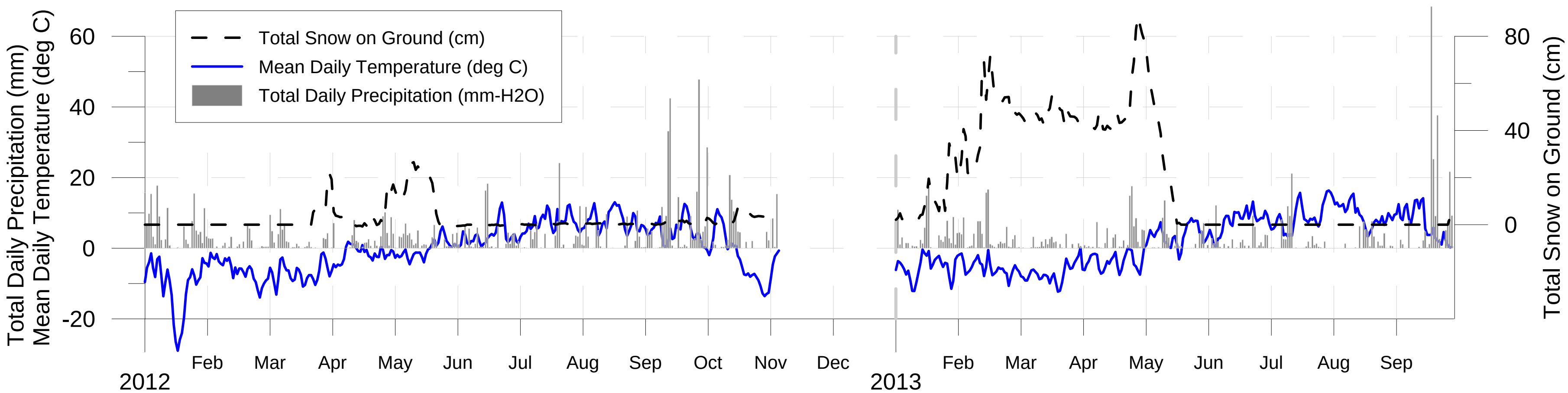




Notes:
1) VWP tip elevation at 1388.4 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013).
No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE:	N/A	DESIGNED:	KSJ
DATE:	MAY 2014	CHECKED:	DP
DRAWN:	RET, BS	APPROVED:	VC

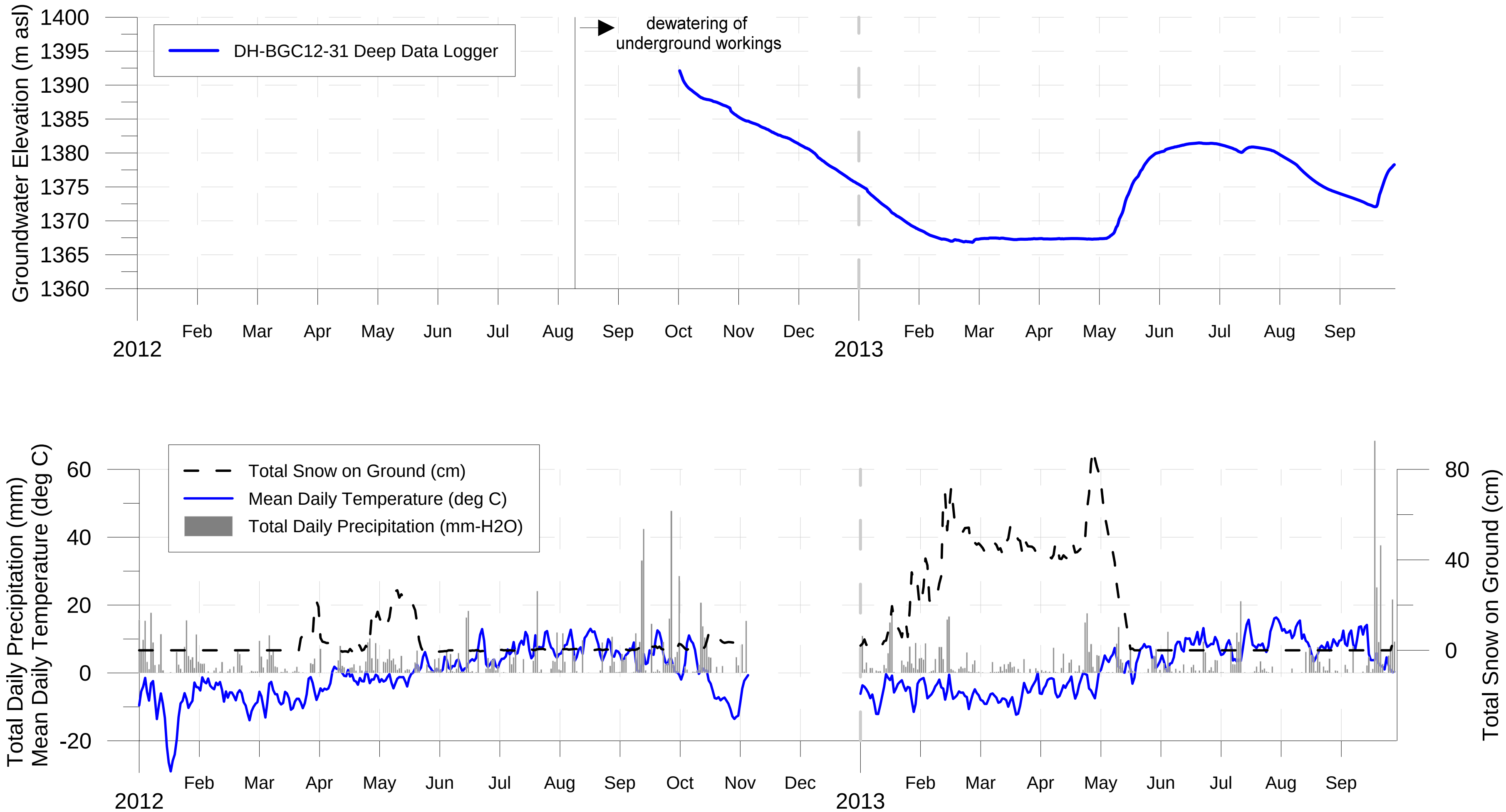
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
DH-BGC12-31 SHALLOW
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-30	1



Notes:
1) VWP tip elevation at 1368 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: RET, BS	APPROVED: VC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
DH-BGC12-31 DEEP
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-31	1

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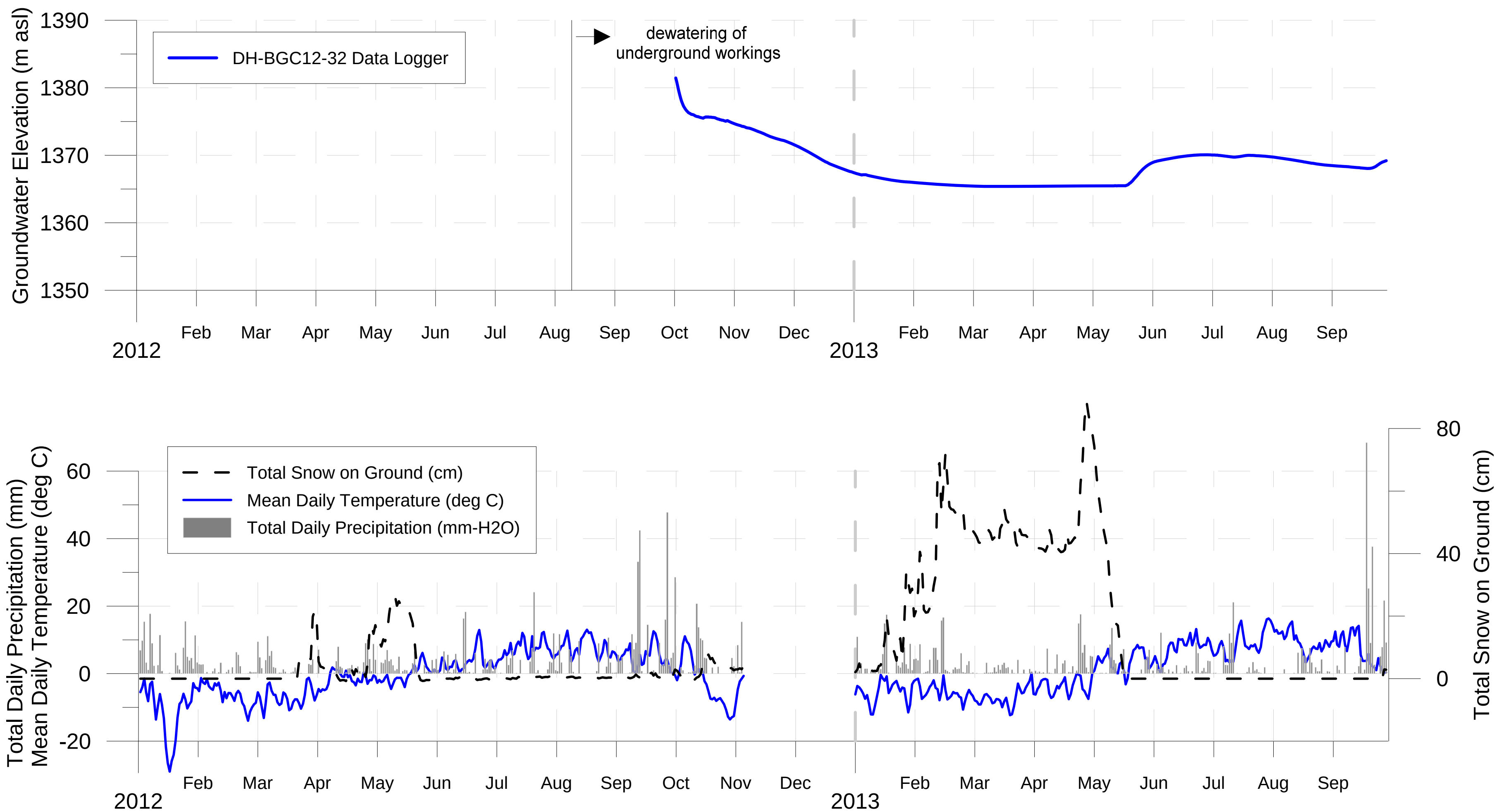

Notes:

1) VWP tip elevation at 1368.3 m asl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occurred from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: DH-BGC12-32 GROUNDWATER HYDROGRAPH
DRAWN: LH, RET, BS	APPROVED: VC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. D-32 / REV. 1

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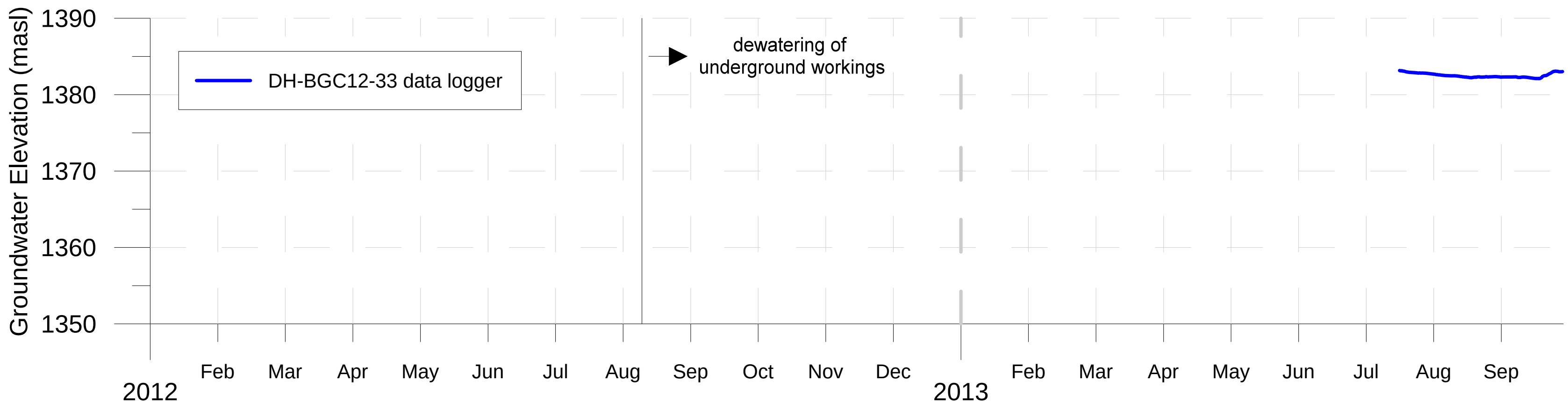

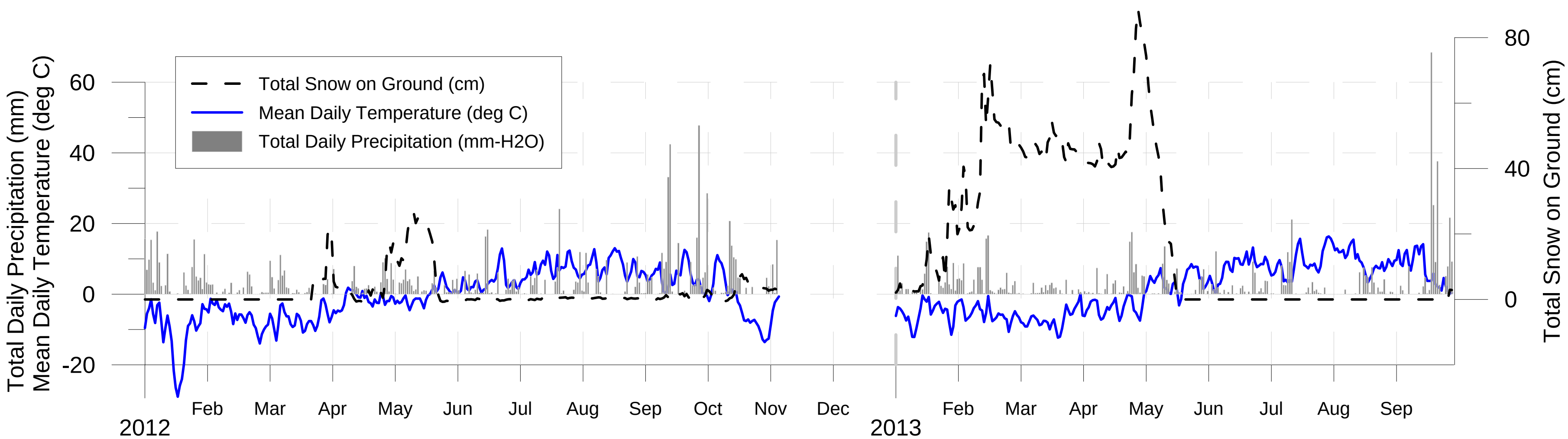

Notes:
1) VWP tip elevation at 1370 masl; see Appendix C for VWP summary log.
2) Meteorological data from the Brucejack meteorological station (Rescan, 2011-2013). No meteorological data available from Nov 2012 to Jan 2013.
3) Dewatering of underground workings impacting groundwater elevations at the site occured from Aug 2012 onwards.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, BS	APPROVED: VC

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CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
DH-BGC12-33
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	D-33	1

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APPENDIX E
THORNTHWAITE RECHARGE ESTIMATE

Table E-1. Thornthwaite Recharge Estimate

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual	Comments
Temperature, T[1] (°C)	-12.1	-8.9	-6.4	-2.3	2.6	6.7	8.9	8.1	4.2	-1.6	-7.3	-10.5	-1.6	Average
Heat Index, HI[2] (°C)	-	-	-	-	0.4	1.6	2.4	2.1	0.8	-	-	-	7.2	Sum
Unadjusted Potential Evapotranspiration, U[3] (mm)	-	-	-	-	35.3	63.2	75.2	71.0	47.4	-	-	-	-	
Precipitation, P[1] (mm)	322.0	228.0	180.0	129.0	112.0	91.0	117.0	178.0	227.0	346.0	297.0	299.0	2526.0	Sum
Potential Evapotranspiration, PE[4] (mm)	0.0	0.0	0.0	0.0	35.3	63.2	75.2	71.0	47.4	0.0	0.0	0.0	-	
Runoff, R[5] (mm)	22.0	18.0	16.0	28.0	148.0	406.0	373.0	362.0	214.0	94.0	33.0	28.0	-	
Surplus/Deficit[6] (mm)	300.0	210.0	164.0	101.0	-71.3	-378.2	-331.2	-255.0	-34.4	252.0	264.0	271.0	-	
Moisture Stored in Soil, St[7]	752.6	752.6	752.6	752.6	681.3	303.1	0.0	0.0	0.0	252.0	516.0	752.6	-	
Net Infiltration, NI[8] (mm)	300.0	210.0	164.0	101.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.4	809.5	Sum
								Recharge as percent of total precipitation:					32%	

Notes:

1. Mean monthly temperature and precipitation data from ClimateBC model for Brucejack project elevation of 1,400 m asl (see Tables 1 & 2)
2. Heat Index (HI) = $(T/5)^{1.514}$
3. Unadjusted Potential Evapotranspiration (U) = $16*(10*T/TE)^a$, where TE = Temperature Efficiency Index = sum of monthly HI value and a = [(6.75 x 10−7) * TE3] − [(7.71 x 10−5) * TE2] + [(1.792 x 10−2) * TE] + 0.49239
4. Potential Evapotranspiration (PE) = U * F, where F = altitude correction factor for meteorological data = 1.0 for data at Brucejack elevation
5. Total monthly runoff estimates from Brucejack water balance model Van der Wiele analysis (BGC, 2014b)
6. Surplus (+) and deficit (−) = monthly surplus or deficit of water = P −PE − R
7. Assumed water holding capacity of soil = 752.6 mm; back-calculated maximum value by assuming December storage must be 100% replenished
8. Net Infiltration (NI) = surplus + previous month's storage − total storage capacity (only if greater than zero)

APPENDIX F
ADIT AND UNDERGROUND DEWATERING DATA

Table F-2. Adit Dewatering Data for the Period September 1, 2012 to January 17, 2014

Date / Time	Interval	Totalized Volume[1]			Period Volume			Flow Rate	
	(min)	(ft^3)	(US gal)	(m^3)	(ft^3)	(US gal)	(m^3)	(US gpm)	(m^3/d)
9/1/12 9:00		3,268,200	24,446,136	92,616					
9/2/12 9:05	1,445	3,290,400	24,612,192	93,245	22,200	166,056	629	115	627
9/3/12 8:50	1,425	3,313,600	24,785,728	93,903	23,200	173,536	657	122	664
9/4/12 9:30	1,480	3,337,400	24,963,752	94,577	23,800	178,024	674	120	656
9/6/12 8:55	2,845	3,380,300	25,284,644	95,793	42,900	320,892	1,216	113	615
9/7/12 9:00	1,445	3,402,600	25,451,448	96,425	22,300	166,804	632	115	630
9/8/12 9:00	1,440	3,421,100	25,589,828	96,949	18,500	138,380	524	96	524
9/11/12 9:15	4,335	3,434,700	25,691,556	97,335	13,600	101,728	385	23	128
9/12/12 9:15	1,440	3,441,600	25,743,168	97,530	6,900	51,612	196	36	196
9/13/12 9:15	1,440	3,456,000	25,850,880	97,938	14,400	107,712	408	75	408
9/14/12 9:21	1,446	3,463,100	25,903,988	98,139	7,100	53,108	201	37	200
9/15/12 9:10	1,429	3,463,100	25,903,988	98,139	-	-	-	-	-
9/16/12 9:15	1,445	3,480,200	26,031,896	98,624	17,100	127,908	485	89	483
9/17/12 9:20	1,445	3,507,300	26,234,604	99,392	27,100	202,708	768	140	765
9/18/12 9:52	1,472	3,524,900	26,366,252	99,891	17,600	131,648	499	89	488
9/19/12 9:15	1,403	3,549,100	26,547,268	100,577	24,200	181,016	686	129	704
9/20/12 9:20	1,445	3,554,900	26,590,652	100,741	5,800	43,384	164	30	164
9/21/12 10:10	1,490	3,560,200	26,630,296	100,891	5,300	39,644	150	27	145
9/22/12 9:26	1,396	3,573,200	26,727,536	101,260	13,000	97,240	368	70	380
9/23/12 10:03	1,477	3,586,400	26,826,272	101,634	13,200	98,736	374	67	365
9/24/12 9:45	1,422	3,586,500	26,827,020	101,636	100	748	3	1	3
9/25/12 9:20	1,415	3,600,100	26,928,748	102,022	13,600	101,728	385	72	392
9/26/12 13:20	1,680	3,617,900	27,061,892	102,526	17,800	133,144	504	79	432
9/27/12 9:20	1,200	3,631,000	27,159,880	102,897	13,100	97,988	371	82	445
9/28/12 9:25	1,445	3,659,900	27,376,052	103,716	28,900	216,172	819	150	816
9/29/12 9:00	1,415	3,698,300	27,663,284	104,805	38,400	287,232	1,088	203	1,107
9/30/12 15:00	1,800	3,716,800	27,801,664	105,329	18,500	138,380	524	77	419
10/1/12 18:00	1,620	3,726,600	27,874,968	105,607	9,800	73,304	278	45	247
10/2/12 13:30	1,170	3,731,300	27,910,124	105,740	4,700	35,156	133	30	164
10/3/12 19:30	1,800	3,731,600	27,912,368	105,748	300	2,244	9	1	7
10/4/12 16:30	1,260	3,731,700	27,913,116	105,751	100	748	3	1	3
10/5/12 10:22	1,072	3,731,700	27,913,116	105,751	-	-	-	-	-
10/6/12 16:20	1,798	3,731,700	27,913,116	105,751	-	-	-	-	-
10/7/12 9:46	1,046	3,731,800	27,913,864	105,754	100	748	3	1	4
10/9/12 9:36	2,870	3,732,000	27,915,360	105,760	200	1,496	6	1	3
10/10/12 9:35	1,439	3,737,600	27,957,248	105,918	5,600	41,888	159	29	159
10/11/12 9:30	1,435	3,737,600	27,957,248	105,918	-	-	-	-	-
10/12/12 9:40	1,450	3,737,600	27,957,248	105,918	-	-	-	-	-
10/13/12 9:50	1,450	3,737,600	27,957,248	105,918	-	-	-	-	-
10/14/12 10:00	1,450	3,737,700	27,957,996	105,921	100	748	3	1	3
10/15/12 10:00	1,440	3,737,800	27,958,744	105,924	100	748	3	1	3
10/16/12 11:35	1,535	3,738,000	27,960,240	105,930	200	1,496	6	1	5
10/17/12 9:50	1,335	3,738,600	27,964,728	105,947	600	4,488	17	3	18
10/20/12 9:24	4,294	3,738,600	27,964,728	105,947	-	-	-	-	-
10/21/12 9:50	1,466	3,741,300	27,984,924	106,023	2,700	20,196	77	14	75
10/22/12 9:40	1,430	3,763,700	28,152,476	106,658	22,400	167,552	635	117	639
10/23/12 9:25	1,425	3,784,540	28,308,359	107,249	20,840	155,883	591	109	597
10/24/12 11:48	1,583	3,799,900	28,423,252	107,684	15,360	114,893	435	73	396
10/25/12 10:05	1,337	3,806,700	28,474,116	107,877	6,800	50,864	193	38	208
10/26/12 9:42	1,417	3,810,300	28,501,044	107,979	3,600	26,928	102	19	104
10/27/12 10:21	1,479	3,818,600	28,563,128	108,214	8,300	62,084	235	42	229
10/28/12 11:04	1,483	3,828,000	28,633,440	108,480	9,400	70,312	266	47	259
10/29/12 10:10	1,386	3,832,900	28,670,092	108,619	4,900	36,652	139	26	144
10/30/12 10:05	1,435	3,835,800	28,691,784	108,701	2,900	21,692	82	15	82
10/31/12 10:00	1,435	3,836,800	28,699,264	108,730	1,000	7,480	28	5	28
11/1/12 10:45	1,485	3,840,500	28,726,940	108,834	3,700	27,676	105	19	102
11/2/12 10:30	1,425	3,842,400	28,741,152	108,888	1,900	14,212	54	10	54
11/3/12 10:55	1,465	3,843,400	28,748,632	108,917	1,000	7,480	28	5	28
11/5/12 13:42	3,047	3,848,900	28,789,772	109,072	5,500	41,140	156	14	74
11/6/12 10:02	1,220	3,849,600	28,795,008	109,092	700	5,236	20	4	23
11/7/12 10:03	1,441	3,849,700	28,795,756	109,095	100	748	3	1	3
11/8/12 10:00	1,437	3,850,000	28,798,000	109,104	300	2,244	9	2	9
11/9/12 10:20	1,460	3,850,300	28,800,244	109,112	300	2,244	9	2	8
11/10/12 13:50	1,650	3,850,600	28,802,488	109,121	300	2,244	9	1	7
11/11/12 9:49	1,199	3,850,600	28,802,488	109,121	-	-	-	-	-
11/12/12 10:04	1,455	3,851,000	28,805,480	109,132	400	2,992	11	2	11
11/13/12 9:36	1,412	3,861,800	28,886,264	109,438	10,800	80,784	306	57	312
11/14/12 9:41	1,445	3,862,000	28,887,760	109,444	200	1,496	6	1	6
11/15/12 10:10	1,469	3,862,200	28,889,256	109,449	200	1,496	6	1	6

Notes:

1. Adit dewatering data provided to BGC Engineering Inc. by Pretium Resources Inc.
2. In-line flow gauge measured totalized volume in cubic ft through Jan 2013; measurements recorded daily for calculation of period volume and flow rate. Following installation of new flow meter at water filtration plant in Jan 2013, flow measured as totalized volume in cubic metres.

Table F-2. Cont'd Adit Dewatering Data for the Period September 1, 2012 to January 17, 2014

Date / Time	Interval	Totalized Volume[1]			Period Volume			Flow Rate	
	(min)	(ft^3)	(US gal)	(m^3)	(ft^3)	(US gal)	(m^3)	(US gpm)	(m^3/d)
11/16/12 10:15	1,445	3,862,400	28,890,752	109,455	200	1,496	6	1	6
11/17/12 10:21	1,446	3,862,600	28,892,248	109,461	200	1,496	6	1	6
11/18/12 11:22	1,501	3,866,100	28,918,428	109,560	3,500	26,180	99	17	95
11/19/12 9:55	1,353	3,881,500	29,033,620	109,996	15,400	115,192	436	85	464
11/20/12 10:21	1,466	3,883,300	29,047,084	110,047	1,800	13,464	51	9	50
11/21/12 10:22	1,441	3,883,400	29,047,832	110,050	100	748	3	1	3
11/22/12 10:15	1,433	3,887,000	29,074,760	110,152	3,600	26,928	102	19	103
11/23/12 10:10	1,435	3,889,900	29,096,452	110,234	2,900	21,692	82	15	82
11/24/12 10:10	1,440	3,889,900	29,096,452	110,234	-	-	-	-	-
11/25/12 10:01	1,431	3,890,100	29,097,948	110,240	200	1,496	6	1	6
11/26/12 10:25	1,464	3,890,200	29,098,696	110,243	100	748	3	1	3
11/27/12 10:16	1,431	3,891,100	29,105,428	110,268	900	6,732	26	5	26
11/28/12 10:58	1,482	3,891,200	29,106,176	110,271	100	748	3	1	3
11/29/12 3:23	985	3,891,500	29,108,420	110,280	300	2,244	9	2	12
11/30/12 10:24	1,861	3,891,700	29,109,916	110,285	200	1,496	6	1	4
12/1/12 10:07	1,423	3,903,300	29,196,684	110,614	11,600	86,768	329	61	333
12/2/12 10:37	1,470	3,903,300	29,196,684	110,614	-	-	-	-	-
12/3/12 10:15	1,418	3,903,300	29,196,684	110,614	-	-	-	-	-
12/4/12 9:54	1,419	3,927,000	29,373,960	111,286	23,700	177,276	672	125	682
12/5/12 10:18	1,464	3,978,400	29,758,432	112,742	51,400	384,472	1,457	263	1,433
12/6/12 9:53	1,415	4,001,200	29,928,976	113,388	22,800	170,544	646	121	658
12/7/12 4:12	1,099	4,019,700	30,067,356	113,913	18,500	138,380	524	126	687
12/8/12 9:52	1,780	4,043,000	30,241,640	114,573	23,300	174,284	660	98	534
12/9/12 9:55	1,443	4,049,700	30,291,756	114,763	6,700	50,116	190	35	189
12/10/12 10:11	1,456	4,049,700	30,291,756	114,763	-	-	-	-	-
12/11/12 10:11	1,440	4,059,000	30,361,320	115,026	9,300	69,564	264	48	264
12/12/12 10:15	1,444	4,068,700	30,433,876	115,301	9,700	72,556	275	50	274
12/13/12 10:11	1,436	4,082,600	30,537,848	115,695	13,900	103,972	394	72	395
12/14/12 10:13	1,442	4,109,200	30,736,816	116,449	26,600	198,968	754	138	753
12/15/12 10:06	1,433	4,119,200	30,811,616	116,732	10,000	74,800	283	52	285
12/16/12 10:07	1,441	4,129,800	30,890,904	117,033	10,600	79,288	300	55	300
12/17/12 9:35	1,408	4,132,300	30,909,604	117,104	2,500	18,700	71	13	72
12/18/12 9:50	1,455	4,136,000	30,937,280	117,208	3,700	27,676	105	19	104
12/19/12 10:55	1,505	4,148,100	31,027,788	117,551	12,100	90,508	343	60	328
12/20/12 10:50	1,435	4,167,500	31,172,900	118,101	19,400	145,112	550	101	552
12/21/12 9:35	1,365	4,173,400	31,217,032	118,268	5,900	44,132	167	32	176
12/22/12 10:15	1,480	4,180,000	31,266,400	118,455	6,600	49,368	187	33	182
12/23/12 10:00	1,425	4,182,800	31,287,344	118,535	2,800	20,944	79	15	80
12/24/12 9:55	1,435	4,188,000	31,326,240	118,682	5,200	38,896	147	27	148
12/25/12 9:40	1,425	4,188,100	31,326,988	118,685	100	748	3	1	3
12/26/12 9:51	1,451	4,188,200	31,327,736	118,688	100	748	3	1	3
12/27/12 9:42	1,431	4,188,223	31,327,908	118,688	23	172	1	0	1
12/28/12 10:50	1,508	4,188,300	31,328,484	118,691	77	576	2	0	2
12/29/12 10:10	1,400	4,190,800	31,347,184	118,761	2,500	18,700	71	13	73
12/30/12 10:10	1,440	4,190,800	31,347,184	118,761	-	-	-	-	-
12/31/12 11:10	1,500	4,190,800	31,347,184	118,761	-	-	-	-	-
1/1/13 10:24	1,394	4,190,800	31,347,184	118,761	-	-	-	-	-
1/2/13 9:52	1,408	4,190,800	31,347,184	118,761	-	-	-	-	-
1/3/13 10:29	1,477	4,190,900	31,347,932	118,764	100	748	3	1	3
1/4/13 10:16	1,427	4,190,900	31,347,932	118,764	-	-	-	-	-
1/5/13 10:35	1,459	4,191,000	31,348,680	118,767	100	748	3	1	3
1/6/13 10:40	1,445	4,191,400	31,351,672	118,778	400	2,992	11	2	11
1/7/13 10:48	1,448	4,191,400	31,351,672	118,778	-	-	-	-	-
1/8/13 10:15	1,407	4,191,400	31,351,672	118,778	-	-	-	-	-
1/10/13 10:15	1,351	60,666	453,779	1,719		-	-	-	
1/11/13 11:44	1,529	86,320	645,673	2,446	25,654	191,894	727	126	685
1/12/13 10:55	1,391	108,979	815,165	3,088	22,659	169,492	642	122	665
1/13/13 10:08	1,393	130,948	979,494	3,711	21,969	164,329	623	118	644
1/14/13 10:22	1,454	154,328	1,154,376	4,373	23,380	174,882	663	120	656
1/15/13 11:38	1,516	176,762	1,322,183	5,009	22,434	167,807	636	111	604
1/16/13 10:45	-	-	-	-	-	-	-	-	-
1/17/13 10:22	1,417	221,111	1,653,908	6,266	92,354	690,810	2,617	488	2,660
1/18/13 10:22	1,440	244,686	1,830,249	6,934	23,575	176,340	668	122	668
1/19/13 10:57	1,475	270,278	2,021,679	7,659	25,592	191,430	725	130	708
1/20/13 10:22	1,405	288,624	2,158,907	8,179	18,346	137,228	520	98	533
1/21/13 10:22	1,440	312,238	2,335,543	8,848	23,614	176,636	669	123	669
1/22/13 3:03	1,001	336,294	2,515,478	9,530	24,056	179,935	682	180	981
1/23/13 10:30	1,887	353,617	2,645,052	10,021	17,323	129,573	491	69	375
1/24/13 9:30	1,380	372,531	2,786,530	10,557	18,914	141,478	536	103	559
1/25/13 10:30	1,500	398,206	2,978,580	11,285	25,675	192,051	728	128	698
1/26/13 10:10	1,420	418,616	3,131,249	11,863	20,410	152,669	578	108	587
1/27/13 8:05	1,315	438,131	3,277,217	12,416	19,514	145,967	553	111	606
1/28/13 11:00	1,615	462,050	3,456,133	13,094	23,919	178,916	678	111	604
1/29/13 9:00	1,320	479,770	3,588,676	13,596	17,720	132,543	502	100	548
1/30/13 10:20	1,520	503,403	3,765,452	14,266	23,633	176,776	670	116	634
1/31/13 10:50	1,470	524,626	3,924,205	14,867	21,224	158,753	601	108	589

Notes:

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2. In-line flow gauge measured totalized volume in cubic ft through Jan 2013; measurements recorded daily for calculation of period volume and flow rate. Following installation of new flow meter at water filtration plant in Jan 2013, flow measured as totalized volume in cubic metres.

Table F-2. Cont'd Adit Dewatering Data for the Period September 1, 2012 to January 17, 2014

Date / Time	Interval	Totalized Volume[1]			Period Volume			Flow Rate	
	(min)	(ft³)	(US gal)	(m³)	(ft³)	(US gal)	(m³)	(US gpm)	(m³/d)
2/1/13 10:40	1,430	544,970	4,076,373	15,444	20,343	152,168	577	106	581
2/2/13 11:25	1,485	565,836	4,232,453	16,035	20,866	156,079	591	105	573
2/3/13 11:00	1,415	586,839	4,389,553	16,630	21,003	157,101	595	111	606
2/4/13 9:55	1,375	606,694	4,538,073	17,193	19,856	148,520	563	108	589
2/5/13 11:03	1,508	627,307	4,692,255	17,777	20,613	154,182	584	102	558
2/6/13 10:35	1,412	648,792	4,852,961	18,386	21,485	160,706	609	114	621
2/7/13 10:44	1,449	671,708	5,024,376	19,035	22,916	171,415	649	118	645
2/8/13 11:27	1,483	693,569	5,187,897	19,655	21,861	163,520	620	110	602
2/9/13 11:45	1,458	715,383	5,351,068	20,273	21,814	163,172	618	112	611
2/10/13 12:00	1,455	736,943	5,512,335	20,884	21,560	161,266	611	111	605
2/11/13 10:46	1,366	755,034	5,647,654	21,397	18,091	135,320	513	99	540
2/12/13 11:54	1,508	777,176	5,813,278	22,024	22,142	165,624	627	110	599
2/13/13 10:48	1,374	795,944	5,953,660	22,556	18,768	140,382	532	102	557
2/14/13 10:50	1,442	817,123	6,112,084	23,156	21,180	158,423	600	110	599
2/15/13 11:50	1,500	837,890	6,267,419	23,745	20,767	155,335	588	104	565
2/16/13 10:24	1,354	857,489	6,414,017	24,300	19,599	146,598	555	108	591
2/17/13 10:17	1,433	878,589	6,571,849	24,898	21,101	157,832	598	110	601
2/18/13 11:49	1,532	899,803	6,730,523	25,499	21,213	158,674	601	104	565
2/19/13 11:49	1,440	919,036	6,874,390	26,044	19,233	143,866	545	100	545
2/20/13 10:22	1,353	938,105	7,017,026	26,585	19,069	142,636	540	105	575
2/21/13 10:10	1,428	959,784	7,179,182	27,199	21,679	162,156	614	114	620
2/22/13 11:55	1,545	979,648	7,327,765	27,762	19,864	148,583	563	96	525
2/23/13 11:55	1,440	1,000,216	7,481,614	28,345	20,568	153,849	583	107	583
2/24/13 15:17	1,642	1,029,248	7,698,777	29,167	29,032	217,163	823	132	722
2/25/13 10:25	1,148	1,047,617	7,836,174	29,688	18,369	137,397	521	120	653
2/26/13 12:15	1,550	1,081,160	8,087,080	30,639	33,544	250,906	951	162	883
2/27/13 11:25	1,390	1,103,029	8,250,659	31,258	21,869	163,578	620	118	642
2/28/13 11:07	1,422	1,130,005	8,452,436	32,023	26,976	201,777	764	142	774
3/1/13 12:17	1,510	1,155,667	8,644,389	32,750	25,662	191,953	727	127	694
3/2/13 11:50	1,413	1,177,076	8,804,525	33,357	21,409	160,136	607	113	618
3/3/13 11:40	1,430	1,203,734	9,003,927	34,112	26,658	199,402	755	139	761
3/4/13 9:07	1,287	1,223,431	9,151,267	34,670	19,698	147,340	558	114	625
3/5/13 9:13	1,446	1,253,630	9,377,154	35,526	30,199	225,887	856	156	852
3/6/13 9:40	1,467	1,305,788	9,767,291	37,004	52,157	390,138	1,478	266	1,451
3/7/13 12:07	1,587	1,336,527	9,997,222	37,875	30,739	229,930	871	145	790
3/8/13 11:15	1,388	1,361,721	10,185,669	38,589	25,194	188,448	714	136	741
3/9/13 12:07	1,492	1,361,721	10,185,669	38,589	-	-	-	-	-
3/10/13 11:23	1,396	1,384,376	10,355,131	39,231	22,655	169,462	642	121	662
3/11/13 15:13	1,670	1,419,186	10,615,511	40,218	34,810	260,380	986	156	851
3/12/13 10:56	1,183	1,440,427	10,774,391	40,820	21,241	158,880	602	134	733
3/13/13 10:45	1,429	1,464,105	10,951,505	41,491	23,678	177,114	671	124	676
3/14/13 10:50	1,445	1,489,614	11,142,312	42,214	25,509	190,807	723	132	720
3/15/13 10:34	1,424	1,514,264	11,326,698	42,912	24,650	184,386	699	129	706
3/16/13 15:54	1,760	1,544,945	11,556,190	43,782	30,681	229,492	869	130	711
3/17/13 11:03	1,149	1,564,705	11,703,992	44,342	19,760	147,802	560	129	702
3/18/13 10:47	1,424	1,593,028	11,915,849	45,144	28,323	211,858	803	149	812
3/19/13 10:38	1,431	1,624,412	12,150,599	46,034	31,384	234,750	889	164	895
3/20/13 18:00	1,882	1,644,195	12,298,581	46,594	19,784	147,981	561	79	429
3/21/13 10:23	983	1,678,149	12,552,554	47,556	33,954	253,974	962	258	1,410
3/22/13 11:21	1,498	1,711,953	12,805,406	48,514	33,804	252,852	958	169	921
3/23/13 10:43	1,402	1,747,342	13,070,120	49,517	35,390	264,714	1,003	189	1,030
3/24/13 18:20	1,897	1,793,513	13,415,475	50,826	46,171	345,356	1,308	182	993
3/25/13 11:15	1,015	1,817,260	13,593,107	51,499	23,747	177,631	673	175	955
3/26/13 11:34	1,459	1,848,510	13,826,856	52,384	31,250	233,750	886	160	874
3/27/13 12:40	1,506	1,879,422	14,058,077	53,260	30,912	231,221	876	154	838
3/28/13 9:20	1,240	1,906,109	14,257,693	54,016	26,687	199,615	756	161	878
3/29/13 11:25	1,565	1,936,822	14,487,428	54,887	30,713	229,735	870	147	801
3/30/13 12:15	1,490	1,964,922	14,697,617	55,683	28,100	210,189	796	141	770
3/31/13 11:36	1,401	1,991,696	14,897,884	56,442	26,774	200,267	759	143	780
4/1/13 11:55	1,459	2,018,083	15,095,259	57,190	26,387	197,375	748	135	738
4/2/13 12:12	1,457	2,048,930	15,325,997	58,064	30,847	230,738	874	158	864
4/3/13 12:09	1,437	2,074,091	15,514,202	58,777	25,161	188,205	713	131	715
4/4/13 16:55	1,726	2,102,729	15,728,416	59,588	28,638	214,215	812	124	677
4/5/13 12:20	1,165	2,123,690	15,885,201	60,182	20,960	156,784	594	135	734
4/6/13 12:05	1,425	2,148,299	16,069,275	60,880	24,609	184,074	697	129	705
4/7/13 9:47	1,302	2,170,212	16,233,186	61,501	21,913	163,911	621	126	687
4/8/13 12:00	1,573	2,196,173	16,427,377	62,236	25,961	194,191	736	123	674
4/9/13 12:16	1,456	2,220,766	16,611,330	62,933	24,593	183,953	697	126	689
4/10/13 12:04	1,428	2,244,031	16,785,350	63,593	23,265	174,020	659	122	665
4/11/13 14:50	1,606	2,268,925	16,971,556	64,298	24,894	186,207	705	116	633
4/12/13 11:59	1,269	2,289,428	17,124,920	64,879	20,503	153,363	581	121	659
4/13/13 12:06	1,447	2,312,706	17,299,040	65,539	23,278	174,120	660	120	656
4/14/13 11:52	1,426	2,335,282	17,467,908	66,179	22,576	168,868	640	118	646
4/15/13 12:15	1,463	2,358,289	17,639,999	66,831	23,007	172,091	652	118	642

Notes:

1. Adit dewatering data provided to BGC Engineering Inc. by Pretium Resources Inc.
2. In-line flow gauge measured totalized volume in cubic ft through Jan 2013; measurements recorded daily for calculation of period volume and flow rate. Following installation of new flow meter at water filtration plant in Jan 2013, flow measured as totalized volume in cubic metres.

