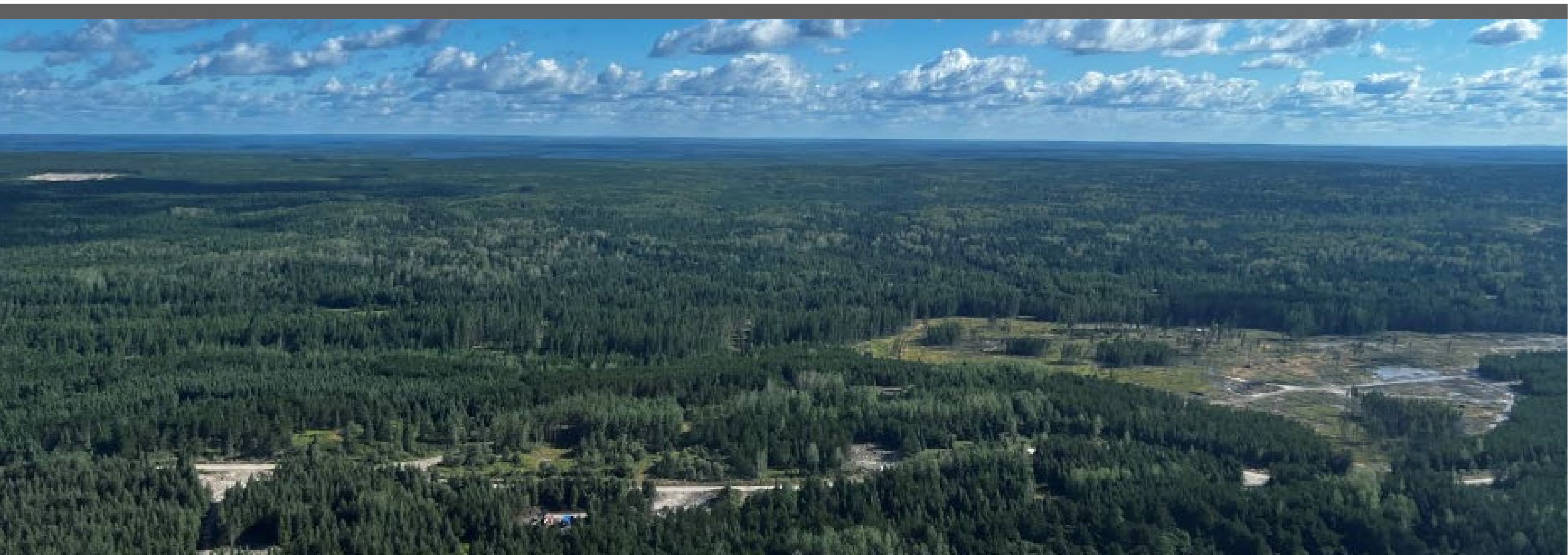
KINROSS Great Bear

Great Bear Gold Project Impact Statement

Appendix K-2:

Mine Site Water Quality Modelling Report



GREAT BEAR RESOURCES

GREAT BEAR PROJECT

MINE SITE WATER QUALITY ESTIMATE

NOVEMBER 2025

GREAT BEAR PROJECT

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GREAT BEAR RESOURCES

PROJECT NO.: OMEMA2303
NOVEMBER 2025

WSP CANADA INC.
6925 CENTURY AVENUE, SUITE 600
MISSISSAUGA, ON, CANADA L5N 7K2

T: +1 905-567-4444
WSP.COM

SIGNATURES

PREPARED BY:

Original Signed

Nathan Logan, B.Sc., GIT
Environmental Scientist

Original Signed

Anna Klein, M.Sc., P.Geo.
Geochemist

Original Signed

Carrie Jewiss, M.Sc.
Environmental Scientist

Original Signed

Kristen Gault, M.Sc., P.Geo.
Technical Director, Geochemistry

REVIEWED BY:

Original Signed

Steve Sibbick, M.Sc., P.Geo.
Senior Technical Director

ABBREVIATIONS

°C	Degrees Celsius
AEX	Advanced Exploration
ARD	Acid Rock Drainage
$CaCO_3$	Calcium carbonate
CarbNP	Carbonate Neutralization Potential
cm	Centimetre
CRF	Cemented Rockfill
CWP	Collection Water Pond
Eh	Oxidation reduction potential
FV	Felsic Volcanic
g	Grams
kg	Kilograms
km	Kilometres
kt	Kilotonnes
L	Litres
LGO	Low Grade Ore stockpile
m	Metres
m^2	Square metres
m^3	Cubic metres
mm	Millimetres
Mm^2	Million square metres
Mm^3	Million cubic metres
masl	Metres above sea level
mg	Milligrams
MFP	Membrane Filtration Plant
ML	Metal leaching
MRS	Mine Rock Stockpile
MS	Metasediment
Mt	Million tonnes
MWP	Mine Water Pond
NML	Non-metal leaching
NP	Neutralization Potential
NPAG	Non-Potentially Acid Generating
NPR	Neutralization Potential Ratio
PAG	Potentially Acid Generating
pCO_2	Partial pressure of carbon dioxide
Project	Great Bear Project
PWQO	Provincial Water Quality Objectives for protection of aquatic life
OVB	Overburden stockpiles
ROM	Run of Mine stockpile
TMF	Tailings Management Facility
TWP	AEX Treated Water Pond
TDS	Total Dissolved Solids
UGM	Underground Mine
VMF	Viggo Management Facility
WAD	Weak Acid Dissociable
WSP	WSP Canada Inc.
WTP	Water Treatment Plant

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APPENDICES

1 INTRODUCTION

Great Bear Resources Ltd. (Great Bear Resources), a wholly owned subsidiary of Kinross Gold Corporation, is proposing to develop a gold mine (the Great Bear Project). The Great Bear Project (the Project) is located approximately 25 km southeast of the Municipality of Red Lake in northwestern Ontario (Figure 1-1).

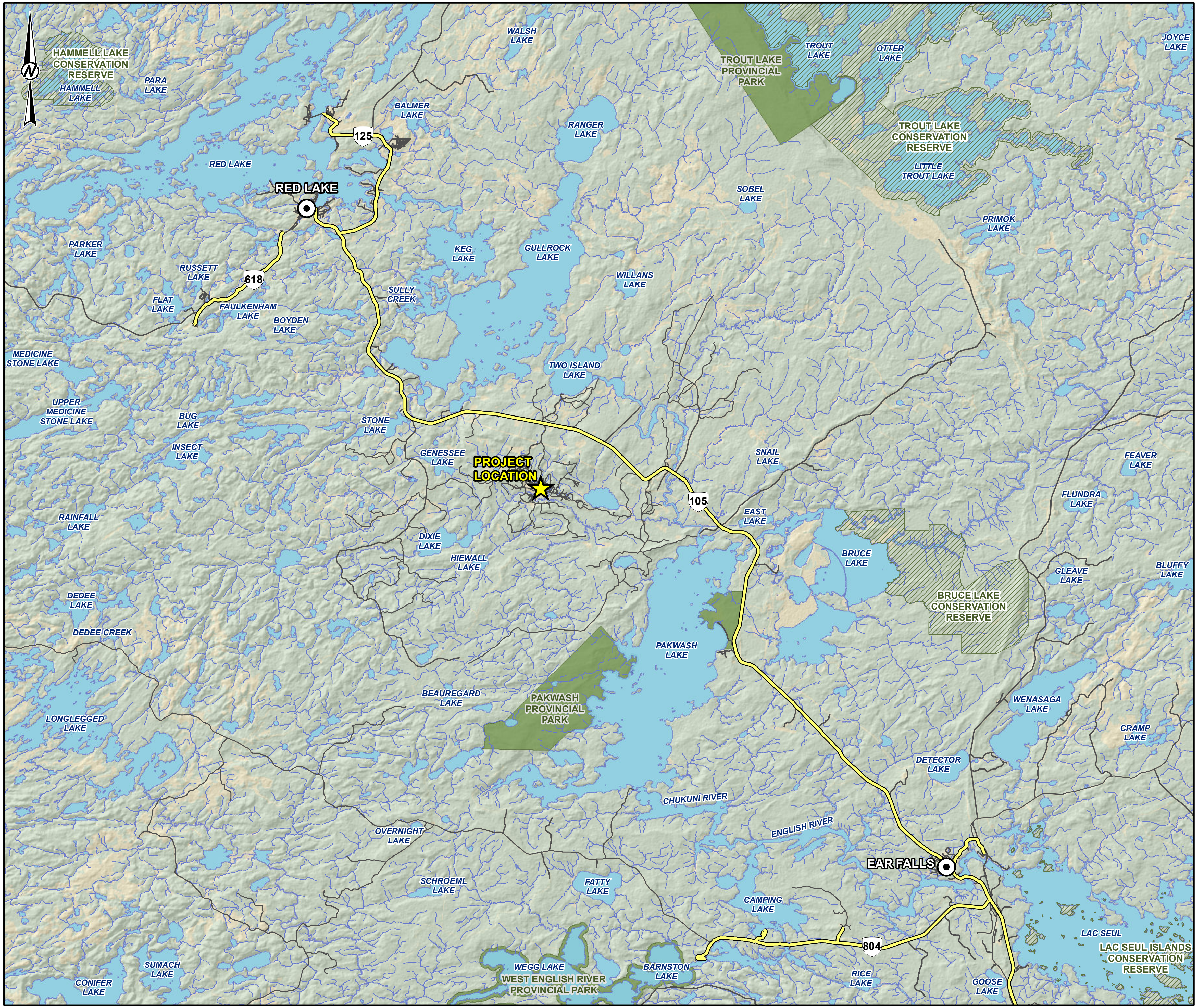
This report is one of a series of documents prepared by WSP Canada Inc. (WSP) on behalf of Great Bear Resources in support of the Project design and Impact Statement. This report presents the water quality estimates prepared for the Project, including contact water quality for the mine site.

Water quality estimates for the mine site were built upon the average annual monthly water balance for the Project (WSP 2025a), along with currently available mine planning information and geochemical data (WSP 2025b). Water quality estimates were prepared for operations phase and closure phase as follows:

Operations Phase: the mine site was modelled throughout the operational phases of the Project, as a continuous monthly time series over 26 years. The model included the development and operation of the Viggo management facility (VMF), the LP Central pit and underground mine, along with related facilities and mine features. A closure cover is placed on the mine rock stockpile (MRS) progressively during mine operations and revegetated.

Closure Phase and Post-Closure: two periods of mine closure and post-closure were evaluated in the mine site water quality estimates.

- **Active closure period:** representing the first three years of closure when the majority of reclamation activities are carried out. The active closure period model was run as a continuous monthly time series. During this period, a cover is placed on the surface of the tailings management facility (TMF), followed by revegetation. Dewatering at the LP Central pit ceases and the pit begins to fill with water from its catchment and redirected site contact water from the Advanced Exploration (AEX) pond, as well as passive overflow from the breached collection water pond (CWP). Fresh water from the Chukuni River will be pumped to the LP Central pit to accelerate the pit filling with water and formation of the pit lake. Underground mine dewatering ceases and the membrane filtration plant (MFP) reject solution temporarily stored in the west VMF during the operations phase will be pumped to the underground during the first year of active closure. Once that is complete, fresh water from the Chukuni River will be pumped to the west VMF and east VMF to accelerate filling with water. Similarly, the underground mine will fill passively from groundwater and with water pumped from the Chukuni River.
- **Passive closure period:** the mine site was represented by passive closure conditions immediately following filling of the VMF, LP Central pit, and underground mine. During this period, long term steady state conditions have not yet developed for the TMF, and residual process water held within the pore space of the desulphurized tailings mass continues to be released via seepage. Contact water from the site, including overflow from the pit lake, will be managed at a water treatment plant (WTP) until suitable for discharge to the environment. Water quality estimates for the passive closure period represent a snapshot of year 1 of the period, once accelerated filling is complete.
- **Post-closure:** the mine site was represented by long-term steady state post-closure conditions. At that time, all residual process water stored within the tailings mass was assumed to have been released due to ongoing infiltration of precipitation through the tailings mass and tailings consolidation. As such the ongoing reduced oxidation of covered desulphurized tailings, along with load from non-potentially acid generating / non-metal-leaching (NPAG / NML) dams, represented the only source of load to TMF seepage. The WTP is decommissioned as site runoff and waters from the LP Central pit lake and VMF (pit lake) are suitable for direct discharge to the environment. Water quality estimates for post-closure represent a snapshot of long-term steady state conditions.



KEY MAP

SCALE 1:30,000,000

LEGEND

- PROJECT LOCATION
- TOWN
- CONSERVATION RESERVE
- PROVINCIAL PARK
- HIGHWAY
- LOCAL ROAD
- RESOURCE/ RECREATION ROAD
- WATERCOURSE
- WATERBODY

0 2.5 5 10
1:250,000 KILOMETRES

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. WATERCOURSES AND WATERBODY ACQUIRED FROM LAND INFORMATION ONTARIO (MNRF) AND MODIFIED TO MATCH AERIAL IMAGERY AND LIDAR.
3. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

TITLE
PROJECT LOCATION

CONSULTANT
wsp

YYYY-MM-DD	2025-02-18
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm

2 MODEL APPROACH

The mine site water quality model is a mass balance water quality model structured as a monthly water balance with associated water quality inputs and geochemical source terms to evaluate the transfer of water volumes and mass loads through the Project site to the WTP and MFP

The water quality estimates were developed using GoldSim (version 14.0 R2 #412), using a mass balance modelling approach. The model was built upon the average annual monthly water balance for the Project (WSP 2025a), which incorporates surface water flows as well as the results of groundwater modelling. Additional geochemical modelling was conducted in PHREEQC version 3.7.3 (Parkhurst and Appelo 2013) to incorporate solubility and adsorptive controls for selected locations where appropriate.

The model comprised a series of components including model nodes representing water management ponds or other infrastructure, upstream flow and loading source areas, and flow pathways to represent the movement and / or conveyance of water. Model nodes receive contact water and mass loading from their local drainage area, applicable infrastructure, and upstream ponds and catchments. Mass loads are stored at these nodes and / or transferred to other nodes as water flows from node to node, before reaching the WTP, MFP, or another receiver.

The water quality estimates were prepared as a continuous monthly time series for the operations phase, representing the continual development of the Project over the life of mine, including Years 1 to 26. Modelling for the closure phase included the active closure period and passive closure period. Post-closure was also modelled. The active closure period included a continuous monthly time series for initial closure conditions, Years 27 to 30. A snapshot assessment was conducted for the first year of the passive closure period following completion of accelerated filling. Post-closure conditions represented the long-term steady state geochemical conditions for the Project.

Pit lake modelling was included as part of the closure water quality estimates. Pit lake water quality estimates were prepared in GoldSim, following a mass balance approach with additional geochemical modelling in PHREEQC. A preliminary assessment of the potential for significant chemical stratification to develop in the pit lake was conducted. Due to closure mitigations at the Project, most inflows have a reasonably low total dissolved solids (TDS) content and any source areas with a higher TDS content (i.e., higher sulphate, metals) have a low inflow rate and discharge near the water surface, where the water will be well mixed. Therefore, inflows with higher sulphate and metals concentrations are not likely to be naturally isolated at depth in the pit lake with the planned closure concept. To be conservative, several conditions were considered for pit lake modelling for assessment purposes, including: a fully mixed pit lake, and two scenarios representing surface water conditions during the summer months, when concentrations could be higher due to seasonal thermal stratification.

Various types of mine materials will be managed at the Project, including non-potentially acid generating / non-metal leaching (NPAG / NML) mine rock, non-acidic potentially acid generating (PAG) mine rock, acidic PAG mine rock, non-potentially acid generating / metal leaching (NPAG / ML) mine rock, NPAG desulphurized tailings, and PAG concentrate tailings. PAG and NPAG / ML mine rock will be placed in a designated area of the MRS or rehandled as underground backfill. The MRS will be covered with a revegetated low permeability compacted clay cover, prior to acidification of the PAG rock, to limit the interaction of surface water and oxygen with these materials and consequently reduce mass loadings from the mine rock. NPAG / NML mine rock will be stockpiled at the MRS and used for construction activities at the Project. Any NPAG / NML rock remaining at the MRS at closure will be covered and revegetated. NPAG desulphurized tailings will be stored in the TMF and ultimately covered with a revegetated soil cover. PAG concentrate tailings will be placed sub-aqueously in the east VMF and isolated from atmospheric oxygen. The submerged PAG concentrate tailings will be covered in a blanket of NPAG tailings prior to closure and accelerated filling of the VMF with water. Tailings (prior to flotation) along with MFP reject solution will also be used to generate paste tailings that will be used underground as backfill. The specific geochemical characteristics of these mine materials were considered in detail for source term development as described in this report.

Source terms and supporting geochemical conditions utilized in the model were developed from the comprehensive geochemical baseline program for the Project (WSP 2025b). Baseline programs included static testing of several thousand geochemical samples and over 100 kinetic tests. Representative source terms were developed to capture the range of observed geochemical conditions in the Project geologic materials. Under this approach, where strong geochemical trends were observed in the Project data parameters (i.e., as observed for sulphate, arsenic, cadmium, lead, selenium, and zinc), the rates of parameter release from mine materials were represented by the overall dataset including low, average and worst case materials. Median data were used where no trends were observed, supported by the large project dataset. Other model assumptions were derived to reasonably represent field scale conditions, as possible with available data.

Model parameters were selected to support water treatment design criteria needs and included: aluminum, antimony, arsenic, beryllium, boron, cadmium, calcium, chloride, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, phosphorus, potassium, selenium, silver, sodium, sulphate, thallium, tungsten, uranium, vanadium, zinc, and zirconium. Estimates of pH were also provided based on geochemical information for the Project. Nitrogen species (ammonia, nitrate, and nitrite), total cyanide, and weak acid dissociable (WAD) cyanide were also assessed (Appendix A, WSP 2025c).

Water quality estimate results are provided in this report as follows.

- **Operations phase**: estimates include the influent to the WTP (AEX mine water pond), the influent to the MFP (TMF pond), fugitive seepage from the TMF and mine water pond (MWP) and contact water from the VMF.
- **Active closure period**: estimates include fugitive seepage from the TMF and MWP, TMF pond water and fugitive seepage, VMF pond water and fugitive seepage, and the overall site contact water pumped to the LP Central pit as part of accelerated filling (via the AEX mine water pond).
- **Passive closure period**: estimates include fugitive seepage from the TMF and MWP, VMF pond water and fugitive seepage, along with key inflows to the WTP including contact water from the TMF pond, MWP, and AEX catchment. The overall influent to the WTP (AEX mine water pond) is provided along with the pit lake water quality at the passive closure water level (approximately 343 masl).
- **Post-closure**: estimates include long-term steady state water quality conditions for fugitive seepage from the TMF, VMF pit lake water and fugitive seepage, and contact water from the closure covers and other rehabilitated areas including the former AEX catchment and MWP catchment. LP Central pit lake water quality is presented for two milestones including when the pit lake initially reaches its long-term elevation (approximately 348 masl) and long-term steady state conditions.

3 MODEL CONFIGURATION

3.1 MINE OPERATIONS

The configuration of key mine features during mine operations are described below and presented in Figures 3-1 to 3-3.

3.1.1 MINE ROCK STOCKPILE

Mine rock will be stored in the MRS. At its maximum extent, the MRS will contain 126 Mt of PAG and 3.3 Mt NPAG / ML rock. NPAG / NML mine rock being used for construction will be stored in a separate area of the MRS, with a maximum of 16 Mt of material stored at this location.

Mine rock in the MRS originates from several sources. Placement of rock in the MRS begins in Year -3, including material moved from the AEX stockpiles to the MRS in Year -3 through Year -1. This occurs prior to the start of operations and the model assumes this material is present at the MRS at the start of the simulation. Rock from the VMF is placed in the MRS from Year -3 to Year -1, and rock from the LP Central pit is placed in the MRS from Year -1 to Year 8. Rock from the underground mine is placed in the MRS from Year -1 to Year 9.

Project geochemical data indicates that the PAG mine rock from the LP Central pit and underground has a lag time to acid onset of approximately 22 years (see Section 4.3) whereas PAG mine rock from the VMF is estimated to have a lag time of 40 years. The PAG rock portion of the MRS will be progressively rehabilitated during mine operations, over a three-year period during operations, starting in Year 7 and completed by the end of Year 10. The cover will be placed prior to potential acidification of drainage from the stockpile. The MRS cover comprises a low permeability compacted clay cover which is revegetated.

For assessment purposes it was assumed that the closure cover system limited oxygen ingress and reduced mine rock contact water. Oxygen ingress was limited by the ability of the compacted clay cover to maintain a sufficient level of saturation such that oxygen transport into the underlying mine rock is reduced, and mine rock contact water was limited (i.e., reduced net infiltration, and no surface runoff contacting mine rock). The net effect of these processes was assumed to result in a 90% reduction in mass load release from the covered stockpile, considering results of numerical modelling and expectations of cover performance (WSP 2025e). For assessment purposes it was assumed that the cover prevents the development of acidic drainage from the pile. Runoff from the cover provided mass load that was based on available geochemical data for overburden used to represent the cover surface.

The NPAG / NML area of the MRS will remain active during mine operations, with NPAG / NML rock from the underground mine continuing to be placed in the stockpile until Year 26 for use in construction. As the NPAG / NML area of the MRS is depleted, the compacted clay cover will be advanced over adjacent areas of the PAG / ML rock that were not covered as part of the cover placement earlier in operations. Any remaining NPAG / NML rock will be covered with a soil cover during closure. Mine rock contact water decreased by 98% after placement of the cover due to the reduced runoff and net infiltration. The reduction in contact water was assumed to correspond to an equivalent reduction in mass loading from the pile following placement of the cover.

Sources of load to the MRS contact water include non-acidic PAG rock, NPAG / ML rock, and NPAG / NML rock. As previously described, the cover system is expected to prevent acidification of the PAG rock in the MRS. During operations, runoff and toe seepage from the MRS will be captured in collection ditches and flow by gravity through the main collection channel to the VMF. Based on subsurface conditions and hydrogeological considerations, all fugitive seepage from the MRS is estimated to be captured by the LP Central pit and pumped to the VMF. Water from the VMF is pumped to the WTP via the AEX mine water pond for management.

3.1.2 PROCESS PLANT AND ORE STOCKPILES

Throughout mine operations, ore will be stored in the run of mine (ROM) stockpile located adjacent to the process plant, and in two low grade ore (LGO) stockpiles located south of the MRS. The ore stockpiles are lined.

The ROM stockpile has a balance of approximately 147 kt at the start of the first full year of operations. The ROM stockpile will continue to have ore stored for several weeks or less before processing. The stockpile balances for LGO1 and LGO2 vary throughout operations as shown in Table 4-5.

For assessment purposes it was assumed all ore material is PAG. Ore materials were determined to have a lag time to acid onset of 18 years for ore from the LP Central pit, 66 years for ore from the VMF, and 21 years for ore from the underground (see Section 4.3). The project material balance indicates that ore will not remain in the any stockpiles for more than 13 years. Therefore, ore was assumed to be non-acid PAG during operations.

Runoff from the process plant area will flow by gravity to the gravity channel and ultimately to the east VMF, where it will be pumped to the WTP for management.

3.1.3 COLLECTION WATER POND

The CWP will be constructed in Year -1 and collects drainage from a natural catchment, the ROM stockpile, and the LGO stockpiles. The collected water from the CWP is pumped to the east VMF during operations. Additionally, the CWP will receive mass load from the NPAG / NML rock used to construct the dam around the pond.

3.1.4 TAILINGS MANAGEMENT FACILITY

Desulphurized tailings will be deposited in the TMF, including a total of approximately 51.8 Mt of tailings over the life of mine. As a result of the desulphurization process, the tailings will be NPAG and not a risk for acid generation. NPAG / NML rock will be used to construct the dams associated with the facility.

During operations, runoff from the TMF catchment and process water discharged with the tailings is collected in the TMF pond, which is used as reclaim for the process plant, and the excess water is treated at the MFP prior to being discharged to the environment. Seepage from the TMF and runoff from the three dams are collected in a seepage collection ditch around the facility. The water collected in the seepage collection ditch is pumped back to the TMF and the TMF pond. Potentially, some seepage may bypass the seepage collection system (i.e., fugitive seepage) and reports back to the TMF (up to 52 m^3/day) and the receiving environment (up to 48 m^3/day).

Sources of mass loading to the TMF contact water during mine operations include process water discharged with the tailings, load released from ongoing oxidation of the desulphurized tailings stored in the facility and NPAG / NML rock used to construct the dams, as well as loading contributions from the natural and cleared area within the TMF catchment. In the model, load was allowed to accumulate in the process plant circuit with reclaim water use.

3.1.5 MEMBRANE FILTRATION PLANT

Excess water in the TMF pond during operations will be directed to the MFP to support management of sulphate concentrations. The MFP produces two effluent streams, a treated membrane filtration effluent and a smaller volume of reject solution. The treated membrane filtration effluent will be discharged to the environment via the treated water pond. The reject solution will be temporarily held in a holding pond until it can be sequestered underground as paste which is used as underground mine backfill. Excess reject solution will be stored temporarily in the west VMF, and if necessary, inside an isolated area of the LP Central pit. Excess reject solution is expected to start being deposited into the west VMF beginning in Year 12, based on average climate conditions.

The MFP ceases at the end of the operations phase, when the processing of ore in the process plant ceases.

3.1.6 LP CENTRAL PIT

The LP Central pit will be actively mined from Year -1 to Year 10, exposing pit walls which comprise overburden, NPAG and PAG mine rock. Approximately 17% of the exposed pit walls are overburden, 62% of the pit walls are PAG rock, whereas 2% and 19% of the pit walls are NPAG / ML and NPAG / NML respectively.

Project geochemical data indicates that the PAG mine rock from the LP Central pit has a lag time to acid onset of approximately 22 years (see Section 4.3). Pit design information indicates that most (i.e., approximately 75%) of the final pit walls are exposed by Year 4. Therefore, for assessment purposes it was assumed that all PAG pit walls were net-acid generating by Year 25.

The LP Central pit will collect runoff from pit walls and cleared areas within the open pit catchment area along with any local groundwater seepage, seepage from the LGOs, and seepage from the MRS. Dewatering from the LP Central pit is pumped to the east VMF where water will be pumped to the AEX mine water pond, and then directed to the WTP for management.

3.1.7 VIGGO MANAGEMENT FACILITY

Following completion of development of the Viggo pit during the construction phase, it will be repurposed into the VMF. The VMF will include two lobes separated by a saddle at an elevation of 350 m, which function as separate water management facilities during operations. The west lobe of the VMF (west VMF) will be used to manage excess reject solution from the MFP, that cannot be sequestered underground in paste. The east lobe of the VMF (east VMF) will be used to store concentrate tailings and contact water from around the site. Over the life of mine approximately 3.3 Mt of concentrate tailings will be deposited in the east VMF. The concentrate tailings are PAG and will be deposited subaqueously to remain stored beneath a water cover such that they are isolated from atmospheric oxygen to prevent their acidification.

In addition to receiving process water discharged with the concentrate tailings, the east VMF will receive contact water from its local catchment and the eastern portion of the site, including the process plant area, LP Central pit and various stockpiles. Contact water in the east VMF will be directed to the WTP via the AEX mine water pond for management.

The west VMF will be kept dewatered during the operations phase until Year 12, when it will be used for storage of the reject solution. Prior to Year 12 the excess water will be pumped into the east VMF and ultimately to the WTP. Once deposition of reject solution begins in the west VMF (Year 12), the inflows to the west VMF will be allowed to accumulate there until the end of operations, with any potential overflow being stored within the designated isolated area in LP Central pit.

Wall rock in the VMF is represented by both PAG and NPAG materials. Project geochemical data indicates that the PAG mine rock from the VMF has a lag time to acid onset of 40 years (see Section 4.3). As such, acid onset of PAG wall rock in the VMF is not anticipated to occur during Project operations.

Inputs to the east VMF from the LP Central pit dewatering may be acidic starting in Year 25; this is due to the PAG pit walls that are assumed to be net-acid generating by Year 25. Therefore, for modelling purposes, it was assumed that pH management will be conducted at the VMF as needed to ensure maintenance of stable geochemical conditions for the subaqueously stored concentrate tailings. Any potential reduction to loadings that may occur as part of this process was not considered in the model.

Sources of load to the west VMF contact water during operations include groundwater, site runoff, and reject solution. Sources of load to the east VMF during operations include contact water from the MRS, water from dewatering of the LP Central pit, process water discharged with the concentrate tailings, pit wall runoff, pumped water from the CWP, overburden stockpile (OVB) runoff, loadings from the submerged concentrate tailings, and runoff from cleared areas.

In the final year of operations (Year 26) NPAG / NML rock will be processed to generate an NPAG tailing which will be deposited in the east VMF. This will form a blanket of NPAG tailings overlying the PAG concentrate tailings within the east VMF, further isolating these materials and supporting the VMF closure.

3.1.8 OVERBURDEN STOCKPILES

Stockpiles will be developed to store overburden materials excavated as part of site development. Contact water from the overburden stockpiles (OVB) located on the eastern portion of the site (i.e., OVB1 and OVB2) will be collected in ditches and directed towards the VMF and ultimately the WTP for management.

Contact water from stockpiles located on the western portion of the site (i.e., OVB3, OVB4 and OVB5) will be directed to the TMF pond. The TMF pond is used for reclaim water at the process plant with excess water directed to the MFP for management.

Geochemical testing for the Project indicates that the overburden is NPAG with a low potential for metal leaching (WSP 2025b).

3.1.9 UNDERGROUND WORKINGS

Underground mining occurs during the construction phase and operations phase. Water from dewatering from the underground mine will be pumped to the AEX mine water pond on surface, where excess water will be directed to the WTP for management.

A paste plant will be operated to generate paste backfill for use in the underground mining operation. Paste will be produced from tailings pumped from the process plant following cyanide destruction and prior to flotation, along with reject solution from the MFP. Paste backfill represents the majority of the backfill (80%) used in the underground mine. Lesser volumes of cemented rock backfill (7%) and rock backfill (13%) will also be used. Operation of the paste plant begins in Year -1.

Sources of load to underground mine dewatering include paste backfill (water released during curing as well as ongoing load release from cured paste backfill, where stopes are not fully sealed), load from sulphide oxidation of the exposed wall rock and rock backfill, and groundwater inflows (including shallow and deep groundwater contributions).

Project geochemical data indicates that the PAG mine rock from the underground has a lag time to acid onset of approximately 22 years (see Section 4.3). Exposure of PAG rock underground could begin during the advanced exploration (AEX) program, and consequently acidic conditions were assumed to develop in the underground for the Project beginning in Year 17.

All rock stored proximal to the portal in the AEX stockpiles, will be relocated to the MRS as part of mine operations. This includes moving the NPAG / NML rock to the MRS in Year -3 and Year -2 and moving the PAG and NPAG / ML rock to the MRS in Year -2.

3.1.10 AEX MINE WATER POND

The AEX mine water pond collects runoff from the east VMF, dewatering waters from the underground mine, the MWP, and drainage from the local AEX watershed. Excess water from the AEX mine water pond is directed to the WTP for management.

3.1.11 MINE WATER POND

The MWP will be constructed in Year 16 and collects runoff from the northeast watershed. Water from the MWP is directed to the WTP (via the AEX mine water pond) for management.

Fugitive seepage (102 m^3/day) from the MWP reports to the receiving environment.

3.1.12 WATER TREATMENT PLANT

The WTP receives inputs from the VMF, MWP, and underground dewatering via the AEX mine water pond, and excess water from the site truck wash during operations. WTP effluent will be directed to the AEX treated water pond (TWP).

3.1.13 AEX TREATED WATER POND

Treated effluent from the MFP and the WTP are both directed to the TWP. These two treated effluent streams will be discharged as one combined effluent into the Chukuni River at a maximum rate of 1,330 m^3/hr.

3.2 MINE CLOSURE

The closure phase and post-closure were evaluated in the water quality estimates including the active closure period and passive closure period, as well as long-term post-closure conditions. The configuration of key mine features during the closure phases are presented in Figures 3-4 to 3-6.

3.2.1 ACTIVE CLOSURE PERIOD

The active closure period occurs from Year 27 to Year 31 and includes rehabilitation of mine features, covering of the TMF and NPAG / NML stockpile portion of the MRS, and accelerated filling of the VMF, LP Central pit, and the underground mine with water.

- Underground dewatering ceases and the underground begins to fill passively with groundwater. During the first year of active closure membrane filtration reject solution stored in the west VMF is pumped to the underground. Fresh water pumped in a controlled manner from the Chukuni River is used to accelerate filling of the underground mine. Per the closure water balance (WSP 2025a) the underground mine is estimated to fill to its final elevation of 355 masl by Year 31. Once flooded the underground mine will overflow to the LP Central pit via a vent raise. Wall rock above the long-term phreatic surface in the flooded underground mine is understood to be NPAG / NML rock.
- Dewatering at the LP Central pit ceases, and the pit begins to fill with water from its catchment and drainage from the catchment to the north (including the covered MRS), via a modified main collection channel. Site contact waters including water from the TMF pond, TMF pump back wells, MWP, and drainage from the AEX catchment are pumped to the LP Central pit as a single inflow via the AEX mine water pond. Fresh water from the Chukuni River is added to the LP Central pit to accelerate pit filling. The LP Central pit lake will reach a maximum water level of approximately 343 masl after approximately four years of accelerated filling (WSP 2025a). This maximum operating water level is maintained to provide storage capacity to manage design events and is 5 m below the long-term closure water level for the pit lake.
- After the reject solution stored in the west VMF is pumped to the underground, the east VMF and west VMF will fill with groundwater inflows, drainage from the former OVB1 area, and active filling with fresh water from the Chukuni River. Once the water level exceeds 350 masl, water will overflow the bedrock saddle separating the west VMF and east VMF and a combined VMF will form. The VMF will be operated with a maximum water level of 354 masl after accelerated water filling over approximately two months. The maximum operating water level is maintained to provide storage capacity to manage design events and is 1 m below the long-term closure water level for the VMF. Excess water will be dewatered to the LP Central pit as part to maintain the water level. At the start of active closure and prior to acid onset of PAG wall rock, exposed rock benches above the long-term water level in the VMF are assumed to be suitably covered with clay-rich overburden to limit their interaction with oxygen and water and provide no loading over the long term. Treatment of water in the VMF will be conducted initially after filling, if needed, as part of active closure, to manage legacy load present in the VMF water.

- A closure cover is placed on the TMF surface and remaining NPAG / NML mine rock stockpiled at the MRS, starting in Year 27 and is complete by Year 30. The surface of the cover would be revegetated. For the purposes of this assessment, it was assumed that the closure cover limited infiltration and contact water through the covered mine rock and tailings (per the water balance). Thereby mass load release from the tailings pile was reduced by 50% due to the reduction in net infiltration and the NPAG / NML stockpile load release was reduced proportional to the reduction in contact water.
- Following the cessation of ore processing process water is no longer discharged to the TMF. Residual process water is however retained within the pore spaces in the tailings and is a key loading source to seepage from the desulphurized tailings pile. Over time residual process water will be released from the tailings pores via seepage. During the initial phases of closure, seepage from the TMF is expected to be of the same quality as the seepage water quality at the end of operations. Additional loading to the seepage water quality during closure is expected from ongoing oxidation of the covered NPAG tailings surface and from the NPAG / NML dam rock. Seepage quality will improve over the long term as process water is released due to ongoing infiltration and tailings consolidation.
- Overburden stored in stockpiles will be used to support reclamation of the site progressively and at closure. It is anticipated that the overburden stockpiles will be depleted during reclamation. Once depleted, the stockpile areas will be recontoured to promote natural drainage patterns and revegetated.
- Stockpiled ore will be processed during the operations phase and prior to closure. At closure, the footprint of the former ore stockpiles will be excavated if needed, so that no PAG material is remaining. Thereafter, the ore stockpile areas will be graded and revegetated. Similarly, the process plant will be decommissioned, and the area will be recontoured, covered with overburden and revegetated. Runoff from these areas will be directed to the CWP. The CWP dam will be breached during active closure directing all inflows to the LP Central pit.
- Routine operation of the WTP is deferred during active closure as all site contact waters are directed to the LP Central pit.