Table F-2. Cont'd Adit Dewatering Data for the Period September 1, 2012 to January 17, 2014

Date / Time	Interval	Totalized Volume[1]			Period Volume			Flow Rate	
	(min)	(ft^3)	(US gal)	(m^3)	(ft^3)	(US gal)	(m^3)	(US gpm)	(m^3/d)
4/16/13 11:59	1,424	2,380,541	17,806,446	67,461	22,252	166,447	631	117	638
4/17/13 11:19	1,400	2,403,474	17,977,988	68,111	22,933	171,542	650	123	668
4/18/13 12:04	1,485	2,434,073	18,206,868	68,978	30,599	228,880	867	154	841
4/19/13 11:41	1,417	2,456,649	18,375,733	69,618	22,576	168,865	640	119	650
4/20/13 12:12	1,471	2,479,251	18,544,796	70,259	22,602	169,063	641	115	627
4/21/13 12:05	1,433	2,501,304	18,709,752	70,883	22,053	164,956	625	115	628
4/22/13 15:18	1,633	2,526,200	18,895,978	71,589	24,896	186,225	706	114	622
4/23/13 11:34	1,216	2,544,623	19,033,784	72,111	18,423	137,806	522	113	618
4/24/13 11:50	1,456	2,567,703	19,206,415	72,765	23,079	172,632	654	119	647
4/25/13 6:54	1,144	2,587,689	19,355,912	73,331	19,986	149,497	566	131	713
4/26/13 12:00	1,746	2,614,835	19,558,964	74,101	27,146	203,052	769	116	634
4/27/13 11:25	1,405	2,636,781	19,723,120	74,723	21,946	164,156	622	117	637
4/28/13 13:44	1,579	2,661,653	19,909,164	75,428	24,872	186,043	705	118	643
4/29/13 11:51	1,327	2,682,913	20,068,186	76,030	21,260	159,022	602	120	654
4/30/13 12:07	1,456	2,707,876	20,254,910	76,737	24,963	186,724	707	128	700
5/1/13 11:50	1,423	2,732,391	20,438,282	77,432	24,515	183,372	695	129	703
5/2/13 12:20	1,470	2,757,590	20,626,770	78,146	25,199	188,487	714	128	700
5/3/13 17:00	1,720	2,785,715	20,837,149	78,943	28,126	210,379	797	122	667
5/4/13 11:52	1,132	2,805,280	20,983,494	79,498	19,565	146,345	554	129	705
5/5/13 12:20	1,468	2,829,081	21,161,523	80,172	23,801	178,030	674	121	662
5/6/13 11:53	1,413	2,854,075	21,348,480	80,881	24,994	186,956	708	132	722
5/7/13 8:35	1,242	2,872,997	21,490,016	81,417	18,922	141,536	536	114	622
5/8/13 12:07	1,652	2,903,038	21,714,728	82,268	30,042	224,712	851	136	742
5/9/13 8:52	1,245	2,925,234	21,880,753	82,897	22,196	166,025	629	133	728
5/10/13 8:24	1,412	2,951,717	22,078,843	83,648	26,483	198,090	750	140	765
5/11/13 16:18	1,914	3,018,584	22,579,008	85,542	66,867	500,166	1,895	261	1,426
5/12/13 14:41	1,343	3,047,459	22,794,994	86,361	28,875	215,986	818	161	877
5/13/13 16:08	1,527	3,081,832	23,052,103	87,335	34,373	257,109	974	168	919
5/14/13 14:07	1,319	3,110,927	23,269,736	88,159	29,095	217,633	825	165	900
5/15/13 14:07	1,440	3,110,927	23,269,736	88,159	-	-	-	-	-
5/16/13 15:14	1,507	3,145,863	23,531,055	89,149	34,936	261,319	990	173	946
5/17/13 12:09	1,255	3,174,184	23,742,895	89,952	28,321	211,839	803	169	921
5/18/13 11:39	1,410	3,208,754	24,001,477	90,932	34,570	258,582	980	183	1,001
5/19/13 14:55	1,636	3,251,024	24,317,661	92,129	42,271	316,184	1,198	193	1,054
5/20/13 12:13	1,278	3,281,932	24,548,853	93,005	30,908	231,192	876	181	987
5/21/13 15:21	1,628	3,323,364	24,858,760	94,179	41,431	309,907	1,174	190	1,039
5/22/13 11:45	1,224	3,354,009	25,087,988	95,048	30,645	229,228	868	187	1,022
5/23/13 12:20	1,475	3,392,770	25,377,922	96,146	38,761	289,934	1,098	197	1,072
5/24/13 12:17	1,437	3,432,437	25,674,630	97,270	39,667	296,707	1,124	206	1,126
5/25/13 11:58	1,421	3,475,228	25,994,707	98,483	42,791	320,077	1,213	225	1,229
5/26/13 14:32	1,594	3,521,586	26,341,465	99,797	46,358	346,758	1,314	218	1,187
5/27/13 12:06	1,294	3,562,990	26,651,166	100,970	41,404	309,701	1,173	239	1,306
5/28/13 11:32	1,406	3,609,267	26,997,319	102,282	46,277	346,153	1,311	246	1,343
5/29/13 0:08	756	3,659,990	27,376,722	103,719	50,722	379,403	1,437	502	2,738
5/30/13 8:34	1,946	3,703,785	27,704,312	104,960	43,795	327,589	1,241	168	918
5/31/13 12:27	1,673	3,768,982	28,191,987	106,808	65,197	487,676	1,848	291	1,590
6/1/13 11:19	1,372	3,825,905	28,617,767	108,421	56,922	425,779	1,613	310	1,693
6/2/13 12:01	1,482	3,875,371	28,987,773	109,823	49,466	370,006	1,402	250	1,362
6/3/13 9:35	1,294	3,917,691	29,304,329	111,022	42,320	316,556	1,199	245	1,335
6/4/13 9:56	1,461	3,972,232	29,712,292	112,568	54,540	407,962	1,546	279	1,523
6/5/13 11:37	1,541	4,026,221	30,116,137	114,098	53,990	403,845	1,530	262	1,430
6/6/13 14:15	1,598	4,084,125	30,549,254	115,738	57,903	433,117	1,641	271	1,479
6/7/13 12:07	1,312	4,130,249	30,894,264	117,046	46,124	345,010	1,307	263	1,435
6/8/13 14:50	1,603	4,185,739	31,309,327	118,618	55,490	415,063	1,573	259	1,413
6/9/13 14:55	1,445	4,238,116	31,701,109	120,102	52,377	391,782	1,484	271	1,479
6/10/13 14:31	1,416	4,291,725	32,102,103	121,622	53,609	400,994	1,519	283	1,545
6/11/13 12:15	1,304	4,354,075	32,568,478	123,388	62,350	466,375	1,767	358	1,951
6/12/13 12:02	1,427	4,409,921	32,986,207	124,971	55,846	417,729	1,583	293	1,597
6/13/13 12:22	1,460	4,469,394	33,431,069	126,656	59,474	444,863	1,685	305	1,662
6/14/13 15:22	1,620	4,537,849	33,943,108	128,596	68,454	512,038	1,940	316	1,724
6/15/13 10:49	1,167	4,584,869	34,294,822	129,929	47,021	351,715	1,333	301	1,644
6/16/13 12:27	1,538	4,647,858	34,765,975	131,714	62,988	471,152	1,785	306	1,671
6/17/13 11:45	1,398	4,706,700	35,206,113	133,381	58,842	440,138	1,667	315	1,718
6/18/13 17:53	1,808	4,793,133	35,852,634	135,831	86,433	646,521	2,449	358	1,951
6/19/13 10:22	989	4,861,862	36,366,731	137,778	68,730	514,097	1,948	520	2,836
6/20/13 12:02	1,540	4,926,495	36,850,184	139,610	64,633	483,452	1,832	314	1,713
6/21/13 16:55	1,733	5,018,278	37,536,720	142,211	91,783	686,536	2,601	396	2,161
6/22/13 17:06	1,451	5,095,099	38,111,341	144,388	76,821	574,621	2,177	396	2,160
6/23/13 15:12	1,326	5,163,896	38,625,940	146,338	68,797	514,599	1,950	388	2,117
6/24/13 11:48	1,236	5,230,109	39,121,217	148,214	66,214	495,277	1,876	401	2,186
6/25/13 16:27	1,719	5,323,999	39,823,511	150,875	93,890	702,294	2,661	409	2,229
6/26/13 13:02	1,235	5,389,150	40,310,844	152,721	65,151	487,333	1,846	395	2,153
6/27/13 12:20	1,398	5,461,956	40,855,427	154,784	72,805	544,583	2,063	390	2,125
6/28/13 12:34	1,454	5,534,807	41,400,354	156,849	72,851	544,927	2,064	375	2,045
6/29/13 15:15	1,601	5,615,171	42,001,476	159,126	80,364	601,122	2,277	375	2,048
6/30/13 11:52	1,237	5,679,577	42,483,239	160,951	64,407	481,763	1,825	389	2,125

Notes:

1. Adit dewatering data provided to BGC Engineering Inc. by Pretium Resources Inc.
2. In-line flow gauge measured totalized volume in cubic ft through Jan 2013; measurements recorded daily for calculation of period volume and flow rate. Following installation of new flow meter at water filtration plant in Jan 2013, flow measured as totalized volume in cubic metres.

Table F-2. Cont'd Adit Dewatering Data for the Period September 1, 2012 to January 17, 2014

Date / Time	Interval	Totalized Volume[1]			Period Volume			Flow Rate	
	(min)	(ft^3)	(US gal)	(m^3)	(ft^3)	(US gal)	(m^3)	(US gpm)	(m^3/d)
7/1/13 11:57	1,445	5,753,935	43,039,436	163,059	74,358	556,197	2,107	385	2,100
7/2/13 16:11	1,694	5,841,473	43,694,219	165,539	87,538	654,783	2,481	387	2,109
7/3/13 14:19	1,328	5,908,117	44,192,717	167,428	66,644	498,498	1,889	375	2,048
7/4/13 13:18	1,379	5,975,199	44,694,487	169,329	67,082	501,771	1,901	364	1,985
7/5/13 13:18	1,440	5,975,199	44,694,487	169,329	-	-	-	-	-
7/6/13 16:32	1,634	6,123,675	45,805,087	173,536	148,476	1,110,600	4,208	680	3,708
7/7/13 16:24	1,432	6,195,495	46,342,306	175,572	71,821	537,219	2,035	375	2,047
7/8/13 16:55	1,471	6,266,265	46,871,660	177,577	70,769	529,354	2,006	360	1,963
7/9/13 18:17	1,522	6,341,124	47,431,605	179,699	74,859	559,945	2,121	368	2,007
7/10/13 10:03	946	6,415,803	47,990,204	181,815	74,679	558,599	2,116	590	3,221
7/11/13 9:43	1,420	6,455,960	48,290,581	182,953	40,157	300,376	1,138	212	1,154
7/12/13 11:05	1,522	6,529,531	48,840,892	185,038	73,571	550,311	2,085	362	1,973
7/13/13 10:15	1,390	6,613,459	49,468,673	187,416	83,928	627,781	2,378	452	2,464
7/14/13 9:52	1,417	6,667,537	49,873,177	188,949	54,078	404,505	1,532	285	1,557
7/15/13 10:01	1,449	6,739,421	50,410,872	190,986	71,884	537,694	2,037	371	2,024
7/16/13 10:07	1,446	6,810,423	50,941,967	192,998	71,002	531,096	2,012	367	2,004
7/17/13 9:35	1,408	6,880,526	51,466,332	194,985	70,102	524,365	1,987	372	2,032
7/18/13 9:39	1,444	6,951,362	51,996,187	196,992	70,836	529,855	2,007	367	2,002
7/19/13 9:41	1,442	7,021,944	52,524,142	198,992	70,582	527,955	2,000	366	1,997
7/20/13 9:53	1,452	7,121,843	53,271,387	201,823	99,899	747,245	2,831	515	2,808
7/21/13 10:22	1,469	7,121,843	53,271,387	201,823	-	-	-	-	-
7/22/13 9:44	1,402	7,229,001	54,072,926	204,860	107,158	801,540	3,037	572	3,119
7/23/13 16:16	1,832	7,317,220	54,732,804	207,360	88,219	659,877	2,500	360	1,965
7/24/13 15:22	1,386	7,384,160	55,233,518	209,257	66,940	500,715	1,897	361	1,971
7/25/13 10:07	1,125	7,439,198	55,645,203	210,817	55,038	411,684	1,560	366	1,996
7/26/13 12:19	1,572	7,515,839	56,218,478	212,988	76,641	573,275	2,172	365	1,990
7/27/13 15:11	1,612	7,594,545	56,807,194	215,219	78,705	588,716	2,230	365	1,992
7/28/13 10:22	1,151	7,649,660	57,219,458	216,781	55,116	412,265	1,562	358	1,954
7/29/13 11:12	1,490	7,716,520	57,719,566	218,675	66,859	500,108	1,895	336	1,831
7/30/13 9:31	1,339	7,780,168	58,195,654	220,479	63,648	476,088	1,804	356	1,940
7/31/13 11:50	1,579	7,854,254	58,749,819	222,579	74,086	554,165	2,100	351	1,915
8/1/13 16:13	1,703	7,932,465	59,334,840	224,795	78,211	585,021	2,216	344	1,874
8/2/13 14:15	1,322	7,997,274	59,819,612	226,632	64,809	484,772	1,837	367	2,001
8/3/13 14:00	1,425	8,066,117	60,334,554	228,583	68,842	514,942	1,951	361	1,971
8/4/13 13:40	1,420	8,134,028	60,842,528	230,507	67,911	507,973	1,925	358	1,952
8/5/13 16:40	1,620	8,211,378	61,421,108	232,699	77,350	578,580	2,192	357	1,948
8/6/13 14:00	1,280	8,272,500	61,878,297	234,431	61,122	457,189	1,732	357	1,949
8/7/13 14:00	1,440	8,341,706	62,395,958	236,392	69,206	517,660	1,961	359	1,961
8/8/13 14:55	1,495	8,410,298	62,909,025	238,336	68,592	513,068	1,944	343	1,872
8/9/13 14:33	1,418	8,476,246	63,402,323	240,205	65,949	493,298	1,869	348	1,898
8/10/13 13:46	1,393	8,537,513	63,860,595	241,941	61,266	458,272	1,736	329	1,795
8/11/13 14:08	1,462	8,602,022	64,343,123	243,769	64,509	482,529	1,828	330	1,801
8/12/13 14:35	1,467	8,667,660	64,834,098	245,629	65,638	490,975	1,860	335	1,826
8/13/13 8:46	1,091	8,716,244	65,197,506	247,006	48,584	363,408	1,377	333	1,817
8/14/13 11:37	1,611	8,786,357	65,721,950	248,993	70,113	524,444	1,987	326	1,776
8/15/13 4:25	1,008	8,859,402	66,268,328	251,063	73,045	546,378	2,070	542	2,957
8/16/13 9:56	1,771	8,923,753	66,749,669	252,887	64,350	481,341	1,824	272	1,483
8/17/13 14:57	1,741	8,979,158	67,164,099	254,457	55,405	414,429	1,570	238	1,299
8/18/13 16:34	1,537	9,041,172	67,627,966	256,214	62,014	463,867	1,757	302	1,646
8/19/13 14:59	1,345	9,093,486	68,019,273	257,697	52,314	391,307	1,482	291	1,587
8/20/13 11:06	1,207	9,141,307	68,376,979	259,052	47,822	357,706	1,355	296	1,617
8/21/13 15:20	1,694	9,204,451	68,849,293	260,841	63,144	472,314	1,789	279	1,521
8/22/13 14:55	1,415	9,258,187	69,251,237	262,364	53,736	401,944	1,523	284	1,550
8/23/13 14:35	1,420	9,309,957	69,638,480	263,831	51,770	387,242	1,467	273	1,488
8/24/13 9:58	1,163	9,353,964	69,967,653	265,078	44,007	329,173	1,247	283	1,544
8/25/13 12:07	1,569	9,410,774	70,392,587	266,688	56,809	424,935	1,610	271	1,478
8/26/13 14:34	1,587	9,469,175	70,829,426	268,343	58,401	436,839	1,655	275	1,502
8/27/13 14:30	1,436	9,521,263	71,219,044	269,819	52,088	389,618	1,476	271	1,480
8/28/13 12:30	1,320	9,567,514	71,565,005	271,130	46,251	345,960	1,311	262	1,430
8/29/13 15:15	1,605	9,622,718	71,977,929	272,694	55,204	412,925	1,564	257	1,404
8/30/13 14:01	1,366	9,675,667	72,373,988	274,195	52,949	396,058	1,500	290	1,582
8/31/13 9:27	1,166	9,720,902	72,712,346	275,477	45,235	338,359	1,282	290	1,583
9/1/13 9:48	1,461	9,806,203	73,350,395	277,894	85,301	638,048	2,417	437	2,383
9/2/13 15:53	1,805	9,848,135	73,664,048	279,082	41,932	313,653	1,188	174	948
9/3/13 15:25	1,412	9,902,707	74,072,248	280,629	54,572	408,200	1,547	289	1,577
9/4/13 17:45	1,580	9,963,070	74,523,762	282,340	60,363	451,514	1,711	286	1,559
9/5/13 17:14	1,409	10,018,849	74,940,989	283,920	55,779	417,227	1,581	296	1,615
9/6/13 14:55	1,301	10,069,088	75,316,776	285,344	50,239	375,787	1,424	289	1,576
9/7/13 14:20	1,405	10,122,809	75,718,615	286,866	53,722	401,839	1,522	286	1,560
9/8/13 16:31	1,571	10,187,096	76,199,481	288,688	64,287	480,866	1,822	306	1,670
9/9/13 11:43	1,152	10,234,241	76,552,119	290,024	47,144	352,638	1,336	306	1,670
9/10/13 14:47	1,624	10,300,616	77,048,611	291,905	66,376	496,492	1,881	306	1,668
9/11/13 11:56	1,269	10,352,041	77,433,266	293,362	51,425	384,656	1,457	303	1,654
9/12/13 14:38	1,602	10,415,961	77,911,387	295,174	63,920	478,121	1,811	298	1,628
9/13/13 10:36	1,198	10,461,983	78,255,632	296,478	46,022	344,245	1,304	287	1,568
9/14/13 16:02	1,766	10,528,218	78,751,067	298,355	66,235	495,436	1,877	281	1,531
9/15/13 15:02	1,380	10,579,794	79,136,858	299,817	51,576	385,791	1,462	280	1,525

Notes:

1. Adit dewatering data provided to BGC Engineering Inc. by Pretium Resources Inc.
2. In-line flow gauge measured totalized volume in cubic ft through Jan 2013; measurements recorded daily for calculation of period volume and flow rate. Following installation of new flow meter at water filtration plant in Jan 2013, flow measured as totalized volume in cubic metres.

Table F-2. Cont'd Adit Dewatering Data for the Period September 1, 2012 to January 17, 2014

Date / Time	Interval	Totalized Volume[1]			Period Volume			Flow Rate	
	(min)	(ft^3)	(US gal)	(m^3)	(ft^3)	(US gal)	(m^3)	(US gpm)	(m^3/d)
9/16/13 14:47	1,425	10,631,169	79,521,144	301,273	51,375	384,286	1,456	270	1,471
9/17/13 11:18	1,231	10,675,254	79,850,898	302,522	44,085	329,754	1,249	268	1,461
9/18/13 14:35	1,637	10,733,316	80,285,203	304,167	58,062	434,305	1,645	265	1,447
9/19/13 14:48	1,453	10,789,024	80,701,902	305,746	55,708	416,699	1,579	287	1,565
9/20/13 14:30	1,422	10,850,587	81,162,391	307,491	61,563	460,489	1,745	324	1,767
9/21/13 14:19	1,429	10,918,600	81,671,130	309,418	68,013	508,739	1,927	356	1,942
9/22/13 10:21	1,202	10,969,435	82,051,377	310,859	50,835	380,248	1,441	316	1,726
9/23/13 17:41	1,880	11,051,483	82,665,090	313,184	82,047	613,712	2,325	326	1,781
9/24/13 16:51	1,390	11,113,222	83,126,898	314,933	61,739	461,808	1,750	332	1,813
9/25/13 12:07	1,156	11,164,244	83,508,545	316,379	51,022	381,647	1,446	330	1,801
9/26/13 14:32	1,585	11,232,268	84,017,363	318,307	68,024	508,818	1,928	321	1,751
9/27/13 14:54	1,462	11,292,182	84,465,525	320,005	59,915	448,162	1,698	307	1,672
9/28/13 12:01	1,267	11,345,343	84,863,167	321,511	53,161	397,642	1,507	314	1,712
9/29/13 3:21	920	11,405,441	85,312,702	323,214	60,098	449,535	1,703	489	2,666
9/30/13 11:22	1,921	11,463,708	85,748,538	324,866	58,267	435,836	1,651	227	1,238
10/1/13 11:35	1,453	11,520,765	86,175,320	326,482	57,056	426,782	1,617	294	1,602
10/2/13 12:12	1,477	11,578,664	86,608,410	328,123	57,900	433,091	1,641	293	1,600
10/3/13 14:22	1,570	11,639,751	87,065,336	329,854	61,086	456,925	1,731	291	1,588
10/4/13 12:30	1,328	11,693,067	87,464,139	331,365	53,316	398,803	1,511	300	1,638
10/5/13 14:47	1,577	11,756,867	87,941,362	333,173	63,800	477,223	1,808	303	1,651
10/6/13 15:08	1,461	11,816,478	88,387,255	334,863	59,611	445,892	1,689	305	1,665
10/7/13 15:00	1,432	11,875,842	88,831,299	336,545	59,364	444,045	1,682	310	1,692
10/8/13 14:59	1,439	11,935,146	89,274,895	338,225	59,304	443,596	1,681	308	1,682
10/9/13 15:36	1,477	11,995,597	89,727,069	339,939	60,451	452,174	1,713	306	1,670
10/10/13 15:20	1,424	12,055,727	90,176,842	341,643	60,130	449,772	1,704	316	1,723
10/11/13 14:35	1,395	12,111,595	90,594,729	343,226	55,867	417,887	1,583	300	1,634
10/12/13 10:53	1,218	12,165,613	90,998,785	344,757	54,018	404,056	1,531	332	1,810
10/13/13 14:48	1,675	12,213,195	91,354,696	346,105	47,582	355,911	1,348	212	1,159
10/14/13 14:55	1,447	12,278,727	91,844,879	347,962	65,533	490,183	1,857	339	1,848
10/15/13 14:35	1,420	12,339,432	92,298,954	349,682	60,705	454,075	1,720	320	1,745
10/16/13 10:22	1,187	12,400,716	92,757,357	351,419	61,284	458,404	1,737	386	2,107
10/17/13 10:22	1,440	12,400,716	92,757,357	351,419	-	-	-	-	-
10/18/13 14:35	1,693	12,523,235	93,673,795	354,891	122,518	916,437	3,472	541	2,953
10/19/13 14:45	1,450	12,584,229	94,130,034	356,620	60,995	456,239	1,728	315	1,717
10/20/13 14:25	1,420	12,646,642	94,596,884	358,388	62,413	466,850	1,769	329	1,794
10/21/13 15:47	1,522	12,714,486	95,104,356	360,311	67,844	507,472	1,923	333	1,819
10/22/13 11:30	1,183	12,767,001	95,497,168	361,799	52,515	392,812	1,488	332	1,812
10/23/13 17:41	1,811	12,842,682	96,063,263	363,944	75,681	566,095	2,145	313	1,705
10/24/13 11:03	1,042	12,896,351	96,464,706	365,465	53,669	401,443	1,521	385	2,102
10/25/13 15:45	1,722	12,975,833	97,059,229	367,717	79,482	594,523	2,252	345	1,884
10/26/13 14:27	1,362	13,039,957	97,538,881	369,534	64,125	479,652	1,817	352	1,921
10/27/13 14:25	1,438	13,104,078	98,018,506	371,351	64,121	479,625	1,817	334	1,820
10/28/13 14:43	1,458	13,170,934	98,518,587	373,246	66,856	500,081	1,895	343	1,871
10/29/13 14:56	1,453	13,236,534	99,009,272	375,105	65,600	490,685	1,859	338	1,842
10/30/13 11:37	1,241	13,291,109	99,417,498	376,652	54,576	408,226	1,547	329	1,795
10/31/13 11:37	1,440	13,355,301	99,897,651	378,471	64,192	480,153	1,819	333	1,819
11/1/13 9:40	1,323	13,413,681	100,334,332	380,125	58,380	436,680	1,654	330	1,801
11/2/13 15:33	1,793	13,494,560	100,939,307	382,417	80,879	604,975	2,292	337	1,841
11/3/13 14:42	1,389	13,560,403	101,431,813	384,283	65,843	492,506	1,866	355	1,934
11/4/13 14:15	1,413	13,624,340	101,910,066	386,095	63,938	478,253	1,812	338	1,847
11/5/13 14:42	1,467	13,689,862	102,400,170	387,952	65,522	490,104	1,857	334	1,823
11/6/13 15:23	1,481	13,754,795	102,885,866	389,792	64,933	485,696	1,840	328	1,789
11/7/13 14:35	1,392	13,814,261	103,330,676	391,477	59,467	444,810	1,685	320	1,743
11/8/13 14:05	1,410	13,873,844	103,776,357	393,165	59,583	445,681	1,689	316	1,724
11/9/13 14:50	1,485	13,937,422	104,251,917	394,967	63,578	475,560	1,802	320	1,747
11/10/13 15:05	1,455	13,992,869	104,666,663	396,538	55,447	414,746	1,571	285	1,555
11/11/13 15:33	1,468	14,047,706	105,076,843	398,092	54,837	410,180	1,554	279	1,524
11/12/13 16:24	1,491	14,104,780	105,503,757	399,710	57,074	426,914	1,617	286	1,562
11/13/13 15:17	1,373	14,156,000	105,886,882	401,161	51,220	383,125	1,452	279	1,522
11/14/13 14:30	1,393	14,207,252	106,270,244	402,614	51,252	383,362	1,452	275	1,501
11/15/13 15:30	1,500	14,262,219	106,681,400	404,171	54,967	411,156	1,558	274	1,495
11/16/13 15:35	1,445	14,313,344	107,063,812	405,620	51,125	382,412	1,449	265	1,444
11/17/13 11:18	1,183	14,352,146	107,354,053	406,720	38,802	290,240	1,100	245	1,338
11/18/13 15:30	1,692	14,406,609	107,761,435	408,263	54,463	407,382	1,543	241	1,314
11/19/13 15:17	1,427	14,452,797	108,106,920	409,572	46,188	345,485	1,309	242	1,321
11/20/13 10:26	1,149	14,489,510	108,381,534	410,613	36,713	274,615	1,040	239	1,304
11/21/13 10:50	1,464	14,533,884	108,713,453	411,870	44,374	331,918	1,258	227	1,237
11/22/13 11:20	1,470	14,580,929	109,065,352	413,203	47,045	351,899	1,333	239	1,306
11/23/13 10:06	1,366	14,623,800	109,386,026	414,418	42,871	320,674	1,215	235	1,281
11/24/13 10:44	1,478	14,669,731	109,729,584	415,720	45,930	343,558	1,302	232	1,268
11/25/13 10:01	1,397	14,712,774	110,051,552	416,940	43,044	321,967	1,220	230	1,257
11/26/13 14:32	1,711	14,764,559	110,438,900	418,407	51,784	387,348	1,468	226	1,235
11/27/13 10:47	1,215	14,801,127	110,712,432	419,443	36,568	273,532	1,036	225	1,228
11/28/13 10:41	1,434	14,844,023	111,033,291	420,659	42,896	320,859	1,216	224	1,221
11/29/13 15:00	1,699	14,893,704	111,404,907	422,067	49,681	371,616	1,408	219	1,193
11/30/13 14:05	1,385	14,934,281	111,708,424	423,217	40,577	303,517	1,150	219	1,196

Notes:

1. Adit dewatering data provided to BGC Engineering Inc. by Pretium Resources Inc.
2. In-line flow gauge measured totalized volume in cubic ft through Jan 2013; measurements recorded daily for calculation of period volume and flow rate. Following installation of new flow meter at water filtration plant in Jan 2013, flow measured as totalized volume in cubic metres.

Table F-2. Cont'd Adit Dewatering Data for the Period September 1, 2012 to January 17, 2014

Date / Time	Interval	Totalized Volume[1]			Period Volume			Flow Rate	
	(min)	(ft^3)	(US gal)	(m^3)	(ft^3)	(US gal)	(m^3)	(US gpm)	(m^3/d)
12/1/13 10:00	1,195	14,968,754	111,966,278	424,194	34,472	257,854	977	216	1,177
12/2/13 13:31	1,651	15,015,778	112,318,019	425,526	47,024	351,741	1,333	213	1,162
12/3/13 10:20	1,249	15,051,404	112,584,504	426,536	35,626	266,485	1,010	213	1,164
12/4/13 10:23	1,443	15,090,916	112,880,049	427,656	39,511	295,546	1,120	205	1,117
12/5/13 10:25	1,442	15,130,544	113,176,466	428,779	39,628	296,417	1,123	206	1,121
12/6/13 13:36	1,631	15,174,244	113,503,343	430,017	43,700	326,877	1,238	200	1,093
12/7/13 13:27	1,431	15,213,053	113,793,636	431,117	38,809	290,293	1,100	203	1,107
12/8/13 13:24	1,437	15,248,221	114,056,690	432,113	35,168	263,053	997	183	999
12/9/13 13:22	1,438	15,288,717	114,359,600	433,261	40,496	302,910	1,148	211	1,149
12/10/13 15:08	1,546	15,329,361	114,663,618	434,413	40,644	304,019	1,152	197	1,073
12/11/13 14:27	1,399	15,365,933	114,937,177	435,449	36,572	273,559	1,036	196	1,067
12/12/13 15:03	1,476	15,404,019	115,222,059	436,528	38,086	284,882	1,079	193	1,053
12/13/13 12:30	1,287	15,436,907	115,468,061	437,460	32,888	246,002	932	191	1,043
12/14/13 13:54	1,524	15,475,522	115,756,903	438,555	38,615	288,841	1,094	190	1,034
12/15/13 13:42	1,428	15,511,554	116,026,423	439,576	36,032	269,520	1,021	189	1,030
12/16/13 14:22	1,480	15,549,280	116,308,613	440,645	37,726	282,190	1,069	191	1,040
12/17/13 19:16	1,734	15,592,638	116,632,930	441,874	43,358	324,316	1,229	187	1,020
12/18/13 13:45	1,109	15,620,532	116,841,583	442,664	27,895	208,653	790	188	1,026
12/19/13 14:07	1,462	15,656,508	117,110,681	443,684	35,976	269,098	1,020	184	1,004
12/20/13 14:01	1,434	15,691,902	117,375,423	444,687	35,393	264,743	1,003	185	1,007
12/21/13 13:07	1,386	15,725,619	117,627,628	445,642	33,717	252,205	955	182	993
12/22/13 13:50	1,483	15,761,312	117,894,615	446,654	35,693	266,986	1,012	180	982
12/23/13 13:47	1,437	15,796,582	118,158,434	447,653	35,270	263,819	1,000	184	1,002
12/24/13 11:03	1,276	15,826,732	118,383,953	448,508	30,150	225,520	854	177	964
12/25/13 13:45	1,602	15,865,086	118,670,842	449,594	38,354	286,888	1,087	179	977
12/26/13 11:51	1,326	15,896,576	118,906,391	450,487	31,491	235,550	892	178	969
12/27/13 13:00	1,509	15,932,129	119,172,322	451,494	35,552	265,931	1,008	176	961
12/28/13 15:47	1,607	15,969,763	119,453,825	452,561	37,634	281,504	1,067	175	956
12/29/13 14:20	1,353	16,002,065	119,695,446	453,476	32,302	241,621	915	179	974
12/30/13 16:08	1,548	16,036,583	119,953,643	454,454	34,518	258,197	978	167	910
12/31/13 10:37	1,109	16,062,100	120,144,506	455,178	25,516	190,863	723	172	939
1/1/14 13:35	1,618	16,098,841	120,419,331	456,219	36,741	274,826	1,041	170	927
1/2/14 11:21	1,306	16,129,181	120,646,276	457,079	30,340	226,945	860	174	948
1/3/14 15:50	1,709	16,166,600	120,926,170	458,139	37,419	279,894	1,060	164	893
1/4/14 8:42	1,012	16,189,668	121,098,715	458,793	23,067	172,545	654	170	930
1/5/14 11:02	1,580	16,224,747	121,361,108	459,787	35,079	262,394	994	166	906
1/6/14 12:00	1,498	16,257,730	121,607,823	460,721	32,983	246,715	935	165	899
1/7/14 10:39	1,359	16,286,800	121,825,266	461,545	29,070	217,443	824	160	873
1/8/14 10:16	1,417	16,318,566	122,062,874	462,445	31,766	237,609	900	168	915
1/9/14 11:19	1,503	16,351,094	122,306,184	463,367	32,528	243,310	922	162	883
1/10/14 10:16	1,377	16,380,799	122,528,378	464,209	29,705	222,194	842	161	880
1/11/14 9:26	1,390	16,410,772	122,752,578	465,058	29,973	224,200	849	161	880
1/12/14 8:43	1,397	16,440,658	122,976,118	465,905	29,885	223,540	847	160	873
1/13/14 11:17	1,594	16,474,421	123,228,666	466,862	33,763	252,548	957	158	864
1/14/14 15:37	1,700	16,510,301	123,497,052	467,879	35,880	268,385	1,017	158	861
1/15/14 13:56	1,339	16,538,820	123,710,377	468,687	28,519	213,325	808	159	869
1/16/14 23:55	2,039	16,564,940	123,905,753	469,427	26,120	195,376	740	96	523
1/17/14 10:10	615	16,594,328	124,125,571	470,260	29,387	219,818	833	357	1,950

Notes:

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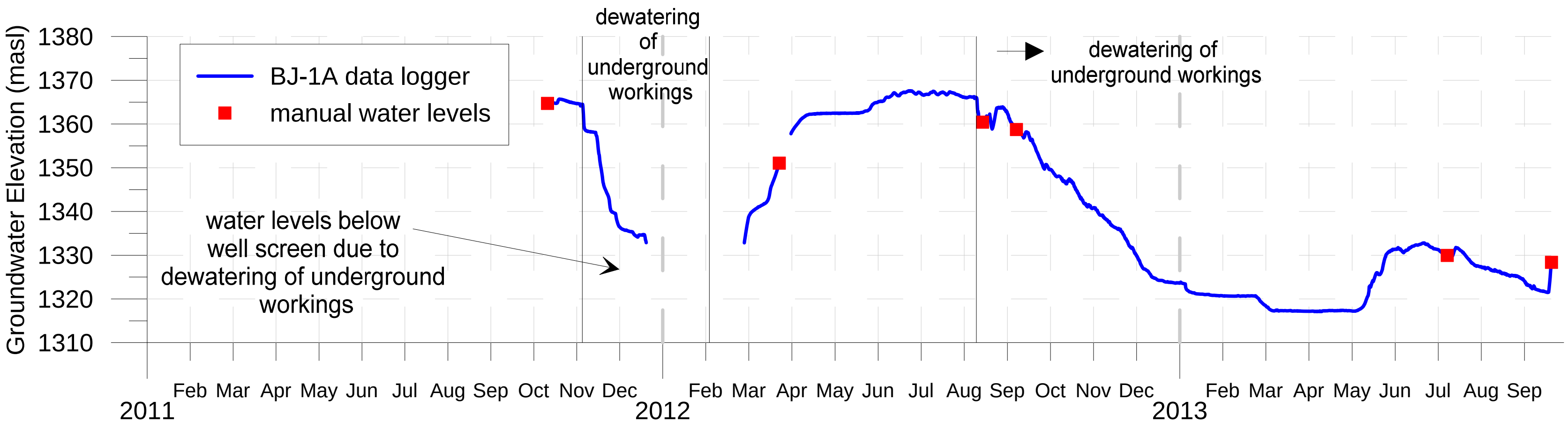
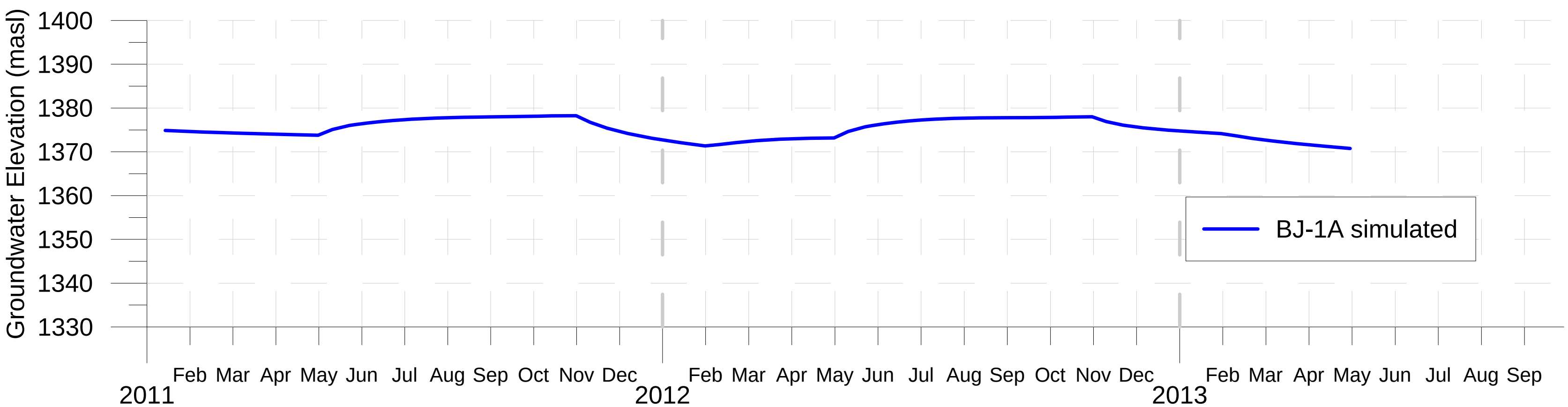
2. In-line flow gauge measured totalized volume in cubic ft through Jan 2013; measurements recorded daily for calculation of period volume and flow rate. Following installation of new flow meter at water filtration plant in Jan 2013, flow measured as totalized volume in cubic metres.

APPENDIX G
TRANSIENT CALIBRATION SIMULATION RESULTS

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-1A





Notes:
1) Well screened from 1300.92 to 1307.12 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.
3) Simulated vs observed y-axis offset is 20 m.