3.2.2 PASSIVE CLOSURE PERIOD

The passive closure period represents closure conditions immediately following the completion of accelerated filling of the LP Central pit, underground mine and VMF with water, as well as rehabilitation of site infrastructure areas (except as needed for ongoing site management), and placement of the closure covers on the TMF surface and remaining NPAG / NML rock stockpiled at the MRS. Features of this period include the following:

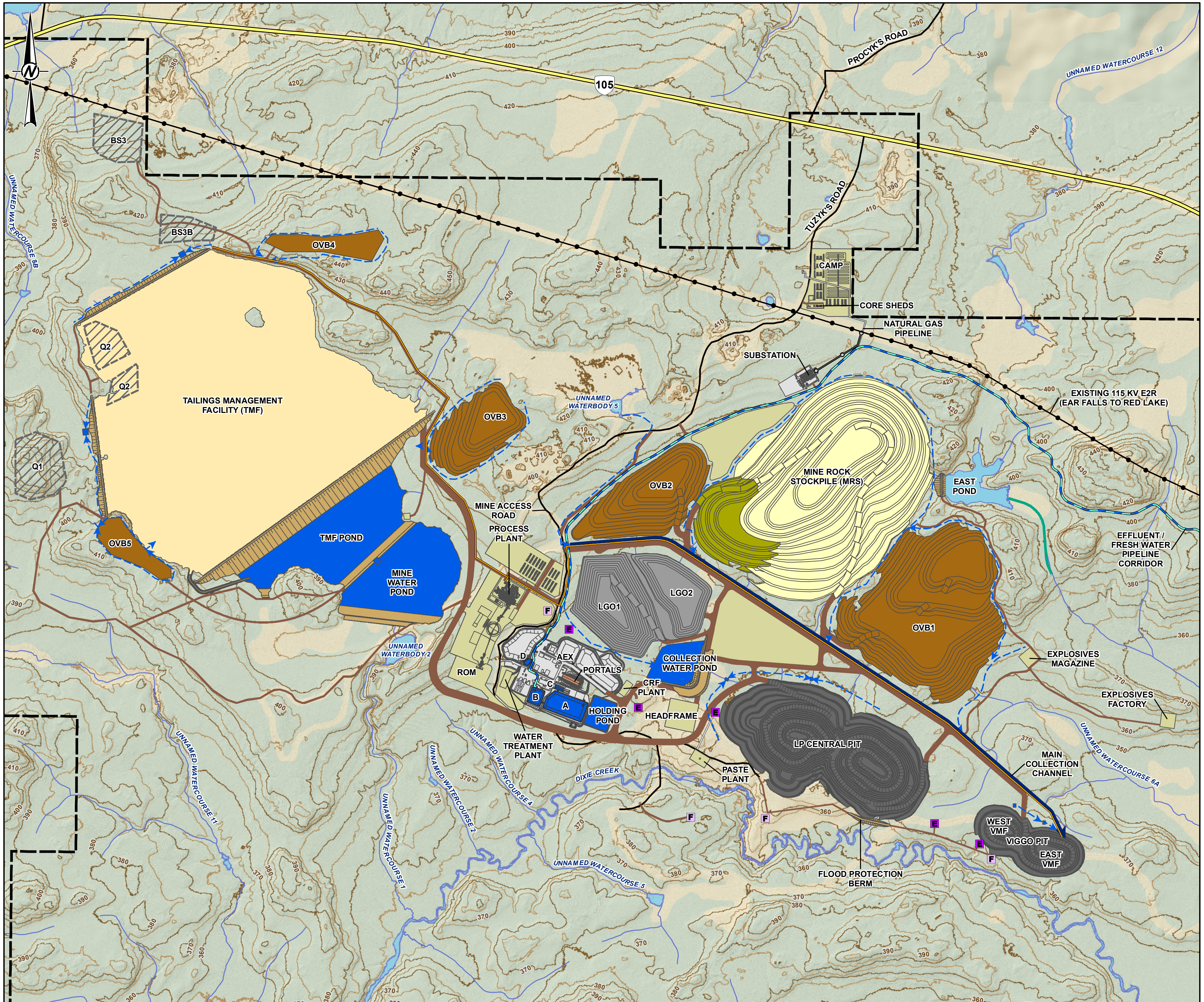
- Drainage from the TMF including seepage and water collected at the TMF pond, as well as drainage from the MWP and AEX catchment are directed to the WTP for management.
- Contact water from the covered MRS and LP Central pit lake catchment flow directly to the pit lake by gravity. The pit lake water level is maintained at 343 masl via pumping with excess water pumped to the WTP for management if needed.
- At the cessation of mining in Year 26, it is assumed that all of the covered PAG in the MRS was non-acidic due to the net effect of the cover in reducing contact water and oxygen ingress.
- All PAG wall rock above the water level at passive closure in the LP Central pit lake (maximum of 343 masl) was acidic PAG, representing approximately 47,000 m^2, which represents approximately 12% of the total wall area. Wall rock in the LP Central pit was not covered in closure. Wall rock above the long-term water level in the VMF was covered during active closure to isolate this material from oxygen and water.
- The flooded underground mine workings will overflow to the LP Central pit lake by one of the vent raises. Wall rock above the long-term phreatic surface in the flooded underground mine (355 masl) is understood to be NPAG / NML rock.

- Given the short duration of active closure, seepage from the TMF during passive closure was assumed to be of the same quality as the seepage water quality at the end of operations, for assessment purposes. Minor, but additional loading to the seepage water quality during closure is expected from ongoing oxidation of the covered NPAG tailings surface and from the NPAG / NML dam rock. Seepage quality will improve over the long term as process water is released due to ongoing infiltration and tailings consolidation.
- The MWP operates similarly to the operations phase during passive closure. Loading sources include runoff from a natural / cleared area, gravity flows from the TMF pond and loads from the NPAG / NML dam rock.
- The WTP continues to operate with discharge of excess treated water to the Chukuni River, until site runoff and waters from the LP Central pit lake are suitable for direct discharge to the environment.

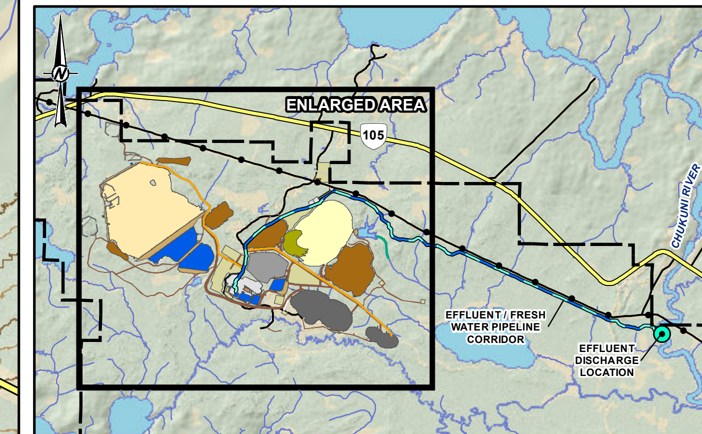
3.2.3 POST-CLOSURE

Post-closure represents long-term steady state geochemical conditions with natural gravity runoff to the environment from the Project site. The model uses the same site configuration and assumptions as for the passive closure period, with the following exceptions:

- During post-closure it is assumed a steady state geochemical condition will be achieved for the TMF as all residual process water has been flushed from the tailings mass. Preliminary estimates indicate that the steady state condition may be reached within approximately 70 years after the passive closure stage. Load sources in the TMF seepage water quality at this stage are derived from the covered NPAG tailings and the NPAG / NML dam rock.
- The LP Central pit lake will at its final closure water level of 348 masl (5 m above the active / passive closure maximum water level that was maintained for design event storage during those closure sub-phases). Approximately 39,000 m^2 of PAG wall rock will be exposed, which represents approximately 9% of the total wall area, above the long-term water level.
- The VMF (pit lake) will be at its final closure water level of 355 masl (1 m above the active / passive closure maximum water level that was maintained for design event storage during those closure sub-phases).
- The TMF pond and the MWP dams are breached and the pond size is reduced. Fugitive seepage from the MWP to the environment ceases. Flows from the covered TMF, the TMF pond catchment, and the natural catchment upstream of the MWP passively discharge to the environment.



KEY MAP



SCALE 1:175,000

LEGEND

- PROPERTY BOUNDARY
- HIGHWAY (INCLUDING ENBRIDGE PIPELINE)
- LOCAL ROAD
- EXISTING TRANSMISSION LINE
- WATERCOURSE
- WATERBODY
- MAJOR CONTOURS (10 M INTERVAL)
- MINOR CONTOURS (5 M INTERVAL)

PROPOSED MINE FEATURE

- OPEN PIT
- MINE ROCK STOCKPILE (NPAG)
- MINE ROCK STOCKPILE (PAG)
- LOW GRADE ORE STOCKPILE (LGO)
- OVERBURDEN STOCKPILE (OVB)
- TAILINGS MANAGEMENT FACILITY (TMF)
- DAM
- POND
- MAIN COLLECTION CHANNEL
- COLLECTION DITCH
- MINE FACILITIES / INFRASTRUCTURE
- ROAD
- PORTAL
- ADVANCED EXPLORATION SITE (AEX)
- ROCK QUARRY (Q) / SAND AND GRAVEL PIT (B)
- DIVERSION CHANNEL
- EXHAUST VENT RAISE
- FRESH AIR VENT RAISE
- TRANSMISSION LINE
- TAILINGS PIPELINE
- PASTE PLANT PIPELINE
- EFFLUENT / FRESH WATER PIPELINE CORRIDOR
- EFFLUENT DISCHARGE LOCATION

0 0.25 0.5 1
1:26,500 KILOMETRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE
2. VMF: VIGGO MANAGEMENT FACILITY
3. ROM: RUN OF MINE ORE
4. AEX PONDS: A-AEX MINE WATER POND, B-AEX TREATED WATER POND, C-AEX SETTLING POND, D-AEX SEDIMENT POND

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. CONTOURS ACQUIRED FROM 2022 LIDAR SURVEY.
3. PROPERTY BOUNDARY PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2024.
4. ROADS INFORMATION PROVIDED BY GREAT BEAR RESOURCES, AUGUST 2022.
5. SITE PLAN BASED ON INFORMATION PROVIDED BY GREAT BEAR RESOURCES, DECEMBER 2024 / JUNE 2025.
6. COORDINATE SYSTEM: NAD 1983 UTM ZONE 15N

CLIENT
GREAT BEAR RESOURCES

PROJECT
GREAT BEAR PROJECT

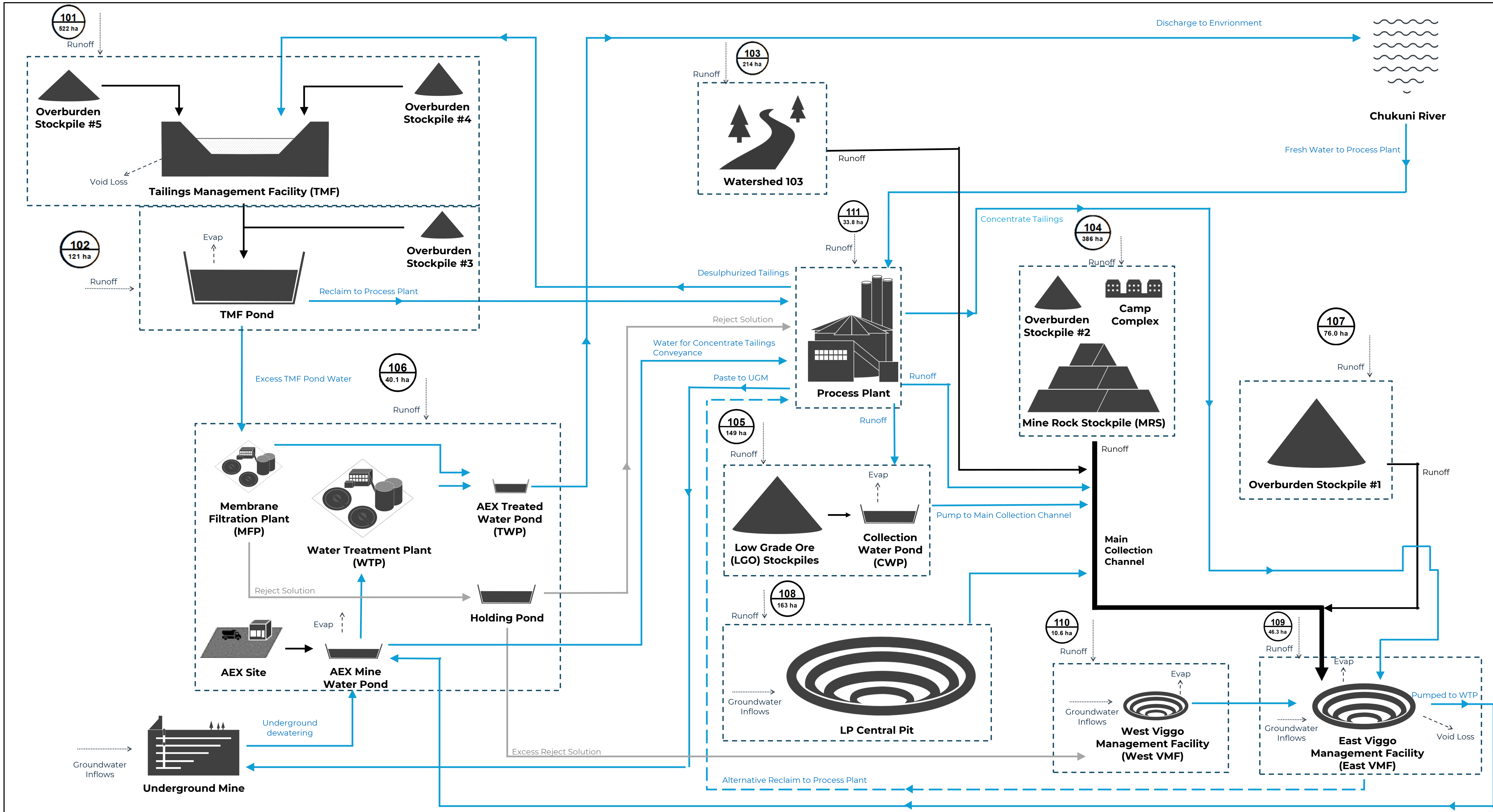
TITLE
SITE PLAN (TOPOGRAPHY)

CONSULTANT

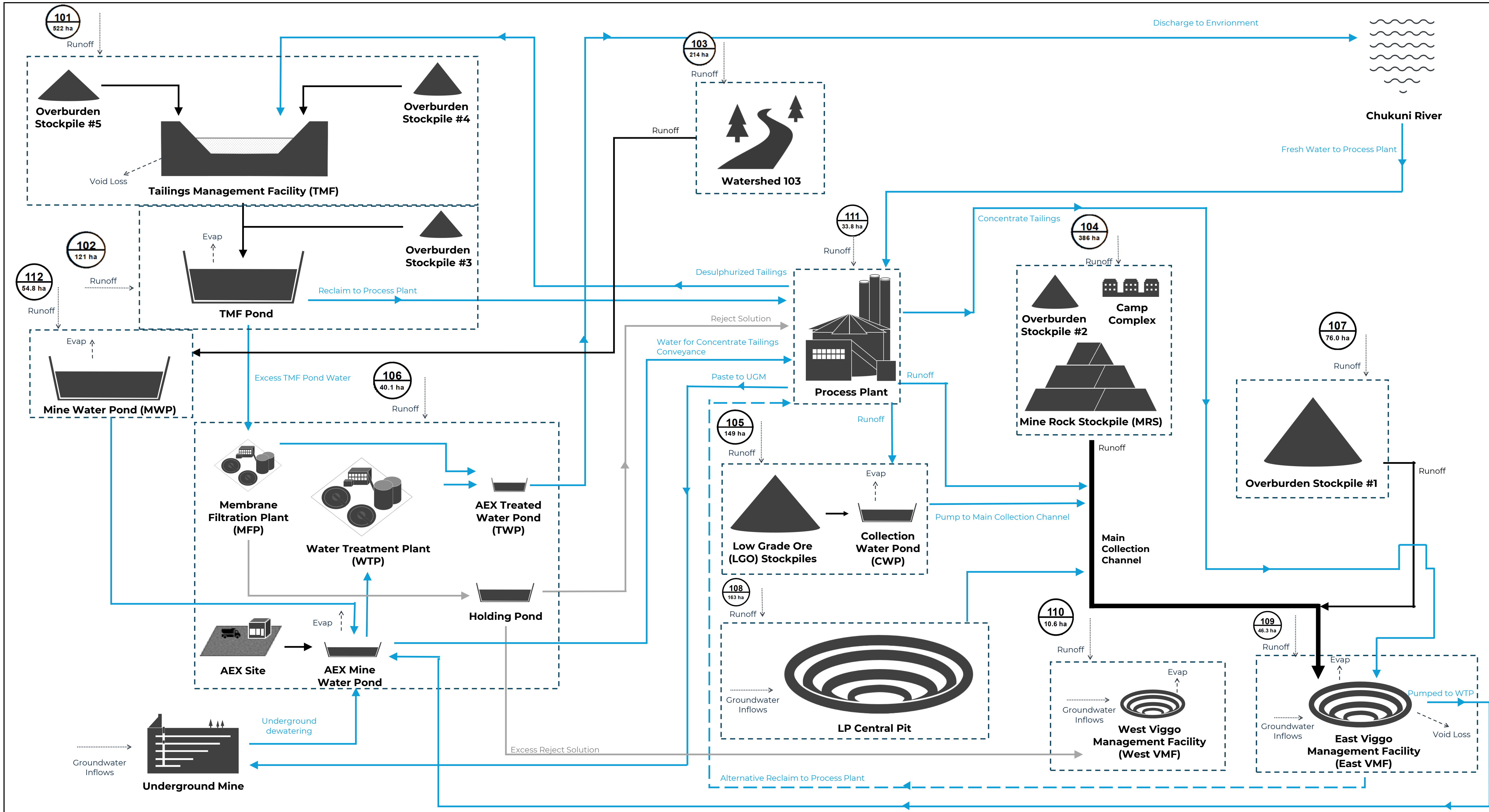
YYYY-MM-DD	2025-07-23
DESIGNED	----
PREPARED	MD
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0031271	0001	A	3-1

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



LEGEND: Pumped Flow; Contingency Pumped Flow (Not Modeled); Reject Solution Flow; Gravity Flow; Input; Loss; Watershed	KINROSS	GREAT BEAR RESOURCES	WSP	GREAT BEAR PROJECT	DATE: AUGUST 2025
		WSP Canada Inc. 6925 Century Avenue, Suite 600 Mississauga, Ontario, Canada, L5N 7K2		MINE SITE WATER BALANCE	PROJECT NO: OMEMA2303
				DRAWING TITLE: FLOW SCHEMATIC - OPERATIONS PHASE (SUB-PHASE 1 PRIOR TO MWP CONSTRUCTION)	FIGURE NO: 3-2



LEGEND:
Pumped Flow
Contingency Pumped Flow (Not Modeled)
Reject Solution Flow
Gravity Flow
Input
Loss
Watershed

KINROSS

GREAT BEAR RESOURCES

WSP Canada Inc.
6925 Century Avenue, Suite 600
Mississauga, Ontario, Canada, L5N 7K2

wsp

GREAT BEAR PROJECT

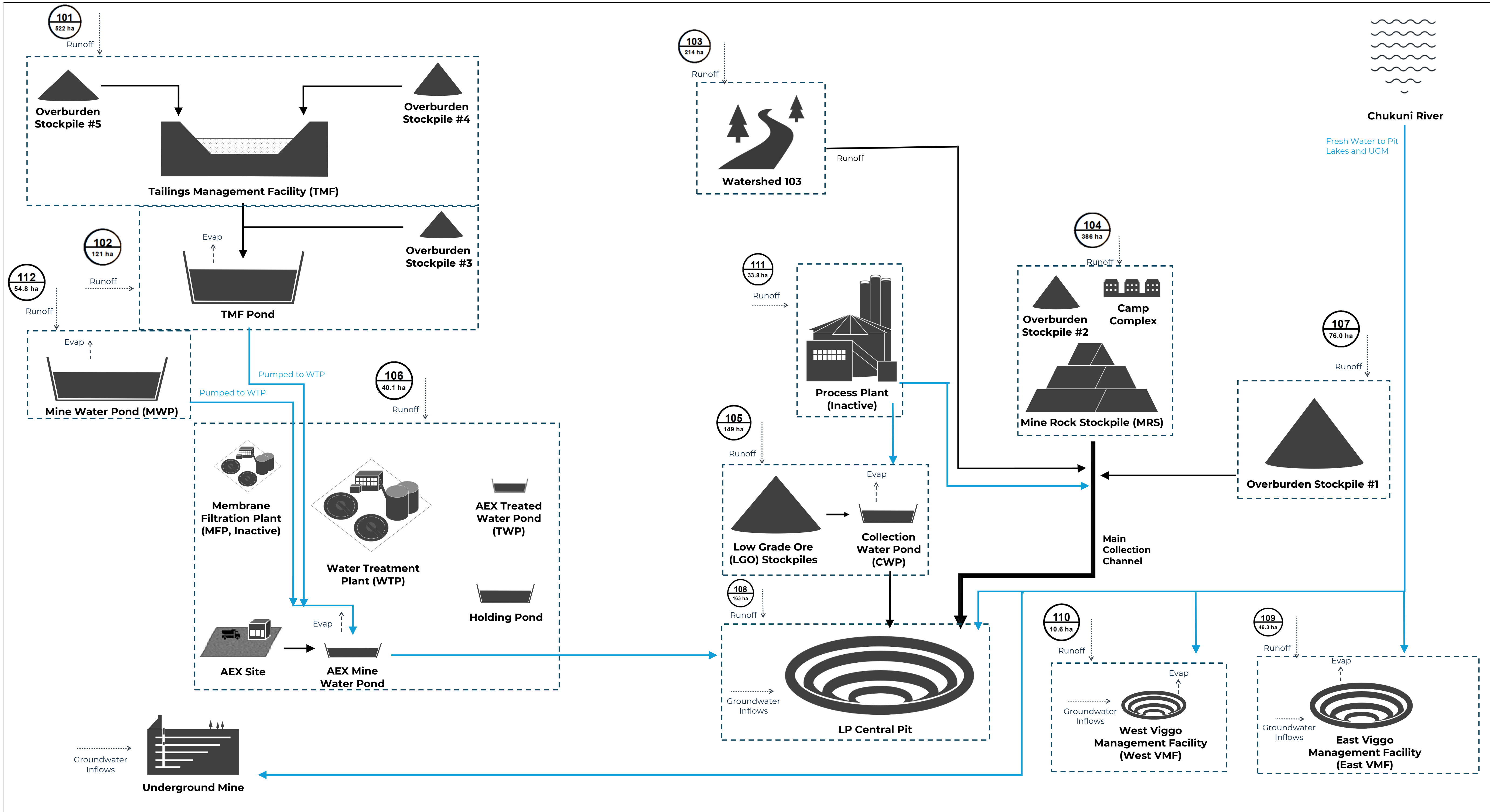
MINE SITE WATER BALANCE

DRAWING TITLE:
FLOW SCHEMATIC - OPERATIONS PHASE
(SUB-PHASE 2 FOLLOWING MWP CONSTRUCTION)

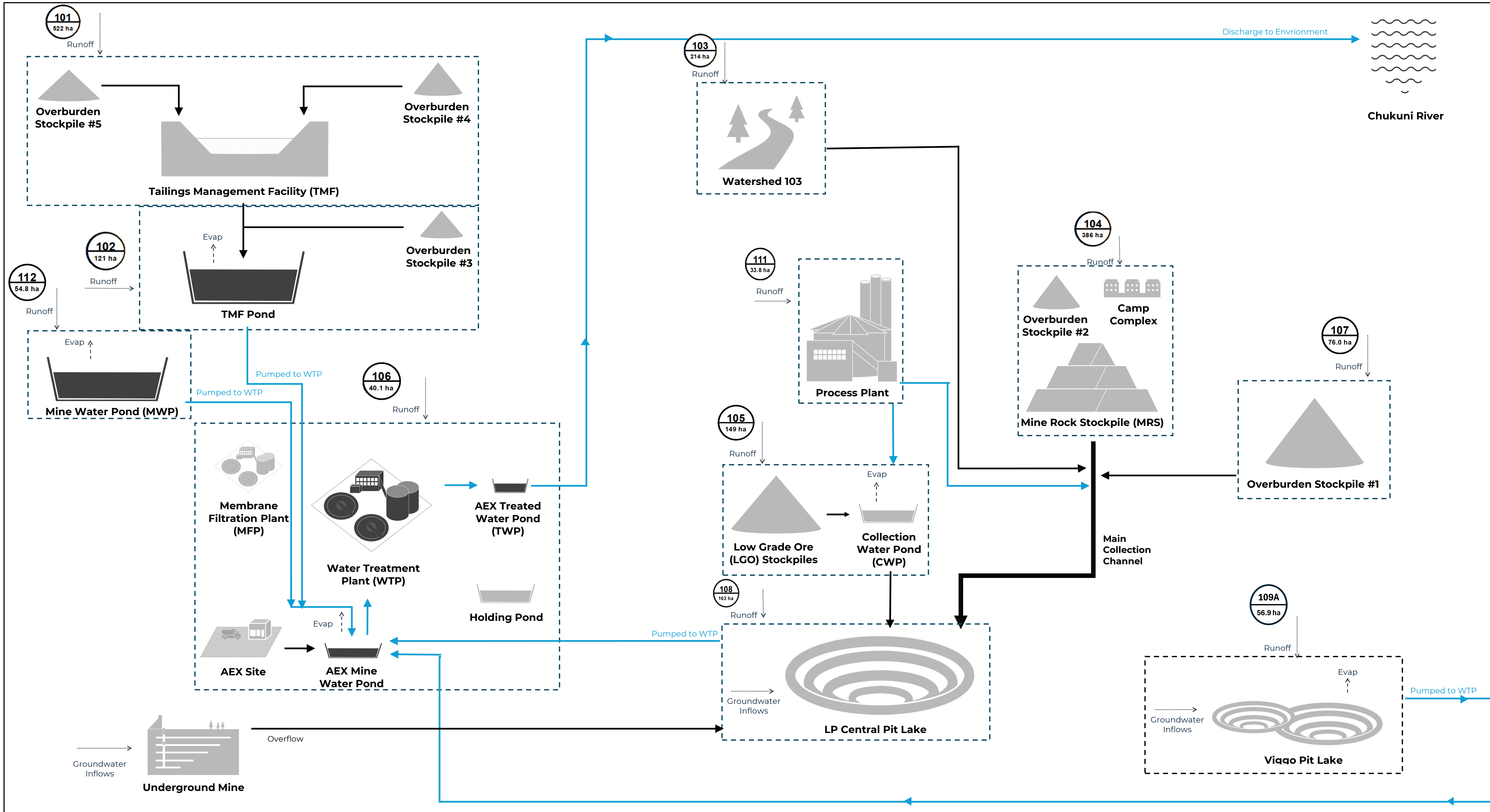
DATE:
AUGUST 2025

PROJECT NO:
OMEMA2303

FIGURE NO:
3-3



LEGEND: Pumped Flow Gravity Flow Input Loss Watershed	KINROSS	GREAT BEAR RESOURCES WSP Canada Inc. 6925 Century Avenue, Suite 600 Mississauga, Ontario, Canada, L5N 7K2	wsp	GREAT BEAR PROJECT MINE SITE WATER BALANCE DRAWING TITLE: FLOW SCHEMATIC - CLOSURE PHASE DURING UNDERGROUND AND PIT FILLING	DATE: AUGUST 2025 PROJECT NO: OMEMA2303 FIGURE NO: 3-4



LEGEND:
- Reclaimed
- Potential Pumped Flow
- Gravity Flow
- Input
- Loss
- Watershed

KINROSS

GREAT BEAR RESOURCES

WSP Canada Inc.
6925 Century Avenue, Suite 600
Mississauga, Ontario, Canada, L5N 7K2

WSP

GREAT BEAR PROJECT

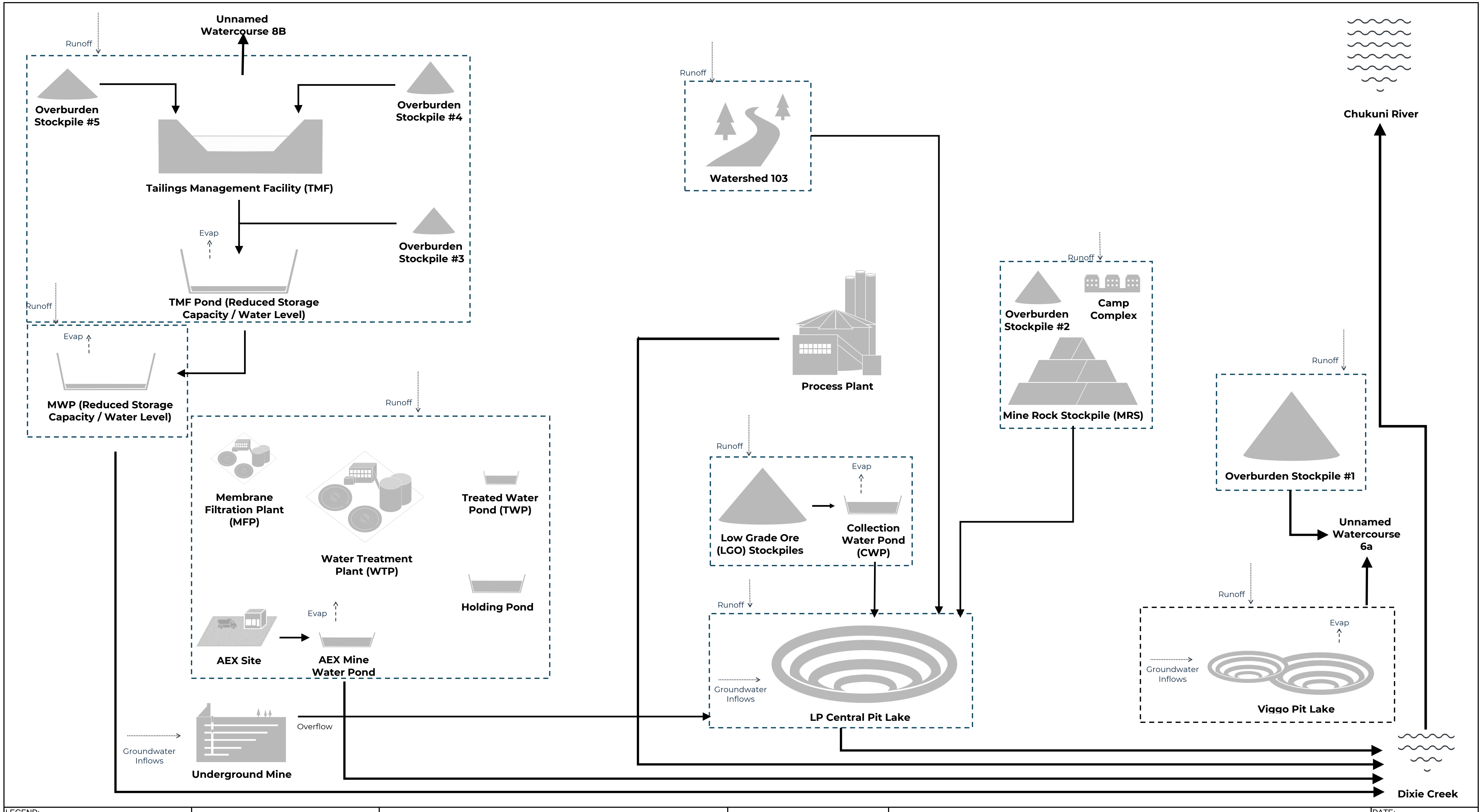
MINE SITE WATER BALANCE

DRAWING TITLE:
FLOW SCHEMATIC - CLOSURE PHASE WITH FILLED VMF / LP CENTRAL / UNDERGROUND MINE (WATER TREATMENT CONTINUING)

DATE: AUGUST 2025

PROJECT NO: OMEMA2303

FIGURE NO: 3-5



LEGEND:					
Reclaimed Passive Gravity Flow Input Loss Watershed	KINROSS	GREAT BEAR RESOURCES WSP Canada Inc. 6925 Century Avenue, Suite 600 Mississauga, Ontario, Canada, L5N 7K2	wsp	GREAT BEAR PROJECT MINE SITE WATER BALANCE DRAWING TITLE: FLOW SCHEMATIC - POST - CLOSURE	DATE: AUGUST 2025 PROJECT NO: OMEMA2303 FIGURE NO: 3-6

4 KEY INPUTS AND ASSUMPTIONS

Key model inputs and assumptions are provided in the following sections. Key assumptions related to nitrogen and cyanide modelling are presented in Appendix A (WSP 2025c).

4.1 WATER BALANCE

The operations phase was modelled based on the average annual monthly water balance for the Project during operations (WSP 2025a). The closure phases were modelled based on the average annual monthly water balance for the passive and post-closure phases (WSP 2025a) for the mine site catchments.

Flow schematics for the water balance are provided in Figures 3-2 to 3-6.

4.2 ROCK TYPES

The mine will extract both PAG and NPAG rock. NPAG rock is further classified as NPAG / ML and NPAG / NML rock. The PAG and NPAG mine rock types have specific geochemical characteristics that result in varying management considerations in the mine plan, as well as specific consideration of these geochemical characteristics in the water quality estimates.

Data from the Project metal leaching and acid rock drainage (ML / ARD) block models were extracted to support the interpretation of the specific characteristics of PAG, NPAG / ML and NPAG / NML rock in the material balance. The Project screening criteria (shown in Figure 4-1) were applied in the block model to identify the volumes of material that were PAG, NPAG / ML, and NPAG / NML. These rock types were represented in the material balance and mine plan as follows.

- PAG rock and NPAG / ML rock generated from mining of the LP Central pit, VMF, and underground mine will be managed at the MRS. These materials will ultimately be covered with a low permeability compacted clay cover. PAG rock and NPAG / ML rock generated from underground mining, after the closure cover is placed on the MRS, will be rehandled for use as backfill in the underground and placed below the long-term water level in the underground mine at closure.
- NPAG / NML rock generated from mining of the LP Central pit, VMF, and underground mine will be stored adjacent to the MRS. This material is planned to be used for construction purposes. Geochemical testing has been conducted (and is continuing) to support the use of these materials for construction.
- PAG and NPAG rock types are present on pit walls and on exposed mine walls in the underground workings. Rock backfill used in the underground comprises PAG and NPAG rock types.
- Ore-grade materials in the ROM and LGO stockpiles is represented by PAG rock.

As outlined in Figure 4-1, classification and management of Project rock is also lithology-dependent, as certain rock types had unique characteristics, particularly related to arsenic leaching. The overall abundance of each lithology is shown in Table 4-1.

- Felsic Volcanic (FV1 and FV2), Basalt, and Metasediment (MS2 and MS3) rock types comprise over 98% of the mine volume, with the Felsic Volcanic rock types representing over 85% of the mine volume. The relative proportions of these rock types in the LP Central pit (approximately 67 Mm^3) and the underground mine (approximately 25 Mm^3) are similar.
- VMF provides a much smaller proportion of the rock that will be extracted (6 Mm^3) and primarily comprises the Felsic Volcanic, Fragmental, and Metasediment rock types. VMF has a higher proportion of Fragmental lithology than the LP Central pit or underground mine; however, this represents a low overall tonnage unit considering the overall mine volume.

The relative abundances of NPAG / NML, NPAG / ML, and PAG material for the key lithological groups (Felsic Volcanic; Basalt; and Metasediment, Fragmental and Argillite) were calculated using Project screening criteria (Figure 4-1) and available information from the ML / ARD block model. Relative abundances are summarized in Table 4-2. Material balance information was interpreted alongside these relative abundances to determine the volumes of each lithology that were NPAG / NML, NPAG / ML, and PAG in each year.

The proportions of PAG (including acidic [1] and non-acidic PAG, see Section 4.3), NPAG / ML and NPAG / NML, along with the various lithologies within each group, were used to apply source terms in the model. Other available geochemical data from the ML / ARD block model for these rock types including sulphur content, carbonate neutralization potential content, and metal content were used to further assess the characteristics of the rock and implications for model development.

4.3 LAG TIMES TO ACID ONSET

Projected lag times to acid rock drainage (ARD) were based on currently available geochemical information (i.e., humidity cell test results) and the Project ML / ARD block models for the open pits (LP Central pit and VMF), and underground mine (Table 4-3). The exposure time for PAG rock or exposed PAG mine surfaces (i.e., pit walls, underground mine walls) is tracked in the model to determine the quantity of acidic PAG and non-acidic PAG at a given timepoint. Source terms are then applied in the model to represent sulphide oxidation and metal release rates from these materials.

Lag times were estimated using Project-specific data from the comprehensive humidity cell test program. The humidity cell program includes 35 humidity cell tests containing drill core samples for the Project (WSP 2025b). Data from tests operating for 19 weeks (eight humidity cells) to 66 weeks (27 humidity cells) was available and used in the report preparation although testing is continuing. A key objective of humidity cell tests is to determine the rates of sulphide oxidation and neutralization potential release from mine materials including rock samples. As described in WSP (2025b), the humidity cell test results were used to interpret lag times to acid onset for PAG rock as follows.

- In the humidity cell test results, a relationship between sulphate release rate and solid phase sulphur content was observed, whereby samples with a lower solid phase sulphur content appear to have lower sulphide oxidation rates, and the rate of sulphide oxidation increases with increasing sulphide content. This suggests that a sample’s sulphur content will influence the rate at which acid potential is produced, and consequently the rate at which neutralization potential (NP) is consumed and the estimated lag time to net-acidification of the sample.
- Sulphate release rates were converted to acid potential release. A relationship between sulphide content (expressed as maximum potential acidity) and acid potential release was represented by an equation to estimate the minimum time to acid onset.
- Acid potential release rates were used to estimate neutralization potential loss rates, assuming a 1:2 ratio of acid potential production and neutralization potential dissolution. Only carbonate neutralization potential (CarbNP) was assumed to contribute to effective NP release from a sample.
- As shown in WSP (2025b), the lag time to acid onset can be estimated from these relationships.

The lag time equations presented in WSP (2025b) were used in conjunction with the ML / ARD block model data for the Project to estimate lag times to acid onset for PAG mine rock as follows.

- The average sulphur content and average CarbNP contents from the mine volume were extracted from the block model to provide an estimate of the overall rock characteristics for the Project. Sulphur content and CarbNP content data was extracted for mine rock and ore-grade materials for

[1] PAG rock is differentiated as acidic PAG and non-acidic PAG for modelling purposes. Acidic PAG rock is PAG rock that is already net acid generating. Non-acidic PAG rock is PAG rock that is not yet acid generating but will become net acid generating in the future.

assessment purposes, and for block models that were specific to the open pits (LP Central pit and VMF) and underground mine, respectively.

- Lag time equations developed from the kinetic testing program were applied to the sulphur and CarbNP contents to establish the lag time estimates to acid onset. Sulphur and CarbNP contents from the block model, along with estimated lag times, are presented in Table 4-3.

For both open pits, mine rock was represented as the average sulphur and CarbNP content of model blocks classified as mine rock. Ore-grade materials from the open pits were represented as the average sulphur and CarbNP content of ore-grade materials.

For the underground, mine rock was represented as the average sulphur and CarbNP content of all underground blocks (i.e., including mine rock and ore blocks). Due to the proximity of most of the underground workings to the orebody this was considered more representative of the ARD potential of the underground mine surfaces. Ore-grade materials from the underground mine were represented as the average sulphur and CarbNP content of ore-grade materials.

In the model, PAG rock is progressively exposed as mining occurs (i.e., rock placed in the MRS, rock surfaces exposed on pit walls or in the underground mine). The exposure time of PAG rock is tracked and acid onset occurs after the PAG rock has been exposed without mitigation for the time durations shown in Table 4-3. Prior to acid onset, non-acidic PAG rock source terms are applied. After acid onset, acidic-PAG rock source terms are applied, as presented in Section 4.11.

As described in WSP (2025a), field kinetic tests (field leach barrel tests) are showing lower rates of sulphide oxidation relative to the laboratory humidity cell tests for most PAG samples. This often observed feature suggests that lag times may be longer under field conditions, relative to model assumptions which are based on laboratory test results. Monitoring of the field tests is ongoing to confirm lag times for the Project.

Additionally, an engineered cover is placed on the MRS before the mine rock is estimated to become net-acid generating. The revegetated compacted clay cover system is designed to limit oxygen ingress and reduce mine contact water. Initial numerical modelling (WSP 2025e) indicates that the proposed cover design will significantly limit oxidation of the mine rock. For assessment purposes it was assumed that the effect of the cover prevented the development of acidic drainage from the MRS.