SCALE: N/A	DESIGNED: KSJ		
DATE: MAY 2014	CHECKED: DP		
DRAWN: LH, BS	APPROVED: TC		

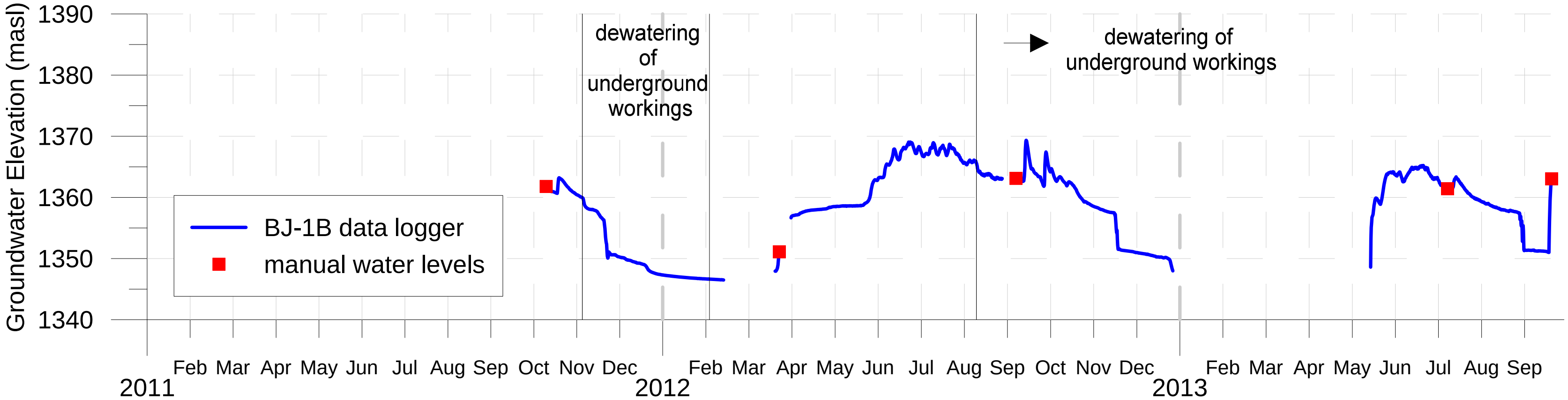
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

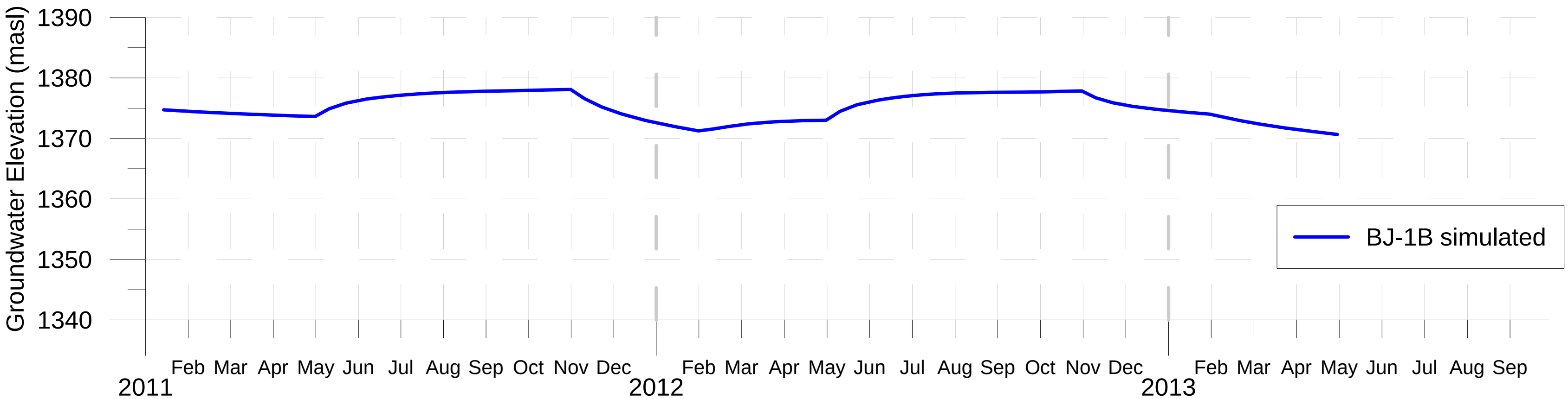
CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC11-BJ-1A: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-1	





Notes:
1) Well screened from 1347.32 to 1350.42 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE:	N/A	DESIGNED:	KSJ
DATE:	MAY 2014	CHECKED:	DP
DRAWN:	LH, BS	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

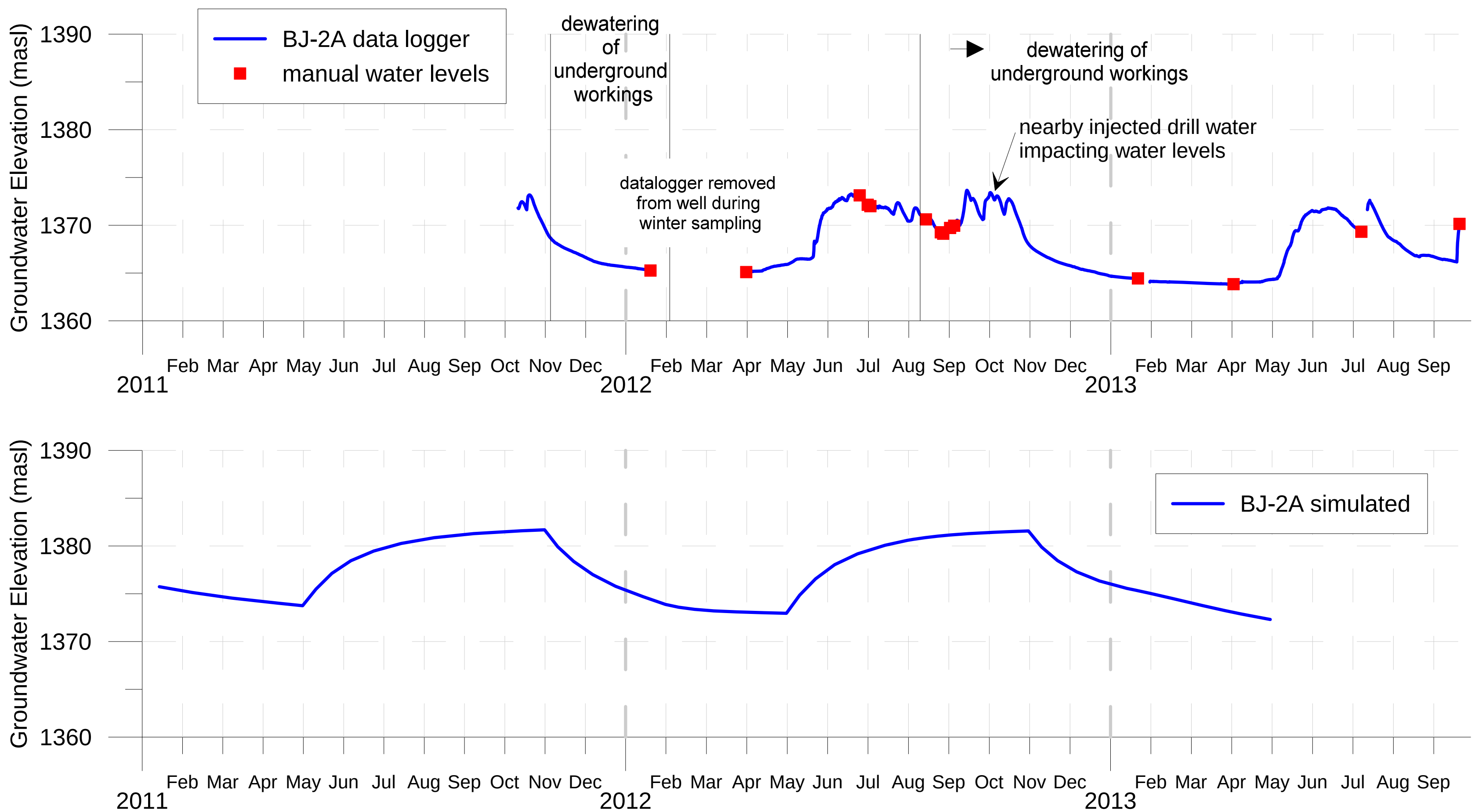
PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC11-BJ-1B: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-2	

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-1B

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-2A



Notes:
1) Well screened from 1346.37 to 1352.47 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ		
DATE: MAY 2014	CHECKED: DP		
DRAWN: LH, BS	APPROVED: TC		

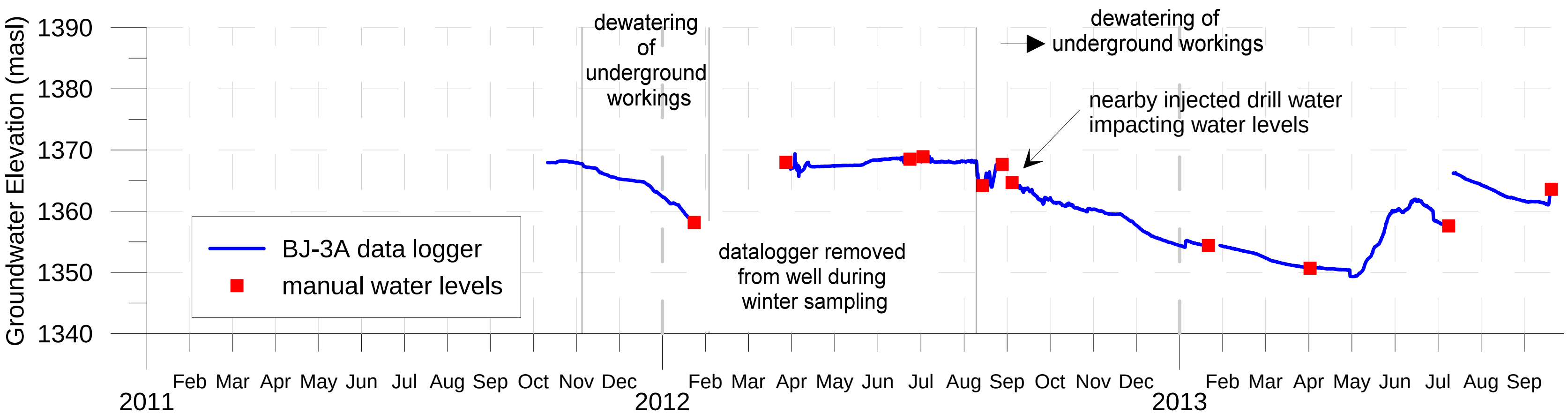
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

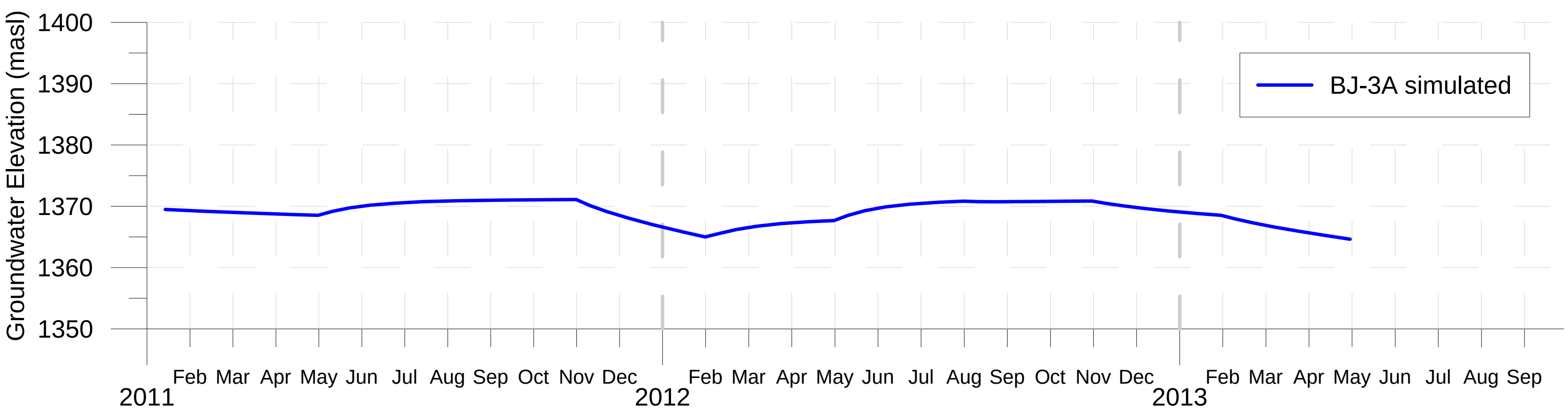
CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC11-BJ-2A: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-3	





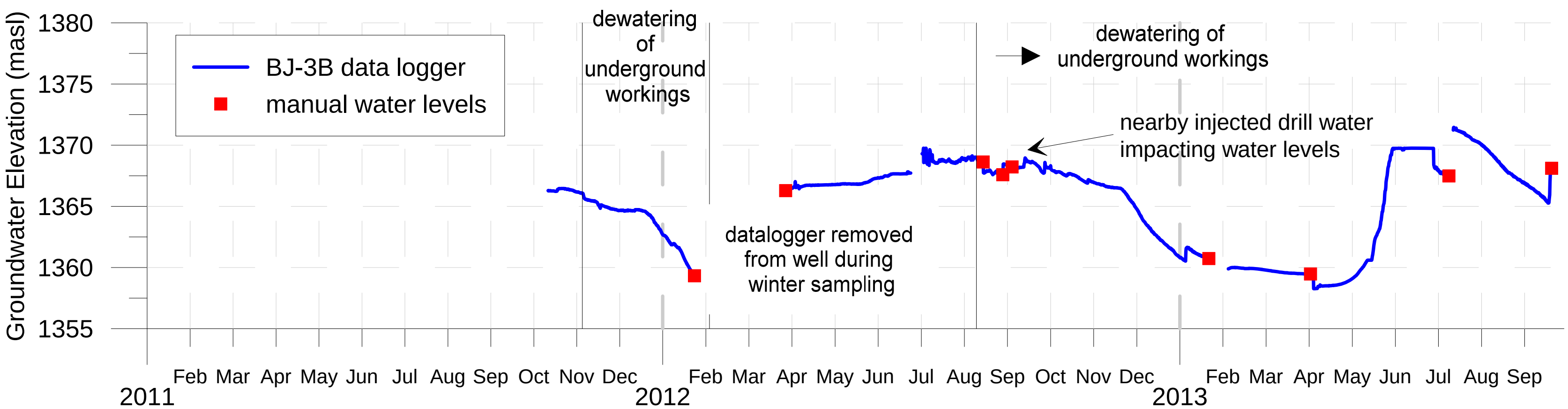
Notes:
1) Well screened from 1279.33 to 1284.63 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.
3) Simulated vs observed y-axis offset is 10 m.

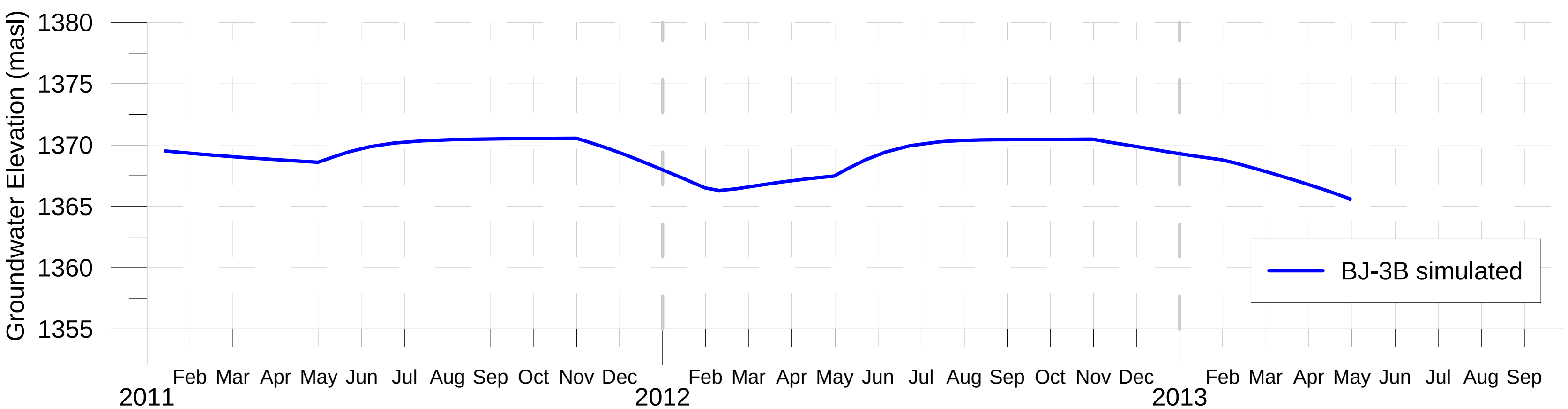
SCALE: N/A	DESIGNED: KSJ	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL	
DATE: MAY 2014	CHECKED: DP	TITLE: MW-BGC11-BJ-3A: OBSERVED VS SIMULATED GROUNDWATER HYDROGRAPH	
DRAWN: LH, BS	APPROVED: TC	PROJECT No. 1008-010	DWG No. G-4	REV.

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-3B





Notes:
1) Well screened from 1358.73 to 1361.73 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, BS	APPROVED: TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

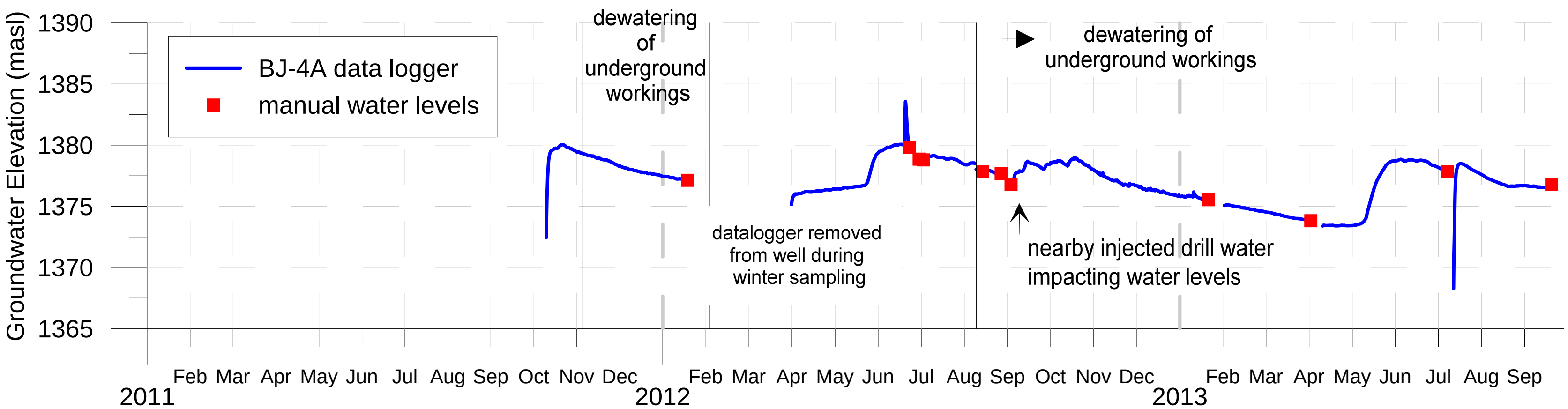
CLIENT:
PRETIUM RESOURCES INC.

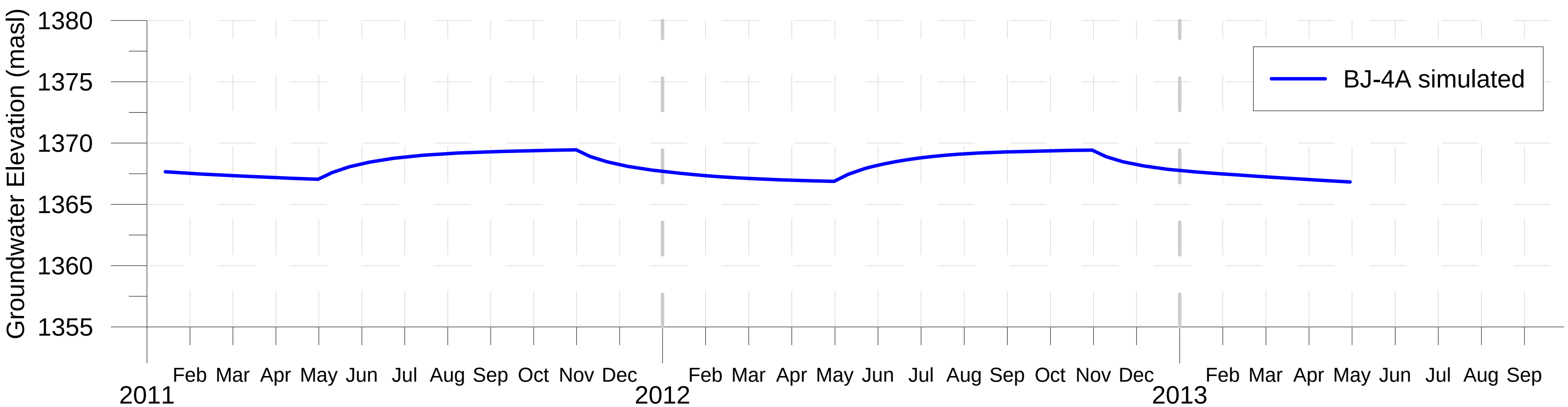
PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC11-BJ-3B: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-5	

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-4A





Notes:
1) Well screened from 1359.96 to 1369.16 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.
3) Simulated vs observed y-axis offset is 10 m.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, BS	APPROVED: TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

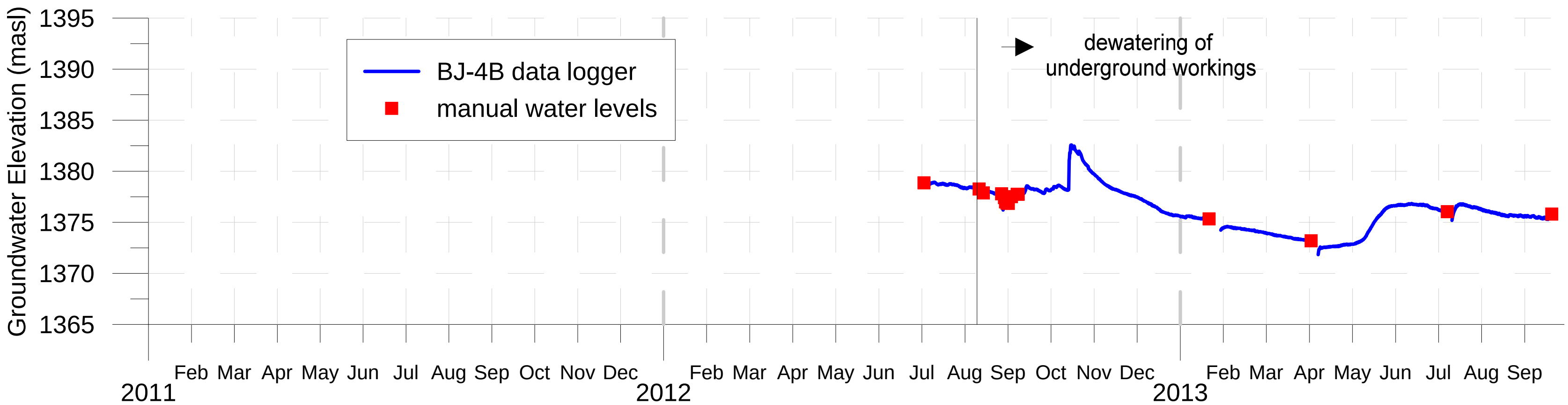
CLIENT:
PRETIUM RESOURCES INC.

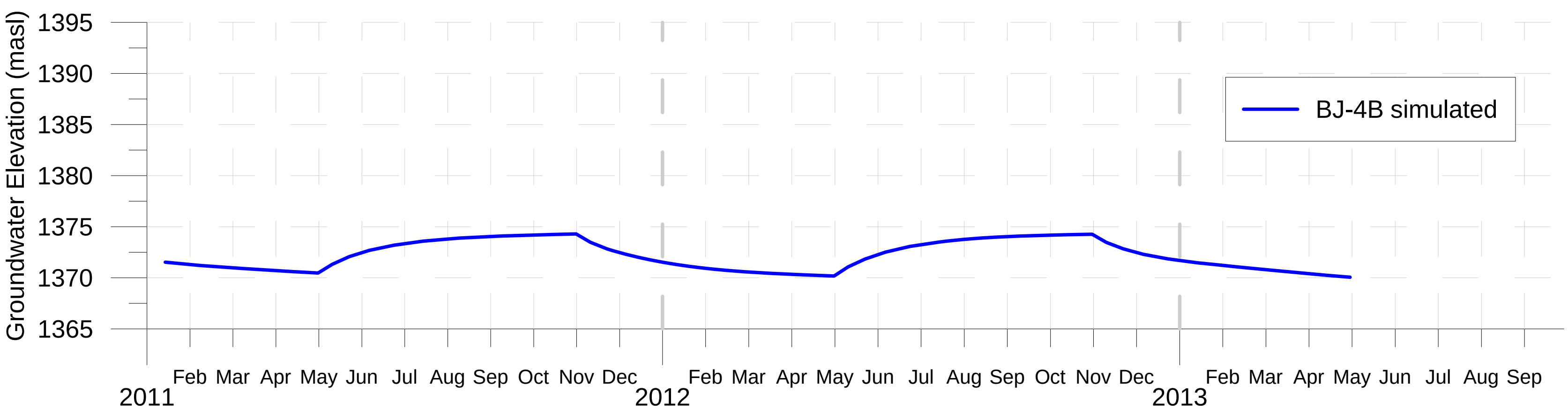
PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC11-BJ-4A: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-6	

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-4B





Notes:
1) Well screened from 1292.53 to 1295.53 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE:	N/A	DESIGNED:	KSJ
DATE:	MAY 2014	CHECKED:	DP
DRAWN:	LH, BS	APPROVED:	TC

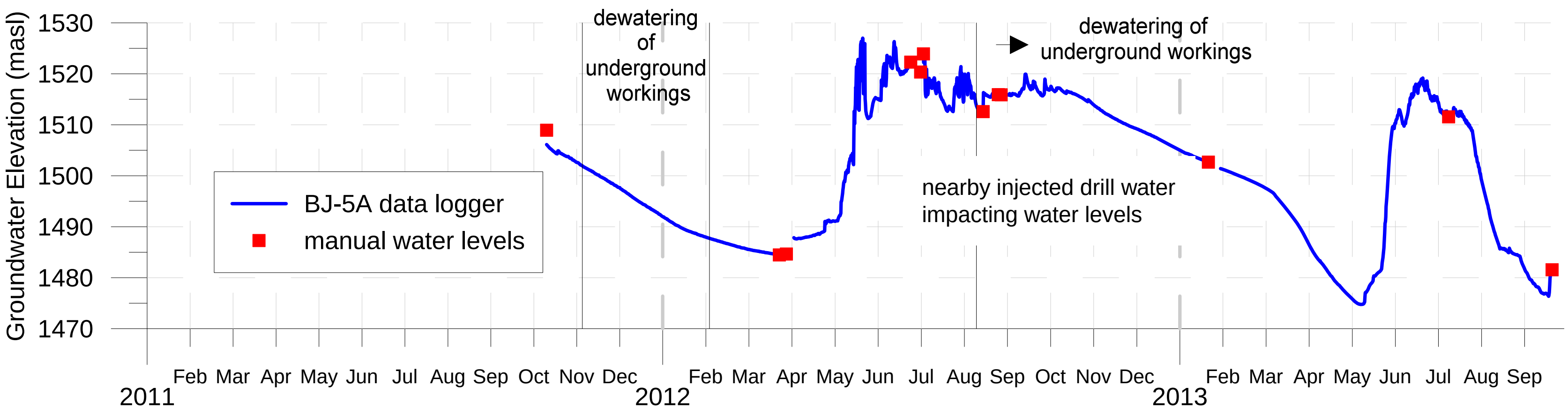
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

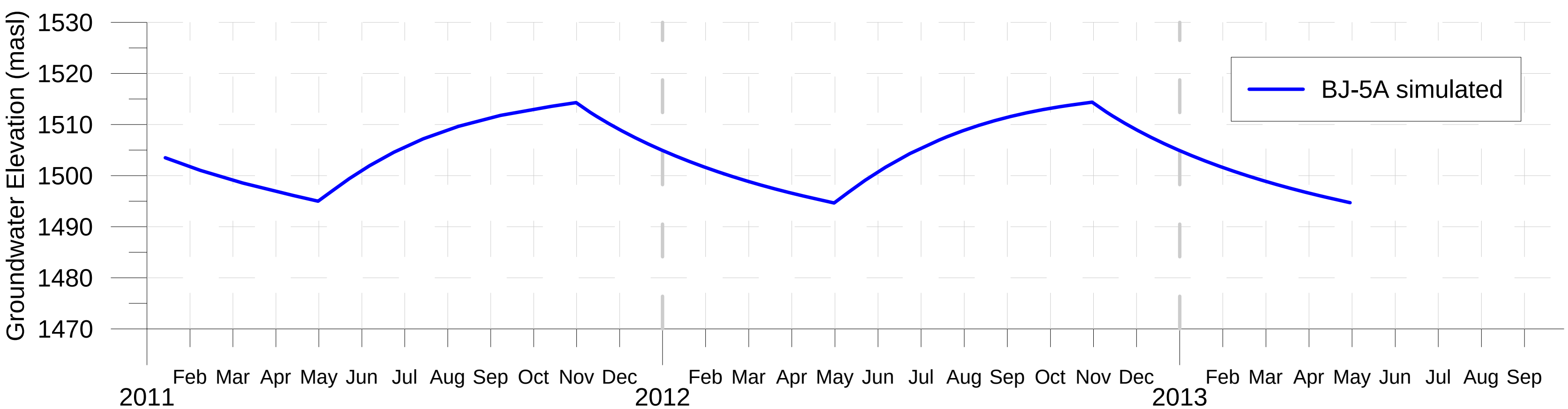
CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-4B: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-7	





Notes:
1) Well screened from 1448.44 to 1457.54 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE:	N/A	DESIGNED:	KSJ
DATE:	MAY 2014	CHECKED:	DP
DRAWN:	LH, BS	APPROVED:	TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

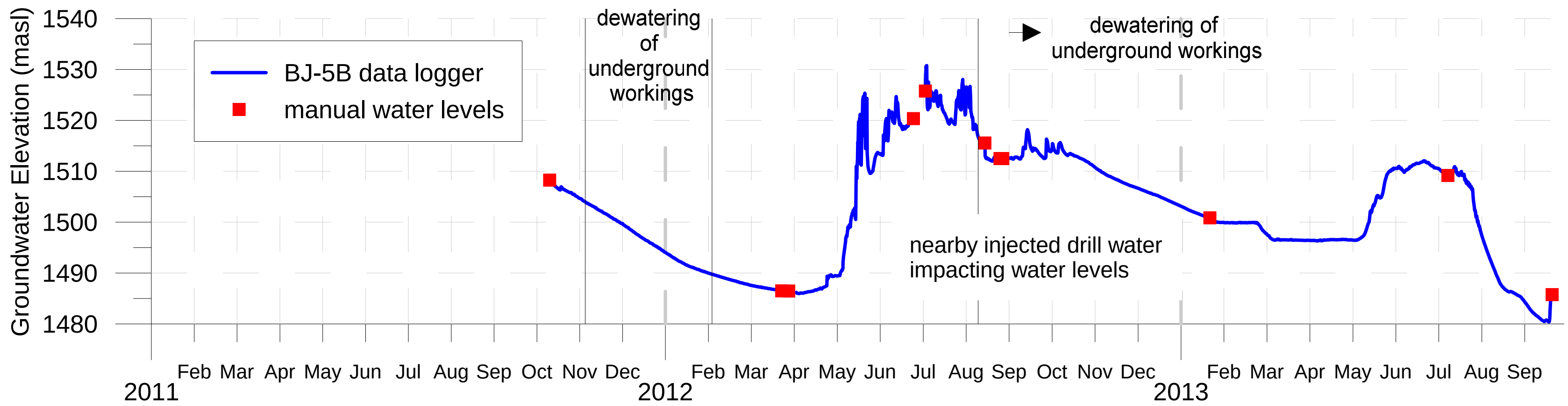
PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

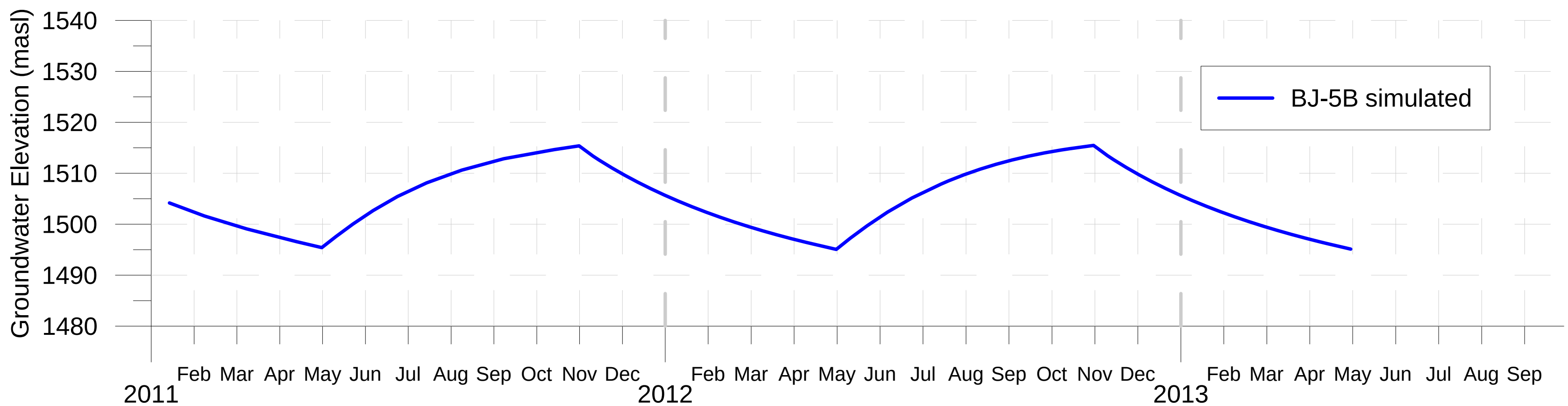
TITLE:
MW-BGC11-BJ-5A: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-8	

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-5A

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-5B





Notes:
1) Well screened from 1475.96 to 1485.16 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, BS	APPROVED: TC

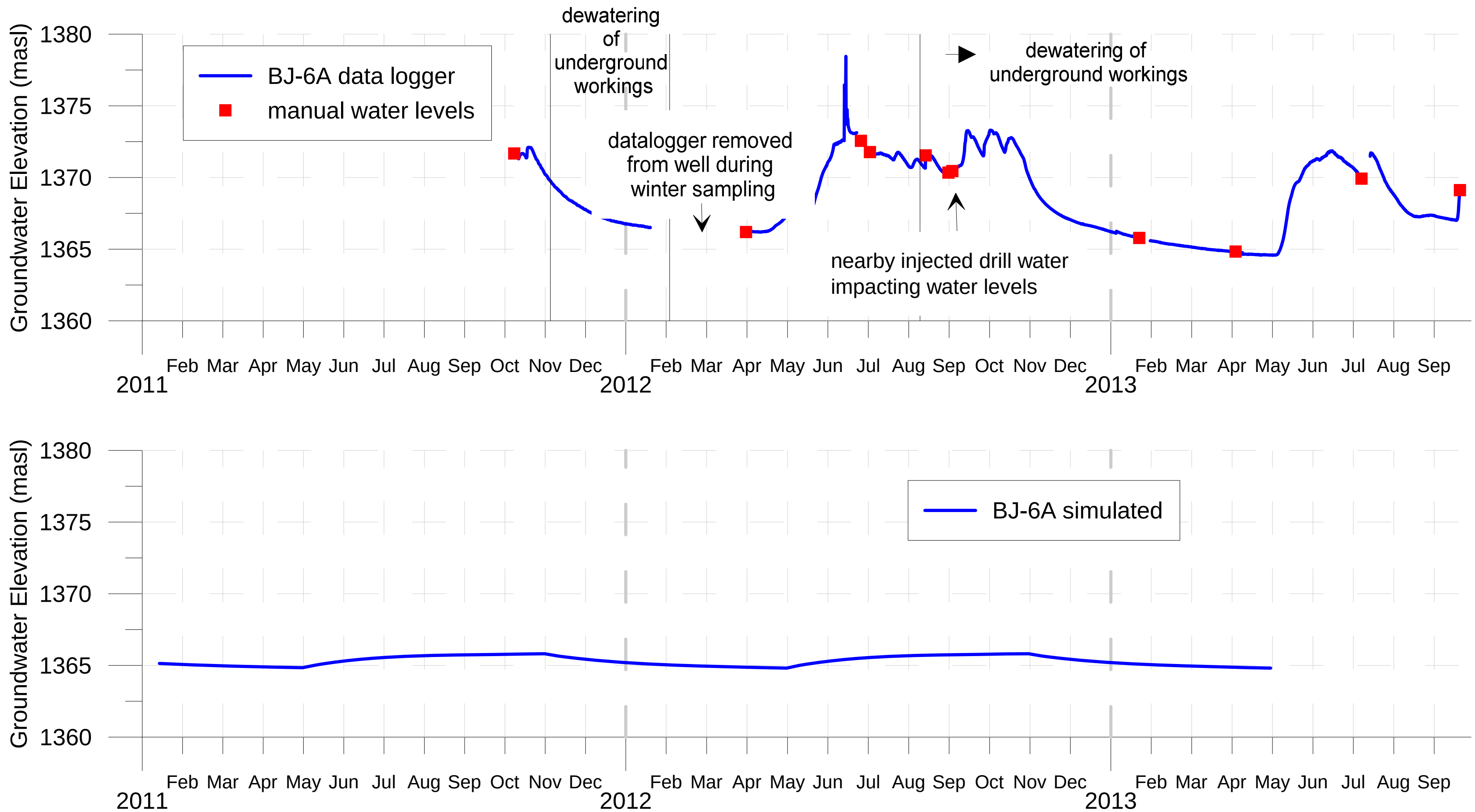
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC11-BJ-5B: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

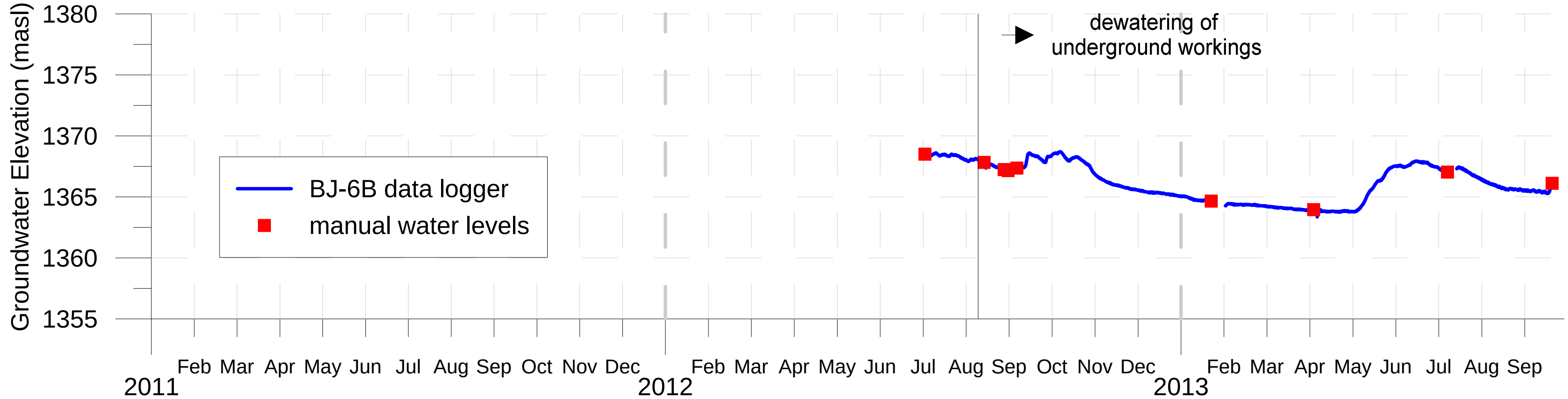
PROJECT No.	DWG No.	REV.
1008-010	G-9	

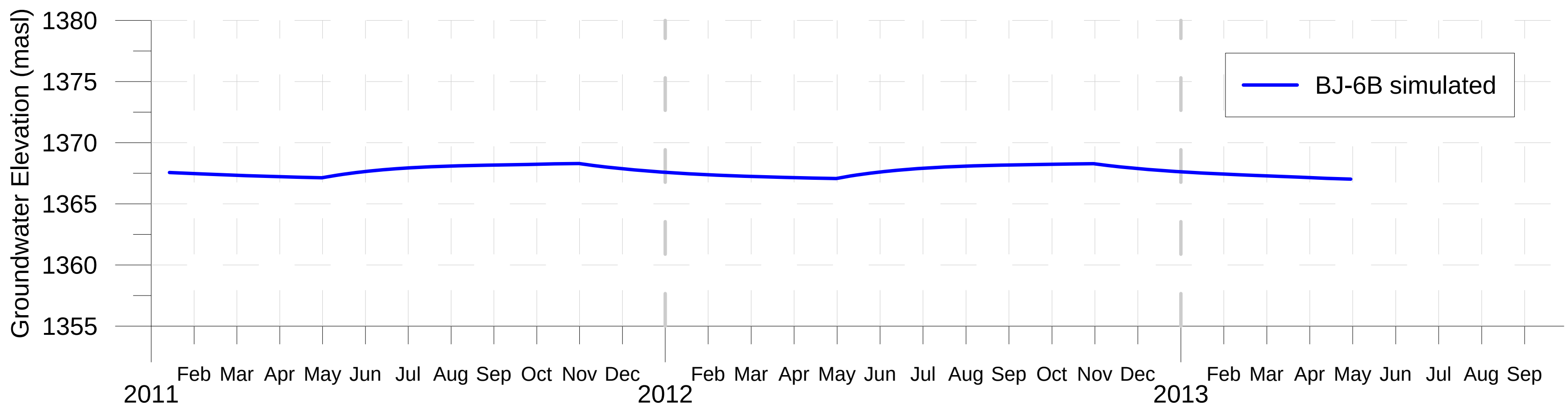


Notes:
1) Well screened from 1349.51 to 1358.61 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: MW-BGC11-BJ-6A: OBSERVED VS SIMULATED GROUNDWATER HYDROGRAPH
DRAWN: LH, BS	APPROVED: TC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. G-10 / REV.

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-6A





Notes:
1) Well screened from 1276.26 to 1279.26 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ	DATE: MAY 2014	CHECKED: DP
DRAWN: LH, BS	APPROVED: TC		

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-6B: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-11	

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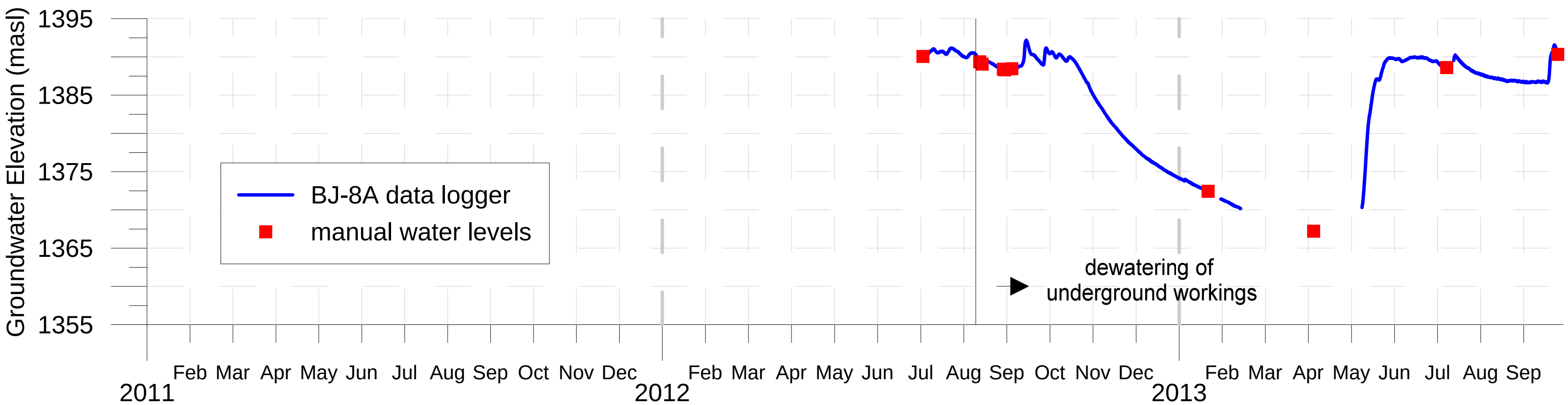
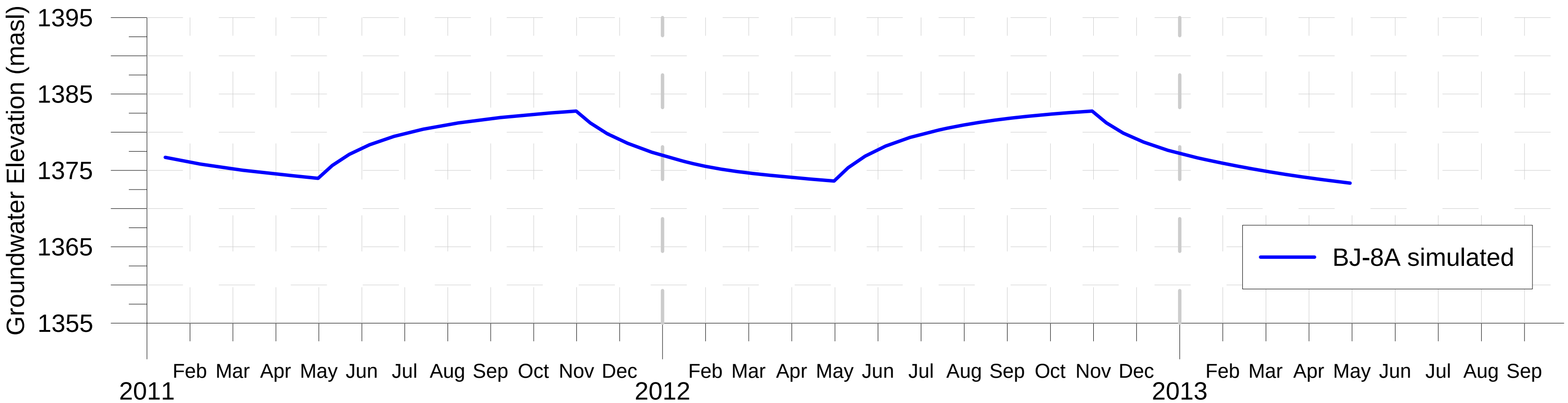




Notes:
1) Well screened from 1311.08 to 1317.18 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ		
DATE: MAY 2014	CHECKED: DP		
DRAWN: LH, BS	APPROVED: TC		

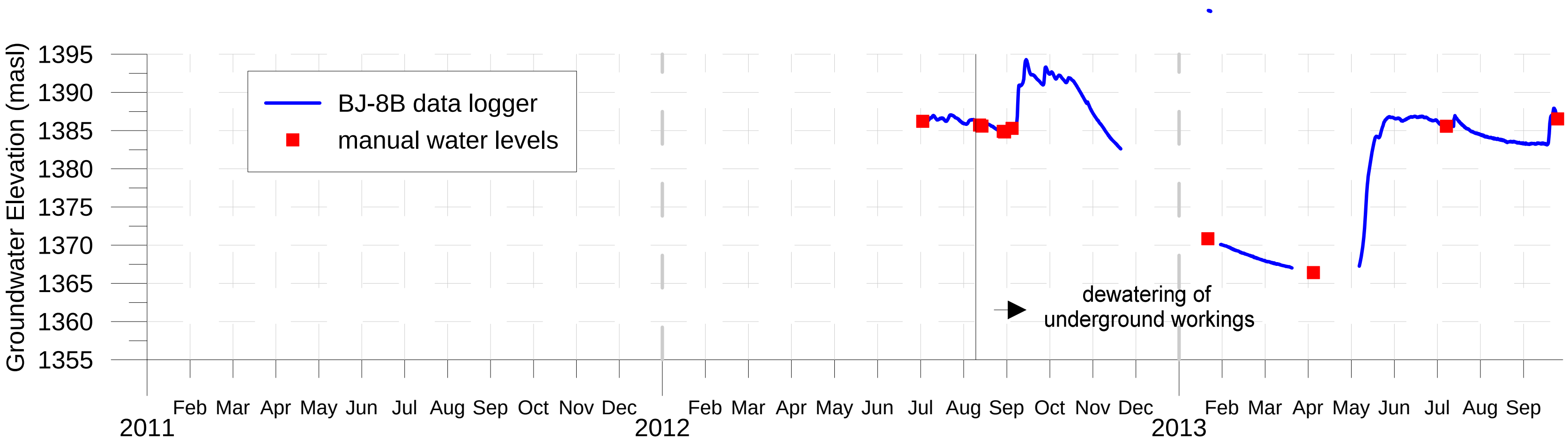
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

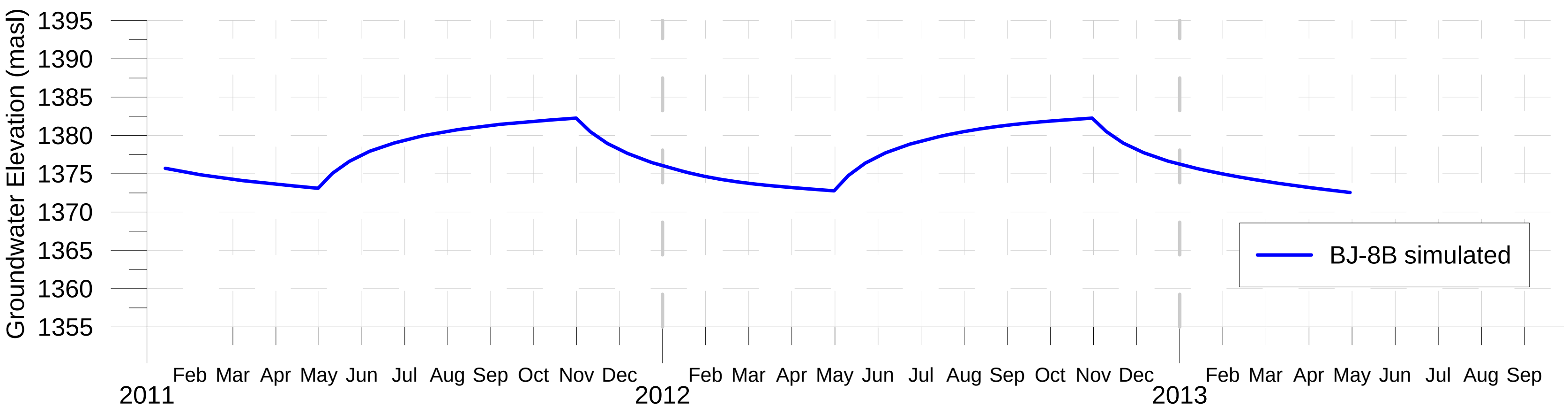
CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-8A: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-12	





Notes:
1) Well screened from 1352.4 to 1358.5 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ
DATE: MAY 2014	CHECKED: DP
DRAWN: LH, BS	APPROVED: TC

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

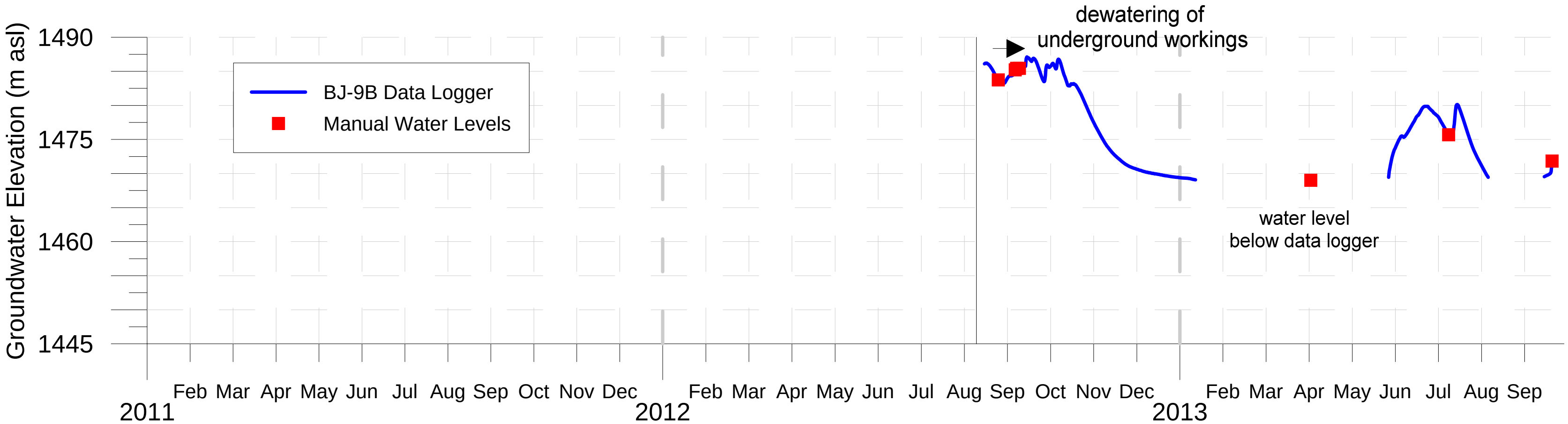
CLIENT:
PRETIUM RESOURCES INC.

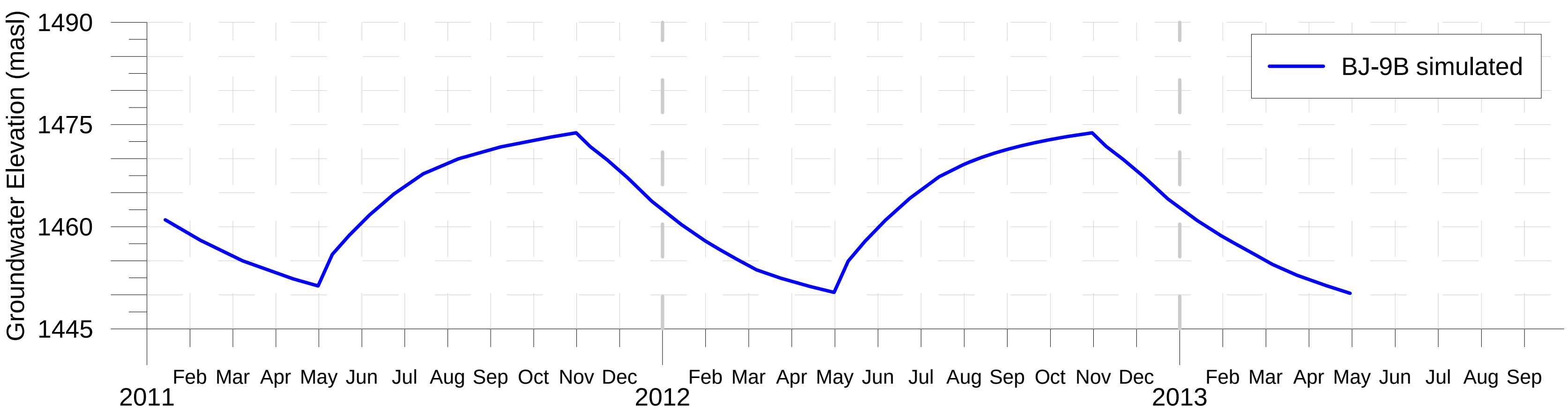
PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-8B: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-13	

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_MW-BGC12-BJ-9B





Notes:
1) Well screened from 1435.4 to 1441.5 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE:	N/A	DESIGNED:	KSJ
DATE:	MAY 2014	CHECKED:	DP
DRAWN:	LH, BS	APPROVED:	TC

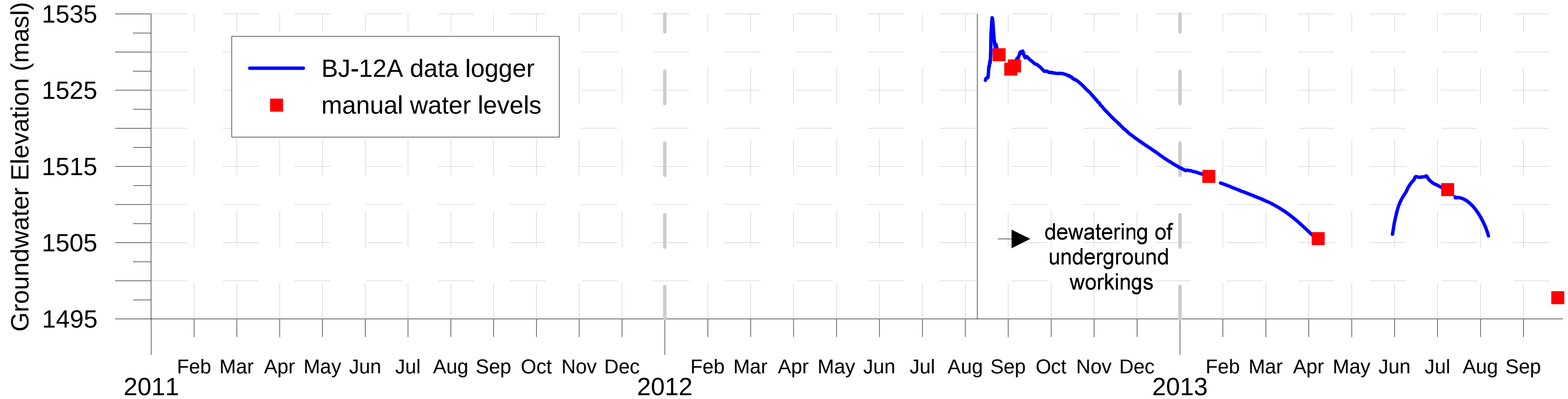
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

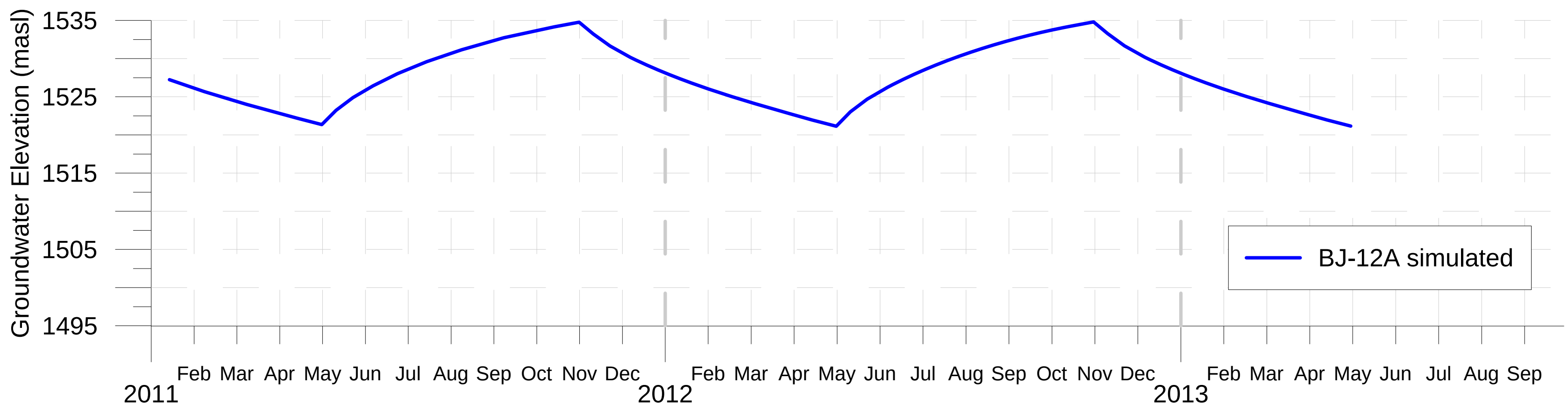
CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
MW-BGC12-BJ-9B: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-14	

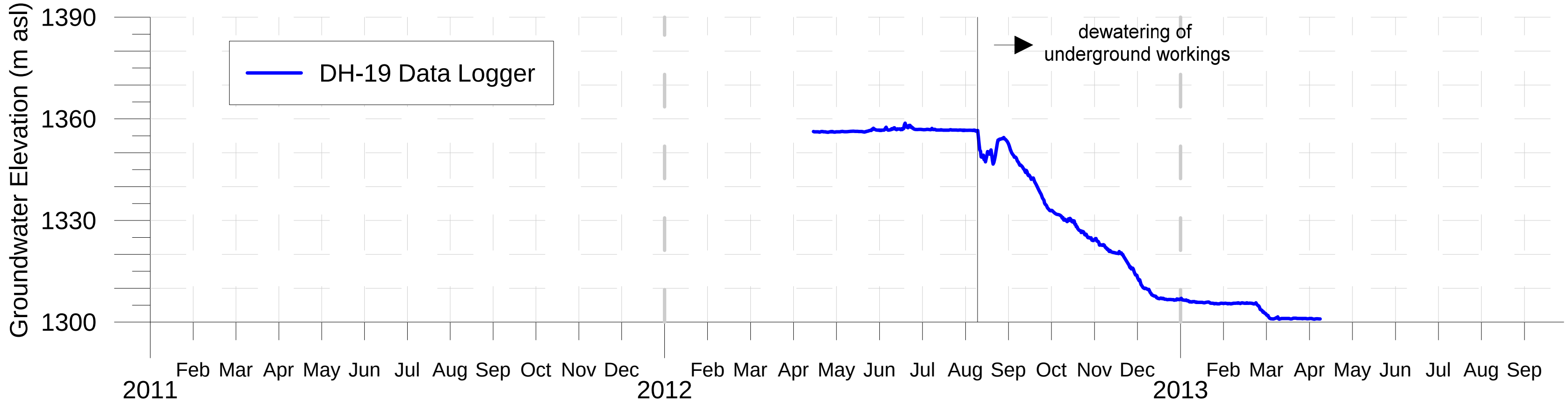


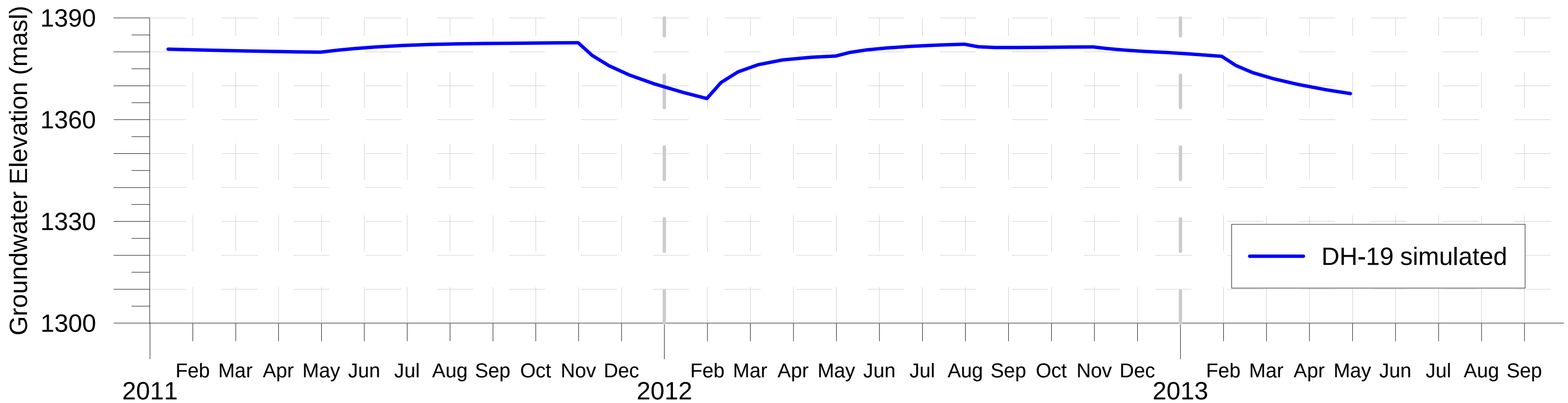


Notes:
1) Well screened from 1485.29 to 1491.39 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: MW-BGC12-BJ-12A: OBSERVED VS SIMULATED GROUNDWATER HYDROGRAPH
DRAWN: LH, BS	APPROVED: TC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. G-15 / REV.

N:\BGC\Projects\1008 Pretium\010 EA 2013\002 Hydrogeology\04 Numerical Model\Calibration\04 EA Cal adit dewatering calibration\EACal2_0_4-1_headresults\grapher plots\Sim vs Obs_sDH-BGC12-19.grf





Notes:
1) VWP tip elevation at 1158.9 m asl; see BGC (2014a) for VWP summary log.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE:	N/A	DESIGNED:	KSJ
DATE:	MAY 2014	CHECKED:	DP
DRAWN:	LH, BS	APPROVED:	TC

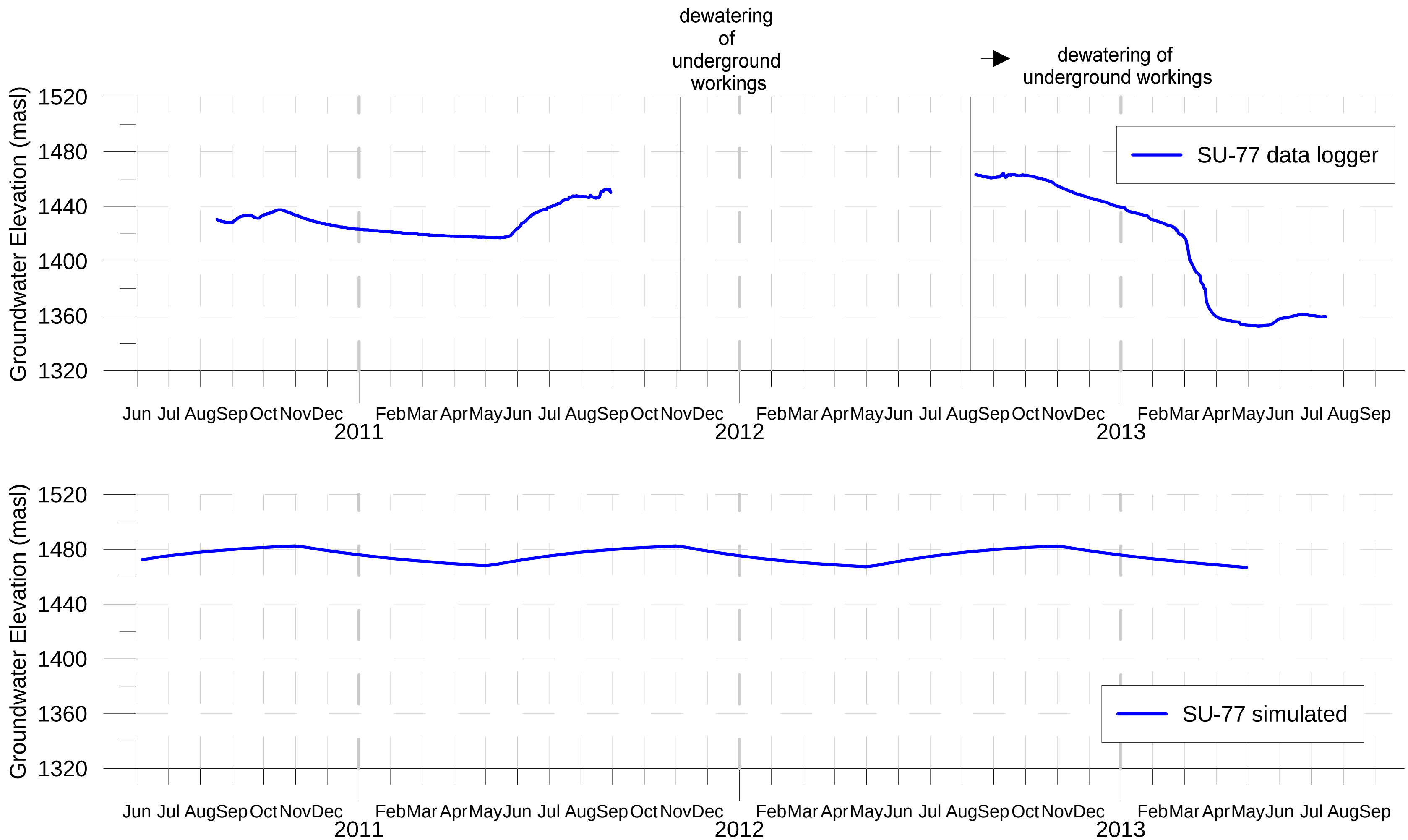
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
DH-BGC12-19: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-16	



Notes:
1) VWP tip elevation at 1268 masl
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: SU-77: OBSERVED VS SIMULATED GROUNDWATER HYDROGRAPH
DRAWN: LH, BS	APPROVED: TC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. G-17 / REV.

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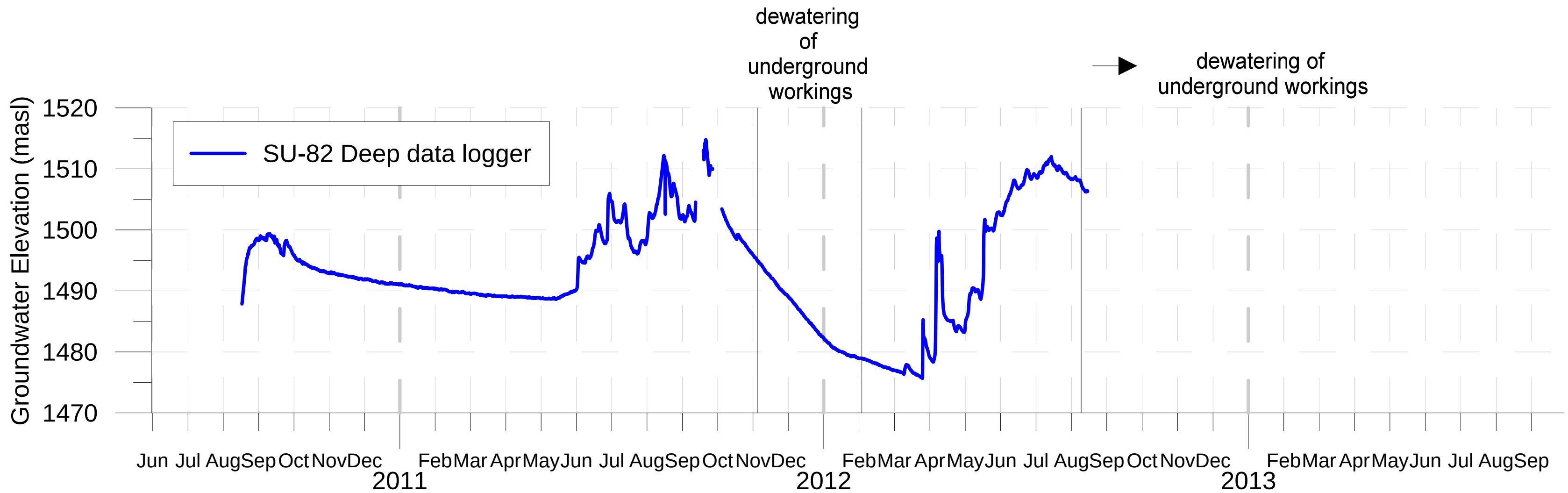

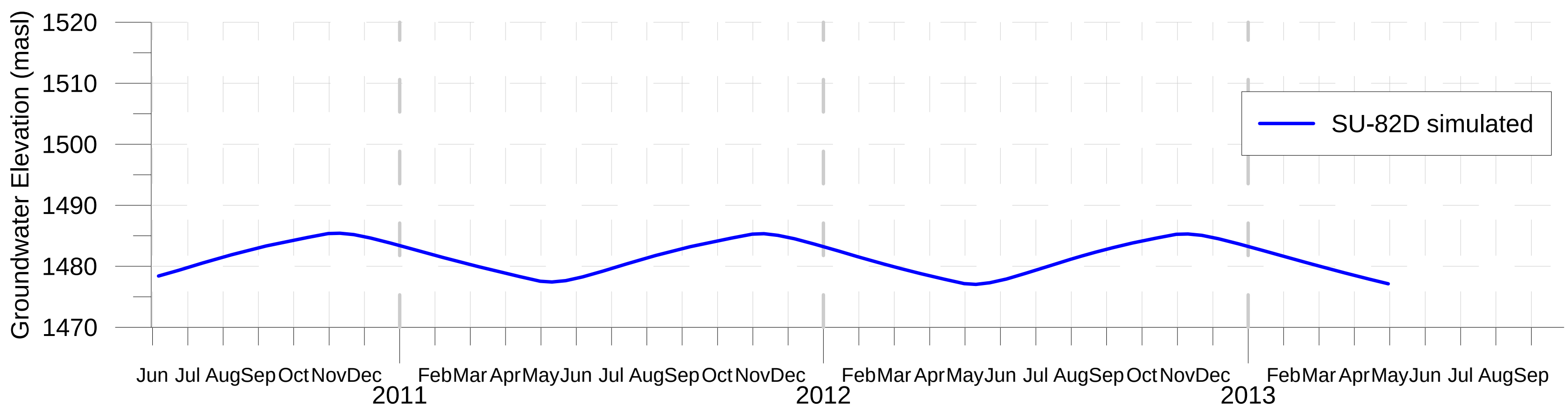

Notes:
1) VWP tip elevation at 1203 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT NUMERICAL HYDROGEOLOGIC MODEL
DATE: MAY 2014	CHECKED: DP		TITLE: SU-82D: OBSERVED VS SIMULATED GROUNDWATER HYDROGRAPH
DRAWN: LH, BS	APPROVED: TC	CLIENT: PRETIUM RESOURCES INC.	PROJECT No. 1008-010 / DWG No. G-18 / REV.

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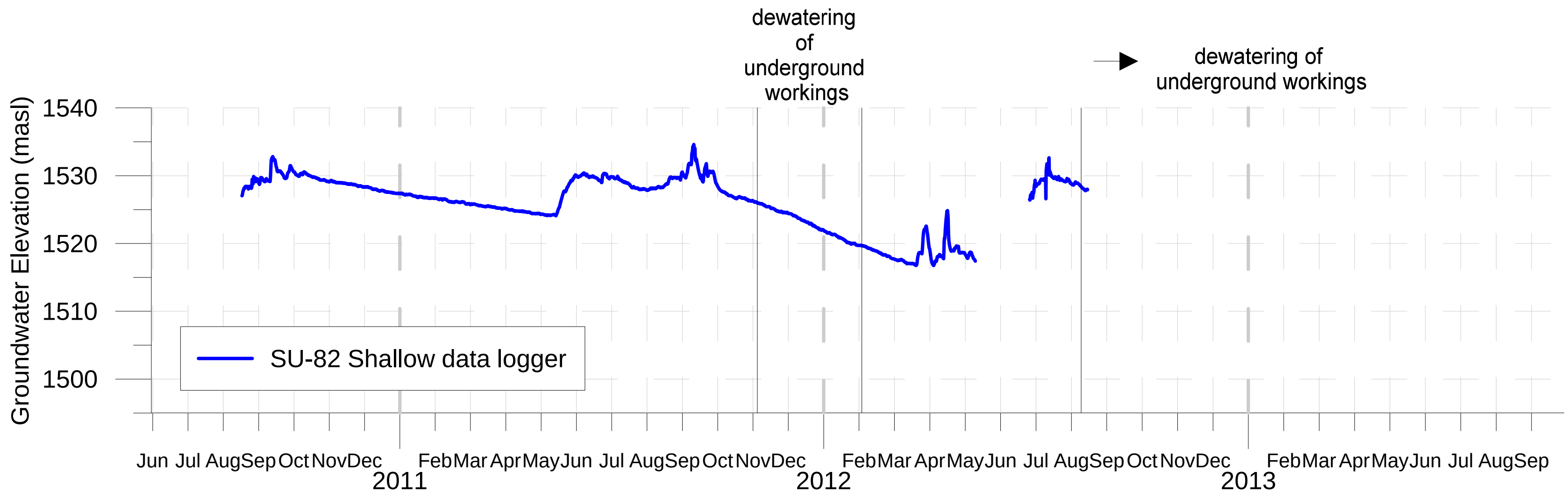

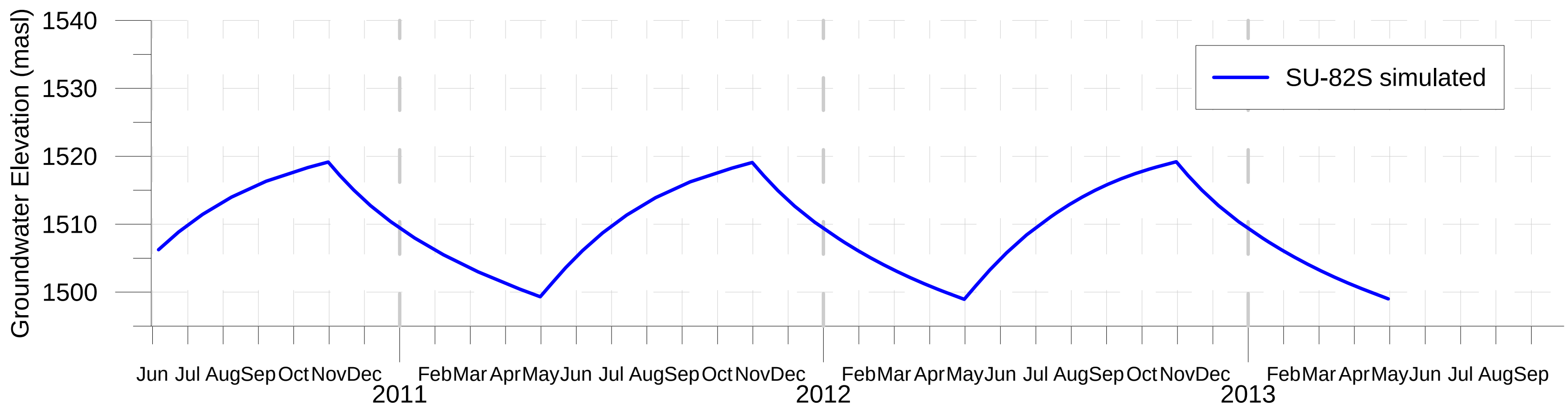

Notes:
1) VWP tip elevation at 1476 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ		
DATE: MAY 2014	CHECKED: DP		
DRAWN: LH, BS	APPROVED: TC		

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PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SU-82S: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-19	

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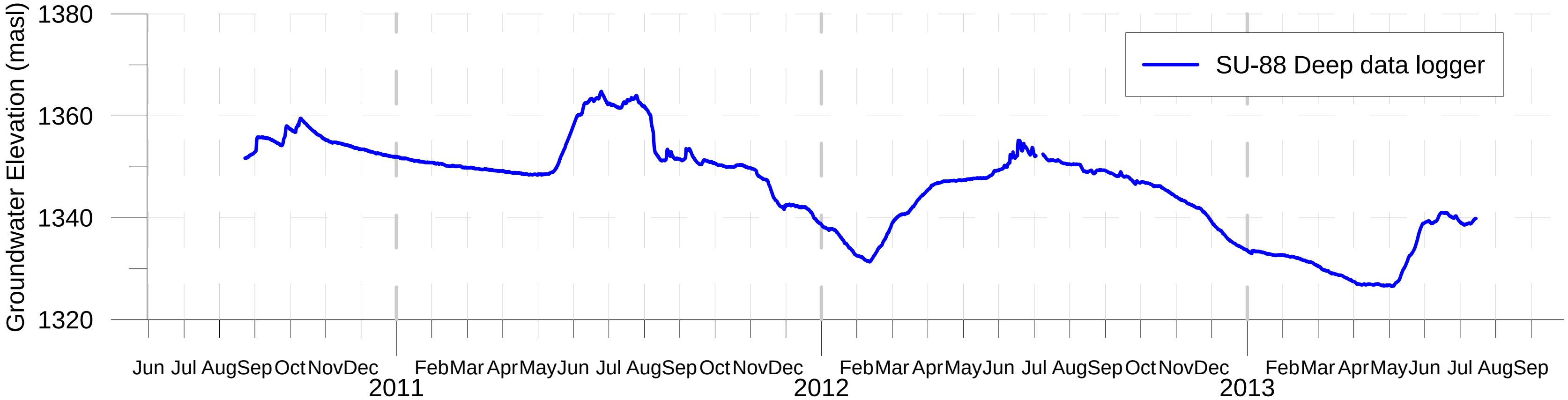
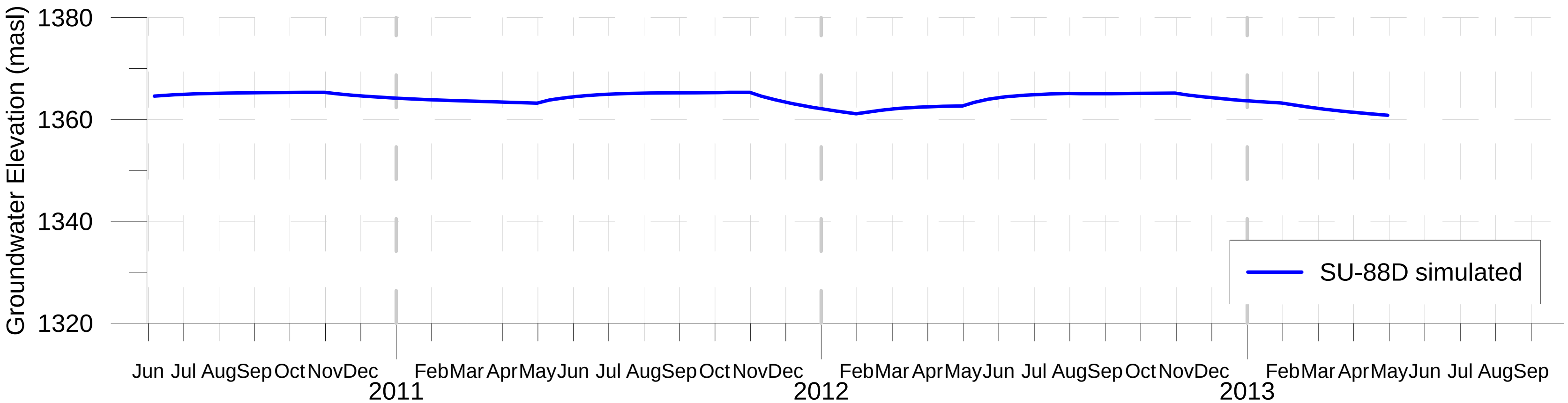




Notes:
1) VWP tip elevation at 1181 masl.
2) Transient calibration simulated adit dewatering from November 2011 to February 2012 and August 2012 to May 2013.

SCALE: N/A	DESIGNED: KSJ		
DATE: MAY 2014	CHECKED: DP		
DRAWN: LH, BS	APPROVED: TC		

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
PRETIUM RESOURCES INC.

PROJECT:
BRUCEJACK PROJECT ENVIRONMENTAL ASSESSMENT
NUMERICAL HYDROGEOLOGIC MODEL

TITLE:
SU-88D: OBSERVED VS SIMULATED
GROUNDWATER HYDROGRAPH

PROJECT No.	DWG No.	REV.
1008-010	G-20	

APPENDIX H
TAILINGS HYDRAULIC CONDUCTIVITY CALCULATIONS

Table H-1. Tailings Hydraulic Conductivity (K) Estimates from Grain Size Distribution - Sauerbrei Solution

	Sauerbrei Equation Parameters							K Estimate
	g (m/s²)	υ (m²/s)	β_z (-)	n (-)	τ (-)	d_{17} (m)	T (°C)	(m/s)
Tailings Porosity 50%	9.8	1.1E-06	3.8E-03	0.5	9.2E-01	1.5E-06	15	3.3E-08
Tailings Porosity 40%	9.8	1.1E-06	3.8E-03	0.4	9.2E-01	1.5E-06	15	1.2E-08
Tailings Porosity 30%	9.8	1.1E-06	3.8E-03	0.3	9.2E-01	1.5E-06	15	3.7E-09

Notes:

1. The Sauerbrei Equation is $K = \frac{g}{\upsilon}\beta_z\left(\frac{n^3}{(1-n)^2}\right)\tau {d_{17}}^2$

Where "K" is hydraulic conductivity, "g" is the standard gravitational constant,"υ" is the kinematic viscosity, "βz" is a constant, "n" is assumed porosity of tailings, "τ" is a temperature correction factor, and "d17" is the effective grain size diameter. Assumed temperature is 15 °C.

2. The Sauerbrei Equation is for use in sand and sandy clays, with grain size diameters no greater than 0.5 mm (Kasenow, 2002).

Table H-2. Tailings Hydraulic Conductivity (K) Estimates from Grain Size Distribution - Hazen and Kozeny-Carman Solutions

Groundwater Temperature (°C):	4
Porosity:	0.5
Particle Shape:	rounded
D10 particle size (mm):	0.0004

Sieve Size	Percent Finer	Grain Size (mm)	$D_{ave\ i}$ (mm)	Fraction of Particles Between Sieves (f_i)	f_i / $D_{ave\ i}$
1.5 in.	100	38.100	-	-	-
3/4 in.	100	19.050	25.132	0	0
3/8 in.	100	9.525	12.575	0	0
#4	100	4.750	6.282	0	0
#10	100	2.000	2.835	0	0
#20	100	0.850	1.201	0	0
#40	100	0.425	0.563	0	0
#60	100	0.250	0.310	0	0
#100	98	0.150	0.185	0.02	0.11
#140	82	0.106	0.122	0.16	1.31
#200	76	0.075	0.086	0.06	0.69
D_0*	0	0.001	0.006	0.76	137.08

* If D_0 < #200 sieve, spreadsheet will extrapolate log-linearly to get D_0 and the last $D_{ave\ i}$.

Calculations:

Shape Factor, SF =	6.6
D_{eff} = 1 / (Σ f_i/$D_{ave\ i}$) [cm]=	0.000718442
void ratio, e =	1
Temp. Correction Factor, TF =	0.82
KKozeny-Carman (cm/s) =	9.66791E-05
KKozeny-Carman (m/s) =	9.66791E-07
KHazen (cm/s) =	0.00000016
KHazen (m/s) =	1.6E-09

Notes:

1. The formula assumes there are no electrochemical reactions between the soil particles and the water. That means the formula is not appropriate for clayey soils, although it will work for nonplastic silts. For an example of an empirical formula to predict the permeability of a clay, see Carrier and Beckman [1984].

2. The formula assumes Darcian conditions; that is, laminar flow and a low pore water velocity, such that the inertia term in the Bernoulli energy equation can be ignored. These conditions apply in silts, sands, and even gravelly sands. But as the pore size increases and the velocity increases, turbulent flow and the inertia term must be taken into account.

3. The formula assumes the soil particles are relatively compact. It is not appropriate for soils containing platy particles such as mica (and this is another reason it does not work for clayey soils). Furthermore, if the measured specific surface area is significantly higher than the calculated specific surface area, then the latter should be used to predict permeability. This condition occurs when the particles are extremely irregular with re-entrant surfaces and intragranular porosity. This results in ''dead end'' and ''bypassed'' flow channels that do not contribute to the effective specific surface area. For example, lunar soil particles look like microscopic pieces of popcorn. The measured specific surface area is nearly eight times the calculated area [Carrier et al. 1991, pp. 480–481]

4. The formula is not appropriate if the particle size distribution has a long, flat tail in the fine fraction. As a practical matter, D0 must be known or estimated in order to calculate Deff.

5. The formula does not explicitly account for anisotropy. Of course, in most deposits (both natural and manmade), the horizontal permeability kh is greater than the vertical permeability kv . Nearly all of the laboratory measurements which have been made to validate the formula and to establish the value of CK-C were based on the vertical permeability. Thus, kKozeny-Carman ~= kv .

APPENDIX I
MODEL OUTPUTS – HYDROLOGY & WATER QUALITY

Table I-1. Pre-Disturbance Numerical Model Outputs for Hydrology and Water Quality Modeling.