4.4 MINE ROCK AND ORE STOCKPILES

- The MRS will contain up to 126 Mt of PAG and 3.3 Mt NPAG / ML rock. NPAG / NML mine rock being used for construction will be stored separately on the MRS, including up to a maximum of 16 Mt of material stored at this location. Annual material movement information for the MRS was provided by Great Bear Resources and is summarized in Table 4-4. Rock is sourced from the open pits (LP Central pit and VMF) and underground mine.
- Ore will be stored in three stockpiles, including two LGO stockpiles (LGO1 and LGO2) and one ROM stockpile. The ROM stockpile has a balance of 147 kt at the start of the first full year of operations. After that time, ore is not stored in the ROM stockpile. The stockpile balances for the LGO1 and LGO2 vary throughout operations as shown in Table 4-5.
- Site features (i.e., dams at the TMF, CWP and roadways) will be constructed of NPAG / NML rock. Loads from dams constructed of NPAG / NML rock that sit between two features are assumed to contribute load to each feature according to the proportioning of drainage from the dam in the water balance.
- The proportions of PAG, NPAG / ML and NPAG / NML rock, and rock lithologies, were obtained from the ML / ARD block model and geologic model for the open pits and underground, depending on the rock source specified in the material balance. This is summarized in Tables 4-4 and 4-5 for the MRS and ore stockpiles, and the NPAG / NML rock used for construction.
- The bulk of the PAG rock in the MRS is from the LP Central pit. PAG rock from the LP Central pit was estimated to have a lag time of approximately 22 years. based on block model information and lag

time equations for the Project (see Section 4.3). A small volume of PAG rock at the MRS is from the AEX Program of the Project and is relocated to the MRS early during the operations phase. While the bulk of the PAG rock in the MRS is placed from Year -3 to Year 14, the PAG rock in the AEX stockpile could be brought to surface as early as Year -5. For model purposes contact water from the MRS is assumed to be non-acidic due to placement of the closure cover system as described in Section 3.1.1.

  - PAG rock from the VMF represents a minor proportion of the overall MRS volume and has a longer lag time than rock from the LP Central pit. PAG rock from the VMF that is placed in the MRS was assumed to have the same lag time as rock from the LP Central pit for assessment purposes.

- Ore materials in the ROM and LGOs were assumed to be PAG and the Felsic Volcanic lithology (Table 4-5), which has been identified as the predominant ore lithology. Ore in the stockpiles is processed within several years of placement and prior to acid onset for these materials (see Section 4.3). Therefore, the ore was assumed to be non-acidic PAG.
- Total tonnages of rock in stockpiles or NPAG / NML rock used to construct site features were converted to a three-dimensional reactive surface area based on a mine rock surface area of 500 m^2/t. This scaling factor is consistent with field data for mine rock from an open pit gold mine in northern Ontario. Other open pit mines have shown lower scaling factors (on the order of 50 m^2/t) and this is considered reasonably conservative for the Project.
- Load generated from November to March was reduced by 85% to account for lower rates of sulphide oxidation at reduced temperatures (MEND 2006). This reduced load was allowed to accumulate until April when it was released, along with load generated during the month of April.
- Due to the heterogenous nature of MRS, infiltrating water can spread laterally and follow preferential flow paths. This means that some of the mass load released by the rock is not in contact with water that infiltrates into the pile, and therefore there is no mechanism for this mass load to be released from the MRS. A flushing factor of 40% was applied to represent the estimated proportion of the total generated load that is released from these features each month.
- Placement of the closure cover on the MRS during mine operations begins in Year 7 and is completed by the end of Year 10. The closure cover consists of a vegetated low permeability compacted clay material placed over the mine rock. It was assumed that placement of the cover reduces load release from the underlying mine rock by approximately 90% due to the reduced oxygen ingress and reduction in contact water (including a reduction in contact water from runoff and net infiltration) following placement of the cover.
- To account for constant yearly seepage flows from the MRS to the LP Central pit and gravity channel once the PAG cover is placed, annual loads released from the MRS are distributed into seepage pathways relative to the portion of annual contact water each pathway represents.

As described above, some field-scaling factors for temperature and grain size have been incorporated into the model, along with the estimated performance of the cover in terms of a reduction in mine rock contact water and related mass loadings. Estimated cover performance is based on initial modelling (WSP 2025e) and will be confirmed as part of ongoing engineering.

Source terms used to represent mine rock and ore-grade materials in the model are provided in Section 4.11.1.

4.5 TAILINGS MANAGEMENT FACILITY

The TMF will store the desulphurized tailings. Source terms for the desulphurized tailings and process water discharged with the tailings are presented in Section 4.11.2:

- An aerial extent of 1.4 Mm^2 was used to represent the exposed surface of desulphurized tailings in the TMF during at the end of the first full year of operations (Year 1) with an aerial extent of 3.1 Mm^2

at the end of operations (Year 26). The TMF ultimately contains 51.8 Mt of desulphurized NPAG tailings at the operations phase.

- Reclaim water for the process plant is sourced from the TMF pond, with alternate sources from the VMF and Chukuni River. Due to the use of reclaim water, load can accumulate in the process water circuit. This can increase the concentration of model parameters in process water discharged with the tailings. Load accumulation was permitted to occur at the process plant circuit in the model and incorporated mass load from reclaim water sources and new load released from ore processing.
- In the TMF, load generated from ongoing oxidation of exposed tailings from November to March was reduced by 85% to account for lower rates of sulphide oxidation at reduced temperatures (MEND 2006). This load was allowed to accumulate until April when it was released, along with load generated during the month of April.
- Sulphide oxidation in the tailings mass is largely driven by oxygen diffusion into the tailings. In the model, mass load is released from the surface and near-surface tailings mass, with an active oxidation depth assumed to be 10 cm. All the load generated by the NPAG tailings was assumed to be released (i.e., 100% flushing). Load is also released from the TMF (pore water) as seepage.
- Placement of the closure cover on the TMF was assumed to reduce load release from the underlying NPAG tailings by 50% in direct proportion to the reduction in contact water following placement of the cover. Cover modelling is planned as part of ongoing engineering studies to confirm these assumptions.

4.6 VIGGO MANAGEMENT FACILITY

The VMF will store the concentrate tailings under a continuous water cover. Source terms for the submerged concentrate tailings and process water discharged with the tailings are presented in Section 4.11.2. Contact water from around the site is also stored in the VMF:

- A total of 3.3 Mt of concentrate tailings will be subaqueously deposited within the east VMF. The final surface of submerged tailings will have an extent of approximately 64,000 m^2.
  - The concentrate tailings contained within the east VMF are stored beneath a water cover such that they are isolated from atmospheric oxygen. For the purposes of the model, it was assumed that tailings management during mine operations was successful at maintaining a water cover over the tailings and preventing acidic drainage from developing. Load was released from the concentrate tailings assuming they are non-acidic and in a submerged condition (see Section 4.11.3).
  - In the final year of operations NPAG / NML tailings will be deposited in the east VMF to form a blanket over the concentrate tailings, further isolating these materials and supporting the VMF closure. The tailings in the VMF will remain submerged in closure, with the concentrate tailings physically and geochemically isolated under the NPAG / NML tailings.
- Load release from the subaqueously stored tailings in the east VMF was assumed to occur at a constant rate year-round (i.e., temperature-related scaling not applied due to submerged conditions).
- All the load generated by the surface of the submerged tailings was assumed to be released (i.e., 100% flushing).
- Reclaim water for the process plant is sourced from the VMF, TMF pond, and Chukuni River. Due to the use of reclaim water, load can accumulate in the process water circuit. This can increase the concentration of model parameters in process water discharged with the tailings. Load accumulation was permitted to occur at the process plant circuit in the model and incorporated mass load from reclaim water sources and new load released from ore processing.
- Acidic inputs from the PAG pit walls in the LP Central pit report to the east VMF later in mine life (starting in Year 25). For modelling purposes, it was assumed that pH management of these flows will be undertaken at or upstream of the VMF to prevent acidification of the water in the VMF and

maintain geochemical stability of the submerged concentrate tailing stored therein. Concentrate tailings released load in the model assuming that neutral pH conditions were maintained. No concurrent reduction in mass loadings due to pH management of acidic inflows to the VMF was included.

- Following the dewatering of the west VMF to remove reject solution, both the east VMF and west VMF are filled with fresh water from the Chukuni River during the active closure phase. For modelling purposes, 0.5% of the load from the reject solution stored in the west VMF is assumed to be retained as mineral precipitates that can redissolve during accelerated filling. Once the water elevation is higher than the saddle between the east VMF and west VMF (350 masl), the VMF is treated as a single water body.
- Given the relatively low surface area to depth ratio of the VMF it was assumed that the water in the VMF is fully mixed (i.e., meromixis does not develop).

Information on wall rock in the VMF is provided in Section 4.7. It is assumed that there will be initial treatment of the VMF contact water once filled during the active closure period, to support the management of legacy load present in the VMF. For modelling purposes, this initial treatment was assumed to reduce parameter concentrations to Provincial Water Quality Objectives (PWQO) values. If any element was already less than its PWQO value(s), its concentration was not modified as part of this modelling step. Additionally, it was assumed that exposed rock benches were covered with clay-rich overburden, prior to acid onset of PAG wall rock, to limit their interaction with oxygen and water. For modelling purposes they were assumed to be suitably covered such that they provide no loading over the long term.

4.7 OPEN PIT WALL ROCK

- Pit wall areas in the LP Central pit and the VMF were based on 3D AutoCAD pit shell surfaces. Block model information was projected onto the pit shell to determine the proportion of the pit walls represented by PAG, NPAG / ML, NPAG / NML, and overburden. The lithological proportions of each rock type were assumed to be consistent with the mine rock for the LP Central pit and VMF. The proportions of each type on the overall pit walls were used to represent wall rock during the operations phase. After accelerated filling of the LP Central pit and VMF with water during the closure phase, the proportions of PAG, NPAG / ML, NPAG / NML, the various lithologies, and overburden above the final water level were used for modelling.
- Initial and final open pit designs were used to support the model. The initial and final design for the LP Central pit had a total wall area of 654,000 m^2 and 1,270,000 m^2 respectively. The initial design was applied to represent start-up conditions in the model in Year -1. The pit wall area was interpolated to the final design wall area from Year -1 to Year 8. The wall area was interpolated each year according to the relative change in rock volume removed from the pit. The final design was used to represent the pit walls through the remainder of the model during mine operations. For modelling purposes, it was assumed that the final wall rock surfaces would be exposed following extraction of 75% of the rock volume from the LP Central pit. This is estimated to occur in Year 4. For this assessment, a lag time of 22 years is estimated for rock from this pit (Section 4.3). Acid onset was assumed to occur for all PAG wall rock in the LP Central pit in Year 25.
- The Viggo pit / VMF design has a total wall area of 308,300 m^2 of which 240,800 m^2 is estimated to be exposed rock surface, the remaining 67,500 m^2 is estimated to be overburden. A volume area elevation curve was developed to estimate the exposed wall area following placement of tailings and the discharge of water to the VMF, and the exposed wall area varied in the model depending on the water level in each lobe of the VMF (i.e., east VMF and west VMF).
  - During operations the exposed wall area in the east VMF ranged from 50,000 to 187,000 m^2. PAG wall rock in the VMF is initially exposed in Year -1. During operations the wall area in the west VMF ranged from 58,000 to 116,000 m^2, with more wall rock exposed for the first 12 years of operations, prior to the use of the west VMF for reject solution storage.

  - Without mitigation, acid onset for PAG walls in the VMF is estimated to occur in Year 40, 40 years after the start of operations (Section 4.3).
- The three-dimensional surface area of the pit walls was converted to an effective surface area. A fracture factor of 50 m^2/m^2 was assumed to calculate the effective surface area of the walls that would contribute loading when exposed.
- It was assumed that rock debris will be present on the open pit benches. The mass of rock was calculated using the two-dimensional plan area of the benches, an assumed thickness of 0.3 m, and a density of broken rock of 1,900 kg/m^3. This was converted to a three-dimensional reactive surface area based on a mine rock surface area of 500 m^2/t.
- PAG, NPAG / ML and NPAG / NML rock, and associated lithologies for the pit walls and rock debris on benches were assumed to be consistent with the overall ML / ARD block model for the LP Central and VMF, respectively. The proportion of these rock types is provided in Table 4-1. Acidic and non-acidic PAG were tracked over time as summarized in Section 4.3.
- Load generated from November to March was reduced by 85% to account for lower rates of sulphide oxidation at reduced temperatures (MEND 2006). This load was allowed to accumulate until April when it was released, along with load generated during the month of April.
- A flushing factor of 100% was applied to represent the estimated proportion of the total generated load that is released from these features each month (i.e., no load storage on pit walls). This will be confirmed as part of water quality monitoring during mine operations.
- Some of the wall rock in the VMF is submerged during the operations phase and following filling of the VMF in closure. Wall rock in the LP Central pit is exposed over the life of mine and submerged during filling in closure. Although it was assumed that 100% flushing of oxidation products from the pit walls (i.e., no oxidation products are stored) occurred during subaerial exposure, an initial flush of mass load from stored oxidation products was accounted for upon submergence of pit walls with rising water levels. Wall rock is assumed to contribute no additional loading once submerged.
- Benches above the long-term water elevation in LP Central pit were assumed to be cleared of rock debris at closure.

Source terms used to represent LP Central and VMF wall rock are presented in Section 4.11.1.

4.8 UNDERGROUND MINE WALLS AND BACKFILL

- The current mine plan was used to develop a schedule for the volume and mine wall surface area of underground development and stopes over the life of mine. The underground mine workings were designated as either operating development or capital development to discretize how these volumes were backfilled. A maximum final areal extent of 7,000,000 m^2 of underground workings is achieved in the final year of the operations phase.
- All stopes and 55% of the operating development will be backfilled with paste backfill (approximately 20 Mm^3 between Year 1 and Year 26 and cemented rockfill (CRF; approximately 1.7 Mm^3 between Year -3 and Year 22. An additional approximately 3.8 Mm^3 of rock backfill will be placed from Year 1 to Year 26. Rock backfill is derived from underground mine operations. Information on the underground mine development and backfill is provided in Table 4-6.
- The proportion of underground mine wall rock and rock backfill that was PAG, NPAG / ML, and NPAG / NML, and specific lithologies of each rock type, were based on the overall ML / ARD block model for the underground (Table 4-2).
- Wall rock types and lithologies for the stopes were based on the ore blocks in the ML / ARD block model (Table 4-2). Acidic and non-acidic PAG were tracked over time as summarized in Section 4.3. As indicated in Section 4.3, PAG rock comprising the underground walls and rehandled backfill was estimated to have a lag time of 22 years and the surface area and tonnages of acidic and non-acidic PAG rock in the underground were tracked over time. Acid onset of the underground walls is

assumed to begin in Year 17. Rock backfill placement begins in Year 1 and acid onset of the rock backfill is assumed to begin in Year 22. It was assumed that contact water from the underground is net-acidic immediately following acid onset in underground PAG rock. At the end of the operations phase (Year 26) and immediately prior to the completion of rapid filling of the underground (Year 30), 20% and 29% of the PAG rock is net-acid generating, respectively.

- Water quality estimates did not consider the potential effect of delayed acid onset due to the additional alkalinity that may be available from the cement in the CRF, paste bleed water, or regional groundwater inputs. Paste appears to have relatively low alkalinity release rates based on available test data.
- Stopes are developed and backfilled with paste backfill within a three-month period; as such wall rock representing ore is not exposed for more than a three-month period. Therefore, it was assumed in the model that only 25% of the annual stope development was exposed as wall rock at a time during the year.
- It was assumed that stopes and underground workings backfilled with paste and CRF would not be free-draining, and that the backfill would restrict water and air flow. Underground workings backfilled with rock backfill were considered free-draining.
  - Since the rock backfill was considered free draining, it was assumed that this backfill and mine walls of these backfilled areas would release load like open mine areas (i.e., free access to air and water flow). When a stope or underground mine area is open, its surfaces are actively producing and releasing load.
  - Loading from mine surfaces is reduced once paste backfill or CRF is placed in the stopes. Since the paste backfill and CRF stopes were not free-draining they are expected to have restricted water and air flow. The effect of restricted water and air flow to mine areas backfilled with paste and CRF was assumed to reduce sulphide oxidation and subsequent load release from wall rock. Based on the backfilling process, paste is assumed to completely contact and seal the stope surfaces and the sealed stope surfaces are inactive. After a stope is backfilled, a cement plug is placed at the front face of the stope, further sealing the stope. One backfill face was assumed to be active for each closed stope (i.e., no load reduction assumed for that face), when the stope below is mined, per the mine design. A 5% scaling factor is applied to this face once the underlying stope is closed.
  - Restricted air and water flow within backfilled areas also reduces the rates of sulphide oxidation in the paste and will prolong lag times. For modelling purposes, it was assumed that paste would have no potential for ARD.
- The total area of the mine walls was converted to an effective surface area by applying a fracture factor of 50 m^2/m^2. The total tonnage of mine rock backfill was converted to a three-dimensional reactive surface area by applying a scaling factor of 500 m^2/t. Paste backfill and CRF also released load on a surface area basis.
- A flushing factor of 50% was applied to represent the estimated proportion of the total generated load from the mine walls and rock backfill that is released each month. The retained load (50%) is stored and instantaneously released during filling of the underground mine at closure.
- Once submerged at closure, underground mine walls and rock backfill are assumed to release no further load. Submerged paste backfill and CRF releases load using the source term presented in Section 4.11.3. The potential for enhanced metal release (i.e., arsenic) due to submerged conditions in the underground mine was assumed not to occur as organic carbon levels are expected to be low in the flooded mine water and thus there are no drivers for reductive processes.

Source terms for underground mine walls and backfill are presented in Section 4.11.1.

In addition to the above information and assumptions for mine walls and backfill, groundwater also flows into the underground mine workings. These flows are collected at sumps associated with underground mine dewatering during the construction phase and operations phase.

- Hydrogeological assessments indicate that groundwater inputs to the mine will include both shallow and deep groundwater sources. Baseline groundwater monitoring has indicated that these sources have different chemistries. It was assumed that groundwater inflows to the underground mine comprised 50% shallow groundwater and 50% deeper groundwater. Deep regional groundwater flow is expected to be transient and assuming deep groundwater flows into the underground mine is considered conservative.

Accelerated filling of the underground mine with fresh water from the Chukuni River will be conducted during the active closure period. A small portion of the mine development will be above the long-term water level (355 masl) and water from the underground mine will discharge to the LP Central pit. The mine workings above the long-term water level are predominantly situated in the Basalt (90%) and Fragmental (10%) lithologies and are understood to comprise NPAG / NML rock. The quality of the water draining by gravity from the water-filled underground mine to the LP Central pit is assumed to be sourced from shallow infiltration and therefore comprise shallow groundwater, with additional loadings from the NPAG / NML wall rock above the long-term water level in the underground mine. Circulation of water from deep in the flooded mine was assumed not to occur due to the extensive use of backfill and the hydrogeologic regime.

4.9 TMF QUARRY

A quarry (Q2) will be developed within the TMF footprint during mine operations. The quarry will eventually be buried by the desulphurized tailings with ongoing tailings deposition. Before that time, rock surfaces will be exposed in the quarry that will contribute mass load. Rock associated with the quarry is estimated to be NPAG / NML based on available Project information. Design information was not yet available for the quarry and the following simplifying assumptions were made to derive an area of wall rock associated with the quarry.