				Predicted Flows[1] (m^3/d)								
Stress Period (SP)	Days per SP (d)	Model Years (y)	Model "Months"	Brucejack Lake[2] (GHB)[3]	Brucejack Lake Tributaries (DRN)	Unnamed Creek (DRN)	Brucejack Creek b/w BJ2.62 & BJL-H1 (RIV)	VOK Creek (RIV)	Camp Creek (DRN)	Brucejack Creek above BJ2.62 (RIV/DRN)	Total Baseflow @ BJ2.62 -	Total Baseflow @ BJL-H1 -
1	60.9	0.2	Nov-Dec	2,305	5,100	921	365	212	157	1,079	8,641	10,139
2	60.9	0.3	Jan-Feb	2,015	3,548	577	315	117	58	795	6,416	7,424
3	60.9	0.5	Mar-Apr	1,844	2,872	477	289	75	47	686	5,450	6,291
4	60.9	0.7	May-Jun	2,030	4,501	747	392	172	78	1,046	7,656	8,967
5	60.9	0.8	Jul-Aug	2,283	5,802	1,075	435	266	139	1,327	9,551	11,326
6	60.9	1.0	Sept-Oct	2,404	6,503	1,318	448	316	188	1,416	10,512	12,594
7	60.9	1.2	Nov-Dec	2,223	4,440	799	356	191	97	1,016	7,776	9,121
8	60.9	1.3	Jan-Feb	1,965	3,314	556	309	106	55	762	6,097	7,068
9	60.9	1.5	Mar-Apr	1,808	2,710	463	286	71	46	686	5,251	6,070
10	60.9	1.7	May-Jun	2,005	4,354	731	390	167	77	1,036	7,472	8,760
11	60.9	1.8	Jul-Aug	2,265	5,672	1,056	434	263	135	1,318	9,390	11,143
12	60.9	2.0	Sept-Oct	2,391	6,403	1,307	447	313	186	1,418	10,398	12,466
13	60.9	2.2	Nov-Dec	2,211	4,366	795	355	189	96	1,021	7,695	9,035
14	60.9	2.3	Jan-Feb	1,955	3,260	555	309	105	55	763	6,034	7,003
15	60.9	2.5	Mar-Apr	1,799	2,665	462	285	70	46	690	5,201	6,019
16	60.9	2.7	May-Jun	1,998	4,307	729	390	167	77	1,036	7,419	8,704
17	60.9	2.8	Jul-Aug	2,259	5,627	1,053	434	262	135	1,319	9,341	11,090
18	60.9	3.0	Sept-Oct	2,386	6,365	1,305	447	313	186	1,420	10,358	12,423
19	60.9	3.2	Nov-Dec	2,207	4,336	794	355	189	96	1,010	7,649	8,988
20	60.9	3.3	Jan-Feb	1,951	3,236	554	309	105	55	765	6,008	6,976
21	60.9	3.5	Mar-Apr	1,796	2,644	462	285	70	46	681	5,167	5,984
22	60.9	3.7	May-Jun	1,995	4,285	728	390	166	77	1,022	7,379	8,664
23	60.9	3.8	Jul-Aug	2,257	5,606	1,052	434	262	135	1,312	9,309	11,057
24	60.9	4.0	Sept-Oct	2,384	6,346	1,304	447	313	186	1,420	10,335	12,399
25	60.9	4.2	Nov-Dec	2,205	4,320	794	355	189	96	1,009	7,629	8,968
26	60.9	4.3	Jan-Feb	1,949	3,223	554	309	105	55	769	5,996	6,965
27	60.9	4.5	Mar-Apr	1,794	2,633	462	285	70	46	685	5,157	5,975
28	60.9	4.7	May-Jun	1,994	4,272	728	390	166	77	1,024	7,367	8,651
29	60.9	4.8	Jul-Aug	2,256	5,593	1,052	434	262	135	1,317	9,300	11,047
30	60.9	5.0	Sept-Oct	2,383	6,334	1,303	447	313	186	1,419	10,322	12,385
31	60.9	5.2	Nov-Dec	2,204	4,310	794	355	189	96	1,008	7,618	8,956
32	60.9	5.3	Jan-Feb	1,947	3,215	554	309	105	55	773	5,991	6,959
33	60.9	5.5	Mar-Apr	1,793	2,626	461	285	70	46	683	5,147	5,964
34	60.9	5.7	May-Jun	1,993	4,264	728	390	166	77	1,028	7,361	8,645
35	60.9	5.8	Jul-Aug	2,255	5,585	1,051	434	262	135	1,311	9,285	11,032
36	60.9	6.0	Sept-Oct	2,382	6,326	1,303	447	313	186	1,403	10,297	12,360
37	60.9	6.2	Nov-Dec	2,203	4,304	794	355	189	96	1,017	7,620	8,958
38	60.9	6.3	Jan-Feb	1,947	3,210	554	309	105	55	770	5,982	6,950
39	60.9	6.5	Mar-Apr	1,792	2,621	461	285	70	46	683	5,142	5,959
40	60.9	6.7	May-Jun	1,992	4,259	727	390	166	77	1,021	7,349	8,632
41	60.9	6.8	Jul-Aug	2,254	5,580	1,051	434	262	134	1,315	9,283	11,030
42	60.9	7.0	Sept-Oct	2,382	6,321	1,303	447	313	186	1,410	10,299	12,361
43	60.9	7.2	Nov-Dec	2,203	4,299	794	355	189	96	1,018	7,616	8,954
44	60.9	7.3	Jan-Feb	1,946	3,207	554	309	105	55	764	5,972	6,940
45	60.9	7.5	Mar-Apr	1,791	2,618	461	285	70	46	690	5,145	5,961
46	60.9	7.7	May-Jun	1,991	4,255	727	390	166	77	1,024	7,348	8,631
47	60.9	7.8	Jul-Aug	2,254	5,576	1,051	434	262	134	1,315	9,279	11,026
48	60.9	8.0	Sept-Oct	2,381	6,317	1,303	447	313	186	1,420	10,304	12,367
49	60.9	8.2	Nov-Dec	2,202	4,296	793	355	189	96	1,031	7,626	8,963
50	60.9	8.3	Jan-Feb	1,946	3,204	554	309	105	55	763	5,968	6,935
51	60.9	8.5	Mar-Apr	1,791	2,615	461	285	70	46	681	5,133	5,949
52	60.9	8.7	May-Jun	1,991	4,252	727	390	166	77	1,021	7,341	8,625
53	60.9	8.8	Jul-Aug	2,253	5,573	1,051	434	262	134	1,315	9,276	11,022
54	60.9	9.0	Sept-Oct	2,381	6,315	1,303	447	313	186	1,422	10,303	12,366
55	60.9	9.2	Nov-Dec	2,202	4,294	793	355	189	96	1,020	7,612	8,950
56	60.9	9.3	Jan-Feb	1,945	3,202	554	309	105	55	760	5,962	6,930
57	60.9	9.5	Mar-Apr	1,791	2,613	461	285	70	46	683	5,133	5,949
58	60.9	9.7	May-Jun	1,991	4,250	727	390	166	77	1,030	7,348	8,631
59	60.9	9.8	Jul-Aug	2,253	5,571	1,051	434	262	134	1,312	9,271	11,017
60	60.9	10.0	Sept-Oct	2,381	6,313	1,302	447	313	186	1,415	10,294	12,357

Notes:

1. The numerical model was spun-up for 9 years, with flows from the final model year used for input to the WBM.
2. For spatial distribution of zones used to define flows, see Figure I-1.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, and RIV refers to a river boundary.

Table I-2. Predictive Transient Mining Operations Basecase Simulation Outputs for Hydrology and Water Quality Modeling.

			Predicted Flows[1] (m^3/d)									
Stress Period (SP)	Days per SP (d)	Mine Years (y)	Brucejack Lake[2] (GHB)[3]	Brucejack Lake Tributaries (DRN)	Unnamed Creek (DRN)	Brucejack Creek b/w BJ2.62 & BJL-H1 (RIV)	Mine Workings[2] (DRN)	Camp Creek (DRN)	VOK Creek (RIV)	Brucejack Creek above BJ2.62 (RIV/DRN)	Total Baseflow @ BJ2.62 -	Total Baseflow @ BJL-H1 -
1	60.9	-2.8	1,906	3,302	542	291	4,995	0	44	167	5,375	6,252
2	60.9	-2.7	1,725	2,598	402	251	3,185	0	35	115	4,438	5,125
3	60.9	-2.5	1,914	4,191	678	361	3,339	0	60	246	6,351	7,450
4	60.9	-2.3	2,175	5,505	1,011	412	3,718	0	90	367	8,047	9,561
5	60.9	-2.2	2,304	6,251	1,263	428	3,915	0	111	404	8,959	10,762
6	60.9	-2.0	2,122	4,234	743	329	3,376	0	56	222	6,578	7,706
7	60.9	-1.8	1,860	3,142	486	270	5,919	0	38	132	5,134	5,927
8	60.9	-1.7	1,699	2,549	376	239	4,018	0	30	93	4,341	4,986
9	60.9	-1.5	1,896	4,174	658	351	4,103	0	53	220	6,290	7,353
10	60.9	-1.3	2,160	5,501	995	405	4,443	0	73	334	7,995	9,468
11	60.9	-1.2	2,290	6,253	1,253	421	4,632	0	88	377	8,919	10,681
12	60.9	-1.0	2,106	4,234	736	319	4,110	0	49	200	6,540	7,644
13	60.9	-0.8	1,844	3,138	478	258	4,591	0	33	115	5,097	5,866
14	60.9	-0.7	1,686	2,543	369	228	3,721	0	26	79	4,308	4,930
15	60.9	-0.5	1,883	4,170	652	343	4,012	0	48	208	6,262	7,305
16	60.9	-0.3	2,149	5,499	990	399	4,466	0	68	320	7,968	9,425
17	60.9	-0.2	2,281	6,251	1,249	417	4,725	0	80	372	8,903	10,649
18	60.9	0.0	2,098	4,233	732	314	4,277	0	47	194	6,525	7,618
19	60.9	0.2	1,836	3,136	475	253	4,592	0	32	110	5,082	5,842
20	60.9	0.3	1,678	2,540	365	223	3,756	0	24	74	4,292	4,904
21	60.9	0.5	1,876	4,168	649	339	3,980	0	47	200	6,243	7,278
22	60.9	0.7	2,142	5,496	987	396	4,442	0	66	316	7,953	9,402
23	60.9	0.8	2,274	6,248	1,246	415	4,731	0	76	361	8,883	10,620
24	60.9	1.0	2,091	4,231	730	311	4,264	0	46	190	6,512	7,599
25	60.9	1.2	1,830	3,133	472	250	4,122	0	31	106	5,069	5,822
26	60.9	1.3	1,672	2,536	363	221	3,561	0	23	71	4,279	4,885
27	60.9	1.5	1,870	4,164	647	337	3,853	0	46	197	6,232	7,261
28	60.9	1.7	2,137	5,493	985	395	4,331	0	65	309	7,939	9,384
29	60.9	1.8	2,270	6,245	1,244	414	4,637	0	75	362	8,878	10,611
30	60.9	2.0	2,088	4,229	729	310	4,207	0	45	189	6,505	7,589
31	60.9	2.2	1,795	3,132	471	249	3,742	0	30	105	5,031	5,782
32	60.9	2.3	1,671	2,534	362	220	3,482	0	23	70	4,275	4,879
33	60.9	2.5	1,869	4,163	646	336	3,844	0	46	197	6,229	7,256
34	60.9	2.7	2,135	5,491	984	394	4,356	0	65	307	7,933	9,376
35	60.9	2.8	2,269	6,244	1,243	413	4,671	0	75	360	8,873	10,605
36	60.9	3.0	2,091	4,227	728	310	4,240	0	45	188	6,506	7,590
37	60.9	3.2	1,831	3,130	471	249	4,361	0	30	104	5,065	5,815
38	60.9	3.3	1,673	2,533	361	219	3,638	0	22	69	4,275	4,879
39	60.9	3.5	1,868	4,161	645	336	3,979	0	45	196	6,225	7,251
40	60.9	3.7	2,134	5,490	983	394	4,471	0	64	304	7,928	9,369
41	60.9	3.8	2,268	6,243	1,243	413	4,767	0	75	358	8,869	10,599
42	60.9	4.0	2,090	4,227	728	310	4,295	0	45	188	6,505	7,587
43	60.9	4.2	1,831	3,130	470	249	4,308	0	30	104	5,064	5,813
44	60.9	4.3	1,673	2,533	361	219	3,754	0	22	69	4,274	4,876
45	60.9	4.5	1,867	4,161	644	335	4,060	0	45	195	6,224	7,248
46	60.9	4.7	2,133	5,489	983	393	4,539	0	64	303	7,925	9,365
47	60.9	4.8	2,267	6,242	1,242	412	4,835	0	74	359	8,867	10,595
48	60.9	5.0	2,088	4,226	727	309	4,371	0	44	187	6,501	7,581
49	60.9	5.2	1,829	3,129	469	247	3,776	0	30	102	5,060	5,806
50	60.9	5.3	1,671	2,531	360	217	3,602	0	22	67	4,269	4,868
51	60.9	5.5	1,865	4,159	643	334	3,984	0	45	194	6,218	7,240
52	60.9	5.7	2,131	5,487	982	392	4,484	0	63	307	7,926	9,363
53	60.9	5.8	2,265	6,240	1,241	412	4,786	0	73	359	8,865	10,591
54	60.9	6.0	2,087	4,225	727	308	4,351	0	44	186	6,498	7,577
55	60.9	6.2	1,825	3,127	462	242	4,747	0	28	69	5,021	5,754
56	60.9	6.3	1,665	2,528	348	209	3,795	0	19	25	4,218	4,794
57	60.9	6.5	1,857	4,154	629	325	4,388	0	41	143	6,154	7,149
58	60.9	6.7	2,120	5,480	969	384	4,905	0	57	224	7,824	9,235
59	60.9	6.8	2,253	6,231	1,230	405	5,203	0	66	249	8,732	10,434
60	60.9	7.0	2,073	4,216	712	297	4,496	0	39	123	6,413	7,461
61	60.9	7.2	1,557	3,117	421	218	11,108	0	19	9	4,683	5,341
62	60.9	7.3	1,428	2,515	282	172	4,956	0	12	1	3,944	4,410
63	60.9	7.5	1,617	4,132	525	277	5,355	0	22	22	5,771	6,595
64	60.9	7.7	1,871	5,452	889	341	5,845	0	38	42	7,365	8,633
65	60.9	7.8	2,006	6,197	1,157	364	6,158	0	46	51	8,254	9,820
66	60.9	8.0	1,848	4,192	638	257	5,433	0	23	14	6,054	6,972
67	60.9	8.2	1,626	3,097	367	192	5,114	0	13	2	4,724	5,296
68	60.9	8.3	1,495	2,498	256	156	4,756	0	10	0	3,992	4,414
69	60.9	8.5	1,674	4,113	493	267	5,258	0	20	19	5,805	6,585
70	60.9	8.7	1,922	5,435	866	335	5,802	0	36	38	7,395	8,632
71	60.9	8.8	2,051	6,181	1,141	359	6,165	0	44	47	8,280	9,824
72	60.9	9.0	1,889	4,182	628	253	5,474	0	22	12	6,083	6,986
73	60.9	9.2	1,665	3,089	360	189	5,036	0	13	1	4,755	5,317
74	60.9	9.3	1,532	2,491	252	153	4,763	0	10	0	4,023	4,438
75	60.9	9.5	1,709	4,105	488	265	5,283	0	19	18	5,833	6,605
76	60.9	9.7	1,955	5,429	862	334	5,827	0	35	37	7,421	8,652
77	60.9	9.8	2,082	6,176	1,137	359	6,182	0	44	47	8,305	9,845
78	60.9	10.0	1,917	4,178	627	253	5,532	0	22	12	6,107	7,008

Notes:

1. Simulated groundwater discharge to receptors provided for input to the WBM on a 2-month stress period basis, for mine years -3 through 22.
2. For spatial distribution of zones used to define flows, see Figure I-1. Mine workings, which occur below model layer 1, are not depicted.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, and RIV refers to a river boundary.

Table I-2. Cont'd Predictive Transient Mining Operations Basecase Simulation Outputs for Hydrology and Water Quality Modeling.

			Predicted Flows[1] (m^3/d)									
Stress Period (SP)	Days per SP (d)	Mine Years	Brucejack Lake[2] (GHB)[3]	Brucejack Lake Tributaries (DRN)	Unnamed Creek (DRN)	Brucejack Creek b/w BJ2.62 & BJL-H1 (RIV)	Mine Workings[2] (DRN)	Camp Creek (DRN)	VOK Creek (RIV)	Brucejack Creek above BJ2.62 (RIV/DRN)	Total Baseflow @ BJ2.62 -	Total Baseflow @ BJL-H1 -
79	60.9	10.2	1,690	3,086	359	188	4,689	0	13	1	4,777	5,337
80	60.9	10.3	1,555	2,488	252	152	4,523	0	10	0	4,043	4,457
81	60.9	10.5	1,731	4,102	487	265	5,096	0	19	18	5,851	6,621
82	60.9	10.7	1,975	5,426	860	334	5,668	0	35	37	7,438	8,668
83	60.9	10.8	2,100	6,173	1,136	359	6,045	0	44	47	8,320	9,859
84	60.9	11.0	1,934	4,176	626	253	5,450	0	22	12	6,122	7,023
85	60.9	11.2	1,706	3,084	359	188	4,952	0	13	1	4,791	5,351
86	60.9	11.3	1,570	2,486	251	152	4,680	0	10	0	4,056	4,469
87	60.9	11.5	1,745	4,099	485	264	5,178	0	19	18	5,862	6,631
88	60.9	11.7	1,988	5,424	859	334	5,718	0	35	37	7,449	8,677
89	60.9	11.8	2,112	6,172	1,135	359	6,076	0	44	47	8,330	9,868
90	60.9	12.0	1,945	4,174	625	253	5,467	0	22	12	6,132	7,032
91	60.9	12.2	1,689	3,083	358	188	4,990	0	13	1	4,772	5,331
92	60.9	12.3	1,553	2,484	251	152	4,713	0	10	0	4,038	4,450
93	60.9	12.5	1,728	4,098	484	264	5,217	0	19	18	5,843	6,610
94	60.9	12.7	1,971	5,422	857	333	5,763	0	35	37	7,429	8,654
95	60.9	12.8	2,095	6,169	1,132	358	6,126	0	44	46	8,309	9,844
96	60.9	13.0	1,929	4,172	623	252	5,522	0	22	12	6,112	7,009
97	60.9	13.2	1,700	3,080	355	186	5,074	0	13	1	4,781	5,335
98	60.9	13.3	1,565	2,483	247	150	4,717	0	10	0	4,048	4,455
99	60.9	13.5	1,739	4,096	475	261	5,218	0	18	14	5,849	6,604
100	60.9	13.7	1,981	5,421	850	331	5,764	0	34	32	7,434	8,649
101	60.9	13.8	2,106	6,169	1,128	356	6,121	0	43	40	8,314	9,842
102	60.9	14.0	1,940	4,173	620	251	5,515	0	21	10	6,123	7,014
103	60.9	14.2	1,713	3,082	354	186	4,922	0	12	0	4,795	5,347
104	60.9	14.3	1,576	2,483	248	150	4,672	0	10	0	4,059	4,466
105	60.9	14.5	1,747	4,095	474	261	5,196	0	18	14	5,856	6,609
106	60.9	14.7	1,987	5,419	849	331	5,759	0	34	31	7,437	8,650
107	60.9	14.8	2,110	6,166	1,127	356	6,125	0	43	38	8,314	9,838
108	60.9	15.0	1,944	4,170	617	250	5,540	0	21	9	6,123	7,010
109	60.9	15.2	1,718	3,079	353	186	4,854	0	12	0	4,796	5,347
110	60.9	15.3	1,582	2,481	248	151	4,650	0	10	0	4,063	4,472
111	60.9	15.5	1,756	4,094	479	263	5,169	0	19	17	5,866	6,627
112	60.9	15.7	1,998	5,420	854	332	5,726	0	35	35	7,453	8,674
113	60.9	15.8	2,122	6,168	1,131	357	6,086	0	43	44	8,333	9,865
114	60.9	16.0	1,954	4,171	622	251	5,504	0	21	11	6,137	7,031
115	60.9	16.2	1,725	3,080	355	187	4,978	0	13	1	4,806	5,361
116	60.9	16.3	1,588	2,482	249	151	4,693	0	10	0	4,070	4,479
117	60.9	16.5	1,760	4,095	479	262	5,195	0	19	16	5,871	6,631
118	60.9	16.7	2,002	5,420	854	332	5,741	0	34	35	7,457	8,677
119	60.9	16.8	2,125	6,168	1,131	357	6,093	0	43	43	8,336	9,868
120	60.9	17.0	1,958	4,171	622	251	5,501	0	21	11	6,140	7,034
121	60.9	17.2	1,713	3,080	355	187	5,056	0	13	1	4,793	5,348
122	60.9	17.3	1,576	2,482	249	151	4,842	0	10	0	4,058	4,467
123	60.9	17.5	1,749	4,095	478	262	5,344	0	19	16	5,860	6,619
124	60.9	17.7	1,991	5,420	853	332	5,884	0	34	34	7,445	8,665
125	60.9	17.8	2,114	6,167	1,130	357	6,232	0	43	43	8,325	9,855
126	60.9	18.0	1,947	4,171	621	251	5,650	0	21	11	6,128	7,021
127	60.9	18.2	1,718	3,079	355	186	4,190	0	13	1	4,798	5,351
128	60.9	18.3	1,582	2,481	248	150	4,114	0	10	0	4,063	4,471
129	60.9	18.5	1,754	4,095	478	262	4,717	0	18	16	5,865	6,623
130	60.9	18.7	1,997	5,421	853	332	5,311	0	34	34	7,452	8,671
131	60.9	18.8	2,120	6,170	1,130	357	5,709	0	43	43	8,333	9,863
132	60.9	19.0	1,953	4,173	621	251	5,187	0	21	11	6,138	7,031
133	60.9	19.2	1,725	3,083	355	187	4,752	0	13	1	4,808	5,363
134	60.9	19.3	1,588	2,485	249	151	4,501	0	10	0	4,073	4,482
135	60.9	19.5	1,761	4,099	478	263	4,986	0	19	16	5,876	6,636
136	60.9	19.7	2,002	5,424	853	332	5,511	0	35	35	7,461	8,681
137	60.9	19.8	2,126	6,172	1,131	357	5,866	0	43	43	8,341	9,872
138	60.9	20.0	1,958	4,175	621	252	5,296	0	21	11	6,144	7,038
139	60.9	20.2	1,729	3,084	355	187	4,827	0	13	1	4,814	5,369
140	60.9	20.3	1,592	2,486	249	151	4,554	0	10	0	4,079	4,489
141	60.9	20.5	1,765	4,101	479	263	5,030	0	19	16	5,882	6,642
142	60.9	20.7	2,006	5,425	854	333	5,553	0	35	35	7,465	8,686
143	60.9	20.8	2,129	6,173	1,131	358	5,899	0	44	43	8,345	9,877
144	60.9	21.0	1,961	4,176	622	252	5,317	0	22	11	6,147	7,042
145	60.9	21.2	1,732	3,085	355	188	4,843	0	13	1	4,817	5,373
146	60.9	21.3	1,595	2,487	249	152	4,568	0	10	0	4,082	4,492
147	60.9	21.5	1,767	4,101	479	263	5,042	0	19	16	5,885	6,646
148	60.9	21.7	2,008	5,425	854	333	5,566	0	35	35	7,468	8,689
149	60.9	21.8	2,131	6,173	1,131	358	5,909	0	44	43	8,347	9,880
150	60.9	22.0	1,963	4,176	622	252	5,325	0	22	11	6,150	7,045

Notes:

1. Simulated groundwater discharge to receptors provided for input to the WBM on a 2-month stress period basis, for mine years -3 through 22.
2. For spatial distribution of zones used to define flows, see Figure I-1. Mine workings, which occur below model layer 1, are not depicted.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, and RIV refers to a river boundary.

Table I-3. Predictive Transient Mining Operations S.A. Run 2 Simulation Outputs for Hydrology and Water Quality Modeling.

			Predicted Flows[1] (m^3/d)							
Stress Period (SP)	Days per SP (d)	Mine Years (y)	Brucejack Lake[2] (GHB)[3]	Brucejack Lake Tributaries (DRN)	Unnamed Creek (DRN)	Mine Workings[2] (DRN)	Camp Creek (DRN)	VOK Creek (RIV)	Brucejack Creek (RIV/DRN)	Total Baseflow @ BJL-H1 -
1	60.9	-2.8	626	2,449	504	3,377	25	118	362	4,083
2	60.9	-2.7	586	2,180	397	1,931	10	79	320	3,573
3	60.9	-2.5	626	3,956	750	1,836	31	163	462	5,988
4	60.9	-2.3	682	4,451	920	1,933	50	217	524	6,844
5	60.9	-2.2	708	4,697	993	1,995	69	243	553	7,263
6	60.9	-2.0	673	2,777	633	1,719	31	149	412	4,674
7	60.9	-1.8	617	2,399	486	3,065	5	95	358	3,960
8	60.9	-1.7	582	2,175	389	2,007	0	59	319	3,525
9	60.9	-1.5	624	3,958	744	2,010	8	134	460	5,927
10	60.9	-1.3	681	4,459	918	2,190	15	189	522	6,784
11	60.9	-1.2	707	4,702	992	2,314	19	218	550	7,188
12	60.9	-1.0	672	2,780	632	2,011	5	125	409	4,623
13	60.9	-0.8	616	2,401	485	2,208	0	77	354	3,934
14	60.9	-0.7	581	2,176	389	1,823	0	48	314	3,508
15	60.9	-0.5	622	3,960	744	1,899	2	119	455	5,902
16	60.9	-0.3	680	4,462	918	2,122	12	176	518	6,765
17	60.9	-0.2	706	4,703	992	2,283	17	208	548	7,174
18	60.9	0.0	671	2,780	632	2,021	5	118	407	4,613
19	60.9	0.2	615	2,401	485	2,245	0	73	352	3,926
20	60.9	0.3	580	2,177	389	1,868	0	45	312	3,502
21	60.9	0.5	621	3,961	744	1,951	1	114	454	5,894
22	60.9	0.7	679	4,462	917	2,173	11	171	517	6,758
23	60.9	0.8	705	4,703	992	2,334	17	204	547	7,167
24	60.9	1.0	670	2,780	632	2,082	4	115	406	4,608
25	60.9	1.2	614	2,401	485	2,133	0	70	351	3,921
26	60.9	1.3	579	2,177	389	1,784	0	44	311	3,498
27	60.9	1.5	621	3,961	743	1,909	0	111	453	5,889
28	60.9	1.7	679	4,462	917	2,160	11	168	516	6,753
29	60.9	1.8	705	4,702	991	2,338	16	202	546	7,162
30	60.9	2.0	669	2,780	632	2,063	4	113	406	4,604
31	60.9	2.2	606	2,401	485	1,832	0	69	350	3,911
32	60.9	2.3	581	2,176	388	1,681	0	43	310	3,499
33	60.9	2.5	623	3,960	743	1,838	0	110	452	5,889
34	60.9	2.7	681	4,462	917	2,103	10	167	516	6,753
35	60.9	2.8	708	4,702	991	2,293	16	201	546	7,164
36	60.9	3.0	673	2,780	632	2,038	4	113	405	4,606
37	60.9	3.2	617	2,401	485	2,257	0	68	350	3,921
38	60.9	3.3	582	2,176	388	1,763	0	43	310	3,499
39	60.9	3.5	623	3,960	743	1,902	0	109	452	5,887
40	60.9	3.7	681	4,462	917	2,149	10	166	515	6,751
41	60.9	3.8	707	4,702	991	2,325	16	199	546	7,162
42	60.9	4.0	673	2,780	632	2,052	4	111	405	4,605
43	60.9	4.2	617	2,401	485	2,038	0	68	350	3,920
44	60.9	4.3	581	2,176	388	1,816	0	43	310	3,498
45	60.9	4.5	623	3,960	743	1,944	0	108	452	5,886
46	60.9	4.7	681	4,462	917	2,187	11	164	515	6,750
47	60.9	4.8	707	4,702	991	2,363	17	198	546	7,160
48	60.9	5.0	672	2,780	632	2,112	4	110	405	4,603
49	60.9	5.2	617	2,401	484	1,790	0	67	350	3,919
50	60.9	5.3	581	2,176	388	1,664	0	42	309	3,497
51	60.9	5.5	623	3,960	743	1,837	0	107	452	5,884
52	60.9	5.7	681	4,461	917	2,104	11	163	515	6,748
53	60.9	5.8	707	4,702	991	2,286	16	197	546	7,159
54	60.9	6.0	672	2,780	632	2,045	4	110	405	4,602
55	60.9	6.2	616	2,401	484	3,156	0	65	338	3,903
56	60.9	6.3	580	2,176	387	1,864	0	39	287	3,469
57	60.9	6.5	621	3,959	742	2,132	0	98	432	5,852
58	60.9	6.7	679	4,461	916	2,401	1	152	489	6,697
59	60.9	6.8	705	4,700	990	2,566	5	185	518	7,104
60	60.9	7.0	670	2,778	631	2,187	0	98	378	4,555
61	60.9	7.2	537	2,399	482	7,899	0	55	289	3,761
62	60.9	7.3	505	2,174	385	2,355	0	32	221	3,317
63	60.9	7.5	548	3,956	740	2,537	0	84	374	5,703
64	60.9	7.7	606	4,457	914	2,770	0	138	441	6,555
65	60.9	7.8	634	4,697	988	2,914	1	173	470	6,964
66	60.9	8.0	602	2,775	628	2,467	0	87	315	4,407
67	60.9	8.2	551	2,396	479	2,206	0	47	238	3,710
68	60.9	8.3	519	2,171	382	2,023	0	27	198	3,297
69	60.9	8.5	562	3,951	737	2,358	0	80	359	5,689
70	60.9	8.7	620	4,453	912	2,636	0	134	432	6,550
71	60.9	8.8	647	4,694	987	2,816	0	171	463	6,963
72	60.9	9.0	615	2,772	627	2,436	0	85	308	4,407
73	60.9	9.2	562	2,393	478	2,181	0	46	232	3,712
74	60.9	9.3	530	2,169	381	2,036	0	27	195	3,302
75	60.9	9.5	573	3,949	736	2,373	0	79	356	5,693
76	60.9	9.7	630	4,451	912	2,648	0	133	430	6,556
77	60.9	9.8	657	4,693	986	2,827	0	170	462	6,970
78	60.9	10.0	624	2,771	626	2,447	0	85	308	4,414

Notes:
1. Simulated groundwater discharge to receptors provided for input to the WBM on a 2-month stress period basis, for mine years -3 through 22.
2. For spatial distribution of zones used to define flows, see Figure I-1. Mine workings, which occur below model layer 1, are not depicted.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, and RIV refers to a river boundary.

Table I-3. Cont'd Predictive Transient Mining Operations S.A. Run 2 Simulation Outputs for Hydrology and Water Quality Modeling.

Stress Period (SP)	Days per SP (d)	Mine Years (y)	Predicted Flows[1] (m³/d)							
			Brucejack Lake[2]	Brucejack Lake Tributaries	Unnamed Creek	Mine Workings[2]	Camp Creek	VOK Creek	Brucejack Creek	Total Baseflow @ BJL-H1
			(GHB)[3]	(DRN)	(DRN)	(DRN)	(DRN)	(RIV)	(RIV/DRN)	-
79	60.9	10.2	571	2,393	477	1,976	0	46	232	3,719
80	60.9	10.3	539	2,169	380	1,860	0	27	195	3,309
81	60.9	10.5	581	3,948	735	2,207	0	79	356	5,699
82	60.9	10.7	638	4,450	911	2,515	0	133	430	6,562
83	60.9	10.8	665	4,692	986	2,727	0	171	462	6,977
84	60.9	11.0	632	2,771	626	2,379	0	85	307	4,421
85	60.9	11.2	578	2,392	477	2,117	0	46	231	3,724
86	60.9	11.3	545	2,168	380	1,986	0	27	195	3,314
87	60.9	11.5	587	3,948	735	2,316	0	79	355	5,704
88	60.9	11.7	643	4,450	911	2,601	0	133	430	6,567
89	60.9	11.8	670	4,692	986	2,789	0	171	462	6,982
90	60.9	12.0	636	2,771	626	2,424	0	86	307	4,425
91	60.9	12.2	571	2,392	477	2,159	0	46	231	3,717
92	60.9	12.3	538	2,168	379	2,016	0	27	194	3,307
93	60.9	12.5	580	3,947	735	2,343	0	79	355	5,697
94	60.9	12.7	637	4,449	911	2,627	0	134	429	6,560
95	60.9	12.8	664	4,692	986	2,813	0	171	461	6,974
96	60.9	13.0	630	2,770	625	2,446	0	86	306	4,418
97	60.9	13.2	576	2,392	477	2,248	0	46	227	3,717
98	60.9	13.3	543	2,167	379	2,031	0	27	190	3,306
99	60.9	13.5	585	3,947	734	2,349	0	79	349	5,694
100	60.9	13.7	641	4,449	911	2,628	0	134	424	6,558
101	60.9	13.8	668	4,691	986	2,810	0	171	457	6,973
102	60.9	14.0	634	2,770	625	2,442	0	86	300	4,415
103	60.9	14.2	580	2,391	477	2,031	0	46	224	3,718
104	60.9	14.3	547	2,167	379	1,944	0	27	190	3,310
105	60.9	14.5	588	3,947	734	2,279	0	79	347	5,696
106	60.9	14.7	645	4,449	911	2,566	0	133	423	6,560
107	60.9	14.8	671	4,691	986	2,764	0	170	455	6,974
108	60.9	15.0	637	2,770	625	2,420	0	85	298	4,416
109	60.9	15.2	583	2,391	477	2,130	0	45	223	3,720
110	60.9	15.3	550	2,167	379	1,985	0	26	190	3,313
111	60.9	15.5	592	3,947	734	2,310	0	79	350	5,702
112	60.9	15.7	648	4,449	911	2,594	0	133	426	6,566
113	60.9	15.8	675	4,691	986	2,785	0	170	459	6,981
114	60.9	16.0	641	2,770	625	2,433	0	85	302	4,423
115	60.9	16.2	587	2,391	477	2,173	0	45	226	3,727
116	60.9	16.3	553	2,167	379	2,028	0	27	191	3,318
117	60.9	16.5	595	3,947	734	2,339	0	79	351	5,705
118	60.9	16.7	651	4,449	911	2,614	0	133	426	6,569
119	60.9	16.8	677	4,691	986	2,799	0	170	458	6,983
120	60.9	17.0	643	2,770	625	2,433	0	85	302	4,425
121	60.9	17.2	581	2,391	477	2,194	0	45	226	3,721
122	60.9	17.3	548	2,167	379	2,072	0	26	191	3,312
123	60.9	17.5	589	3,947	734	2,380	0	79	350	5,700
124	60.9	17.7	646	4,449	911	2,651	0	132	426	6,563
125	60.9	17.8	672	4,691	986	2,833	0	170	458	6,977
126	60.9	18.0	638	2,770	625	2,477	0	85	302	4,420
127	60.9	18.2	584	2,391	477	1,794	0	45	226	3,723
128	60.9	18.3	550	2,167	379	1,688	0	26	191	3,314
129	60.9	18.5	592	3,947	734	2,036	0	79	350	5,702
130	60.9	18.7	648	4,449	911	2,338	0	133	426	6,566
131	60.9	18.8	674	4,691	986	2,552	0	171	458	6,980
132	60.9	19.0	640	2,770	625	2,214	0	85	302	4,422
133	60.9	19.2	586	2,391	476	1,990	0	46	226	3,725
134	60.9	19.3	552	2,167	379	1,871	0	27	191	3,316
135	60.9	19.5	593	3,947	734	2,199	0	80	350	5,704
136	60.9	19.7	650	4,449	911	2,487	0	134	426	6,569
137	60.9	19.8	676	4,691	986	2,682	0	172	458	6,983
138	60.9	20.0	642	2,770	625	2,330	0	86	302	4,425
139	60.9	20.2	587	2,391	476	2,080	0	46	226	3,727
140	60.9	20.3	554	2,167	379	1,938	0	27	191	3,318
141	60.9	20.5	595	3,947	734	2,237	0	80	350	5,706
142	60.9	20.7	651	4,449	911	2,529	0	135	426	6,571
143	60.9	20.8	677	4,691	986	2,721	0	172	458	6,985
144	60.9	21.0	643	2,770	625	2,364	0	86	302	4,427
145	60.9	21.2	589	2,391	476	2,101	0	46	226	3,729
146	60.9	21.3	555	2,167	379	1,953	0	27	191	3,319
147	60.9	21.5	596	3,947	734	2,249	0	80	350	5,708
148	60.9	21.7	652	4,449	911	2,540	0	135	426	6,572
149	60.9	21.8	678	4,691	986	2,730	0	173	458	6,986
150	60.9	22.0	644	2,770	625	2,371	0	87	302	4,428

Notes:
1. Simulated groundwater discharge to receptors provided for input to the WBM on a 2-month stress period basis, for mine years -3 through 22.
2. For spatial distribution of zones used to define flows, see Figure I-1. Mine workings, which occur below model layer 1, are not depicted.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, and RIV refers to a river boundary.

Table I-4. Predictive Transient Mining Operations S.A. Run 12 Simulation Outputs for Hydrology and Water Quality Modeling.

			Predicted Flows[1] (m^3/d)							
			Brucejack Lake[2]	Brucejack Lake Tributaries	Unnamed Creek	Mine Workings[2]	Camp Creek	VOK Creek	Brucejack Creek	Total Baseflow @ BJL-H1
Stress Period (SP)	Days per SP (d)	Mine Years (y)	(GHB)[3]	(DRN)	(DRN)	(DRN)	(DRN)	(RIV)	(RIV/DRN)	-
1	60.9	-2.8	5,772	4,756	616	8,570	0	3	153	10,666
2	60.9	-2.7	5,032	3,833	215	6,524	0	0	41	8,333
3	60.9	-2.5	6,253	6,586	1,129	8,633	0	23	394	13,880
4	60.9	-2.3	7,385	9,275	2,121	10,137	0	48	758	19,186
5	60.9	-2.2	7,784	10,927	2,419	10,657	0	53	861	21,664
6	60.9	-2.0	6,578	6,192	1,053	8,139	0	15	295	13,590
7	60.9	-1.8	5,391	4,267	374	13,005	0	0	72	9,352
8	60.9	-1.7	4,840	3,693	125	9,160	0	0	10	7,805
9	60.9	-1.5	6,109	6,405	1,015	11,277	0	15	317	13,325
10	60.9	-1.3	7,262	9,119	2,031	12,851	0	42	669	18,704
11	60.9	-1.2	7,661	10,793	2,348	13,337	0	47	765	21,219
12	60.9	-1.0	6,455	6,073	996	10,544	0	9	234	13,184
13	60.9	-0.8	5,270	4,187	330	11,439	0	0	43	9,029
14	60.9	-0.7	4,737	3,627	99	9,647	0	0	2	7,566
15	60.9	-0.5	6,028	6,333	971	11,974	0	13	281	13,075
16	60.9	-0.3	7,200	9,061	1,997	13,732	0	38	630	18,503
17	60.9	-0.2	7,607	10,743	2,323	14,332	0	45	738	21,056
18	60.9	0.0	6,402	6,031	978	11,661	0	7	217	13,041
19	60.9	0.2	5,211	4,154	312	11,710	0	0	34	8,891
20	60.9	0.3	4,676	3,597	86	9,819	0	0	1	7,435
21	60.9	0.5	5,965	6,284	937	11,867	0	11	258	12,890
22	60.9	0.7	7,157	9,023	1,968	13,656	0	35	602	18,354
23	60.9	0.8	7,567	10,711	2,300	14,358	0	44	714	20,931
24	60.9	1.0	6,365	6,009	961	12,019	0	6	204	12,940
25	60.9	1.2	5,177	4,135	299	11,230	0	0	28	8,805
26	60.9	1.3	4,647	3,584	80	9,900	0	0	0	7,377
27	60.9	1.5	5,947	6,268	926	11,963	0	10	251	12,835
28	60.9	1.7	7,137	9,002	1,958	13,687	0	35	594	18,292
29	60.9	1.8	7,553	10,695	2,294	14,391	0	43	709	20,887
30	60.9	2.0	6,352	5,999	957	12,131	0	6	202	12,908
31	60.9	2.2	5,060	4,128	296	10,530	0	0	27	8,674
32	60.9	2.3	4,639	3,579	79	9,850	0	0	0	7,360
33	60.9	2.5	5,922	6,261	924	11,971	0	10	249	12,799
34	60.9	2.7	7,114	8,994	1,956	13,727	0	35	592	18,258
35	60.9	2.8	7,538	10,688	2,292	14,452	0	43	708	20,863
36	60.9	3.0	6,365	5,994	956	12,196	0	6	201	12,914
37	60.9	3.2	5,180	4,125	295	10,996	0	0	26	8,788
38	60.9	3.3	4,648	3,578	78	9,968	0	0	0	7,366
39	60.9	3.5	5,921	6,259	922	12,265	0	10	248	12,793
40	60.9	3.7	7,113	8,992	1,955	14,037	0	34	591	18,252
41	60.9	3.8	7,538	10,686	2,291	14,724	0	43	706	20,858
42	60.9	4.0	6,366	5,994	955	12,231	0	6	200	12,912
43	60.9	4.2	5,179	4,125	294	11,555	0	0	26	8,783
44	60.9	4.3	4,643	3,576	76	10,244	0	0	0	7,353
45	60.9	4.5	5,912	6,253	913	12,519	0	9	242	12,758
46	60.9	4.7	7,102	8,982	1,944	14,286	0	33	579	18,206
47	60.9	4.8	7,526	10,675	2,281	14,999	0	42	695	20,810
48	60.9	5.0	6,352	5,985	947	12,564	0	6	194	12,869
49	60.9	5.2	5,164	4,117	287	10,719	0	0	23	8,745
50	60.9	5.3	4,630	3,570	72	10,169	0	0	0	7,327
51	60.9	5.5	5,902	6,244	907	12,496	0	9	238	12,728
52	60.9	5.7	7,095	8,974	1,940	14,286	0	33	576	18,183
53	60.9	5.8	7,520	10,668	2,279	15,009	0	42	693	20,793
54	60.9	6.0	6,352	6,001	951	12,581	0	6	194	12,889
55	60.9	6.2	5,151	4,108	269	11,321	0	0	18	8,677
56	60.9	6.3	4,611	3,563	57	10,390	0	0	0	7,253
57	60.9	6.5	5,868	6,224	837	13,282	0	5	204	12,546
58	60.9	6.7	7,048	8,939	1,834	15,055	0	26	513	17,910
59	60.9	6.8	7,467	10,629	2,168	15,752	0	33	615	20,489
60	60.9	7.0	6,306	5,956	890	12,805	0	3	162	12,661
61	60.9	7.2	4,329	4,065	119	21,480	0	0	3	7,355
62	60.9	7.3	3,909	3,505	0	13,987	0	0	0	5,985
63	60.9	7.5	5,096	6,041	298	16,131	0	0	14	10,486
64	60.9	7.7	6,206	8,719	1,119	18,067	0	0	163	15,511
65	60.9	7.8	6,649	10,412	1,498	18,877	0	0	269	18,189
66	60.9	8.0	5,694	5,836	501	16,109	0	0	27	11,026
67	60.9	8.2	4,645	3,977	17	14,943	0	0	0	7,257
68	60.9	8.3	4,152	3,469	0	13,940	0	0	0	6,076
69	60.9	8.5	5,278	5,953	229	16,179	0	0	3	10,426
70	60.9	8.7	6,350	8,631	1,042	18,285	0	0	133	15,410
71	60.9	8.8	6,759	10,342	1,443	19,197	0	0	246	18,111
72	60.9	9.0	5,778	5,799	471	16,530	0	0	23	10,984
73	60.9	9.2	4,726	3,956	12	14,807	0	0	0	7,284
74	60.9	9.3	4,229	3,461	0	14,007	0	0	0	6,135
75	60.9	9.5	5,345	5,934	223	16,293	0	0	3	10,464
76	60.9	9.7	6,408	8,610	1,035	18,424	0	0	131	15,437
77	60.9	9.8	6,809	10,325	1,440	19,346	0	0	244	18,135
78	60.9	10.0	5,814	5,770	467	16,668	0	0	22	10,982

Notes:
1. Simulated groundwater discharge to receptors provided for input to the WBM on a 2-month stress period basis, for mine years -3 through 22.
2. For spatial distribution of zones used to define flows, see Figure I-1. Mine workings, which occur below model layer 1, are not depicted.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, and RIV refers to a river boundary.

Table I-4. Cont'd Predictive Transient Mining Operations S.A. Run 12 Simulation Outputs for Hydrology and Water Quality Modeling.

Stress Period (SP)	Days per SP (d)	Mine Years (y)	Predicted Flows[1] (m^3/d)							
			Brucejack Lake[2]	Brucejack Lake Tributaries	Unnamed Creek	Mine Workings[2]	Camp Creek	VOK Creek	Brucejack Creek	Total Baseflow @ BJL-H1
			(GHB)[3]	(DRN)	(DRN)	(DRN)	(DRN)	(RIV)	(RIV/DRN)	-
79	60.9	10.2	4,760	3,954	12	14,249	0	0	0	7,315
80	60.9	10.3	4,255	3,459	0	13,766	0	0	0	6,157
81	60.9	10.5	5,369	5,928	223	15,944	0	0	3	10,479
82	60.9	10.7	6,430	8,604	1,036	18,108	0	0	131	15,453
83	60.9	10.8	6,828	10,320	1,441	19,063	0	0	245	18,152
84	60.9	11.0	5,831	5,768	468	16,511	0	0	22	11,000
85	60.9	11.2	4,775	3,953	12	14,698	0	0	0	7,330
86	60.9	11.3	4,268	3,458	0	13,863	0	0	0	6,170
87	60.9	11.5	5,379	5,926	221	15,996	0	0	3	10,488
88	60.9	11.7	6,439	8,602	1,033	18,143	0	0	131	15,457
89	60.9	11.8	6,835	10,318	1,438	19,090	0	0	245	18,154
90	60.9	12.0	5,837	5,766	466	16,525	0	0	22	11,002
91	60.9	12.2	4,738	3,952	12	14,788	0	0	0	7,288
92	60.9	12.3	4,233	3,457	0	13,982	0	0	0	6,123
93	60.9	12.5	5,343	5,919	215	16,138	0	0	2	10,425
94	60.9	12.7	6,400	8,589	1,019	18,312	0	0	126	15,375
95	60.9	12.8	6,794	10,302	1,421	19,285	0	0	239	18,063
96	60.9	13.0	5,800	5,772	458	16,756	0	0	21	10,944
97	60.9	13.2	4,746	3,942	9	14,882	0	0	0	7,238
98	60.9	13.3	4,251	3,455	0	13,974	0	0	0	6,094
99	60.9	13.5	5,365	5,920	199	16,082	0	0	1	10,390
100	60.9	13.7	6,424	8,596	996	18,257	0	0	116	15,340
101	60.9	13.8	6,822	10,315	1,408	19,216	0	0	231	18,051
102	60.9	14.0	5,830	5,767	447	16,622	0	0	19	10,927
103	60.9	14.2	4,790	3,970	9	14,686	0	0	0	7,308
104	60.9	14.3	4,258	3,455	0	13,966	0	0	0	6,085
105	60.9	14.5	5,365	5,914	194	16,122	0	0	1	10,360
106	60.9	14.7	6,418	8,582	983	18,337	0	0	111	15,284
107	60.9	14.8	6,811	10,296	1,393	19,319	0	0	225	17,981
108	60.9	15.0	5,815	5,752	437	16,791	0	0	18	10,860
109	60.9	15.2	4,769	3,946	8	14,464	0	0	0	7,278
110	60.9	15.3	4,273	3,458	0	13,800	0	0	0	6,162
111	60.9	15.5	5,388	5,925	212	15,980	0	0	2	10,474
112	60.9	15.7	6,446	8,600	1,018	18,174	0	0	124	15,427
113	60.9	15.8	6,840	10,313	1,423	19,135	0	0	238	18,118
114	60.9	16.0	5,842	5,765	456	16,581	0	0	20	10,978
115	60.9	16.2	4,786	3,953	11	14,735	0	0	0	7,322
116	60.9	16.3	4,280	3,459	0	13,872	0	0	0	6,166
117	60.9	16.5	5,391	5,927	209	16,011	0	0	2	10,469
118	60.9	16.7	6,447	8,601	1,011	18,189	0	0	122	15,418
119	60.9	16.8	6,841	10,314	1,419	19,138	0	0	237	18,113
120	60.9	17.0	5,843	5,765	455	16,559	0	0	20	10,977
121	60.9	17.2	4,768	3,953	11	14,966	0	0	0	7,306
122	60.9	17.3	4,276	3,468	0	14,216	0	0	0	6,175
123	60.9	17.5	5,374	5,922	208	16,371	0	0	2	10,445
124	60.9	17.7	6,430	8,592	1,009	18,566	0	0	121	15,387
125	60.9	17.8	6,824	10,303	1,417	19,536	0	0	234	18,078
126	60.9	18.0	5,824	5,757	452	16,957	0	0	19	10,943
127	60.9	18.2	4,788	3,968	10	13,287	0	0	0	7,338
128	60.9	18.3	4,263	3,454	0	13,187	0	0	0	6,140
129	60.9	18.5	5,378	5,918	207	15,336	0	0	3	10,446
130	60.9	18.7	6,448	8,608	1,010	17,536	0	0	122	15,426
131	60.9	18.8	6,843	10,326	1,419	18,522	0	0	238	18,132
132	60.9	19.0	5,850	5,777	455	16,157	0	0	20	11,002
133	60.9	19.2	4,798	3,962	11	14,447	0	0	0	7,352
134	60.9	19.3	4,295	3,462	0	13,607	0	0	0	6,196
135	60.9	19.5	5,406	5,944	210	15,588	0	0	2	10,511
136	60.9	19.7	6,460	8,622	1,015	17,686	0	0	124	15,462
137	60.9	19.8	6,854	10,338	1,422	18,621	0	0	240	18,161
138	60.9	20.0	5,858	5,783	457	16,202	0	0	21	11,019
139	60.9	20.2	4,806	3,965	11	14,479	0	0	0	7,365
140	60.9	20.3	4,314	3,472	0	13,650	0	0	0	6,230
141	60.9	20.5	5,410	5,944	210	15,611	0	0	2	10,515
142	60.9	20.7	6,463	8,620	1,014	17,696	0	0	124	15,464
143	60.9	20.8	6,856	10,337	1,422	18,627	0	0	240	18,162
144	60.9	21.0	5,861	5,783	456	16,208	0	0	21	11,021
145	60.9	21.2	4,808	3,965	11	14,482	0	0	0	7,367
146	60.9	21.3	4,304	3,464	0	13,635	0	0	0	6,209
147	60.9	21.5	5,414	5,948	211	15,619	0	0	2	10,523
148	60.9	21.7	6,466	8,625	1,015	17,701	0	0	125	15,472
149	60.9	21.8	6,858	10,340	1,422	18,631	0	0	240	18,168
150	60.9	22.0	5,862	5,784	457	16,210	0	0	21	11,024

Notes:
1. Simulated groundwater discharge to receptors provided for input to the WBM on a 2-month stress period basis, for mine years -3 through 22.
2. For spatial distribution of zones used to define flows, see Figure I-1. Mine workings, which occur below model layer 1, are not depicted.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, and RIV refers to a river boundary.

Table I-5. Predictive Transient Post-Closure Simulation Outputs for Hydrology and Water Quality Modeling.

			Predicted Flows[1] (m^3/d)										
Stress Period (SP)	Days per SP (d)	Mine Years (y)	Brucejack Lake[2]	Brucejack Lake Tributaries	Unnamed Creek	Brucejack Creek b/w BJ2.62 & BJL-H1	VOK Creek	Camp Creek	Helipad Fill	Mill Site Cut	Brucejack Creek above BJ2.62	Total Baseflow @ BJ2.62	Total Baseflow @ BJL-H1
			(GHB)[3]	(DRN)	(DRN)	(RIV)	(RIV)	(DRN)	(RCH)	(DRN)	(RIV/DRN)	-	-
1	60.9	0.17	1,639.98	3,086.68	359.49	190.74	13.07	0.00	46.14	0.00	0.90	4,727.56	5290.86225
2	60.9	0.33	1,521.47	2,492.03	266.54	166.45	11.89	0.00	44.65	0.00	0.54	4,014.03	4,458.91
3	60.9	0.50	1,699.48	4,117.59	564.94	300.02	30.48	0.00	49.08	0.00	90.00	5,907.07	6,802.51
4	60.9	0.67	1,948.37	5,455.06	958.61	387.79	60.06	0.00	60.43	0.00	432.22	7,835.65	9,242.10
5	60.9	0.83	2,088.99	6,229.37	1,248.73	421.08	106.12	16.10	71.27	0.00	762.63	9,097.08	10,873.01
6	60.9	1.00	1,954.13	4,236.02	766.30	333.29	72.58	59.28	80.10	0.00	754.24	7,003.68	8,175.85
7	60.9	1.17	1,748.49	3,154.41	536.51	286.89	50.75	58.81	72.64	0.00	685.36	5,647.06	6,521.21
8	60.9	1.33	1,625.32	2,570.66	445.48	266.75	46.60	56.14	69.51	0.00	664.61	4,916.74	5,675.57
9	60.9	1.50	1,809.49	4,212.89	713.49	376.73	110.14	104.63	68.18	0.00	898.77	7,025.79	8,226.15
10	60.9	1.67	2,042.95	5,548.83	1,035.11	425.86	170.82	151.47	80.31	3.25	1,112.38	8,855.64	10,487.43
11	60.9	1.83	2,160.50	6,304.43	1,291.11	442.27	204.25	173.42	87.37	13.71	1,188.74	9,827.10	11,764.72
12	60.9	2.00	2,007.04	4,285.27	785.94	350.16	128.88	127.19	93.05	0.46	936.34	7,355.84	8,620.83
13	60.9	2.17	1,790.96	3,193.53	548.59	303.13	78.41	98.59	83.82	0.00	780.09	5,863.17	6,793.30
14	60.9	2.33	1,661.78	2,604.81	456.11	279.84	59.09	84.67	81.04	0.00	728.96	5,080.22	5,875.25
15	60.9	2.50	1,841.51	4,244.81	721.96	385.98	132.47	130.27	77.26	0.51	984.22	7,200.81	8,441.22
16	60.9	2.67	2,070.49	5,570.70	1,043.74	431.65	192.16	168.31	86.87	11.34	1,159.75	8,969.26	10,636.82
17	60.9	2.83	2,183.69	6,319.72	1,297.46	446.17	235.10	183.84	91.62	21.27	1,204.49	9,891.74	11,870.47
18	60.9	3.00	2,027.81	4,296.21	789.20	353.59	139.83	132.82	98.89	0.82	953.09	7,409.94	8,692.56
19	60.9	3.17	1,809.79	3,203.15	550.78	306.52	83.44	102.87	88.56	0.00	792.53	5,908.34	6,849.07
20	60.9	3.33	1,679.14	2,613.82	458.34	282.67	62.60	88.63	84.12	0.00	735.39	5,116.98	5,920.59
21	60.9	3.50	1,857.34	4,253.60	724.18	387.91	136.27	133.69	80.69	1.23	982.34	7,226.98	8,475.34
22	60.9	3.67	2,084.81	5,578.43	1,046.63	432.88	198.10	171.36	89.14	13.14	1,150.87	8,985.48	10,663.08
23	60.9	3.83	2,196.56	6,325.90	1,299.84	446.98	242.00	185.67	94.72	22.72	1,210.72	9,918.85	11,907.67
24	60.9	4.00	2,039.63	4,301.12	790.44	354.32	142.43	133.83	101.43	0.89	953.07	7,427.65	8,714.84
25	60.9	4.17	1,820.63	3,207.46	551.60	307.31	84.46	103.84	90.41	0.00	796.04	5,927.96	6,871.32
26	60.9	4.33	1,689.25	2,617.96	459.21	283.34	63.35	89.58	86.13	0.00	734.01	5,130.80	5,936.70
27	60.9	4.50	1,866.85	4,257.84	725.12	388.40	137.15	134.54	81.58	1.40	987.66	7,246.90	8,497.57
28	60.9	4.67	2,093.38	5,582.37	1,047.95	433.20	199.92	172.20	92.15	13.65	1,163.99	9,011.94	10,693.01
29	60.9	4.83	2,204.37	6,329.23	1,300.98	447.21	243.92	186.20	95.88	23.14	1,215.82	9,935.61	11,927.72
30	60.9	5.00	2,046.79	4,303.82	791.03	354.53	143.26	134.15	102.14	0.91	962.67	7,447.44	8,736.26
31	60.9	5.17	1,827.13	3,209.84	551.98	307.54	84.76	104.15	93.47	0.00	795.92	5,937.05	6,881.34
32	60.9	5.33	1,695.44	2,620.26	459.60	283.58	63.58	89.92	87.14	0.00	734.74	5,140.36	5,947.12
33	60.9	5.50	1,872.58	4,260.20	725.58	388.58	137.43	134.85	81.72	1.47	985.25	7,252.88	8,504.48
34	60.9	5.67	2,098.79	5,584.69	1,048.66	433.31	200.56	172.50	91.16	13.85	1,161.60	9,017.58	10,700.12
35	60.9	5.83	2,209.22	6,331.17	1,301.57	447.29	244.64	186.39	95.45	23.31	1,212.79	9,939.57	11,933.07
36	60.9	6.00	2,051.30	4,305.48	791.33	354.62	143.60	134.28	103.90	0.91	956.76	7,447.81	8,737.36
37	60.9	6.17	1,831.43	3,211.26	552.17	307.65	84.88	104.28	93.28	0.00	804.16	5,951.14	6,895.83
38	60.9	6.33	1,699.38	2,621.64	459.80	283.67	63.69	90.06	88.13	0.00	734.46	5,145.55	5,952.70
39	60.9	6.50	1,876.25	4,261.69	725.81	388.65	137.56	134.98	82.09	1.50	989.94	7,262.86	8,514.87
40	60.9	6.67	2,102.06	5,586.13	1,049.02	433.36	200.85	172.65	91.40	13.95	1,165.46	9,026.30	10,709.53
41	60.9	6.83	2,212.34	6,332.41	1,301.90	447.33	244.96	186.49	95.01	23.39	1,221.93	9,953.17	11,947.37
42	60.9	7.00	2,054.19	4,306.55	791.49	354.66	143.75	134.34	103.03	0.92	969.83	7,464.91	8,754.81
43	60.9	7.17	1,834.18	3,212.17	552.26	307.69	84.94	104.36	92.32	0.00	807.77	5,958.48	6,903.37
44	60.9	7.33	1,701.94	2,622.48	459.90	283.72	63.73	90.13	88.63	0.00	730.44	5,144.99	5,952.35
45	60.9	7.50	1,878.67	4,262.54	725.93	388.68	137.62	135.06	81.81	1.51	995.03	7,271.30	8,523.53
46	60.9	7.67	2,104.25	5,587.00	1,049.22	433.39	200.98	172.72	92.23	14.00	1,153.59	9,017.56	10,701.15
47	60.9	7.83	2,214.33	6,333.23	1,302.06	447.35	245.12	186.53	96.24	23.42	1,215.88	9,949.97	11,944.50
48	60.9	8.00	2,056.11	4,307.24	791.58	354.68	143.83	134.37	104.30	0.92	958.45	7,456.17	8,746.26
49	60.9	8.17	1,835.94	3,212.79	552.31	307.72	84.97	104.38	93.33	0.00	803.81	5,956.93	6,901.93
50	60.9	8.33	1,703.61	2,623.02	459.96	283.74	63.76	90.17	88.63	0.00	736.50	5,153.30	5,960.76
51	60.9	8.50	1,880.29	4,263.19	725.99	388.71	137.65	135.08	81.27	1.52	976.65	7,255.21	8,507.55
52	60.9	8.67	2,105.68	5,587.59	1,049.32	433.40	201.05	172.75	91.70	14.02	1,151.18	9,017.20	10,700.97
53	60.9	8.83	2,215.69	6,333.79	1,302.16	447.36	245.20	186.55	96.42	23.44	1,210.27	9,946.30	11,941.02
54	60.9	9.00	2,057.39	4,307.70	791.64	354.69	143.86	134.39	104.41	0.92	964.01	7,463.48	8,753.67
55	60.9	9.17	1,837.16	3,213.17	552.34	307.73	84.99	104.40	93.09	0.00	809.65	5,964.38	6,909.44
56	60.9	9.33	1,704.83	2,623.38	460.00	283.75	63.77	90.19	88.52	0.00	745.49	5,163.88	5,971.39
57	60.9	9.50	1,881.32	4,263.58	726.03	388.71	137.66	135.10	82.08	1.52	992.11	7,272.11	8,524.51
58	60.9	9.67	2,106.68	5,588.01	1,049.39	433.41	201.09	172.77	92.04	14.04	1,165.49	9,032.94	10,716.83
59	60.9	9.83	2,216.56	6,334.19	1,302.21	447.37	245.25	186.57	97.26	23.46	1,215.04	9,952.35	11,947.17

Notes:
1. Simulated groundwater discharge to receptors provided for input to the WBM on a 2-month stress period basis for a 10-year post-closure period, and seasonal 6-month stress periods thereafter.
2. For spatial distribution of zones used to define flows, see Figure I-2.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, RIV refers to a river boundary, and RCH refers to groundwater seepage.

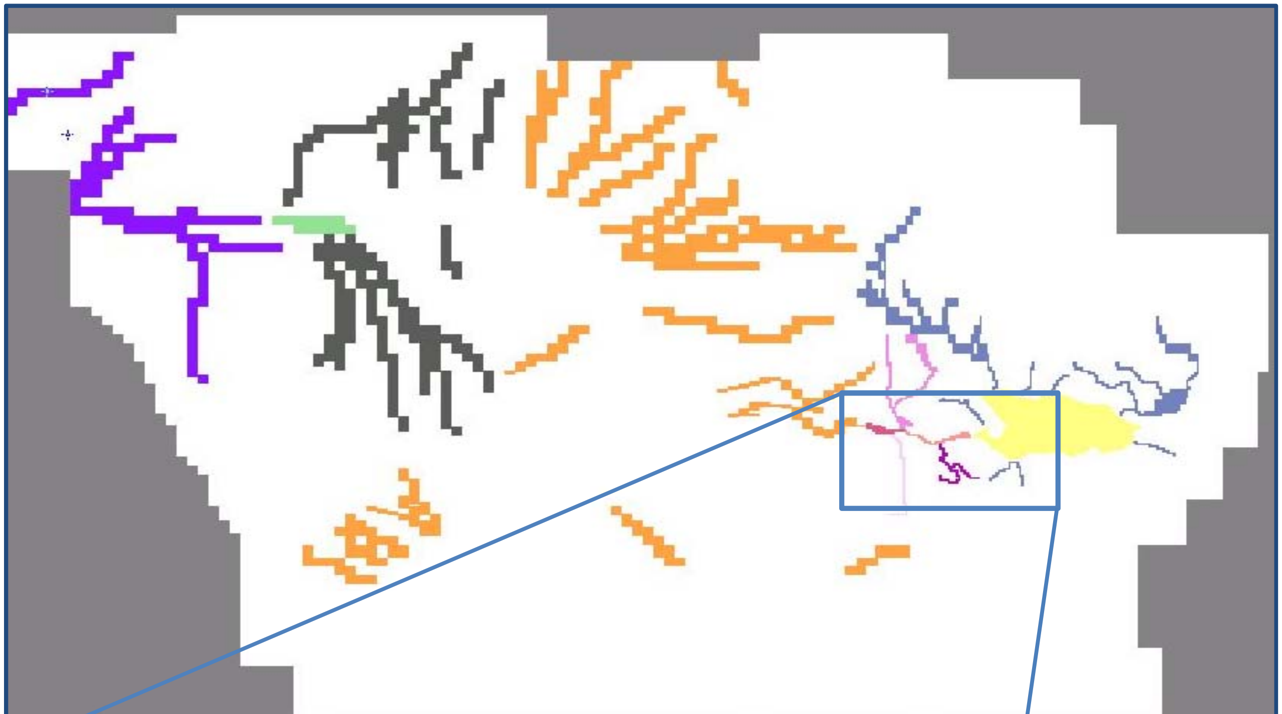
Table I-5. Cont'd Predictive Transient Post-Closure Simulation Outputs for Hydrology and Water Quality Modeling.

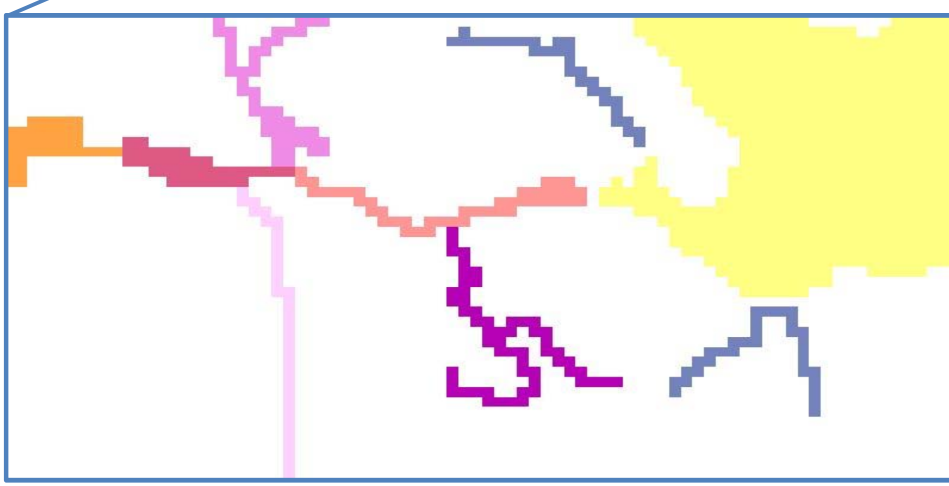
			Predicted Flows[1] (m^3/d)										
Stress Period (SP)	Days per SP (d)	Mine Years (y)	Brucejack Lake[2]	Brucejack Lake Tributaries	Unnamed Creek	Brucejack Creek b/w BJ2.62 & BJL-H1	VOK Creek	Camp Creek	Helipad Fill	Mill Site Cut	Brucejack Creek above BJ2.62	Total Baseflow @ BJ2.62	Total Baseflow @ BJL-H1
			(GHB)[3]	(DRN)	(DRN)	(RIV)	(RIV)	(DRN)	(RCH)	(DRN)	(RIV/DRN)	-	-
60	182.6	10.33	1,850.92	3,290.05	585.33	313.68	92.88	101.54	94.07	0.00	811.03	6,053.55	7,045.44
61	182.6	10.83	2,092.28	5,523.24	1,051.94	426.53	204.08	161.51	91.26	11.50	1,117.46	8,894.49	10,577.04
62	182.6	11.33	1,846.98	3,268.20	580.52	313.01	93.46	101.26	95.46	0.00	814.24	6,030.68	7,017.68
63	182.6	11.83	2,091.32	5,513.45	1,049.54	426.40	204.31	161.63	91.30	11.56	1,122.93	8,889.33	10,569.59
64	182.6	12.33	1,846.74	3,265.14	580.27	312.98	93.51	101.30	95.00	0.00	808.72	6,021.90	7,008.65
65	182.6	12.83	2,091.34	5,511.68	1,049.34	426.40	204.36	161.66	90.83	11.57	1,117.32	8,881.99	10,562.10
66	182.6	13.33	1,846.86	3,264.40	580.24	312.98	93.52	101.31	94.61	0.00	814.29	6,026.86	7,013.60
67	182.6	13.83	2,091.49	5,511.14	1,049.32	426.40	204.38	161.66	91.62	11.57	1,111.32	8,875.62	10,555.71
68	182.6	14.33	1,847.00	3,264.16	580.24	312.98	93.53	101.31	93.85	0.00	816.30	6,028.77	7,015.52
69	182.6	14.83	2,091.62	5,510.95	1,049.31	426.40	204.38	161.67	89.67	11.58	1,113.15	8,877.39	10,557.48
70	182.6	15.33	1,847.12	3,264.04	580.24	312.98	93.53	101.31	94.75	0.00	812.24	6,024.71	7,011.46
71	182.6	15.83	2,091.72	5,510.86	1,049.31	426.40	204.39	161.67	90.95	11.58	1,110.97	8,875.22	10,555.32
72	182.6	16.33	1,847.21	3,263.98	580.24	312.98	93.53	101.31	95.19	0.00	817.81	6,030.31	7,017.05
73	182.6	16.83	2,091.80	5,510.80	1,049.31	426.40	204.39	161.67	91.68	11.58	1,116.58	8,880.85	10,560.94
74	182.6	17.33	1,847.27	3,263.94	580.24	312.98	93.53	101.31	95.62	0.00	809.26	6,021.78	7,008.53
75	182.6	17.83	2,091.85	5,510.78	1,049.31	426.40	204.39	161.67	91.85	11.58	1,122.64	8,886.94	10,567.04
76	182.6	18.33	1,847.31	3,263.92	580.24	312.98	93.53	101.31	94.67	0.00	803.71	6,016.24	7,002.99
77	182.6	18.83	2,091.90	5,510.75	1,049.31	426.40	204.39	161.67	92.21	11.58	1,116.58	8,880.90	10,561.00
78	182.6	19.33	1,847.34	3,263.91	580.24	312.98	93.53	101.31	94.92	0.00	823.18	6,035.75	7,022.50
79	182.6	19.83	2,091.92	5,510.74	1,049.31	426.40	204.39	161.67	91.95	11.58	1,113.99	8,878.32	10,558.42
80	182.6	20.33	1,847.37	3,263.89	580.24	312.98	93.53	101.31	95.49	0.00	815.05	6,027.62	7,014.37
81	182.6	20.83	2,091.94	5,510.74	1,049.31	426.40	204.39	161.67	92.18	11.58	1,117.12	8,881.47	10,561.58
82	182.6	21.33	1,847.38	3,263.89	580.24	312.98	93.53	101.31	94.88	0.00	809.20	6,021.78	7,008.53
83	182.6	21.83	2,091.96	5,510.73	1,049.31	426.40	204.39	161.67	92.26	11.58	1,115.36	8,879.72	10,559.82
84	182.6	22.33	1,847.40	3,263.89	580.24	312.98	93.53	101.31	94.78	0.00	815.16	6,027.75	7,014.51
85	182.6	22.83	2,091.97	5,510.73	1,049.31	426.40	204.39	161.67	91.00	11.58	1,114.38	8,878.75	10,558.85
86	182.6	23.33	1,847.41	3,263.88	580.24	312.98	93.53	101.31	94.36	0.00	815.18	6,027.79	7,014.54
87	182.6	23.83	2,091.98	5,510.73	1,049.31	426.40	204.39	161.67	90.47	11.58	1,117.24	8,881.62	10,561.72
88	182.6	24.33	1,847.42	3,263.89	580.24	312.98	93.53	101.31	94.60	0.00	815.80	6,028.41	7,015.16
89	182.6	24.83	2,091.99	5,510.72	1,049.30	426.40	204.39	161.67	90.55	11.58	1,130.68	8,895.06	10,575.15
90	182.6	25.33	1,847.42	3,263.88	580.24	312.98	93.53	101.31	95.16	0.00	807.38	6,019.99	7,006.74
91	182.6	25.83	2,091.99	5,510.73	1,049.31	426.40	204.39	161.67	91.90	11.58	1,121.85	8,886.24	10,566.34
92	182.6	26.33	1,847.43	3,263.88	580.24	312.98	93.53	101.31	95.30	0.00	809.66	6,022.28	7,009.04
93	182.6	26.83	2,091.99	5,510.73	1,049.31	426.40	204.39	161.67	91.52	11.58	1,123.82	8,888.21	10,568.31
94	182.6	27.33	1,847.43	3,263.88	580.24	312.98	93.53	101.31	95.21	0.00	807.98	6,020.60	7,007.35
95	182.6	27.83	2,091.99	5,510.72	1,049.31	426.40	204.39	161.67	90.63	11.58	1,122.72	8,887.10	10,567.20
96	182.6	28.33	1,847.42	3,263.88	580.24	312.98	93.53	101.31	94.80	0.00	818.12	6,030.74	7,017.49
97	182.6	28.83	2,092.00	5,510.72	1,049.31	426.40	204.39	161.67	90.61	11.58	1,115.48	8,879.87	10,559.97
98	182.6	29.33	1,847.43	3,263.89	580.24	312.98	93.53	101.31	94.41	0.00	816.32	6,028.95	7,015.69

Notes:

1. Simulated groundwater discharge to receptors provided for input to the WBM on a 2-month stress period basis for a 10-year post-closure period, and seasonal 6-month stress periods thereafter.
2. For spatial distribution of zones used to define flows, see Figure I-2.
3. The types of boundary conditions used to represent surface water features in the numerical model are indicated in brackets. GHB refers to a general-head boundary, DRN refers to a drain boundary, RIV refers to a river boundary, and RCH refers to groundwater seepage.

Figure I-1. Spatial distribution of zones used with ZONEBUDGET to provide pre-disturbance and mining operations model outputs for hydrology (WBM) and water quality modeling.

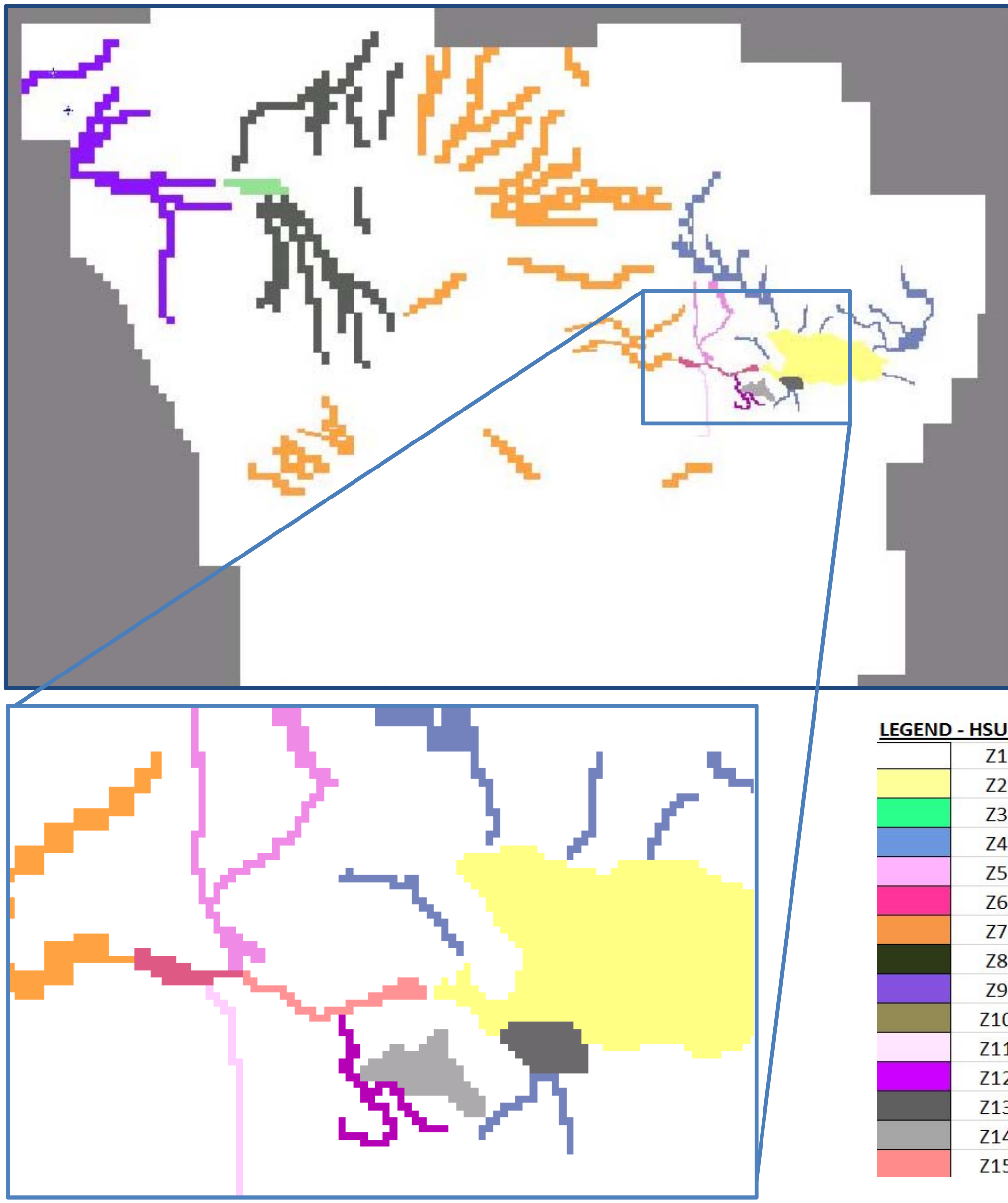




LEGEND - HSU Zone Key

	Z1	All undefined model areas
	Z2	Brucejack Lake
	Z3	Sulphurets Lake
	Z4	Brucjack Lake tributaries
	Z5	Unnamed Creek (tributary to Brucejack Creek)
	Z6	Brucejack Creek between BJ2.62 and BJL-H1
	Z7	Streams above Sulphurets Glacier
	Z8	Streams below Sulphurets Glacier
	Z9	Surface water downstream of Sulphurets Lake
	Z10	Underground workings
	Z11	VOK Creek (tributary to Brucejack Creek)
	Z12	Camp Creek (tributary to Brucejack Creek)
	Z15	Brucejack Creek between Brucejack Lake and BJ2.62

Figure I-2. Spatial distribution of zones used with ZONEBUDGET to provide closure / post-closure model outputs for hydrology (WBM) and water quality modeling.



LEGEND - HSU Zone Key

	Z1	All undefined model areas
	Z2	Brucejack Lake
	Z3	Sulphurets Lake
	Z4	Brucejack Lake tributaries
	Z5	Unnamed Creek (tributary to Brucejack Creek)
	Z6	Brucejack Creek between BJ2.62 and BJL-H1
	Z7	Streams above Sulphurets Glacier
	Z8	Streams below Sulphurets Glacier
	Z9	Surface water downstream of Sulphurets Lake
	Z10	Underground Workings (n/a for closure / post-closure model)
	Z11	VOK Creek (tributary to Brucejack Creek)
	Z12	Camp Creek (tributary to Brucejack Creek)
	Z13	Proposed heli-pad fill
	Z14	Proposed camp and mill site cut
	Z15	Brucejack Creek between Brucejack Lake and BJ2.62

APPENDIX J
SENSITVITY ANALYSIS RESULTS FOR MINING OPERATIONS

Table J-1. Predicted Inflow to the Underground Workings for the Base Case Simulation and Sensitivity Scenarios

Model SP[1]	Mine Year	Predicted Mine Inflow (m^3/d)																
		Base Case	S.A. Run 1	S.A. Run 2	S.A. Run 3	S.A. Run 4	S.A. Run 5	S.A. Run 6	S.A. Run 7	S.A. Run 8	S.A. Run 9	S.A. Run 10	S.A. Run 11	S.A. Run 12	S.A. Run 13	S.A. Run 14	S.A. Run 15	S.A. Run 16
1	-2.83	4,995	6,409	3,377	6,315	6,607	6,819	5,738	4,427	4,436	8,239	5,012	4,990	8,570	4,937	9,944	5,001	4,586
2	-2.67	3,185	5,293	1,931	3,930	3,917	4,289	3,909	2,749	2,953	5,942	3,204	3,174	6,524	3,053	7,509	3,191	4,028
3	-2.50	3,339	6,283	1,836	3,738	4,601	4,446	4,112	2,904	3,175	6,205	3,353	3,326	8,633	3,199	8,565	3,345	4,478
4	-2.33	3,718	7,066	1,933	3,869	5,546	4,807	4,450	3,304	3,570	6,557	3,729	3,704	10,137	3,534	9,700	3,724	4,900
5	-2.17	3,915	7,372	1,995	3,958	5,917	4,973	4,597	3,520	3,763	6,720	3,924	3,902	10,657	3,693	10,239	3,920	5,115
6	-2.00	3,376	6,218	1,719	3,645	4,680	4,386	4,041	3,000	3,208	6,127	3,383	3,361	8,139	3,156	8,687	3,381	4,577
7	-1.83	5,919	11,181	3,065	7,793	6,832	6,960	6,668	5,488	6,928	8,761	5,930	5,885	13,005	5,488	16,867	5,925	9,274
8	-1.67	4,018	7,866	2,007	5,148	4,674	5,032	4,868	3,574	4,684	6,927	4,037	3,977	9,160	3,612	11,181	4,024	6,437
9	-1.50	4,103	8,594	2,010	4,815	5,279	5,207	5,010	3,658	4,817	7,172	4,119	4,065	11,277	3,749	11,849	4,110	6,518
10	-1.33	4,443	9,338	2,190	4,848	6,291	5,594	5,339	4,010	5,176	7,539	4,460	4,403	12,851	4,086	12,860	4,449	6,802
11	-1.17	4,632	9,598	2,314	4,881	6,824	5,789	5,494	4,206	5,347	7,722	4,647	4,591	13,337	4,252	13,260	4,638	6,932
12	-1.00	4,110	8,239	2,011	4,546	5,725	5,220	4,961	3,693	4,694	7,141	4,126	4,054	10,544	3,716	11,409	4,115	6,282
13	-0.83	4,591	9,837	2,208	5,817	5,636	5,673	5,509	4,183	5,506	7,642	4,595	4,551	11,439	4,110	13,753	4,596	8,221
14	-0.67	3,721	8,280	1,823	4,553	4,488	4,813	4,706	3,290	4,561	6,807	3,730	3,683	9,647	3,302	11,086	3,727	6,924
15	-0.50	4,012	9,258	1,899	4,496	5,274	5,203	5,032	3,555	4,907	7,253	4,020	3,974	11,974	3,602	12,198	4,019	7,238
16	-0.33	4,466	10,151	2,122	4,677	6,369	5,713	5,445	4,012	5,391	7,722	4,473	4,422	13,732	4,037	13,487	4,472	7,607
17	-0.17	4,725	10,492	2,283	4,806	6,995	5,977	5,660	4,274	5,647	7,961	4,730	4,673	14,332	4,274	14,072	4,731	7,784
18	0.00	4,277	9,229	2,021	4,540	5,990	5,452	5,194	3,842	5,080	7,412	4,286	4,193	11,661	3,810	12,418	4,283	7,204
19	0.17	4,592	10,416	2,245	5,422	5,741	5,714	5,673	4,166	5,322	7,704	4,612	4,627	11,710	4,259	13,722	4,598	8,978
20	0.33	3,756	8,623	1,868	4,478	4,574	4,906	4,811	3,308	4,510	6,959	3,772	3,749	9,819	3,434	11,131	3,762	7,300
21	0.50	3,980	9,434	1,951	4,425	5,371	5,270	5,085	3,503	4,765	7,377	3,974	3,966	11,867	3,664	11,995	3,986	7,514
22	0.67	4,442	10,293	2,173	4,618	6,486	5,780	5,497	3,955	5,213	7,842	4,425	4,389	13,656	4,084	13,225	4,449	7,866
23	0.83	4,731	10,689	2,334	4,766	7,118	6,045	5,715	4,245	5,481	8,079	4,717	4,636	14,358	4,319	13,882	4,737	8,066
24	1.00	4,264	9,655	2,082	4,493	6,024	5,489	5,233	3,816	5,029	7,482	4,259	4,141	12,019	3,860	12,517	4,270	7,580
25	1.17	4,122	9,618	2,133	4,706	5,226	5,410	5,035	3,685	4,938	7,582	4,186	4,074	11,230	3,690	12,632	4,127	7,919
26	1.33	3,561	8,519	1,784	4,076	4,384	4,795	4,557	3,101	4,365	6,968	3,615	3,522	9,900	3,166	10,931	3,567	7,065
27	1.50	3,853	9,447	1,909	4,121	5,271	5,231	4,915	3,374	4,675	7,439	3,891	3,811	11,963	3,474	11,943	3,859	7,428
28	1.67	4,331	10,334	2,160	4,359	6,453	5,756	5,377	3,853	5,145	7,923	4,363	4,296	13,687	3,926	13,172	4,338	7,838
29	1.83	4,637	10,744	2,338	4,547	7,121	6,038	5,635	4,165	5,439	8,177	4,673	4,632	14,391	4,190	13,842	4,644	8,074
30	2.00	4,207	9,723	2,063	4,317	5,938	5,479	5,152	3,751	4,986	7,592	4,235	4,146	12,131	3,743	12,558	4,213	7,595
31	2.17	3,742	8,857	1,832	4,018	4,858	4,969	4,721	3,283	4,529	7,129	3,784	3,680	10,530	3,320	11,328	3,748	7,154
32	2.33	3,482	8,413	1,681	3,812	4,325	4,705	4,508	3,003	4,284	6,900	3,558	3,435	9,850	3,094	10,675	3,488	6,921
33	2.50	3,844	9,411	1,838	3,974	5,286	5,212	4,924	3,344	4,672	7,461	3,933	3,798	11,971	3,471	11,849	3,850	7,357
34	2.67	4,356	10,330	2,103	4,273	6,482	5,778	5,406	3,858	5,174	7,993	4,444	4,316	13,727	3,951	13,137	4,363	7,801
35	2.83	4,671	10,762	2,293	4,499	7,148	6,080	5,665	4,180	5,482	8,262	4,768	4,610	14,452	4,224	13,847	4,677	8,060
36	3.00	4,240	9,757	2,038	4,295	6,003	5,517	5,209	3,771	5,045	7,671	4,334	4,081	12,196	3,785	12,588	4,246	7,601
37	3.17	4,361	9,083	2,257	4,990	5,580	5,626	5,433	3,839	5,270	7,845	4,435	4,079	10,996	3,864	12,109	4,367	7,223
38	3.33	3,638	8,485	1,763	4,044	4,443	4,838	4,734	3,141	4,547	7,053	3,673	3,509	9,968	3,269	10,850	3,644	6,928
39	3.50	3,979	9,534	1,902	4,146	5,438	5,344	5,097	3,484	4,956	7,593	4,039	3,848	12,265	3,648	12,133	3,986	7,388
40	3.67	4,471	10,470	2,149	4,414	6,605	5,884	5,545	3,985	5,459	8,081	4,542	4,337	14,037	4,117	13,448	4,478	7,834
41	3.83	4,767	10,894	2,325	4,617	7,220	6,166	5,780	4,283	5,745	8,336	4,845	4,652	14,724	4,375	14,135	4,773	8,087
42	4.00	4,295	9,778	2,052	4,368	6,070	5,556	5,306	3,819	5,204	7,709	4,350	4,180	12,231	3,888	12,674	4,301	7,585
43	4.17	4,308	9,841	2,038	4,752	5,405	5,535	5,352	3,836	5,236	7,753	4,407	4,197	11,555	3,872	12,898	4,314	8,040
44	4.33	3,754	8,794	1,816	4,207	4,558	4,975	4,841	3,267	4,651	7,233	3,870	3,674	10,244	3,395	11,284	3,760	7,267
45	4.50	4,060	9,829	1,944	4,288	5,507	5,449	5,187	3,567	5,023	7,751	4,192	3,949	12,519	3,720	12,465	4,067	7,686
46	4.67	4,539	10,757	2,187	4,539	6,686	5,980	5,632	4,059	5,529	8,240	4,682	4,409	14,286	4,173	13,747	4,546	8,120
47	4.83	4,835	11,186	2,363	4,730	7,313	6,263	5,868	4,354	5,823	8,498	4,990	4,696	14,999	4,427	14,436	4,841	8,372
48	5.00	4,371	10,077	2,112	4,478	6,157	5,653	5,397	3,896	5,298	7,878	4,508	4,201	12,564	3,949	13,016	4,377	7,866
49	5.17	3,776	8,978	1,790	3,995	4,806	4,900	4,834	3,302	4,720	7,267	3,878	3,656	10,719	3,334	11,409	3,782	7,192
50	5.33	3,602	8,690	1,664	3,894	4,376	4,765	4,704	3,108	4,527	7,133	3,733	3,480	10,169	3,211	11,003	3,608	7,138