- Loading from rock walls in the quarry requires the conversion of the three-dimensional surface area into an effective surface area. A fracture factor of 50 m^2/m^2 was assumed to calculate the effective surface area of the walls that would contribute loading when exposed.
- It was assumed that a mass of rock debris will be present on the benches. The mass of this rock was calculated using the two-dimensional plan area of the quarry, an assumed thickness of 0.3 m, and a density of 1,900 kg/m^3. This was converted to a three-dimensional reactive surface area based on a mine rock surface area of 500 m^2/t.
- The quarry was represented as NPAG / NML rock and the Felsic Volcanic rock type for modelling purposes.
- Load generated from November to March was reduced by 85% to account for lower rates of sulphide oxidation at reduced temperatures (MEND 2006). This load was allowed to accumulate until April when it was released, along with load generated during the month of April.
- All the load generated by the quarry walls and rock was assumed to be released each month (i.e., 100% flushing).
- Following overprinting by the tailings in the TMF, the quarry surfaces were assumed to release no load.

4.10 LP CENTRAL PIT LAKE

The LP Central pit will be actively mined from Year -1 to Year 10, exposing pit walls which comprise overburden, NPAG and PAG mine rock (see Section 4.7). Once filling of the LP Central pit occurs, it is modelled as a pit lake as follows.

- Inputs of water and mass load into the pit lake include runoff from pit walls (as described in Section 4.7), and cleared areas within the open pit catchment area north of the LP Central pit and south of the gravity channel, along with any regional local groundwater seepage, seepage from the former LGOs, and seepage from the PAG and NPAG portions of the covered MRS. During the active closure period and passive closure period when accelerated filling with water is occurring, the pit lake also receives water and mass load from the AEX mine water pond and Chukuni River. Pit walls release stored load once upon initial flooding and cease to release load once submerged (Section 4.7).

- With accelerated filling of the LP Central pit with water, the pit lake reaches a water level of 343 masl after approximately four years (WSP 2025a). This operating water level is maintained during passive closure to provide storage capacity to manage design events and is 5 m below the long-term closure water level for the pit lake. The long-term maximum water level in post-closure is 348 masl.
- Mass load leaves the pit lake through pumped discharge from the pit to the VMF and AEX mine water pond, during the active and passive closure periods, or mass load out of the pit lake via passive overflow to the environment during post-closure. The only other outflow from the pit lake is via evaporation, where no mass load is removed. Groundwater losses are considered negligible based on the results of hydrogeological modelling for the Project (WSP 2025f).

For the purposes of this assessment, pit lake modelling followed a mass balance approach in GoldSim, with additional geochemical modelling in PHREEQC (see Section 4.13). An initial evaluation regarding the potential for pit lake stratification to occur and its influence on pit lake water quality was also conducted.

Lake stratification occurs due to differences in water density between surface waters and the underlying water volume. The density of water is a function of both its temperature and the concentration of TDS (i.e., sulphate and metals) in the water. Stratification can occur due to vertical gradients in TDS, or solar heat flux which causes surface waters to become warm, and therefore less dense, than underlying cooler waters. Pit lakes are prone to chemical stratification as they are generally deep relative to their surface area and often receive mine waters with high concentrations of TDS (often primarily represented by sulphate). For stratification to be permanently maintained, chemical density differences must be large enough to overcome mixing forces within the pit lake (primarily velocity shear due to wind stress), despite changes in thermal density due to seasonal fluctuations in water temperature. If density stratification is maintained over time, a pit lake is considered to be meromictic (the water column does not fully mix).

A preliminary assessment of the potential for significant chemical stratification to develop in the pit lake was conducted through review of the TDS contents and estimated configurations of the various inflow sources to the pit lake. Key inflows to the pit lake along with estimated sulphate and TDS for each inflow, inflow rates, and inflow configuration based on currently available data are provided in Table 4-7.

As a result of the proposed approach to closure including the MRS cover system most inflows have a reasonably low TDS content, as shown in Table 4-7. The information shown is based on the results of the site water quality model summarized in this report, and source terms; for groundwater-related inflows, any effects of dispersion or diffusion that may further reduce concentrations before these flows enter the pit lake have not been accounted for in these estimates.

Overall, any source areas with a higher TDS content (i.e., covered MRS seepage) have a relatively low inflow rate (<0.75% of the annual inflows) and discharge near the water surface, where the water will be well mixed due to wind-driven mixing, as observed in similar pit lakes in northern Ontario. Further, high volume inflows of low TDS water from the Chukuni River are expected to physically mix the water in the pit lake during accelerated filling, promoting additional mixing to homogenize concentrations. Therefore, higher TDS inflows are not likely to be naturally isolated at depth in the pit lake.

However, during summer months, thermally stratified conditions are expected to develop consistent with most temperate zone lakes. A thermocline depth of 10 to 20 m with surface temperatures of up to 20°C could be expected based on similar pit lakes in the northern Ontario region, depending on water clarity. Thermal stratification could isolate inflows to the surface water layer during the summer months and influence water quality during that time.

To be conservative, several conditions were evaluated as part of pit lake modelling.

- A fully mixed pit lake (mixing from the maximum lake depth of 110 masl to surface)

- Summer thermal stratification conditions, with a mixed epilimnion thickness of 10 m and 20 m, that fully mixes with the pit lake water column in the autumn during isothermal conditions.
- Summer thermal stratification conditions, with a mixed epilimnion thickness of 10 m and 20 m, that mixes with a portion of the underlying water column (bottom mixing depth of 270 masl assumed, selected based on open pit geometry).

4.11 GEOCHEMICAL SOURCE TERMS

Source terms for the various Project components are outlined in the following sections.

Source terms and supporting geochemical conditions utilized in the model were developed from the comprehensive geochemical baseline program for the Project (WSP 2025b). Baseline programs included static testing of several thousand geochemical samples and over 100 kinetic tests. Representative source terms were developed to capture the range of observed geochemical conditions in the Project geological materials. Under this approach, where strong geochemical trends were observed in the Project data parameters (i.e., as observed for sulphate, arsenic, cadmium, lead, selenium, and zinc), the rates of parameter release from mine materials were represented by the overall dataset including low, average and worst case materials. Median data were used where no trends were observed, supported by the large project dataset. Other model assumptions were derived to reasonably represent field scale conditions, as possible with available data.

4.11.1 MINE ROCK AND ORE

Mine rock and ore source terms were developed to represent the various material types including acidic PAG rock, non-acidic PAG rock, NPAG / NML rock, and NPAG / ML rock. Source terms were based on trends in the geochemical test results for the Project. These largely reflect laboratory test results (humidity cells). Scaling factors were applied to the source terms to represent field conditions as outlined in Section 4.4.

Key aspects of mine rock and ore source term development included the following:

- Source terms were developed as mg/m^2/week release rates (from humidity cell tests) and applied to the three-dimensional reactive surface area of rock in the material balance.
- Lithology specific source terms were defined for mine rock and ore, where applicable.
- The ML / ARD block models indicated that overall rock volume from the open pits (LP Central pit and VMF), and underground mine had slightly different geochemical characteristics (primarily sulphur content and arsenic content). Therefore, source terms were also developed to be specific to rock from the open pits and rock from the underground, as applicable.
- Geochemical information from the block model and the ML / ARD dataset was used to directly support source term derivation as described below.

Mine rock and ore source terms are summarized in Tables 4-8 to 4-11.

4.11.1.1 NON-ACID PAG, NPAG / ML AND NPAG / NML

Source terms for non-acidic PAG, NPAG / ML, and NPAG / NML rock were based on currently available humidity cell test results for the Project (WSP 2025b).

- Source terms were derived based on steady state release rates for 35 mine rock humidity cell tests.
- The test samples encompassed key Project lithologies and a range of NP, sulphur, and arsenic contents. The humidity cell data set included representative samples of key rock types including Felsic Volcanic (FV1 and FV2), Basalt, Metasediment (MS2 and MS3), Fragmental (Frag1 and Frag2) and Argillite. Together, these rock types represent over 98% of the mine volume, with Felsic Volcanic rock types representing 85% of the mine volume.

- Sixty-six weeks of data were available for 27 humidity cell tests (HC-1 to HC-27) and 19 weeks of data were available for eight humidity cell tests (HC-28 to HC-35). Release rates were typically based on the last ten and five weeks of these cells, respectively. Some cells (including HC-4 [FV1], HC-9 [FV1], HC-26 [Argillite], HC-17 [MS3], and HC-33 [FV1]) had mildly acidic leachates. Non-acidic release rates for these cells were based upon the neutral leaching period prior to the formation of acidic conditions. HC-33 had no neutral leaching test results and was excluded from the dataset.
- Release rates were expressed as the weekly release of mass load for a given parameter normalized to the surface area of the test sample in the humidity cell (i.e., $mg/m^2/week$).

For some model parameters including sulphate, cadmium, lead, selenium, and zinc a relationship was observed between the release rates in the humidity cell tests and the solid phase sulphur content or metal content of the test samples. Arsenic release also varied with arsenic content.

Sulphate, Cadmium, Lead, Selenium, and Zinc

- Due to the observed relationships between release rates and solid phase chemistry for sulphur, cadmium, lead, selenium, and zinc, regression equations were developed to represent the sulphate or metal release rate based on the solid phase characteristics of the samples. These relationships are presented in Figures 4-2 to 4-11.
- Source terms were calculated using the equations and solid phase metal content data from the ML / ARD block model (for sulphate) or Project ML / ARD database (for cadmium, lead, selenium, and zinc) to calculate an overall release rate representing the range of solid phase concentrations present in the rock. Solid phase concentrations for the rock considered the characteristics of mine rock and ore-grade materials to derive mine rock and ore source terms for the various lithologies.
- The regression equation approach was used as it allows the release rate to vary depending on the solid phase concentrations of the materials, based on the observed relationship. Where such a relationship exists, using it to derive a loading source term can provide increased representativeness of the mine volume, as both low, typical, and higher concentration materials are better represented in a single source term value. Based on the currently available geochemical data, these parameters are expected to have an important influence on water quality, and use of a regression-analysis based source term provides additional representation for the range of release rates that may occur for Project rock.

The relationships developed for sulphate, selenium, cadmium, lead, selenium, and zinc (Figures 4-2 to 4-8) from the humidity cell test results were used to generate source terms as follows.

- The sulphate regression equation representing NPAG / NML, NPAG / ML, and non-acidic PAG was developed using the observed relationship between the solid phase total sulphur content of the samples and sulphate release rates from humidity cell testing. Different sulphate release rate trends were observed for Felsic Volcanic (FV1 and FV2) rock and other lithologies, including Metasediment (MS2, MS3), Basalt, Fragmental (Frag 1 and Frag 2), and Argillite. Felsic Volcanic rock was observed to release sulphate at slightly lower rates for a given sulphur content than samples of other rock types. Therefore, separate regression equations were developed for Felsic Volcanic and the other lithologies, as shown in Figures 4-2 and 4-3. The regression equation and sulphur data from the Project block model was used to determine the final source term value for each rock type as presented in Tables 4-8 to 4-10.
- Regression equations for selenium, cadmium, lead, and zinc were also developed, using the observed relationship between the respective solid phase metal content data and release rate data from the humidity cell tests, for each parameter. The regression equations are shown in Figures 4-4 to 4-8. Data from all rock types followed consistent trends and data were used in aggregate to represent NPAG / NML, NPAG / ML, and non-acidic PAG rock from all lithologies.
- Selenium demonstrated different release rate trends for Felsic Volcanic samples compared to samples from other lithologies, whereby selenium release rates were generally higher for Felsic Volcanic humidity cells for a given solid phase selenium content (Figures 4-4 and 4-5). Samples from the Basalt, Metasediment (MS2, MS3), Fragmental (Frag 1, Frag 2) and Argillite lithologies behaved similarly to one another and showed lower rates of selenium release. Therefore, separate regression

equations were developed for Felsic Volcanic and the other lithologies, as shown in Figures 4-4 and 4-5.

- Cadmium, lead, and zinc displayed similar release rate trends whereby release rates were consistently low for lower solid phase metal content samples, and higher release rates were positively correlated to higher solid phase metal contents (Figure 4-6 to 4-8). Based on the trends, lower metal content samples with consistently low release rates were identified to include samples with a solid phase cadmium, lead, and/or zinc content of up to 0.5 mg/kg (Figure 4-6), 28 mg/kg (Figure 4-7) and 220 mg/kg (Figure 4-8), respectively. For samples with solid phase contents less than or equal to these values, median release rates were used for corresponding humidity cell tests. A regression equation was developed for solid phase metal contents above these values, to represent varying metal release at higher solid phase metal contents. Generally, these higher concentration samples represented a minor proportion of the overall Project rock. Data from the humidity cell test HC-1 was excluded from regression equation development to be protective, as this cell had anomalously low lead release relative to its solid phase (100th percentile) lead content.
- The regression equations and solid phase cadmium, lead, selenium and zinc data from the baseline ML / ARD dataset was used to determine the final source term value as presented in Tables 4-8 to 4-10. This included 3,432 drill core samples from the open pits. The underground was represented by drill core samples from both the underground (n=453) and the open pits (n=3,432) to increase the available baseline data for some ML / ARD groups and rock types. Solid phase sulphur concentrations in the baseline samples were similar to or slightly higher than the sulphur concentrations indicated in the ML / ARD block models for the open pits and underground. Given the association of cadmium, lead, selenium and zinc with sulphide minerals, this relationship suggests that use of the baseline datasets is appropriate but may result in conservative (e.g. higher) release rates for these parameters.

Arsenic

Metal leaching thresholds have been developed for arsenic for NPAG Project rock based on solid phase arsenic content and lithology (WSP 2025b). The arsenic leaching thresholds developed for each lithology group (Felsic Volcanic, Basalt, and all other rock types) were used to define source terms for the NPAG / NML and NPAG / rock. The arsenic source term was based directly on humidity cell release rates as follows.

- The NPAG / NML arsenic source term for Felsic Volcanic 1 and Basalt were based the release rates from humidity cell tests with arsenic below the metal leaching threshold for each lithology, respectively (Figures 4-9 and 4-10). Among Metasediment, Fragmental, and Argillite cells, HC-28 (MS3) was selected to represent arsenic release from NPAG / NML rock (Figure 4-11). This cell was considered suitable to represent these rock types due to its low arsenic content (1.4 mg/kg) and representative host mineralogy for these lithologies (mixed pyrite and arsenic sulphides).
- NPAG / ML source terms were based on cells with solid phase arsenic contents above the respective metal leaching thresholds for each lithology group (Felsic Volcanic, Basalt, and other rock types; Figures 4-9 to 4-11).
  - The available humidity cell data for NPAG / ML Felsic Volcanic rock included HC-2 and HC-30, which contained 1100 and 150 mg/kg As, respectively. Arsenic in these samples was primarily hosted by arsenopyrite and undifferentiated arsenic sulphide (likely cobaltite-gersdorffite); the arsenic mineralogy of these cells is associated with higher arsenic release, and they are considered to represent a conservative estimate for NPAG / ML Felsic Volcanic rock. The NPAG / ML source term for Felsic Volcanic was based on the average of the steady state release rates from these two cells (Figure 4-9).
  - HC-23, which contained 390 mg/kg solid phase arsenic, was used to represent NPAG / ML Basalt (Figure 4-10). Arsenic in this sample is primarily hosted by arsenopyrite, and this is considered a conservative representation of arsenic leaching in Basalt.
  - Data for six humidity cell tests (HC-14, HC-15, HC-16, HC-18, HC-27, and HC-35) from the Metasediment and Fragmental lithologies were available with As >12 mg/kg; the median release

rate among these cells was used to represent the NPAG / ML source term for arsenic (Figure 4-11). A range of arsenic contents (13 to 6000 mg/kg) were represented among this group, as well as a range of arsenic mineral hosts, including arsenopyrite, undifferentiated arsenic sulphides (likely cobaltite-gersdorffite), cobaltite-gersdorffite, and pyrite.

  - HC-10 (Felsic Volcanic) was excluded from source term derivation for NPAG / ML Felsic Volcanic rock as it exhibited anomalously low arsenic leaching relative to its arsenic content.

Non-acidic PAG mine rock source terms for arsenic were developed by applying the release rates described above to the arsenic content distribution for PAG rock and the above rock types. Arsenic content information was obtained from the ML / ARD block model for this purpose.

Other Parameters

Source terms representing NPAG / NML, NPAG / ML and non-acidic PAG for all other modelled parameters are presented in Tables 4-8 to 4-10 and were derived as follows.

- Calcium and magnesium source terms were calculated theoretically based on sulphate release, assuming that two moles of neutralization potential (represented by calcium and magnesium) were released for every one mole of sulphate. This approach was used as the humidity cell tests appeared to have enhanced carbonate dissolution due to the test procedure (i.e., most leachates had carbonate molar ratio values >2). Calcium and magnesium were assumed to represent approximately 95% and 5% of the calculated neutralization potential release, respectively, based on the relative release rates of calcium and magnesium in the tests. Separate regression equations were developed for Felsic Volcanic rock types and all other rock types (Metasediment, Fragmental, Basalt, and Argillite) consistent with the trends observed for sulphate.
- Similarly, given the observation of enhanced NP flushing in the humidity cell tests, the mine rock source term for alkalinity was based on the median steady state alkalinity from trickle leach column testing (31 mg $CaCO_3$/kg; 26 weeks of data available). Alkalinity from these tests was observed to be consistent with data obtained from field tests (WSP 2025b).
- The concentrations of other model parameters (including mercury, silver, beryllium, boron, chromium, molybdenum, zirconium, copper, antimony, thallium, tungsten, iron, chloride, nickel, manganese, aluminum, cobalt, potassium, sodium, uranium, vanadium, and phosphorous) in the humidity cell test leachates (n= 35 tests) were typically low but detectable, although some parameters were below analytical detection limits. Two approaches were used to derive source terms, depending if release rates were based primarily on concentrations below the analytical detection limit for a given parameter, or if release rates were based on detectable concentrations.
  - Model parameters with concentrations generally below the analytical detection limit in humidity cell leachates included all included tests (n=34) for mercury, silver, beryllium, boron, chromium, molybdenum, and zirconium, and a majority of tests for copper (n=30 HCTs), antimony (n=32 HCTs), thallium (n=28 HCTs), tungsten (n=32 HCTs), and iron (n=30 HCTs). Concentrations that were below the analytical detection limit were represented by one-half of the detection limit value to calculate release rates for source term derivation. The median release rate among the humidity cell tests was used to represent the source term for these parameters.
  - Other parameters (including chloride, nickel, manganese, aluminum, cobalt, potassium, sodium, uranium, vanadium, and phosphorus) had concentrations that were generally detectable. For these parameters, the source terms were based on median release rates among the humidity cell tests. Release rates for one to two tests were excluded for some parameters as follows:
    - Data from HC-26 (Argillite) was excluded for nickel, cobalt, potassium, and sodium as it represented the maximum release rate among all humidity cell tests for these parameters but the rock type represents <1% of the mine volume.
    - HC-9 (FV1) and HC-15 (Metasediment 2) were excluded for cobalt, and HC-15 was excluded for nickel, as the release rates from these cells were elevated due to the presence of higher than typical amounts of cobaltite-gersdorffite and these leaching rates were considered non-representative of Project rock overall.

– pH for contact water from non-acidic PAG and NPAG rock were assumed to be equal to the median steady state neutral pH among all humidity cells (i.e., pH 7.5).

4.11.1.2 ACID PAG

Project kinetic tests have shown relatively low rates of sulphide oxidation. No humidity cell tests had reached stable acidic leaching conditions (i.e., pH ≤3.5) at the time of writing which included data from up to 66 weeks of humidity cell testing. Therefore, the acidic PAG source term was based on humidity cell test results for four strongly acidic (pH 2.5 to 3.9) humidity cell tests from two analogue gold mine projects (referred to as Analogue Site 1 and Analogue Site 2).