Notes:

1. Model SP refers to the model stress period; predictive mining operations simulations were run using 6 x 2-month stress periods per year.
2. For details on sensitivity analyses, refer to Table 12 and text section 11.0

Table J-1. Cont'd Predicted Inflow to the Underground Workings for the Base Case Simulation and Sensitivity Scenarios

Model SP[1]	Mine Year	Predicted Mine Inflow (m^3/d)																
		Base Case	S.A. Run 1	S.A. Run 2	S.A. Run 3	S.A. Run 4	S.A. Run 5	S.A. Run 6	S.A. Run 7	S.A. Run 8	S.A. Run 9	S.A. Run 10	S.A. Run 11	S.A. Run 12	S.A. Run 13	S.A. Run 14	S.A. Run 15	S.A. Run 16
51	5.50	3,984	9,794	1,837	4,097	5,373	5,299	5,122	3,486	4,970	7,733	4,123	3,806	12,496	3,623	12,336	3,990	7,628
52	5.67	4,484	10,742	2,104	4,398	6,581	5,869	5,586	4,000	5,504	8,258	4,630	4,278	14,286	4,115	13,670	4,491	8,083
53	5.83	4,786	11,180	2,286	4,616	7,242	6,177	5,824	4,303	5,810	8,530	4,946	4,579	15,009	4,383	14,385	4,793	8,343
54	6.00	4,351	10,070	2,045	4,400	6,119	5,603	5,383	3,872	5,290	7,904	4,487	4,150	12,581	3,912	12,986	4,357	7,836
55	6.17	4,747	9,434	3,156	5,756	6,044	5,998	6,186	4,082	5,503	8,340	4,869	4,652	11,321	4,265	12,565	4,756	7,492
56	6.33	3,795	8,868	1,864	4,161	4,614	5,016	5,086	3,213	4,689	7,374	3,958	3,657	10,390	3,401	11,243	3,803	7,301
57	6.50	4,388	10,245	2,132	4,521	6,084	5,749	5,710	3,819	5,357	8,182	4,547	4,179	13,282	4,017	13,145	4,396	7,917
58	6.67	4,905	11,224	2,401	4,844	7,318	6,330	6,182	4,358	5,902	8,724	5,061	4,659	15,055	4,512	14,510	4,913	8,380
59	6.83	5,203	11,668	2,566	5,058	7,910	6,622	6,417	4,657	6,208	8,981	5,365	4,931	15,752	4,768	15,201	5,211	8,647
60	7.00	4,496	10,288	2,187	4,594	6,269	5,762	5,717	3,956	5,437	8,069	4,645	4,173	12,805	4,032	13,267	4,503	8,044
61	7.17	11,108	19,450	7,899	17,271	12,381	12,589	12,437	10,559	11,673	15,033	11,223	10,719	21,480	10,909	29,016	11,117	17,575
62	7.33	4,956	12,457	2,355	5,732	5,788	6,219	6,436	4,350	5,697	8,640	5,116	4,729	13,987	4,578	15,748	4,964	10,925
63	7.50	5,355	13,060	2,537	5,778	7,119	6,722	6,914	4,673	6,198	9,254	5,488	5,079	16,131	4,936	16,681	5,366	10,935
64	7.67	5,845	13,843	2,770	5,983	8,369	7,272	7,345	5,145	6,717	9,794	5,967	5,522	18,067	5,370	17,830	5,856	11,115
65	7.83	6,158	14,315	2,914	6,150	8,990	7,582	7,573	5,450	7,027	10,078	6,273	5,797	18,877	5,617	18,477	6,167	11,233
66	8.00	5,433	13,172	2,467	5,649	7,247	6,766	6,839	4,764	6,249	9,196	5,557	5,135	16,109	4,916	16,722	5,441	10,731
67	8.17	5,114	12,954	2,206	5,569	6,253	6,304	6,581	4,453	5,921	8,465	5,203	4,969	14,943	4,609	16,181	5,123	11,030
68	8.33	4,756	12,249	2,023	5,222	5,623	5,986	6,294	4,087	5,581	8,228	4,871	4,575	13,940	4,294	15,132	4,766	10,593
69	8.50	5,258	13,056	2,358	5,521	7,028	6,617	6,850	4,518	6,172	8,952	5,366	5,030	16,179	4,788	16,421	5,269	10,850
70	8.67	5,802	13,940	2,636	5,821	8,356	7,234	7,332	5,060	6,738	9,536	5,907	5,517	18,285	5,292	17,781	5,814	11,157
71	8.83	6,165	14,509	2,816	6,049	9,020	7,595	7,606	5,425	7,087	9,843	6,267	5,834	19,197	5,597	18,566	6,175	11,360
72	9.00	5,474	13,494	2,436	5,604	7,323	6,807	6,895	4,784	6,332	8,991	5,589	5,233	16,530	4,945	16,988	5,482	10,963
73	9.17	5,036	12,714	2,181	5,343	6,212	6,322	6,516	4,358	5,874	8,524	5,252	4,779	14,807	4,546	15,756	5,045	10,695
74	9.33	4,763	12,234	2,036	5,159	5,662	6,044	6,309	4,084	5,612	8,281	4,921	4,504	14,007	4,323	15,089	4,773	10,503
75	9.50	5,283	13,108	2,373	5,482	7,054	6,670	6,881	4,536	6,219	8,998	5,408	4,959	16,293	4,829	16,455	5,295	10,834
76	9.67	5,827	14,026	2,648	5,803	8,380	7,280	7,363	5,079	6,788	9,577	5,938	5,437	18,424	5,336	17,864	5,839	11,181
77	9.83	6,182	14,622	2,827	6,037	9,050	7,630	7,630	5,437	7,131	9,885	6,274	5,723	19,346	5,635	18,686	6,192	11,417
78	10.00	5,532	13,619	2,447	5,636	7,395	6,875	6,951	4,841	6,407	9,054	5,638	5,023	16,668	5,027	17,111	5,540	11,060
79	10.17	4,689	12,120	1,976	4,951	5,780	5,858	6,102	4,056	5,336	7,967	4,828	4,492	14,249	4,219	13,166	4,698	10,104
80	10.33	4,523	11,955	1,860	4,733	5,436	5,808	6,061	3,861	5,286	8,075	4,646	4,246	13,766	4,031	14,979	4,533	10,195
81	10.50	5,096	12,807	2,207	5,125	6,833	6,500	6,690	4,354	5,949	8,890	5,207	4,772	15,944	4,579	16,079	5,108	10,541
82	10.67	5,668	13,728	2,515	5,502	8,188	7,157	7,201	4,921	6,552	9,524	5,779	5,308	18,108	5,117	17,469	5,680	10,902
83	10.83	6,045	14,342	2,727	5,775	8,925	7,534	7,486	5,298	6,914	9,861	6,147	5,655	19,063	5,448	18,298	6,055	11,150
84	11.00	5,450	13,426	2,379	5,444	7,343	6,804	6,870	4,755	6,248	9,051	5,561	5,058	16,511	4,871	18,427	5,458	10,832
85	11.17	4,952	12,531	2,117	5,139	6,172	6,256	6,434	4,274	5,714	8,531	5,057	4,608	14,698	4,412	13,856	4,961	10,464
86	11.33	4,680	12,048	1,986	4,965	5,612	5,979	6,225	4,001	5,445	8,296	4,778	4,375	13,863	4,185	14,750	4,690	10,272
87	11.50	5,178	12,852	2,316	5,275	6,932	6,595	6,767	4,428	6,033	9,027	5,272	4,865	15,996	4,675	16,168	5,190	10,570
88	11.67	5,718	13,756	2,601	5,598	8,259	7,222	7,242	4,964	6,603	9,629	5,814	5,387	18,143	5,184	17,508	5,729	10,917
89	11.83	6,076	14,361	2,789	5,839	8,967	7,580	7,509	5,324	6,949	9,947	6,167	5,717	19,090	5,491	18,321	6,087	11,157
90	12.00	5,467	13,437	2,424	5,485	7,363	6,831	6,883	4,769	6,269	9,112	5,571	5,101	16,525	4,896	16,696	5,475	10,832
91	12.17	4,990	12,623	2,159	5,206	6,208	6,299	6,470	4,312	5,755	8,599	5,151	4,648	14,788	4,456	15,533	5,000	10,554
92	12.33	4,713	12,164	2,016	5,019	5,643	6,015	6,257	4,034	5,481	8,364	4,895	4,389	13,982	4,220	14,900	4,724	10,382
93	12.50	5,217	12,994	2,343	5,330	6,971	6,637	6,806	4,466	6,075	9,111	5,399	4,870	16,138	4,717	16,345	5,195	10,705
94	12.67	5,763	13,919	2,627	5,658	8,304	7,270	7,287	5,007	6,651	9,715	5,945	5,381	18,312	5,232	17,709	5,775	11,074
95	12.83	6,126	14,542	2,813	5,903	9,018	7,633	7,560	5,373	7,001	10,035	6,301	5,685	19,285	5,543	18,544	6,137	11,332
96	13.00	5,522	13,645	2,446	5,552	7,419	6,888	6,939	4,824	6,326	9,201	5,708	5,021	16,756	4,952	16,945	5,531	11,027
97	13.17	5,074	12,710	2,248	5,348	6,299	6,391	6,564	4,396	5,838	8,724	5,191	4,688	14,882	4,543	15,616	5,084	10,649
98	13.33	4,717	12,141	2,031	5,013	5,650	6,022	6,275	4,040	5,484	8,389	4,843	4,342	13,974	4,231	14,860	4,727	10,358
99	13.50	5,218	12,935	2,349	5,316	6,972	6,637	6,821	4,463	6,080	9,119	5,339	4,827	16,082	4,722	16,258	5,230	10,650
100	13.67	5,764	13,846	2,628	5,640	8,294	7,266	7,299	4,998	6,664	9,712	5,879	5,343	18,257	5,231	17,618	5,776	10,996

Notes:
1. Model SP refers to the model stress period; predictive mining operations simulations were run using 6 x 2-month stress periods per year.
2. For details on sensitivity analyses, refer to Table 12 and text section 11.0

Table J-1. Cont'd Predicted Inflow to the Underground Workings for the Base Case Simulation and Sensitivity Scenarios

Model SP[1]	Mine Year	Predicted Mine Inflow (m^3/d)																
		Base Case	S.A. Run 1	S.A. Run 2	S.A. Run 3	S.A. Run 4	S.A. Run 5	S.A. Run 6	S.A. Run 7	S.A. Run 8	S.A. Run 9	S.A. Run 10	S.A. Run 11	S.A. Run 12	S.A. Run 13	S.A. Run 14	S.A. Run 15	S.A. Run 16
101	13.83	6,121	14,450	2,810	5,881	9,002	7,624	7,565	5,359	7,012	10,026	6,226	5,651	19,216	5,543	18,440	6,132	11,242
102	14.00	5,515	13,538	2,442	5,531	7,421	6,878	6,943	4,815	6,318	9,193	5,632	4,999	16,622	4,958	16,792	5,524	10,917
103	14.17	4,922	12,569	2,031	5,133	6,061	6,039	6,428	4,204	5,469	8,239	5,241	4,438	14,686	4,401	15,378	4,932	10,595
104	14.33	4,672	12,160	1,944	4,958	5,604	5,944	6,248	3,987	5,332	8,276	4,923	4,203	13,966	4,231	14,841	4,682	10,430
105	14.50	5,196	13,008	2,279	5,280	6,932	6,601	6,810	4,423	5,946	9,066	5,469	4,711	16,122	4,740	16,289	5,208	10,748
106	14.67	5,759	13,951	2,566	5,622	8,263	7,257	7,308	4,971	6,557	9,697	6,035	5,240	18,337	5,263	17,698	5,771	11,106
107	14.83	6,125	14,568	2,764	5,874	8,988	7,633	7,586	5,345	6,927	10,025	6,392	5,556	19,319	5,587	18,553	6,136	11,365
108	15.00	5,540	13,682	2,420	5,543	7,481	6,915	6,986	4,833	6,271	9,201	5,764	4,875	16,791	5,020	16,958	5,549	11,069
109	15.17	4,854	12,214	2,130	5,006	6,123	6,177	6,363	4,172	5,791	8,477	5,089	4,428	14,464	4,340	15,101	4,864	10,085
110	15.33	4,650	11,942	1,985	4,889	5,627	5,970	6,218	3,971	5,550	8,303	4,889	4,129	13,800	4,194	14,661	4,660	10,142
111	15.50	5,169	12,837	2,310	5,226	6,921	6,594	6,774	4,405	6,097	9,055	5,436	4,666	15,980	4,702	16,083	5,181	10,501
112	15.67	5,726	13,772	2,594	5,571	8,241	7,231	7,267	4,949	6,666	9,662	6,013	5,207	18,174	5,217	17,495	5,738	10,873
113	15.83	6,086	14,372	2,785	5,817	8,960	7,596	7,540	5,317	7,005	9,981	6,373	5,526	19,135	5,533	18,344	6,096	11,131
114	16.00	5,504	13,453	2,433	5,489	7,436	6,874	6,944	4,802	6,366	9,156	5,749	4,882	16,581	4,965	16,737	5,513	10,800
115	16.17	4,978	12,519	2,173	5,159	6,245	6,296	6,482	4,301	5,812	8,592	5,202	4,369	14,735	4,484	15,467	4,988	10,437
116	16.33	4,693	12,027	2,028	4,968	5,665	6,006	6,264	4,022	5,539	8,333	4,908	4,145	13,872	4,248	14,787	4,704	10,248
117	16.50	5,195	12,883	2,339	5,266	6,940	6,612	6,803	4,433	6,085	9,071	5,449	4,668	16,011	4,733	16,138	5,206	10,556
118	16.67	5,741	13,789	2,614	5,595	8,252	7,239	7,284	4,965	6,651	9,668	6,022	5,195	18,189	5,236	17,519	5,753	10,901
119	16.83	6,093	14,377	2,799	5,830	8,965	7,598	7,548	5,325	6,993	9,983	6,378	5,512	19,138	5,543	18,344	6,104	11,140
120	17.00	5,501	13,436	2,433	5,485	7,428	6,868	6,941	4,800	6,350	9,149	5,749	4,860	16,559	4,964	16,694	5,510	10,780
121	17.17	5,056	12,718	2,194	5,250	6,327	6,369	6,564	4,387	5,941	8,677	5,498	4,327	14,966	4,583	15,783	5,065	10,616
122	17.33	4,842	12,316	2,072	5,141	5,791	6,113	6,400	4,179	5,786	8,451	5,195	4,089	14,216	4,416	15,266	4,853	10,498
123	17.50	5,344	13,194	2,380	5,467	7,067	6,711	6,940	4,598	6,356	9,176	5,715	4,586	16,371	4,908	16,648	5,355	10,834
124	17.67	5,884	14,133	2,651	5,800	8,383	7,344	7,420	5,124	6,925	9,777	6,262	5,066	18,566	5,408	18,038	5,896	11,198
125	17.83	6,232	14,734	2,833	6,038	9,093	7,712	7,685	5,479	7,267	10,097	6,592	5,302	19,536	5,711	18,882	6,243	11,451
126	18.00	5,650	13,785	2,477	5,712	7,569	6,989	7,077	4,958	6,644	9,282	5,904	4,429	16,957	5,152	17,238	5,659	11,106
127	18.17	4,190	11,552	1,794	4,335	5,079	5,027	5,574	3,542	4,386	7,186	4,489	3,589	13,287	3,725	13,673	4,200	9,902
128	18.33	4,114	11,558	1,688	4,242	4,879	5,147	5,615	3,450	4,526	7,479	4,471	3,410	13,187	3,658	13,010	4,125	9,969
129	18.50	4,717	12,444	2,036	4,611	6,337	6,033	6,278	3,970	5,247	8,481	5,083	4,043	15,336	4,256	15,883	4,729	10,327
130	18.67	5,311	13,380	2,338	4,989	7,789	6,811	6,816	4,553	5,893	9,177	5,680	4,637	17,536	4,829	16,691	5,323	10,692
131	18.83	5,709	13,999	2,552	5,269	8,576	7,247	7,137	4,990	6,307	9,534	6,077	4,991	18,522	5,245	17,585	5,717	10,955
132	19.00	5,187	13,198	2,214	5,003	7,082	6,529	6,598	4,489	5,763	8,732	5,559	4,303	16,157	4,681	16,140	5,196	10,684
133	19.17	4,752	12,358	1,990	4,765	5,931	5,978	6,227	4,070	5,311	8,201	5,124	3,814	14,447	4,264	15,037	4,762	10,370
134	19.33	4,501	11,870	1,871	4,609	5,391	5,691	6,041	3,818	5,069	7,933	4,844	3,588	13,607	4,044	14,382	4,511	10,167
135	19.50	4,986	12,615	2,199	4,922	6,725	6,355	6,562	4,231	5,616	8,673	5,341	4,187	15,588	4,548	15,665	4,998	10,435
136	19.67	5,511	13,492	2,487	5,244	8,053	6,992	7,028	4,746	6,169	9,269	5,853	4,755	17,686	5,064	16,983	5,523	10,766
137	19.83	5,866	14,077	2,682	5,492	8,730	7,341	7,298	5,110	6,510	9,584	6,193	5,080	18,621	5,382	17,792	5,877	11,006
138	20.00	5,296	13,245	2,330	5,190	7,176	6,583	6,701	4,599	5,897	8,766	5,628	4,405	16,202	4,792	16,278	5,305	10,720
139	20.17	4,827	12,394	2,080	4,919	5,978	6,007	6,293	4,146	5,402	8,220	5,159	3,903	14,479	4,335	15,123	4,836	10,397
140	20.33	4,554	11,896	1,938	4,732	5,419	5,708	6,088	3,873	5,135	7,945	4,880	3,634	13,650	4,090	14,465	4,564	10,187
141	20.50	5,030	12,633	2,237	5,022	6,738	6,366	6,602	4,277	5,672	8,680	5,370	4,206	15,611	4,587	15,754	5,042	10,451
142	20.67	5,553	13,510	2,529	5,338	8,070	7,001	7,065	4,789	6,219	9,275	5,878	4,771	17,696	5,100	17,042	5,565	10,780
143	20.83	5,899	14,094	2,721	5,572	8,743	7,348	7,326	5,145	6,549	9,589	6,213	5,096	18,627	5,406	17,839	5,909	11,018
144	21.00	5,317	13,256	2,364	5,254	7,190	6,586	6,719	4,623	5,924	8,768	5,643	4,436	16,208	4,807	16,319	5,326	10,731
145	21.17	4,843	12,402	2,101	4,971	5,983	6,010	6,306	4,165	5,421	8,222	5,170	3,926	14,482	4,346	15,154	4,852	10,403
146	21.33	4,568	11,902	1,953	4,779	5,423	5,711	6,098	3,888	5,152	7,947	4,889	3,654	13,635	4,098	14,490	4,578	10,193
147	21.50	5,042	12,638	2,249	5,065	5,956	6,369	6,613	4,291	5,688	8,682	5,379	4,226	15,619	4,595	15,777	5,054	10,455
148	21.67	5,566	13,514	2,540	5,378	8,387	7,003	7,075	4,803	6,233	9,277	5,885	4,790	17,701	5,107	17,063	5,577	10,783
149	21.83	5,909	14,098	2,730	5,611	8,792	7,350	7,334	5,157	6,562	9,590	6,219	5,111	18,631	5,412	17,857	5,920	11,021
150	22.00	5,325	13,258	2,371	5,285	7,129	6,588	6,725	4,632	5,933	8,769	5,648	4,447	16,210	4,811	16,333	5,333	10,733

Notes:
1. Model SP refers to the model stress period; predictive mining operations simulations were run using 6 x 2-month stress periods per year.
2. For details on sensitivity analyses, refer to Table 12 and text section 11.0

Figure J-1. Predicted Inflow to Proposed Underground Workings for the Base Case Simulation and Sensitivity Scenarios 1, 2 & 3.

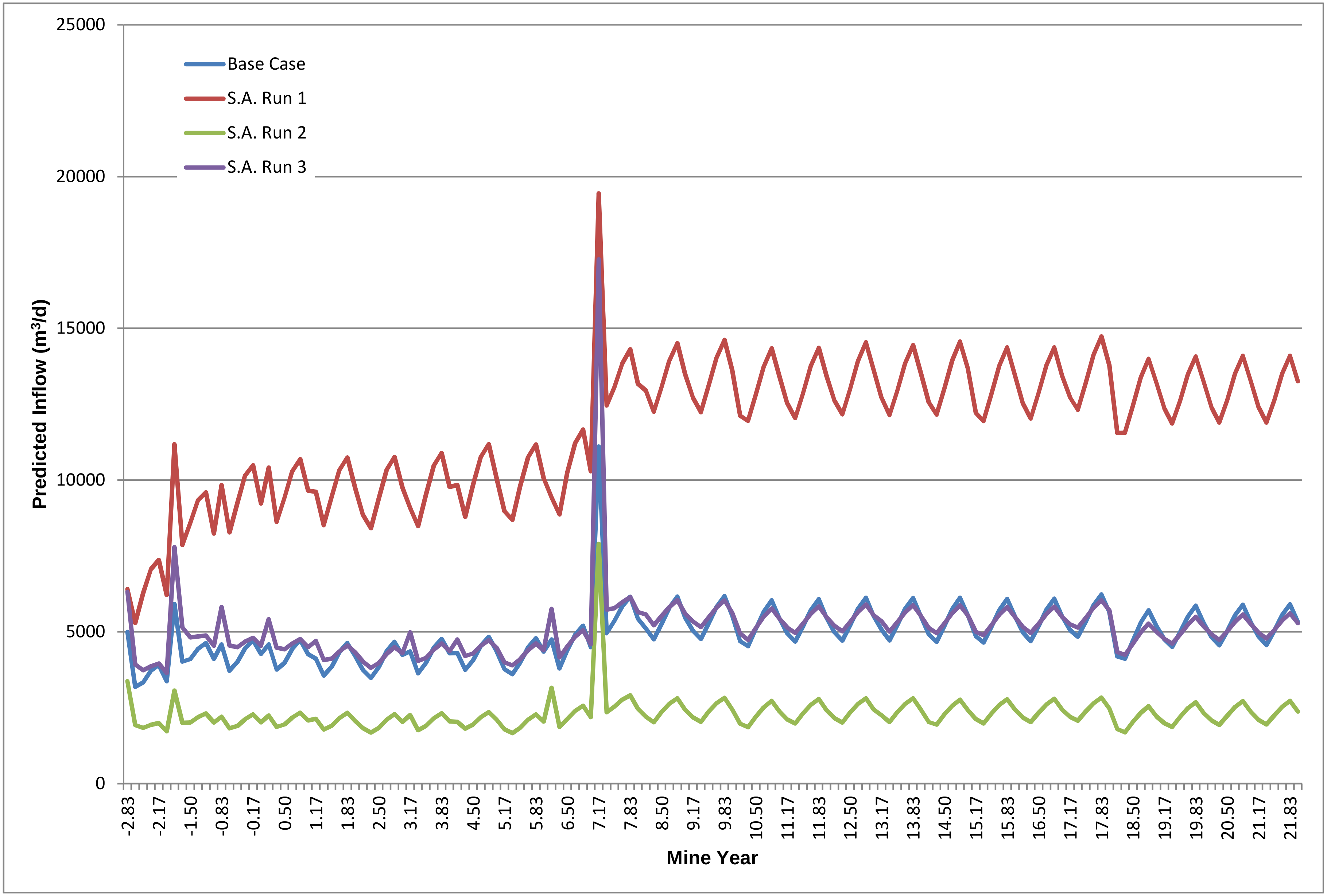


Figure J-2. Predicted Inflow to Proposed Underground Workings for the Base Case Simulation and Sensitivity Scenarios 4, 5 & 9.

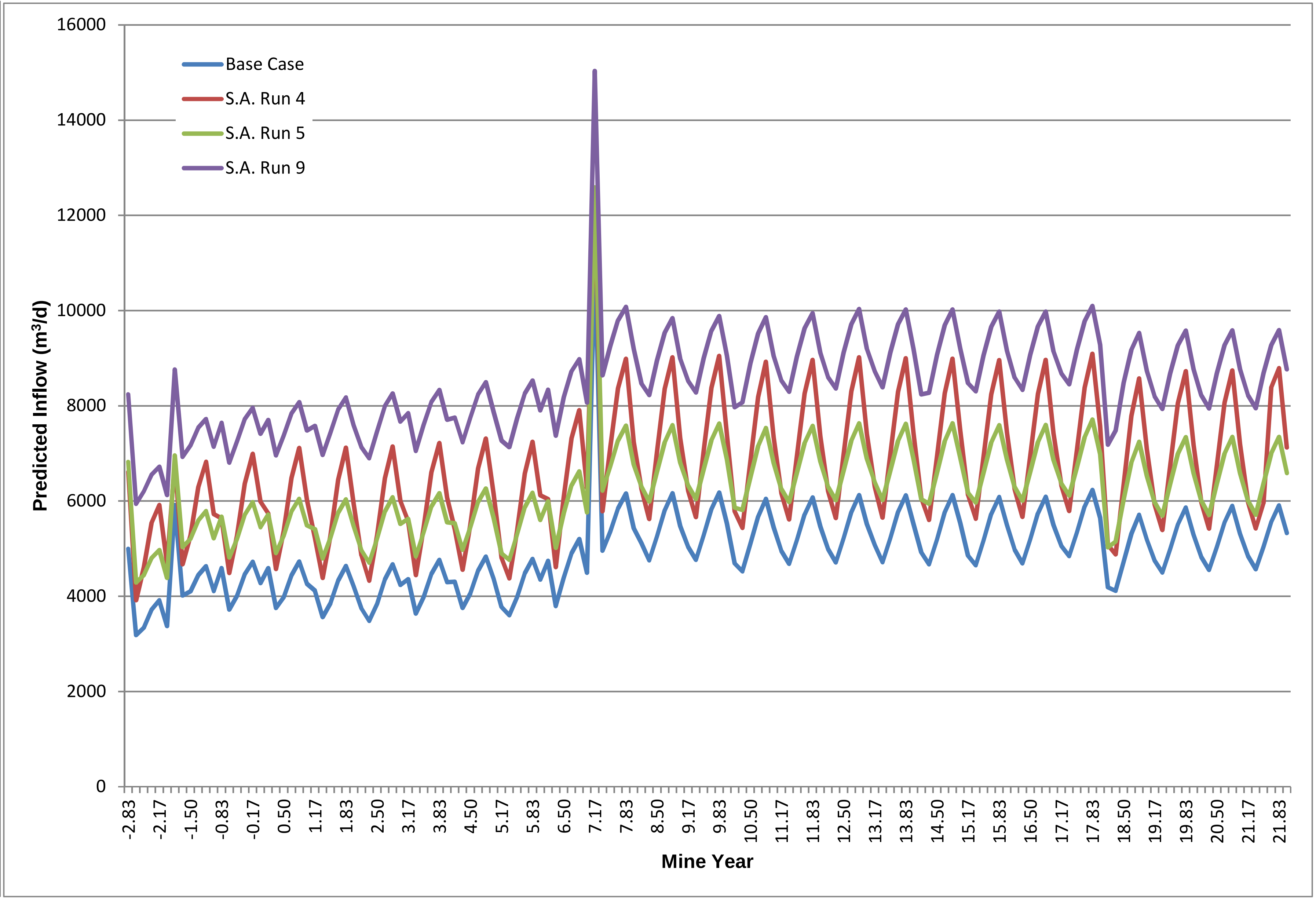


Figure J-3. Predicted Inflow to Proposed Underground Workings for the Base Case Simulation and Sensitivity Scenarios 6, 7 & 15.

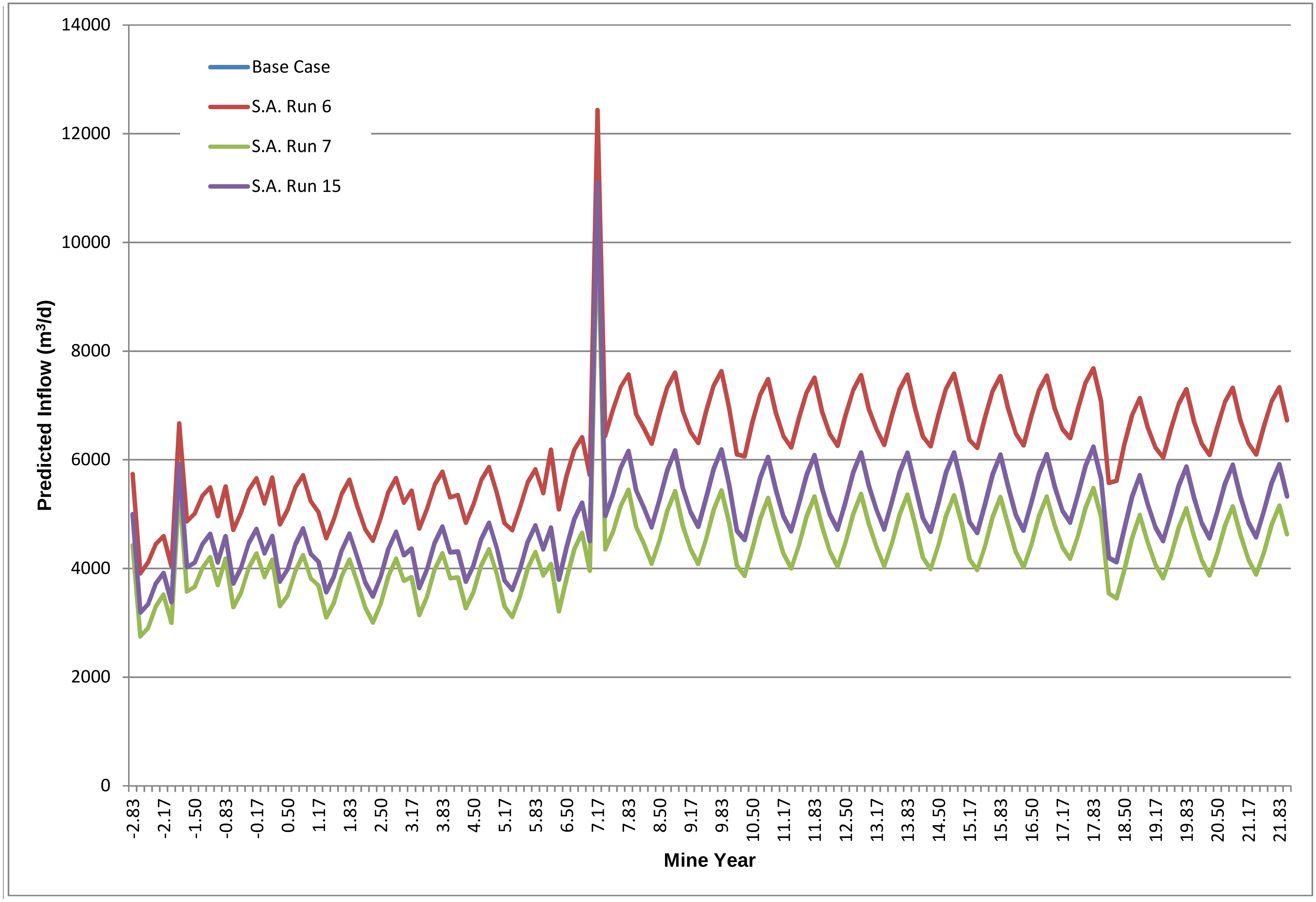


Figure J-4. Predicted Inflow to Proposed Underground Workings for the Base Case Simulation and Sensitivity Scenarios 8, 10, 11 & 13.

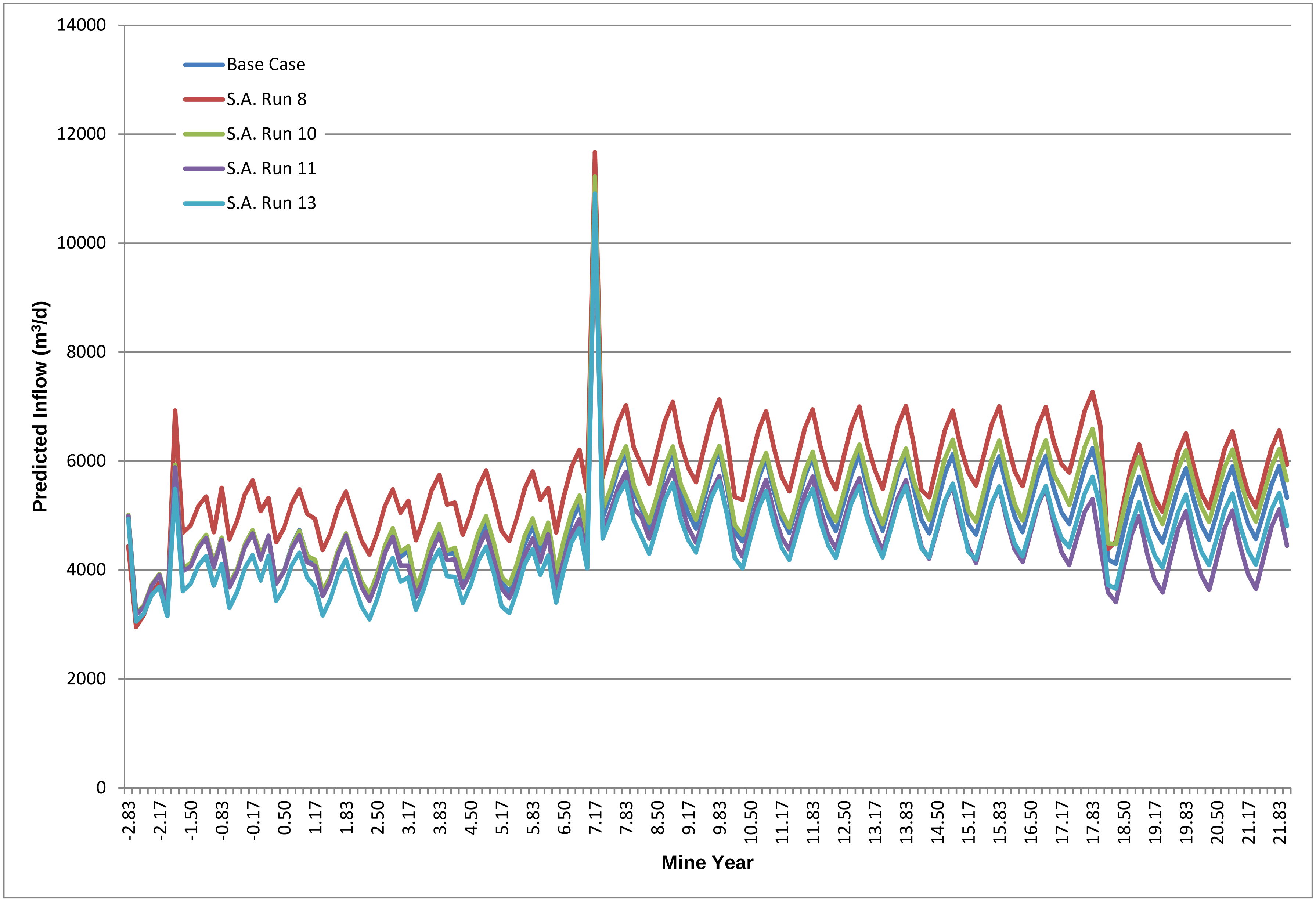


Figure J-5. Predicted Inflow to Proposed Underground Workings for the Base Case Simulation and Sensitivity Scenarios 12, 14 & 16.

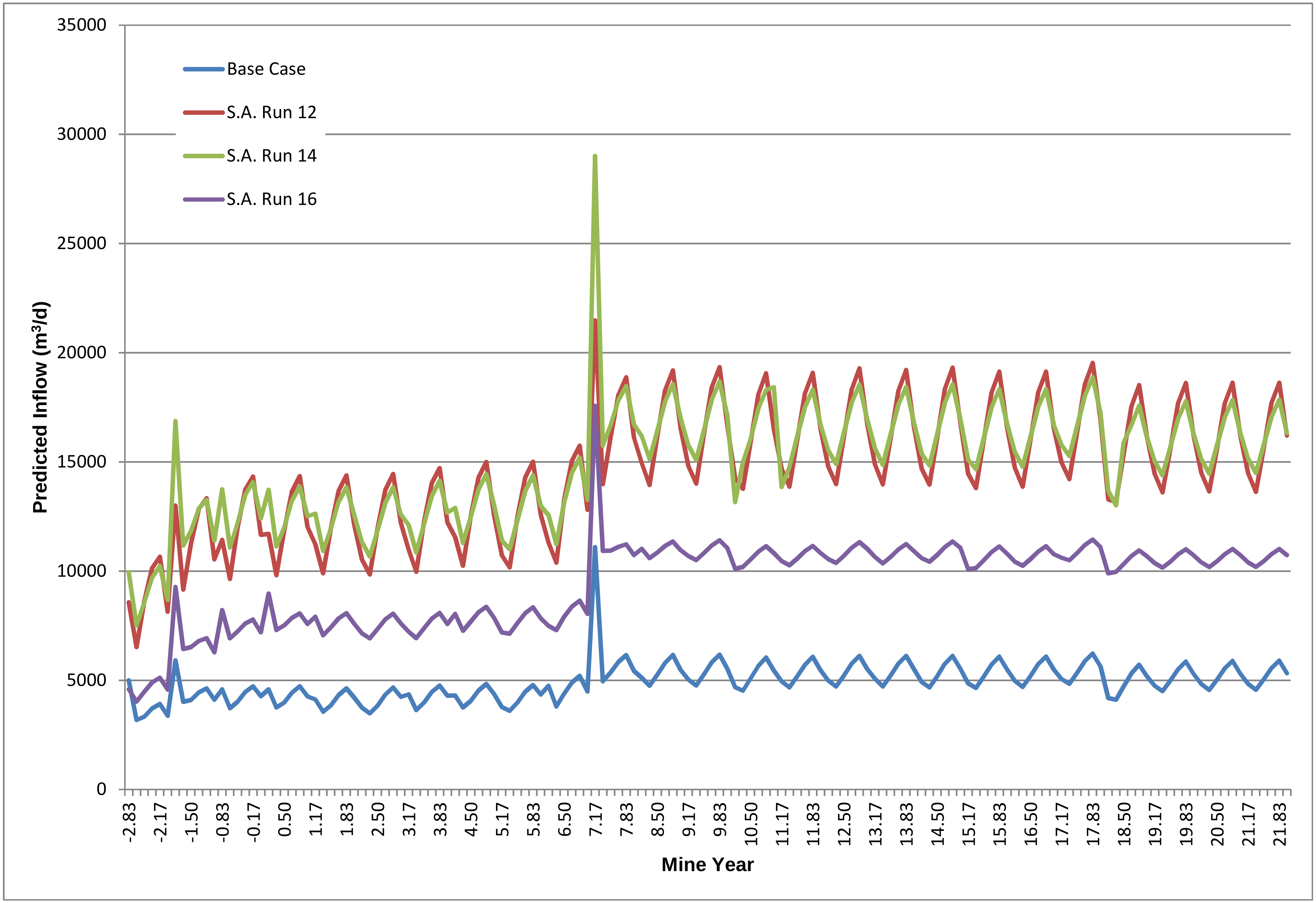


Table J-2. Predicted Baseflow Reporting to the BJL-H1 Gauging Station Throughout Mining Operations for the Base Case Simulation and Sensitivity Scenarios

Model SP[1]	Mine Year	Predicted Mine Inflow (m^3/d)																
		Base Case	S.A. Run 1	S.A. Run 2	S.A. Run 3	S.A. Run 4	S.A. Run 5	S.A. Run 6	S.A. Run 7	S.A. Run 8	S.A. Run 9	S.A. Run 10	S.A. Run 11	S.A. Run 12	S.A. Run 13	S.A. Run 14	S.A. Run 15	S.A. Run 16
1	-2.83	6,252	6,893	4,083	6,721	9,866	7,129	7,354	5,650	6,097	9,011	6,252	6,252	10,666	6,492	12,380	5,068	3,123
2	-2.67	5,125	5,907	3,573	5,914	7,463	5,925	6,263	4,638	5,157	7,667	5,125	5,126	8,333	5,424	10,458	4,040	2,694
3	-2.50	7,435	7,691	5,988	7,498	13,630	8,439	8,690	6,559	7,103	10,555	7,434	7,435	13,880	7,725	13,904	6,236	3,357
4	-2.33	9,487	9,491	6,844	8,815	18,399	10,607	10,718	8,450	8,937	12,951	9,487	9,488	19,186	9,776	17,863	8,158	4,082
5	-2.17	10,668	10,302	7,263	9,720	20,425	11,929	11,884	9,605	10,019	14,252	10,668	10,669	21,664	10,834	19,988	9,284	4,461
6	-2.00	7,693	8,153	4,674	7,820	12,901	8,656	8,755	7,004	7,464	10,849	7,693	7,694	13,590	7,917	15,067	6,409	3,700
7	-1.83	5,927	6,493	3,960	6,584	9,062	6,791	7,038	5,437	5,756	8,741	5,927	5,928	9,352	6,191	11,611	4,777	2,988
8	-1.67	4,986	5,728	3,525	5,867	7,177	5,798	6,145	4,556	4,978	7,524	4,986	4,987	7,805	5,308	10,146	3,920	2,607
9	-1.50	7,346	7,450	5,927	7,471	13,376	8,356	8,609	6,492	6,946	10,411	7,345	7,347	13,325	7,633	13,584	6,161	3,265
10	-1.33	9,417	9,224	6,784	8,794	18,212	10,547	10,643	8,406	8,802	12,831	9,417	9,419	18,704	9,717	17,549	8,099	3,953
11	-1.17	10,606	9,992	7,188	9,703	20,238	11,877	11,813	9,575	9,885	14,147	10,605	10,607	21,219	10,796	19,698	9,230	4,305
12	-1.00	7,638	7,885	4,623	7,799	12,823	8,604	8,710	6,967	7,329	10,769	7,637	7,640	13,184	7,873	14,768	6,363	3,556
13	-0.83	5,866	6,294	3,934	6,554	8,997	6,733	6,997	5,397	5,656	8,666	5,866	5,868	9,029	6,141	11,368	4,725	2,853
14	-0.67	4,930	5,586	3,508	5,832	7,120	5,747	6,108	4,515	4,895	7,461	4,930	4,933	7,566	5,265	9,941	3,872	2,504
15	-0.50	7,301	7,268	5,902	7,438	13,326	8,314	8,577	6,447	6,881	10,361	7,300	7,303	13,075	7,598	13,350	6,123	3,167
16	-0.33	9,383	9,045	6,765	8,767	18,175	10,516	10,617	8,373	8,752	12,794	9,383	9,386	18,503	9,691	17,335	8,070	3,855
17	-0.17	10,576	9,839	7,174	9,677	20,204	11,849	11,791	9,552	9,840	14,115	10,575	10,578	21,056	10,776	19,527	9,204	4,208
18	0.00	7,614	7,754	4,613	7,775	12,802	8,581	8,692	6,945	7,284	10,744	7,613	7,617	13,041	7,855	14,627	6,343	3,463
19	0.17	5,842	6,189	3,926	6,530	8,976	6,709	6,979	5,375	5,618	8,640	5,841	5,845	8,891	6,121	11,256	4,704	2,770
20	0.33	4,904	5,491	3,502	5,808	7,098	5,723	6,089	4,492	4,864	7,437	4,904	4,908	7,435	5,245	9,829	3,850	2,431
21	0.50	7,277	7,134	5,894	7,415	13,303	8,291	8,558	6,422	6,856	10,337	7,277	7,280	12,890	7,578	13,208	6,103	3,079
22	0.67	9,362	8,884	6,758	8,747	18,154	10,496	10,598	8,352	8,731	12,773	9,362	9,365	18,354	9,673	17,179	8,052	3,756
23	0.83	10,555	9,701	7,167	9,660	20,183	11,830	11,773	9,535	9,821	14,095	10,555	10,557	20,931	10,759	19,385	9,187	4,107
24	1.00	7,595	7,637	4,608	7,758	12,785	8,562	8,675	6,928	7,266	10,725	7,594	7,597	12,940	7,838	14,512	6,327	3,369
25	1.17	5,822	6,108	3,921	6,510	8,958	6,690	6,962	5,358	5,601	8,620	5,822	5,824	8,805	6,103	11,164	4,687	2,695
26	1.33	4,885	5,425	3,498	5,789	7,081	5,705	6,074	4,475	4,849	7,417	4,885	4,888	7,377	5,229	9,742	3,834	2,376
27	1.50	7,260	7,061	5,889	7,396	13,287	8,274	8,545	6,404	6,843	10,319	7,260	7,263	12,835	7,563	13,111	6,089	3,018
28	1.67	9,349	8,808	6,753	8,730	18,141	10,481	10,587	8,337	8,720	12,758	9,349	9,351	18,292	9,660	17,084	8,041	3,692
29	1.83	10,544	9,639	7,162	9,645	20,172	11,817	11,763	9,524	9,812	14,081	10,544	10,546	20,887	10,750	19,307	9,177	4,046
30	2.00	7,585	7,588	4,604	7,744	12,776	8,551	8,667	6,919	7,258	10,712	7,585	7,587	12,908	7,829	14,453	6,319	3,317
31	2.17	5,782	6,003	3,911	6,464	8,908	6,645	6,935	5,245	5,562	8,571	5,782	5,784	8,674	6,064	11,004	4,655	2,623
32	2.33	4,879	5,397	3,499	5,777	7,075	5,697	6,051	4,392	4,844	7,409	4,879	4,882	7,360	5,225	9,695	3,827	2,347
33	2.50	7,255	7,025	5,889	7,387	13,279	8,267	8,522	6,343	6,838	10,312	7,253	7,257	12,799	7,559	13,055	6,082	2,981
34	2.67	9,343	8,771	6,753	8,721	18,134	10,475	10,564	8,288	8,715	12,752	9,341	9,346	18,258	9,655	17,026	8,033	3,654
35	2.83	10,540	9,612	7,164	9,637	20,168	11,813	11,741	9,484	9,808	14,077	10,537	10,543	20,863	10,747	19,261	9,171	4,011
36	3.00	7,586	7,581	4,606	7,739	12,777	8,551	8,647	6,887	7,258	10,712	7,582	7,589	12,914	7,830	14,432	6,317	3,296
37	3.17	5,815	6,071	3,921	6,493	8,951	6,682	6,935	5,326	5,592	8,611	5,811	5,819	8,788	6,098	11,113	4,680	2,641
38	3.33	4,879	5,392	3,499	5,772	7,076	5,698	6,046	4,452	4,836	7,411	4,873	4,883	7,366	5,225	9,680	3,826	2,331
39	3.50	7,251	7,014	5,887	7,379	13,276	8,266	8,517	6,385	6,826	10,312	7,245	7,256	12,793	7,555	13,029	6,078	2,962
40	3.67	9,339	8,762	6,751	8,714	18,133	10,476	10,560	8,318	8,702	12,753	9,333	9,345	18,252	9,651	17,001	8,030	3,635
41	3.83	10,537	9,605	7,162	9,630	20,167	11,814	11,738	9,506	9,795	14,079	10,531	10,543	20,858	10,743	19,239	9,168	3,993
42	4.00	7,583	7,576	4,605	7,733	12,779	8,553	8,645	6,903	7,244	10,715	7,578	7,589	12,912	7,828	14,416	6,315	3,280
43	4.17	5,813	6,066	3,920	6,487	8,954	6,684	6,933	5,338	5,579	8,613	5,807	5,820	8,783	6,096	11,092	4,678	2,628
44	4.33	4,876	5,383	3,498	5,767	7,078	5,698	6,045	4,460	4,825	7,411	4,869	4,883	7,353	5,222	9,670	3,824	2,317
45	4.50	7,247	6,996	5,886	7,374	13,275	8,265	8,514	6,390	6,816	10,310	7,239	7,254	12,758	7,552	13,010	6,075	2,944
46	4.67	9,335	8,729	6,750	8,709	18,129	10,472	10,555	8,320	8,692	12,749	9,325	9,342	18,206	9,647	16,970	8,026	3,612
47	4.83	10,532	9,568	7,160	9,625	20,161	11,809	11,732	9,507	9,786	14,073	10,522	10,539	20,810	10,739	19,203	9,164	3,967
48	5.00	7,577	7,544	4,603	7,729	12,773	8,547	8,639	6,902	7,233	10,708	7,566	7,585	12,869	7,822	14,384	6,309	3,255
49	5.17	5,806	6,043	3,919	6,482	8,947	6,676	6,927	5,335	5,569	8,606	5,794	5,815	8,745	6,089	11,064	4,672	2,607
50	5.33	4,868	5,363	3,497	5,762	7,070	5,691	6,038	4,456	4,816	7,403	4,854	4,879	7,327	5,216	9,641	3,817	2,299

Notes:

1. Model SP refers to the model stress period; predictive mining operations simulations were run using 6 x 2-month stress periods per year.
2. For details on sensitivity analyses, refer to Table 12 and text section 11.0

Table J-2. Cont'd Predicted Baseflow Reporting to the BJL-H1 Gauging Station Throughout Mining Operations for the Base Case Simulation and Sensitivity Scenarios

Model SP[1]	Mine Year	Predicted Mine Inflow (m^3/d)																
		Base Case	S.A. Run 1	S.A. Run 2	S.A. Run 3	S.A. Run 4	S.A. Run 5	S.A. Run 6	S.A. Run 7	S.A. Run 8	S.A. Run 9	S.A. Run 10	S.A. Run 11	S.A. Run 12	S.A. Run 13	S.A. Run 14	S.A. Run 15	S.A. Run 16
51	5.50	7,240	6,974	5,884	7,368	13,268	8,258	8,508	6,384	6,809	10,304	7,225	7,251	12,728	7,545	12,976	6,069	2,924
52	5.67	9,328	8,704	6,748	8,703	18,123	10,467	10,550	8,315	8,686	12,745	9,313	9,339	18,183	9,641	16,936	8,020	3,591
53	5.83	10,526	9,549	7,159	9,619	20,157	11,806	11,728	9,502	9,781	14,070	10,512	10,537	20,793	10,734	19,175	9,159	3,947
54	6.00	7,573	7,530	4,602	7,723	12,770	8,545	8,635	6,898	7,229	10,706	7,558	7,584	12,889	7,818	14,363	6,305	3,239
55	6.17	5,754	6,028	3,903	6,442	8,885	6,624	6,851	5,321	5,529	8,553	5,738	5,765	8,677	6,042	11,027	4,620	2,593
56	6.33	4,794	5,343	3,469	5,694	6,981	5,613	5,940	4,434	4,777	7,324	4,778	4,806	7,253	5,159	9,580	3,744	2,285
57	6.50	7,149	6,931	5,852	7,286	13,171	8,163	8,401	6,337	6,737	10,207	7,131	7,162	12,546	7,461	12,859	5,983	2,906
58	6.67	9,235	8,602	6,697	8,615	17,998	10,370	10,436	8,247	8,601	12,648	9,217	9,249	17,910	9,549	16,715	7,934	3,567
59	6.83	10,434	9,432	7,104	9,531	20,004	11,711	11,609	9,432	9,688	13,975	10,416	10,448	20,489	10,639	18,922	9,076	3,917
60	7.00	7,461	7,447	4,555	7,623	12,636	8,428	8,513	6,830	7,133	10,589	7,445	7,475	12,661	7,712	14,194	6,204	3,211
61	7.17	5,341	5,424	3,761	6,032	8,367	6,186	6,393	4,969	5,169	8,087	5,328	5,355	7,355	5,664	9,997	4,280	2,314
62	7.33	4,410	4,770	3,317	5,312	6,519	5,207	5,510	4,082	4,431	6,892	4,396	4,424	5,985	4,810	8,624	3,428	2,028
63	7.50	6,595	6,264	5,703	6,816	12,502	7,590	7,946	5,885	6,265	9,611	6,578	6,612	10,486	6,934	11,545	5,508	2,595
64	7.67	8,633	7,560	6,555	8,096	17,363	9,753	9,960	7,708	8,080	12,013	8,617	8,651	15,511	8,967	14,914	7,409	3,152
65	7.83	9,820	8,146	6,964	8,992	19,405	11,085	11,138	8,884	9,152	13,334	9,804	9,838	18,189	10,052	17,018	8,536	3,439
66	8.00	6,972	6,687	4,407	7,154	12,069	7,924	8,113	6,361	6,721	10,069	6,958	6,988	11,026	7,255	12,880	5,778	2,825
67	8.17	5,296	5,460	3,710	5,970	8,354	6,152	6,425	4,868	5,156	8,063	5,282	5,313	7,257	5,634	9,930	4,224	2,274
68	8.33	4,414	4,807	3,297	5,292	6,556	5,221	5,538	4,039	4,456	6,916	4,400	4,432	6,076	4,828	8,701	3,418	2,012
69	8.50	6,585	6,272	5,689	6,783	12,508	7,589	7,942	5,832	6,278	9,620	6,567	6,607	10,426	6,923	11,492	5,488	2,564
70	8.67	8,632	7,548	6,550	8,072	17,381	9,760	9,936	7,663	8,094	12,030	8,615	8,654	15,410	8,962	14,797	7,400	3,094
71	8.83	9,824	8,118	6,963	8,975	19,429	11,097	11,104	8,853	9,167	13,355	9,807	9,845	18,111	10,058	16,919	8,533	3,368
72	9.00	6,986	6,663	4,407	7,150	12,101	7,944	8,082	6,355	6,741	10,096	6,972	7,005	10,984	7,271	12,849	5,785	2,765
73	9.17	5,317	5,456	3,712	5,972	8,390	6,178	6,403	4,873	5,180	8,096	5,302	5,336	7,284	5,656	9,932	4,236	2,233
74	9.33	4,438	4,809	3,302	5,298	6,596	5,250	5,523	4,049	4,483	6,951	4,423	4,458	6,135	4,853	8,725	3,433	1,988
75	9.50	6,605	6,273	5,693	6,782	12,541	7,616	7,928	5,840	6,303	9,651	6,586	6,630	10,464	6,943	11,481	5,501	2,538
76	9.67	8,652	7,547	6,556	8,073	17,416	9,785	9,923	7,671	8,118	12,061	8,635	8,677	15,437	8,982	14,773	7,412	3,064
77	9.83	9,845	8,117	6,970	8,976	19,463	11,122	11,093	8,865	9,191	13,386	9,828	9,868	18,135	10,079	16,898	8,546	3,337
78	10.00	7,008	6,661	4,414	7,157	12,133	7,970	8,074	6,371	6,764	10,126	6,993	7,030	10,982	7,293	12,848	5,801	2,738
79	10.17	5,337	5,442	3,719	5,982	8,420	6,203	6,395	4,890	5,203	8,124	5,323	5,360	7,315	5,677	8,827	4,251	2,211
80	10.33	4,457	4,805	3,309	5,308	6,624	5,273	5,515	4,066	4,506	6,977	4,442	4,480	6,157	4,872	8,919	3,447	1,970
81	10.50	6,621	6,268	5,699	6,789	12,565	7,635	7,920	5,855	6,324	9,673	6,603	6,650	10,479	6,959	11,785	5,512	2,519
82	10.67	8,668	7,542	6,562	8,079	17,438	9,803	9,916	7,686	8,139	12,082	8,650	8,695	15,453	8,997	14,947	7,423	3,043
83	10.83	9,859	8,114	6,977	8,981	19,485	11,139	11,087	8,880	9,211	13,406	9,843	9,886	18,152	10,094	17,005	8,556	3,316
84	11.00	7,023	6,659	4,421	7,164	12,155	7,987	8,070	6,387	6,785	10,146	7,009	7,047	11,000	7,308	13,984	5,811	2,720
85	11.17	5,351	5,441	3,724	5,990	8,439	6,219	6,391	4,905	5,221	8,142	5,337	5,376	7,330	5,691	8,704	4,261	2,197
86	11.33	4,469	4,804	3,314	5,315	6,641	5,287	5,510	4,081	4,521	6,994	4,455	4,495	6,170	4,885	8,653	3,455	1,958
87	11.50	6,631	6,266	5,704	6,794	12,580	7,648	7,915	5,868	6,337	9,688	6,613	6,662	10,488	6,970	11,773	5,519	2,506
88	11.67	8,677	7,541	6,567	8,082	17,452	9,814	9,911	7,698	8,150	12,096	8,660	8,706	15,457	9,007	14,929	7,429	3,030
89	11.83	9,868	8,113	6,982	8,983	19,498	11,149	11,082	8,891	9,221	13,419	9,851	9,896	18,154	10,103	16,986	8,562	3,304
90	12.00	7,032	6,658	4,425	7,167	12,167	7,997	8,065	6,399	6,794	10,158	7,017	7,057	11,002	7,317	12,477	5,817	2,709
91	12.17	5,331	5,413	3,717	5,965	8,416	6,198	6,342	4,912	5,203	8,120	5,317	5,357	7,288	5,673	9,738	4,245	2,177
92	12.33	4,450	4,775	3,307	5,292	6,619	5,268	5,475	4,087	4,503	6,973	4,433	4,479	6,123	4,867	8,622	3,440	1,940
93	12.50	6,610	6,234	5,697	6,770	12,554	7,626	7,887	5,872	6,317	9,665	6,583	6,648	10,425	6,950	11,734	5,381	2,486
94	12.67	8,654	7,504	6,560	8,059	17,424	9,790	9,885	7,699	8,128	12,071	8,624	8,696	15,375	8,984	14,877	7,413	3,006
95	12.83	9,844	8,072	6,974	8,959	19,469	11,124	11,057	8,889	9,198	13,392	9,810	9,889	18,063	10,079	16,924	8,544	3,275
96	13.00	7,009	6,615	4,418	7,145	12,140	7,973	8,043	6,398	6,772	10,133	6,979	7,055	10,944	7,295	12,420	5,799	2,680
97	13.17	5,335	5,404	3,717	5,969	8,420	6,203	6,348	4,916	5,207	8,127	5,307	5,382	7,238	5,678	9,723	4,246	2,165
98	13.33	4,455	4,779	3,306	5,292	6,627	5,274	5,473	4,091	4,510	6,981	4,428	4,502	6,094	4,874	8,623	3,442	1,935
99	13.50	6,604	6,247	5,694	6,760	12,542	7,622	7,880	5,873	6,316	9,662	6,572	6,666	10,390	6,947	11,719	5,494	2,483
100	13.67	8,649	7,525	6,558	8,045	17,413	9,787	9,876	7,697	8,127	12,069	8,619	8,711	15,340	8,979	14,852	7,405	3,007

Notes:
1. Model SP refers to the model stress period; predictive mining operations simulations were run using 6 x 2-month stress periods per year.
2. For details on sensitivity analyses, refer to Table 12 and text section 11.0

Table J-2. Cont'd Predicted Baseflow Reporting to the BJL-H1 Gauging Station Throughout Mining Operations for the Base Case Simulation and Sensitivity Scenarios

Model SP[1]	Mine Year	Predicted Mine Inflow (m^3/d)																
		Base Case	S.A. Run 1	S.A. Run 2	S.A. Run 3	S.A. Run 4	S.A. Run 5	S.A. Run 6	S.A. Run 7	S.A. Run 8	S.A. Run 9	S.A. Run 10	S.A. Run 11	S.A. Run 12	S.A. Run 13	S.A. Run 14	S.A. Run 15	S.A. Run 16
101	13.83	9,842	8,100	6,973	8,945	19,461	11,124	11,049	8,887	9,199	13,394	9,813	9,903	18,051	10,078	16,905	8,540	3,281
102	14.00	7,014	6,647	4,415	7,137	12,146	7,980	8,035	6,403	6,780	10,141	6,990	7,065	10,927	7,302	12,433	5,801	2,689
103	14.17	5,347	5,428	3,718	5,969	8,436	6,217	6,357	4,927	5,221	8,142	5,323	5,395	7,308	5,691	9,746	4,254	2,171
104	14.33	4,466	4,789	3,310	5,297	6,640	5,286	5,477	4,102	4,523	6,993	4,438	4,517	6,085	4,885	8,639	3,450	1,936
105	14.50	6,609	6,249	5,696	6,763	12,548	7,627	7,877	5,881	6,325	9,669	6,570	6,683	10,360	6,953	11,722	5,497	2,481
106	14.67	8,650	7,518	6,560	8,046	17,411	9,788	9,868	7,701	8,132	12,071	8,606	8,731	15,284	8,979	14,836	7,405	3,001
107	14.83	9,838	8,086	6,974	8,945	19,456	11,122	11,036	8,888	9,201	13,393	9,790	9,927	17,981	10,074	16,873	8,537	3,271
108	15.00	7,010	6,629	4,416	7,137	12,143	7,978	8,021	6,404	6,782	10,140	6,968	7,090	10,860	7,299	12,405	5,798	2,678
109	15.17	5,347	5,420	3,720	5,969	8,440	6,219	6,361	4,929	5,224	8,145	5,306	5,425	7,278	5,691	9,728	4,254	2,164
110	15.33	4,472	4,795	3,313	5,300	6,650	5,294	5,491	4,107	4,528	7,002	4,427	4,548	6,162	4,889	8,638	3,454	1,932
111	15.50	6,627	6,265	5,702	6,772	12,578	7,649	7,897	5,891	6,338	9,691	6,562	6,746	10,474	6,968	11,744	5,512	2,481
112	15.67	8,674	7,544	6,566	8,061	17,448	9,814	9,892	7,720	8,150	12,098	8,605	8,798	15,427	9,003	14,890	7,424	3,007
113	15.83	9,865	8,117	6,981	8,962	19,493	11,150	11,062	8,912	9,221	13,422	9,794	9,992	18,118	10,100	16,942	8,558	3,281
114	16.00	7,031	6,660	4,423	7,152	12,169	8,000	8,044	6,424	6,796	10,163	6,974	7,134	10,978	7,317	12,452	5,815	2,688
115	16.17	5,361	5,441	3,727	5,980	8,455	6,233	6,366	4,944	5,232	8,159	5,309	5,457	7,322	5,703	9,760	4,265	2,170
116	16.33	4,479	4,804	3,318	5,306	6,658	5,302	5,488	4,119	4,533	7,011	4,427	4,572	6,166	4,897	8,651	3,460	1,934
117	16.50	6,631	6,270	5,705	6,778	12,581	7,653	7,894	5,901	6,340	9,696	6,558	6,781	10,469	6,973	11,753	5,515	2,482
118	16.67	8,677	7,547	6,569	8,065	17,450	9,817	9,889	7,728	8,152	12,101	8,600	8,826	15,418	9,005	14,891	7,426	3,007
119	16.83	9,868	8,119	6,983	8,964	19,495	11,153	11,060	8,918	9,223	13,425	9,791	10,021	18,113	10,102	16,940	8,560	3,281
120	17.00	7,034	6,662	4,425	7,153	12,172	8,003	8,043	6,430	6,798	10,166	6,973	7,148	10,977	7,320	12,452	5,817	2,688
121	17.17	5,348	5,431	3,721	5,966	8,439	6,219	6,340	4,947	5,219	8,144	5,293	5,452	7,306	5,690	9,742	4,254	2,164
122	17.33	4,467	4,795	3,312	5,293	6,643	5,288	5,469	4,122	4,519	6,996	4,412	4,567	6,175	4,884	8,636	3,450	1,930
123	17.50	6,619	6,261	5,700	6,764	12,566	7,640	7,880	5,903	6,326	9,681	6,540	6,778	10,445	6,961	11,740	5,505	2,478
124	17.67	8,665	7,536	6,563	8,052	17,434	9,804	9,877	7,729	8,137	12,087	8,582	8,823	15,387	8,993	14,877	7,416	3,002
125	17.83	9,855	8,105	6,977	8,951	19,479	11,139	11,049	8,918	9,206	13,410	9,773	10,020	18,078	10,089	16,923	8,550	3,275
126	18.00	7,021	6,647	4,420	7,141	12,157	7,990	8,032	6,430	6,781	10,152	6,956	7,144	10,943	7,307	12,434	5,806	2,681
127	18.17	5,351	5,428	3,723	5,970	8,445	6,224	6,356	4,950	5,222	8,149	5,293	5,465	7,338	5,693	9,743	4,257	2,162
128	18.33	4,471	4,794	3,314	5,296	6,649	5,294	5,481	4,125	4,530	7,003	4,413	4,580	6,140	4,888	8,246	3,453	1,927
129	18.50	6,623	6,262	5,702	6,767	12,572	7,646	7,889	5,907	6,342	9,688	6,541	6,795	10,446	6,964	12,187	5,508	2,474
130	18.67	8,671	7,544	6,566	8,054	17,443	9,812	9,887	7,733	8,158	12,096	8,586	8,841	15,426	8,998	14,883	7,420	2,999
131	18.83	9,863	8,121	6,980	8,954	19,489	11,149	11,059	8,925	9,232	13,421	9,780	10,039	18,132	10,097	16,938	8,556	3,273
132	19.00	7,031	6,665	4,422	7,144	12,169	8,001	8,043	6,438	6,812	10,163	6,966	7,159	11,002	7,316	12,455	5,814	2,681
133	19.17	5,363	5,445	3,725	5,974	8,457	6,235	6,367	4,959	5,252	8,161	5,305	5,480	7,352	5,704	9,770	4,265	2,163
134	19.33	4,482	4,807	3,316	5,301	6,661	5,305	5,492	4,135	4,554	7,014	4,425	4,595	6,196	4,899	8,662	3,462	1,928
135	19.50	6,636	6,277	5,704	6,772	12,585	7,657	7,900	5,918	6,364	9,699	6,555	6,812	10,511	6,976	11,771	5,517	2,476
136	19.67	8,681	7,561	6,569	8,058	17,454	9,822	9,895	7,743	8,174	12,105	8,596	8,858	15,462	9,008	14,911	7,429	3,001
137	19.83	9,872	8,136	6,983	8,958	19,498	11,157	11,066	8,934	9,245	13,428	9,789	10,056	18,161	10,106	16,962	8,563	3,276
138	20.00	7,038	6,676	4,425	7,149	12,176	8,007	8,048	6,446	6,822	10,170	6,973	7,171	11,019	7,324	12,471	5,820	2,683
139	20.17	5,369	5,455	3,727	5,979	8,463	6,241	6,371	4,967	5,261	8,167	5,311	5,490	7,365	5,711	9,784	4,270	2,164
140	20.33	4,489	4,814	3,318	5,306	6,667	5,310	5,496	4,142	4,562	7,019	4,431	4,603	6,230	4,905	8,673	3,466	1,930
141	20.50	6,642	6,285	5,706	6,776	12,591	7,662	7,904	5,925	6,372	9,704	6,560	6,820	10,515	6,982	11,784	5,522	2,478
142	20.67	8,686	7,568	6,571	8,062	17,459	9,826	9,898	7,750	8,181	12,110	8,600	8,865	15,464	9,014	14,924	7,433	3,003
143	20.83	9,877	8,142	6,985	8,961	19,502	11,162	11,068	8,940	9,251	13,433	9,793	10,062	18,162	10,111	16,973	8,567	3,277
144	21.00	7,042	6,681	4,427	7,152	12,180	8,011	8,049	6,451	6,827	10,174	6,976	7,176	11,021	7,328	12,478	5,823	2,684
145	21.17	5,373	5,459	3,729	5,982	8,467	6,244	6,373	4,972	5,265	8,170	5,314	5,495	7,367	5,714	9,791	4,273	2,165
146	21.33	4,492	4,818	3,319	5,309	6,670	5,313	5,497	4,146	4,566	7,022	4,434	4,608	6,209	4,909	8,679	3,469	1,931
147	21.50	6,646	6,288	5,708	6,778	11,115	7,665	7,905	5,930	6,376	9,707	6,563	6,824	10,523	6,986	11,791	5,525	2,478
148	21.67	8,689	7,572	6,572	8,065	18,222	9,829	9,900	7,754	8,185	12,113	8,603	8,869	15,472	9,017	14,930	7,436	3,003
149	21.83	9,880	8,145	6,986	8,964	19,638	11,164	11,069	8,944	9,254	13,436	9,795	10,066	18,168	10,113	16,979	8,569	3,278
150	22.00	7,045	6,684	4,428	7,154	12,375	8,013	8,050	6,455	6,830	10,176	6,978	7,179	11,024	7,331	12,483	5,825	2,684

Notes:
1. Model SP refers to the model stress period; predictive mining operations simulations were run using 6 x 2-month stress periods per year.
2. For details on sensitivity analyses, refer to Table 12 and text section 11.0

Figure J-6. Predicted Baseflow Reporting to BJL-H1 for the Base Case Simulation and Sensitivity Scenarios 1, 2 & 3.

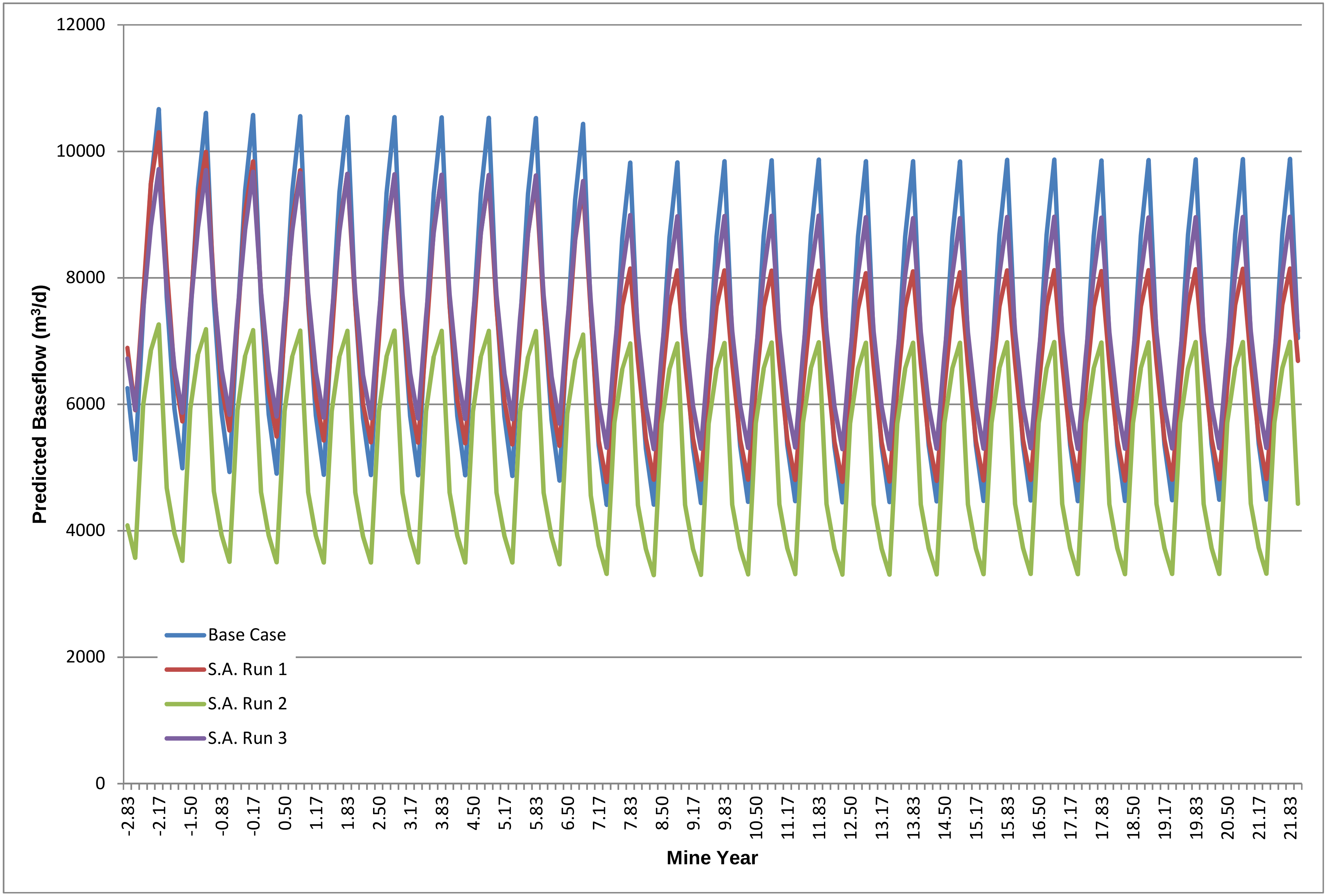


Figure J-7. Predicted Baseflow Reporting to BJL-H1 for the Base Case Simulation and Sensitivity Scenarios 4, 5 & 9.

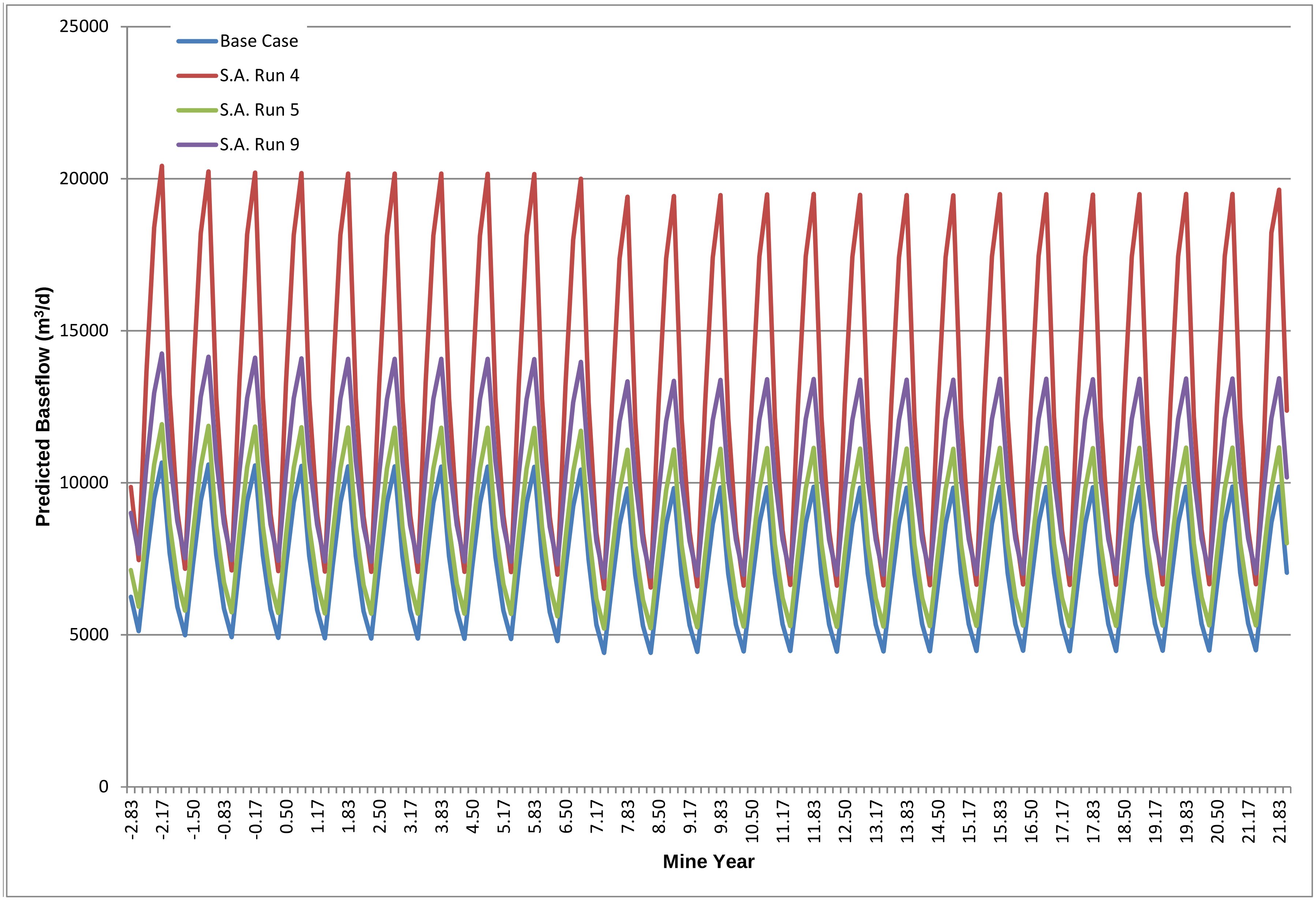


Figure J-8. Predicted Baseflow Reporting to BJL-H1 for the Base Case Simulation and Sensitivity Scenarios 6, 7 & 15.

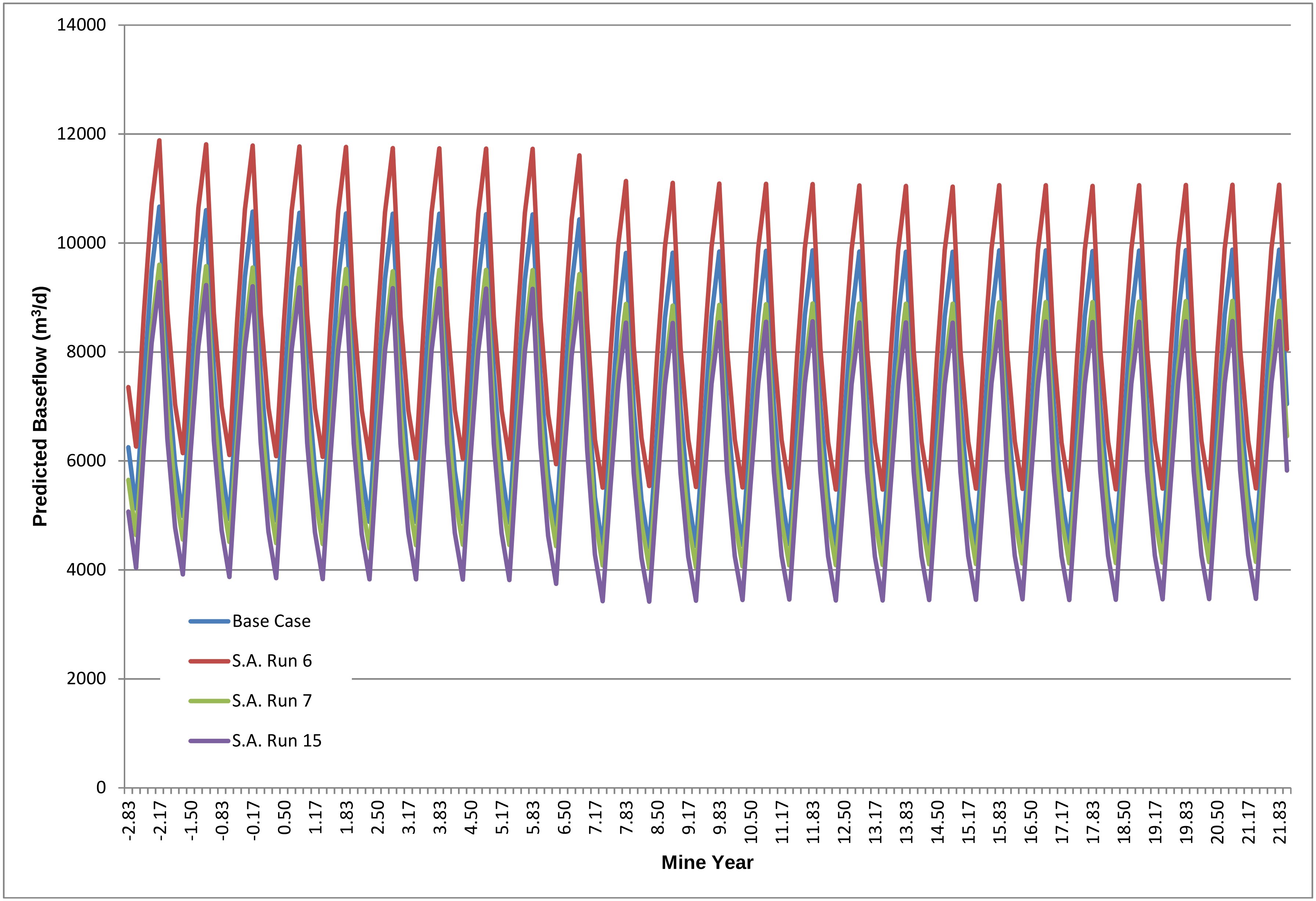


Figure J-9. Predicted Baseflow Reporting to BJL-H1 for the Base Case Simulation and Sensitivity Scenarios 8, 10, 11 & 13.

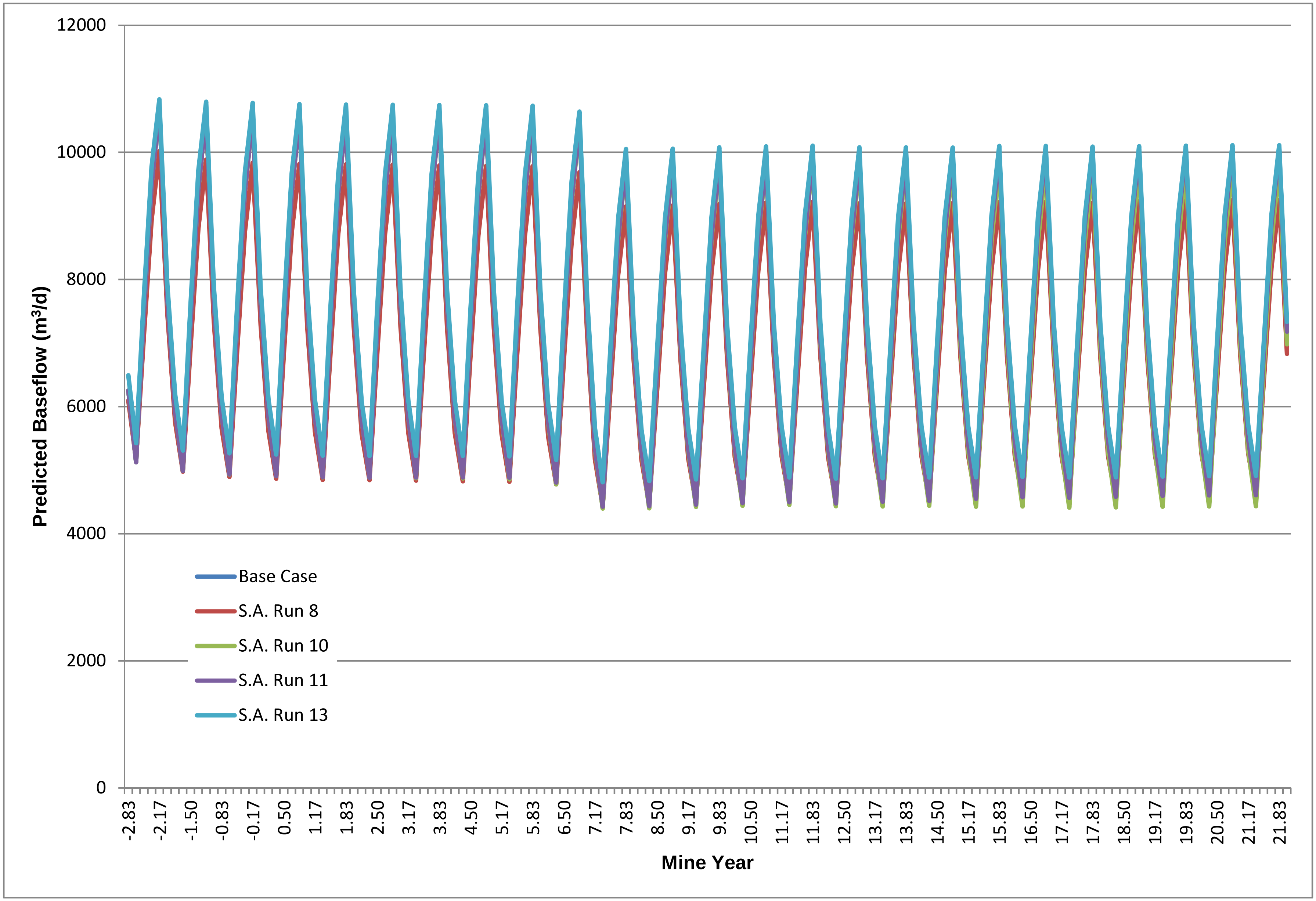


Figure J-10. Predicted Baseflow Reporting to BJL-H1 for the Base Case Simulation and Sensitivity Scenarios 12, 14 & 16.