The analogue tests had operated for approximately 85 to 100 weeks and median release rates over the last 20 weeks of testing were used to derive source terms. The analogue sites were selected based on their similar geologic setting, sulphide content and mineralogy, and comparable geographic location to the Project.

- Average release rates from the four analogue site humidity cells were used to represent the acidic PAG source term in the model (Table 4-11).
- Data from all four analogue site humidity cell tests were used for most parameters, as the sulphide content (approximately 1%) and metals content of the analogue test samples was consistent with Project PAG rock. The following data was excluded to be representative.
  - Analogue Site 1 has molybdenite in the rock along with elevated solid phase molybdenum contents and elevated molybdenum release rates. Molybdenite is not pervasive among Project rock and potentially elevated molybdenum release is not expected based on currently available data.
  - Analogue Site 2 has elevated solid phase lead contents relative to Project PAG rock and lead release rates were high from the Analogue Site 2 humidity cell tests. Therefore, lead release rates were based on the Analogue Site 1 humidity cell test results, for which the test samples had a similar solid phase lead content to the Project PAG rock.
  - One of the four analogue site humidity cell tests had notably elevated phosphorus release rates (several orders of magnitude higher than the other tests) and was excluded from the dataset.
- Concentrations of boron, mercury, molybdenum, and zirconium were typically below the analytical detection limit in the humidity cell leachates. Release rates for these parameters were based on one-half of the detection limit value in place of concentrations that were below the analytical detection limit.
- pH for acidic PAG contact water was assumed to be the same as the average acidic leachate from the analogue site humidity cells (pH 3).

The acid PAG source term will be confirmed with site-specific data once stable acidic leaching conditions develop in the Project kinetic tests.

4.11.2 PIT WALL FLOODING – INITIAL FLUSH

A source term was developed to represent the initial flush of surface oxidation products from exposed pit walls in the LP Central pit and VMF for NPAG / NML, NPAG / ML, non-acidic PAG, and acidic PAG rock (Table 4-12). NPAG / NML, NPAG / ML, and non-acid PAG source terms were additionally subdivided into lithologic groups, including Felsic Volcanic, Basalt, and Metasediment, Fragmental, and Argillite, consistent with the overall mine rock source terms. The pit wall flooding source term was developed as a surface area normalized load (mg/m^2) that was applied as a one-time loading during pit flooding upon first contact of exposed pit walls with pit lake water.

- The source term for the initial flush was based on the total load released from the humidity cell tests over the first five weeks of test operation (week 0 to week 4).

- For NPAG / NML, NPAG / ML, and non-acidic PAG source terms, the total load over this period was summed for each humidity cell utilized for mine rock source terms. Details on the specific cells used are provided in Section 4.11.1. The initial flushing source term was based on the 75th percentile of the total load (week 0 to 4) for all of these humidity cells to represent the initial flush from submerging NPAG / NML, NPAG / ML, and non-acid PAG wall rock.
- Some of the PAG pit walls are assumed to be acidic at the time of pit wall flooding. Analogue cells used to represent the acidic PAG source term for mine rock were not acidic from cell start up, and consequently suitable acidic first flush data from these humidity cell tests was not available. The non-acid PAG pit wall flooding term was therefore estimated based on scaling up the non-acidic source term using the ratio of sulphate release in the acid and non-acid PAG humidity cell tests (increased by a factor of approximately 70 times). This scaling factor was applied to all parameters to develop the acidic PAG source term for initial flooding.

4.11.3 TAILINGS AND PROCESS WATER

Source terms were developed to represent the sulphate and metal release from desulphurized (NPAG) tailings to be stored in the TMF and the concentrate (PAG) tailings to be stored subaqueously in the VMF.

Source terms for tailings and process water are presented in Table 4-13 and described below. All tailings products referenced in the following discussion were produced via metallurgical testwork for the Project. Process water source terms therefore account for reagent use and load released from ore during processing. All samples underwent cyanide destruction as part of the bench scale testwork.

Desulphurized Tailings

Humidity cell testing is ongoing for metallurgical testwork tailings produced for the Project. At the time of writing, 39 weeks of test results were available for one tailings humidity cell test prepared with desulphurized tailings (WSP 2025b). The tailings test sample was NPAG based on its neutralization potential ratio (neutralization potential ratio; NPR >2) and it had a low sulphur content (0.19% sulphur). Data from the desulphurized tailings test were used to derive source terms.

Release rates for the tailings were expressed as load released per planar surface area of tailings in the humidity cell test per week (mg/m^2/week). Release rates were applied to the footprint area of desulphurized tailings in the TMF in the model.

- Source terms were based on the humidity cell test results for the desulphurized tailing sample. This included use of the median release rate (mg/m^2/week) in the last 10 weeks of testing, over the 39-week test period. Concentrations of some parameters (including mercury, silver, beryllium, boron, cadmium, lead, antimony, thallium, vanadium, tungsten, zinc and zirconium) were below their respective analytical detection limits. For these parameters, half of the detection limit values were used to calculate release rates.
- pH values and alkalinity concentrations for the desulphurized tailings contact water were based on the median pH and alkalinity in humidity cell leachates through the last 10 weeks of the desulphurized tailings humidity cell test.

Additional humidity cell tests have been initiated with desulphurized tailings and results will be used to validate the source terms used herein.

Concentrate Tailings

Concentrate tailings are expected to be PAG (NPR <1) with a high sulphur content and will be stored subaqueously in the VMF to limit oxidation and prevent acidification. Results from a tailings kinetic test prepared with concentrate tailings were used to support source term derivation. The test was prepared with 7 cm of tailings and 21 cm of overlying water, which was slowly recirculated to simulate submerged tailings in contact with ponded water. The sample used in the test had a total sulphur content of approximately 30% and was PAG (NPR <1; WSP 2025b).

Nine weeks of data were available from the test at the time of writing. Since the test was operated as a recirculating column (i.e., load is retained in the overlying water each week), weekly release rates were calculated based on the change in load released from week to week. Release rates were represented as a flux (i.e., release rate per planar surface area of tailings in contact with the overlying water, mg/m^2/week), and applied to the surface area of concentrate tailings in the VMF in the model.

- The source term for the concentrate tailings was based on the median release rate (mg/m^2/week) for the subaqueous recirculating column over the first nine weeks of testing.
- If parameters were at the analytical detection limit, or the change in load from week to week was negative (i.e., load was lost) or equal to zero, release rates were determined based on one-half of the detection limit value for the given parameter. This occurred for beryllium, chromium, vanadium, and zirconium.
- The submerged PAG tailings were assumed to maintain a neutral pH due to their subaqueous condition. For modelling purposes, a flux of hydrogen ions or alkalinity was not included for the subaqueous concentrate tailings (i.e. they were assumed to be inert from an acidification / neutralization capacity).

The NPAG tailings used to cover the PAG tailings in the VMF at closure utilized the desulphurized tailings source term (which represents subaerial leaching in a humidity cell test), scaled down by a factor of 10 to estimate release rates under subaqueous conditions.

Process Water

Process water is discharged with the desulphurized tailings and the concentrate tailings when they are deposited in the TMF and VMF, respectively. Supernatant water quality (post-cyanide destruction and post-flotation) from metallurgical testwork tailings, representing the currently planned Project tailings, was used to represent process water in the model. Source terms were represented as a concentration (mg/L) applied to the volume of process water discharged with each tailings stream.

Supernatant water quality data (post-cyanide destruction) for the desulphurized NPAG tailing (n=6 samples) and concentrate tailing (n=6 samples) generated in the metallurgical program supported source term derivation. Process water source terms are presented in Table 4-13.

- Source terms were based on the 75th percentile concentration (mg/L) for the desulphurized tailings supernatant samples and concentrate tailings supernatant samples except for pH and alkalinity, which were based on 25th percentile values.
- Concentrations of mercury, beryllium and chromium were below analytical detection limits in all of the desulphurized tailings supernatant samples, and mercury was below detection limits in all of the concentrate tailings supernatant samples. Concentrations in supernatant below analytical detection limits were represented by half the detection limit for a given parameter.

4.11.4 MEMBRANE FILTRATION REJECT SOLUTION

Estimated membrane filtration reject solution water chemistry was estimated by others (Great Bear Resources, 2025) and used directly in the model. The reject solution source term is provided in Table 4-14.

4.11.5 BACKFILL

Paste backfill source terms were generated from kinetic tests prepared with paste backfill samples prepared for the Project. Paste backfill was prepared using simulated whole tailings representative of the LP Zone (post-cyanide destruction) and binder. The paste was cured for 28 days before use in the tests.

Prepared paste backfill underwent subaerial and subaqueous kinetic testing, to simulate mass load release from the paste in an unsaturated and saturated condition, respectively. Source terms were also developed to represent the bleed water released from the paste backfill during the curing process. Paste backfill and bleed water source terms are described below and summarized in Table 4-14.

Underground backfill largely comprises paste backfill (80%). Lesser quantities of the backfill volume are represented by rock backfill (13%) and CRF (7%). Paste backfill source terms were used to represent both paste backfill and cemented rockfill in the model, considering the low volume of CRF.

Unsaturated Paste Backfill

The source term for unsaturated paste backfill was developed to represent the load contributed by the flow of water over exposed surfaces of paste backfill in the underground throughout the operations phase, prior to filling of the underground.

To simulate these conditions, prepared paste backfill was cast and subject to a subaerial kinetic test in the laboratory. A large slab of paste was prepared and mounted at a slight angle. Water was slowly percolated over the surface of the paste slab, then collected and analyzed weekly. Ten weeks of data from the test were available at the time of writing (WSP 2025b). Release rates were expressed as load released per planar surface area (representing the top surface of the paste slab in contact with water) of paste per week (mg/m^2/week).

- The source term was based on the maximum release rate over the 10-week test period.
- pH values and alkalinity concentrations for the unsaturated paste backfill contact water were based on the median pH and alkalinity in kinetic test leachates through the 10 weeks of available data.
- Silver, beryllium, cadmium, nickel, phosphorous, lead, vanadium and zirconium were below the analytical detection limits in the test leachates. For these parameters, half of the detection limit was used when calculating release rates used to develop source terms.
- Sulphate and calcium release rates were adjusted upwards relative to the test results to account for equilibrium with gypsum, which is likely to be attained with the use of membrane reject solution in the paste. Release rates of sulphate and calcium were therefore adjusted upwards to reflect assumed concentrations of 2,200 mg/L and 400 mg/L, respectively. The assumed concentrations were converted to a surface area-normalized release rate using the average water volume and surface area of the test sample.

Saturated Paste Backfill

The source term for saturated paste backfill was developed to represent the load contributed by backfilled stopes after they are flooded.

Results from a subaqueous kinetic test prepared with paste backfill were used to derive the source term. The test comprised a 15 cm thick layer of prepared paste that had been cast in (2.5 cm diameter) spheres, with a 47.5 cm thick overlying column of water. The water was slowly recirculated through the layer of paste spheres and returned to the top of the column, to simulate a longer flow path of water across a surface of paste. Samples of the column water were collected weekly from a port located at the bottom of the column. Deionized water was added to replace the volume lost through sampling each week.

Seven weeks of data were available from the test at the time of writing. Since the test was operated as a recirculating column (i.e., load is retained in the overlying water each week), weekly release rates were calculated based on the change in load released from week to week. Release rates were represented as a flux (i.e., release rate per surface area of paste backfill spheres in contact with deionized water, mg/m^2/week) and applied to the surface area of exposed paste surfaces in the model.

- The source term was based on the maximum release rates from weeks one through seven of testing. If parameters were at the analytical detection limit, or the change in load from week to week was negative (i.e., load is lost) or equal to zero, release rates were determined based on half the detection limit for a given parameter. This occurred for iron, beryllium, boron, lead, mercury, nickel, thallium, vanadium and zirconium.
- As with the unsaturated paste backfill, sulphate and calcium release rates were adjusted upwards relative to the test results to account for equilibrium with gypsum, which is likely to be attained with the use of membrane reject solution in the paste. Release rates of sulphate and calcium were therefore adjusted upwards to reflect assumed concentrations of 2,200 mg/L and 400 mg/L,

respectively. The assumed concentrations were converted to a surface area-normalized release rate using the average water volume and cross-sectional surface area for the test.

- The flooded paste backfill was assumed to maintain a neutral pH condition due to limited exposure of backfilled stopes to contact water and oxygen (see Section 4.7) during mine operations and prior to filling, as well as being isolated due to flooded conditions in the underground mine at closure. For modelling purposes, a flux of hydrogen ions or alkalinity was not included for the flooded paste backfill (i.e. they were assumed to be inert from an acidification / neutralization capacity).

Paste Backfill Bleed Water

The paste backfill placed underground is expected to release (bleed) water as it cures. The source term for the paste backfill bleed water was developed by proportionally mixing the membrane filtration reject solution chemistry and the whole tailings supernatant chemistry. The supernatant samples were associated with three samples of simulated whole LP zone tailings, post-cyanide destruction. The proportion of each solution used was 29 and 71 % respectively, based on average operating conditions for the paste plant. Concentrations of sulphate and calcium were assumed to be 2,200 mg/L and 400 mg/L, respectively, based assumed equilibration with gypsum.

4.11.6 OVERBURDEN

Source terms for contact water from stockpiled overburden were represented as a concentration applied to estimated contact water volumes from these stockpiles. At closure, the overburden source term was used to represent contact water shed from the closure cover placed on the TMF and MRS (including the PAG and NPAG / ML rock and NPAG / NML rock). Geochemical testing for the Project indicates that the overburden is NPAG with a low potential for metal leaching (WSP 2025b).

Source terms for overburden were derived trickle leach column tests prepared with representative overburden materials from the site. The tests comprised a layer of overburden in a plexiglass column, with water drained through the material to simulate the flow of precipitation through overburden. Leachate that flowed out of the base of the column was collected and analyzed. The test with the most available data at the time of writing (COL-1, 29 weeks) was primarily used for source term development. This test was NPAG and with elevated sulphur contents (0.06% total sulphur) relative to most overburden samples and highest metal contents of the dataset (WSP 2025b). Of the approximately 100 overburden samples tested, approximately half of the samples had below detection sulphur content (<0.005% or <0.01%). When detectable, sulphur concentrations ranged from 0.006% to 0.11%. Metal concentrations were similarly low. Based on its solid phase characteristics, the overburden test sample used to define the overburden source term was considered to conservatively represent overburden materials.

Additional representative overburden column tests (COL-2 to COL-4) have been initiated, with early release rate data (9 weeks) available (WPS 2025b). Data from these columns was used to supplement source term development as described below, but metal release rates were not used as these columns had a lower solid phase metal content and not reached steady state at the time of writing.

- Source terms were calculated based on the median concentration (mg/L) in the COL-1 leachates over the last ten weeks of testing. pH was based on the median pH of column leachate (pH 7.5) through the last 10 weeks of testing.
- Some parameters had concentrations in COL-1 leachates below the analytical detection limit including mercury, silver, beryllium, cadmium, lead, thallium and tungsten. Where this occurred, concentrations were represented by half the detection limit value for these parameters.
- It was noted that the alkalinity of COL-1 was elevated (approximately 130 mg $CaCO_3$/L) relative to natural background levels (approximately 30 mg $CaCO_3$/L) measured as part of the baseline water quality assessment. This was attributed to the higher carbonate NP of the sample (85 kg $CaCO_3$/t) relative to typical project overburden (median of 2.5 kg CaCO3/t). As such, alkalinity, calcium, and magnesium source terms were based on the average results for COL-2 and COL-3 as these columns had neutralization potential contents consistent with average overburden materials.

Overburden source terms are presented in Table 4-15.

Additional overburden kinetic tests are underway to verify the source term utilized in the model.

4.11.7 NATURAL AND CLEARED AREA RUNOFF

Source terms for runoff from natural and cleared areas were represented by a concentration applied to estimated runoff volumes from these areas.

Source terms are summarized in Table 4-15 and were derived using baseline water quality monitoring data for the Project. Spatial differences in water quality were noted in the baseline data for waters around the central areas of the site relative to waters around the western portion of the site where the TMF will be developed. To be consistent with these observations, two types of natural and cleared ground source terms were developed.

- Source terms that apply to natural / cleared ground proximal to the Dixie Creek main stem, which represents the majority of surface runoff (stations SW-3, SW-4, SW-8 and SW-9; n=84 sampling events).
- Source terms that apply to natural / cleared ground proximal to the TMF area (station SW-GL, n=26 sampling events).

Water from the Chukuni River will be used in the process plant during operations and to support accelerated filling of the underground mine, LP Central pit, and VMF at closure. A source term for the Chukuni River water was developed using data from station CR-FDP (n=29 sampling events).

Median concentrations were calculated for each quarter from available baseline surface water quality data collected between June 2020 and October 2024, and prior to the initiation of the AEX program. The source term for each area was based on the median of these quarterly concentrations.

4.11.8 GROUNDWATER SEEPAGE

Several sources of groundwater seepage are incorporated into the model including regional groundwater, and mine contact water from site features that flows as groundwater seepage to other receivers. Source terms associated with groundwater seepage are presented below.

Regional groundwater is intercepted by the TMF, LP Central pit, underground mine workings, and the VMF and is collected as part of dewatering and water management activities during mine operations.

Baseline groundwater monitoring at deep boreholes indicated that there was an increase in conductivity with depth, whereby shallow groundwater had lower conductivity than deeper groundwater, reflecting different water quality between these two groundwater sources.

Therefore, regional groundwater source terms were developed for both shallow and deep groundwater and are provided in Table 4-15. Development of groundwater source terms was supported by data from the ongoing hydrogeological assessment for the Project.

- The shallow groundwater source term was based on baseline groundwater data collected as part of quarterly sampling programs between 2022 and 2024 prior to the AEX program. Source term data utilized the median of the quarterly data for 41 wells interpreted to be intercepting shallow flow (average screen depth 10m).
- The deep groundwater source term was based on data collected in 2025 from a recent deep groundwater survey campaign. This campaign targeted open exploration drillholes that were selected based on electrical conductivity values, depths, and geographic coverage. Samples were collected from depths between approximately 50 and 460 m below surface and reflect deep groundwater conditions. A total of 17 samples were collected from six boreholes during this campaign. The deep groundwater source term was calculated as the median concentration for model parameters in the deep groundwater dataset.

In the model, shallow and deep regional groundwater source terms were applied to the underground mine and open pit during mine operations and accelerated filling. Regional groundwater that is intercepted by the LP Central pit lake (once full), VMF, and TMF pump back wells utilized the shallow groundwater source term.

Mine contact water reports to onsite receivers as seepage and is incorporated into the model per the water balance. This includes seepage from the MWP that is pumped to the TMF pond, seepage from the TMF and TMF pond that is pumped to the MFP as well as seepage from the PAG / ML and NPAG / NML rock at the MRS and ore stockpiles that flows to the LP Central pit. In the model, seepage from these features was represented by the modelled monthly concentration for each seepage source. Mass transport processes and geochemical reactions along groundwater flow paths were not considered in these estimates and cannot be defined with currently available information.

The water balance indicated that a small volume of groundwater seepage to the underground mine was represented by water sourced from surface features including the TMF, TMF pond, and MWP. Water sourced from these features comprises on average 5% of the total groundwater seepage to the underground mine. The distance between the underground mine and the TMF is approximately 2 km. The underground mine is developed and closed within approximately 30 years, and groundwater flow rates are expected to be slow owing to the low hydraulic conductivity of the bedrock (WSP 2025d), such that seepage sourced directly from the TMF, TMF pond, and MWP is not expected to reach the underground mine prior to the completion of filling. Therefore, for modelling purposes these seepages were assumed to have the same quality as regional groundwater reporting to the underground mine in the model (50% shallow and 50% deep groundwater source term).

4.11.9 CYANIDE AND NITROGEN SPECIES

The approach and data used to support modelling of cyanide and nitrogen species, along with source term assumptions, is provided in Appendix A.

4.12 ESTIMATES OF pH

Estimates of pH were developed to supplement the mass balance results generated as part of the GoldSim water quality estimates. Simplifying assumptions were utilized to estimate pH as outlined below.

- Estimates of pH were based on the proportion of acidic versus non-acidic inflows to the various nodes in the model. This included consideration for the proportion of contact water from mine materials (i.e., acidic PAG, non-acidic PAG, and NPAG mine contact water), as well as contact water from other drainages in a given catchment, along with the source term data (including alkalinity). pH data for source terms was obtained from laboratory test results, baseline water quality data, and analogue site data, as outlined in Section 4.11.
- Site features and catchments that did not contain mine materials or contained NPAG mine rock were estimated to have contact water with a circumneutral to slightly alkaline pH, based on the source terms associated with the associated mine features and land uses in those catchments during the operations phase and closure phase.
- Acidic contact water is ultimately sourced from acidic PAG mine rock materials. PAG materials are present in several locations including the: MRS, underground mine (mine walls and backfill), ore stockpiles, LP Central pit and VMF wall rock, and subaqueously stored concentrate tailings in the VMF. Assumptions pertaining to acidic drainage for these features are provided in detail throughout this report and summarized below.
- As a result of the placement of an engineered low permeability compacted clay cover over the MRS, it is assumed that there is no onset of acidic conditions in the MRS. The MRS was therefore assumed to have a neutral pH drainage consistent with non-acidic PAG mine rock (Section 4.4).
  - The onset of acidic conditions in the underground mine was also estimated to occur in Year 17, based on the lag times for PAG rock exposed on underground mine walls and used as rock

backfill (Section 4.7). Contact water was assumed to be acidic immediately following acid onset in PAG rock in the underground mine. Underground mine water was assumed to have a moderately acidic pH (pH 4) prior to accelerated filling at closure as a result of buffering from alkalinity in regional groundwater inflows. It was assumed that paste and CRF did not provide additional alkalinity loading to the underground mine.

- Rock in the ore stockpiles is represented by PAG material and is processed within several years of placement, well prior to acid onset. The ore stockpiles were therefore assumed to have a neutral pH drainage consistent with non-acidic PAG mine rock (Section 4.4).
  - Acidic drainage is estimated to occur for the LP Central pit walls beginning in Year 25 (2054). It was assumed that no additional buffering capacity is provided by non-acidic rock also present on the pit walls or by regional groundwater inflows that flow over the pit walls as they enter into the pit. Acidic drainage from the pit walls has a pH of 3, consistent with the leachate pH for acidic humidity cells used to derive the acidic PAG source term (Section 4.11.1).
  - The concentrate tailings contained within the VMF are stored continuously under water cover such that they are isolated from atmospheric oxygen. It was assumed that tailings management during mine operations is successful at maintaining a water cover over the tailings and preventing acidic drainage from developing. Acidic inputs from the MRS and PAG pit walls report to the VMF later in mine life (starting in Year 17). For modelling purposes, it was assumed that pH management will be undertaken at or upstream of the VMF to prevent acidification of the inflows / contact water in the VMF and maintain geochemical stability of the submerged concentrate tailing stored therein during operations. Therefore, neutral pH conditions (pH 7) were assumed to be maintained at the VMF during mine operations. The submerged concentrate tailings are covered with NPAG tailings prior to accelerated filling of the VMF, and any PAG wall rock above the long-term water level will be covered in clay-rich overburden at closure. This will further promote the maintenance of neutral pH at the VMF during closure.

Contact water volumes for the above acidic and non-acidic source areas were proportionally mixed for each node where model results are reported. Alkalinity source terms were incorporated into mixing simulations for neutral pH nodes. No additional buffering to mixing simulations at the AEX mine water pond, which includes acidic inflows, is assumed to be conservative. Therefore, the current pH may be underestimated at the AEX mine water pond to be protective.

4.13 SOLUBILITY CONSTRAINTS

As part of the water quality estimate, geochemical modelling was conducted in PHREEQC version 3.7.2 (Parkhurst and Appelo 2013) to incorporate solubility constraints related to mineral precipitation and adsorption at model nodes that report to the receiving environment or that represent other exit points. To be conservative in terms of mass loadings that report from source areas to various model nodes, and between internal nodes in the model, solubility constraints were not applied at internal model locations.

PHREEQC modelling was conducted for the following model components:

- Fugitive seepage from the TMF and TMF pond for mine operations and closure.
- Fugitive seepage from the MWP for mine operations, as well as active and passive closure periods. The MWP is rehabilitated and as such there is no fugitive seepage from the MWP during post-closure.
- Influent to the WTP for mine operations, as well as the active and passive closure periods. The WTP is decommissioned at post-closure.
- Influent to the MFP for mine operations. The MFP is assumed to not operate during closure.
- Outflows from the VMF for closure and post-closure.
- Outflows from the LP Central pit lake once pit filling is complete by Year 31 (2060) and water excess water is directed to the AEX mine water pond during passive closure, the start of modelled post-

closure in Year 35, and Year 70 which represents an estimate of the long term water quality within the LP Central pit lake.

Drainages for other rehabilitated catchments in post-closure are provided as mass balance estimates (i.e., no solubility constraints applied).

PHREEQC simulations incorporating mineral precipitation and adsorption utilized the following information.

- Source solutions were charge balanced with chloride and sodium. For most equilibrated nodes, the concentrations of chloride and sodium required to maintain neutrality were low relative to the starting concentrations of these parameters based on the GoldSim model result. Results for charge balance parameters were represented by mass balance values in model results.
- Solutions were equilibrated with the atmosphere.

A partial pressure of carbon dioxide (i.e., pCO_2) of $10^{-3.37}$ was used to reflect current atmospheric conditions.

Equilibration with atmospheric oxygen used a fixed pe approach, based on an oxidation reduction potential (i.e, Eh) of 0.5 volts for the TMF seepage, MWP seepage, WTP influent, and VMF outflows. A fixed oxidation reduction potential of 0.3 volts was used for the LP Central pit lake. Equilibration with oxygen assumes relatively oxygenated conditions per pH-Eh relationships for natural waters (i.e., Garrels 1960).

- Commonly observed mineral phases in mining environments were allowed to form if they were oversaturated.

For the TMF seepage, MWP seepage, WTP influent, MFP influent (TMF Pond) and VMF this included gypsum ($CaSO_4$-$2H_2O$), amorphous ferrihydrite ($Fe(OH)_3$), gibbsite ($Al(OH)_3$), calcite ($CaCO_3$), and anglesite ($PbSO_4$).

For the pit lake, specific consideration was given to minerals that can exert equilibrium control in pH neutral to slightly alkaline pit lake environments and which corresponded to the suite of model parameters. The mineral list used was modified from Eary (1999) and includes amorphous ferrihydrite ($Fe(OH)_3$)), gibbsite ($Al(OH)_3$), malachite ($Cu_2CO_3(OH)_2$), azurite ($Cu_3(CO_3)_2(OH)_2$), brochantite ($Cu_4SO_4(OH)_6$), rhodochrosite ($MnCO_3$), Mn(HPO4), manganite (MnO(OH)), gypsum ($CaSO_4$-$2H_2O$), calcite ($CaCO_3$), sphaerocobaltite ($CoCO_3$), anglesite ($PbCO_3$), and Cerussite ($PbCO_3$).

- If ferrihydrite formed, metals were allowed to adsorb to its surfaces. The number of available adsorption sites was calculated assuming 0.005 strong bonding sites and 0.2 weak bonding sites per mole of ferrihydrite (Dzombak and Morel 1990). A specific surface area of 600 m^2/g was assumed.
- The ThermoChimie database (Giffaut et al. 2014) was used. This database was selected due to its suitability to higher ionic strength waters. ThermoChimie does not include thermodynamic data for adsorption to ferrihydrite. Therefore, data from the Minteq.v4 database was added to the ThermoChimie database to support adsorption simulations.
- All model parameters were included within the simulations except for thallium and vanadium, which are not included in the thermodynamic database. Results for these parameters were represented by mass balance values in model results.
- Where solubility constraints were applied in PHREEQC, it is assumed that waters at the modelled mine components reach thermodynamic equilibrium (which is the computational basis for PHREEQC). As a result, modelled parameters that are oversaturated will precipitate in the simulations until thermodynamic equilibrium is reached. Therefore, the simulations represent the final state of the aqueous system which may overestimate the removal of some parameters subject to kinetic constraints under field conditions. The following approach was utilized to account for this, for assessment purposes.

Where a mass balance estimated parameter was below the relevant screening value (e.g. PWQO), equilibrated results were directly represented by the PHREEQC equilibrated result.

Where a mass balance estimated parameter was above the relevant screening value and the PHREEQC equilibrated value was notably below the relevant screening value, the PHREEQC equilibrated value for that parameter was multiplied by a factor of 10 to account for potential incomplete equilibration.

Table 4-1: Relative Abundances of Key Lithologies

Lithology Group	Lithology	Relative Abundance		
		LP Central Pit	Underground	VMF
Felsic Volcanic	Felsic Volcanic 1 and 2	85%	80%	56%
Basalt	Basalt	--	3%	0.4%
Metasediment	Metasediment 2 and 3	15%	16%	20%
Fragmental	Fragmental 1 and 2	0.10%	1%	24%
Argillite	Argillite	--	0.03%	--

Notes:

Other trace rock units comprised minor volumes (generally <1%). These were represented as part of the Felsic Volcanic lithology group for assessment purposes.

Table 4-2: Relative Abundances of ARD Groups - Open Pit and Underground

Group	Lithology	Open Pit		Underground[1]
		LP Central	VMF	
Overall				
Mine Rock	NPAG/ML	1%	8%	5%
	NPAG/NML	12%	38%	12%
	PAG	87%	54%	83%
Ore[2]	NPAG/ML	0%	0%	0%
	NPAG/NML	0%	0%	0%
	PAG	100%	100%	100%
By Lithology				
NPAG/ML Mine Rock	Felsic Volcanic	39%	48%	63%
	Basalt	0%	0%	10%
	Metasediment, Fragmental, and Argillite	61%	52%	28%
NPAG/NML Mine Rock	Felsic Volcanic	89%	77%	56%
	Basalt	0%	1%	18%
	Metasediment, Fragmental, and Argillite	11%	22%	26%
PAG Mine rock	Felsic Volcanic	85%	36%	85%
	Basalt	0%	0%	0.05%
	Metasediment, Fragmental, and Argillite	15%	64%	15%
PAG Ore[3]	Felsic Volcanic	100%	100%	100%
	Basalt	0%	0%	0%
	Metasediment, Fragmental, and Argillite	0%	0%	0%

Notes

1) Relative abundances for underground mine rock were based on all available blocks in the underground block model (see text).

2) Ore assumed to be 100% PAG.

3) Ore assumed to be 100% Felsic Volcanic (see text).

Table 4-3: Estimated Lag Time to Acid Onset - Open Pit and Underground

Material Type	Average S	Average CarbNP	Estimated Lag Time[1]
Units	%	kg $CaCO_3$/t	years
LP Central Pit PAG Mine Rock	0.86	11	22
LP Central Pit PAG Ore	1.2	12	18
Viggo Pit PAG Mine Rock	0.25	7.4	40
Viggo Pit PAG Ore	0.30	14	66
Underground PAG Mine Rock	1.1	14	22
Underground PAG Ore	1.3	14	21

Notes:

1) *Based on lag time equations developed from Project kinetic test results (WSP 2025a).*

Table 4-4: Mine Rock Stockpile (MRS) Schedule (tonnes)

ARD Group	Source	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
NPAG/NML	Open Pit	2,988,984	3,585,522	3,103,630	8,379,999	10,276,677	13,318,550	15,182,404	15,675,264	15,550,122	13,642,754
	Underground	65,114	156,710	137,551	199,959	284,894	393,070	512,398	549,988	591,327	674,762
NPAG/ML	Open Pit	1,652,845	1,756,336	1,969,758	2,071,506	2,164,882	2,273,022	2,553,668	2,870,671	3,145,000	3,151,000
	Underground	34,827	53,518	72,935	94,305	109,215	141,261	168,367	180,667	194,454	210,625
PAG	Open Pit	14,851,000	35,345,000	51,007,000	64,360,000	80,310,000	94,980,000	109,920,000	120,960,000	122,850,000	122,850,000
	Underground	115,988	193,786	246,287	316,786	372,872	443,427	523,772	568,274	634,427	644,537
Total NPAG/NML		*3,054,098*	*3,742,232*	*3,241,181*	*8,579,958*	*10,561,571*	*13,711,620*	*15,694,802*	*16,225,252*	*16,141,449*	*14,317,516*
Total NPAG/ML		*1,687,672*	*1,809,854*	*2,042,693*	*2,165,811*	*2,274,097*	*2,414,283*	*2,722,035*	*3,051,338*	*3,339,454*	*3,361,625*
Total PAG		*14,966,988*	*35,538,786*	*51,253,287*	*64,676,786*	*80,682,872*	*95,423,427*	*110,443,772*	*121,528,274*	*123,484,427*	*123,494,537*

ARD Group	Source	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
NPAG/NML	Open Pit	13,495,652	12,995,291	12,859,193	12,723,097	12,588,003	12,462,912	12,337,822	12,212,735	12,098,651	11,770,419
	Underground	868,269	1,056,520	1,342,277	1,650,373	1,895,022	2,218,891	2,478,233	2,987,069	3,477,443	3,808,448
NPAG/ML	Open Pit	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000
	Underground	210,625	210,625	210,625	210,625	210,625	210,625	210,625	210,625	210,625	210,625
PAG	Open Pit	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000
	Underground	644,537	644,537	644,537	644,537	644,537	644,537	644,537	644,537	644,537	644,537
Total NPAG/NML		*14,363,921*	*14,051,811*	*14,201,470*	*14,373,470*	*14,483,025*	*14,681,803*	*14,816,055*	*15,199,804*	*15,576,094*	*15,578,867*
Total NPAG/ML		*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*
Total PAG		*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*

ARD Group	Source	2049	2050	2051	2052	2053	2054	2055
NPAG/NML	Open Pit	11,667,340	11,554,263	11,554,263	11,531,244	11,452,189	11,316,091	11,292,074
	Underground	4,201,553	4,570,988	4,908,642	4,897,675	4,864,821	4,806,511	4,796,645
NPAG/ML	Open Pit	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000	3,151,000
	Underground	210,625	210,625	210,625	210,625	210,625	210,625	210,625
PAG	Open Pit	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000	122,850,000
	Underground	644,537	644,537	644,537	644,537	644,537	644,537	644,537
Total NPAG/NML		*15,868,893*	*16,125,251*	*16,462,905*	*16,428,919*	*16,317,010*	*16,122,602*	*16,088,719*
Total NPAG/ML		*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*	*3,361,625*
Total PAG		*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*	*123,494,537*

Notes:
The distribution of NPAG/NML, NPAG/ML, and PAG rock among the modelled rock types was assumed to be consistent with the distribution provided in Table 4-2.

Table 4-5: Ore Stockpile Schedule (tonnes)

Stockpile	Source	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
ROM	Open Pit	75,793	-	-	-	-	-	-	-	-	-
	Underground	70,787	-	-	-	-	-	-	-	-	-
LGO1	Open Pit	247,672	467,531	1,359,887	2,258,826	3,012,290	3,695,514	4,291,274	4,684,879	5,295,218	5,344,774
	Underground	-	-	-	-	-	-	-	-	-	-
LGO2	Open Pit	409,222	636,209	268,878	411,425	109,075	459,864	798,638	702,307	748,645	525,384
	Underground	-	-	-	-	-	-	-	-	-	-
Total Ore		*656,894*	*1,103,740*	*1,628,765*	*2,670,251*	*3,121,365*	*4,155,378*	*5,089,912*	*5,387,186*	*6,043,863*	*5,870,158*

Stockpile	Source	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
ROM	Open Pit	-	-	-	-	-	-	-	-	-	-
	Underground	-	-	-	-	-	-	-	-	-	-
LGO1	Open Pit	4,848,158	3,826,158	2,811,158	1,789,158	140,997	100,000	-	-	-	-
	Underground	-	-	-	-	-	-	-	-	-	-
LGO2	Open Pit	-	-	-	-	-	-	-	-	-	-
	Underground	-	-	-	-	786,161	826,886	926,590	935,887	935,615	935,334
Total Ore		*4,848,158*	*3,826,158*	*2,811,158*	*1,789,158*	*927,158*	*926,886*	*926,590*	*935,887*	*935,615*	*935,334*

Stockpile	Source	2049	2050	2051	2052	2053	2054	2055
ROM	Open Pit	-	-	-	-	-	-	-
	Underground	-	-	-	-	-	-	-
LGO1	Open Pit	-	-	-	-	-	-	-
	Underground	-	-	-	-	-	-	-
LGO2	Open Pit	-	-	-	-	-	-	-
	Underground	935,037	934,757	403,350	106,076	149,591	98,106	98,106
Total Ore		*935,037*	*934,757*	*403,350*	*106,076*	*149,591*	*98,106*	*98,106*

Notes:

All ore-grade PAG rock was assumed to be non-acid PAG (see text).

Table 4-6: Backfill Schedule (Cubic Meters)

Year	Paste Backfill	Cemeted Rockfill (CRF)	Underground Rock Fill (URF)
2027	-	10,237	-
2028	-	-	-
2029	-	182,252	-
2030	335,022	6,678	39,774
2031	335,022	-	56,503
2032	335,022	75,565	67,338
2033	753,328	36,625	84,210
2034	753,328	22,162	94,266
2035	753,328	-	124,742
2036	753,328	-	108,679
2037	753,328	-	135,612
2038	753,328	175,537	120,793
2039	753,328	144,173	206,874
2040	753,328	34,543	270,500
2041	753,328	84,605	275,245
2042	753,328	172,966	209,534
2043	942,447	97,260	217,327
2044	942,447	204,377	201,537
2045	942,447	100,121	238,129
2046	942,447	192,554	144,036
2047	942,447	88,478	249,932
2048	942,447	22,268	264,647
2049	942,447	-	287,006
2050	942,447	9,565	273,434
2051	942,447	22,004	164,650
2052	942,447	-	164,714
2053	942,447	-	164,314
2054	877,454	-	112,054
2055	108,206	-	17,615

Table 4-7: Pit Lake Inflows

Inflow Source	Sulphate (mg/L)	TDS (mg/L) [1]	Inflow Rate	Inflow Configuration
Chukuni River	~5	86	1.0 Mm^3/year during accelerated filling Accelerated filling ceases once the pit fills during passive closure	Point source at surface
Gravity channel	28	117	1.2 to 1.4 Mm^3/year (passive and post-closure)	Point source at surface
Seepage from covered MRS	114	247	0.018 Mm^3/year (passive and post-closure)	Diffuse seepage Groundwater modelling indicates that >95% of the seepage enters the upper 5-10 m of the lake, over a 700 m lateral distance
Runoff from revegetated areas	~1	81	0.17 Mm^3/year (passive and post-closure)	Diffuse overland flow at surface
Runoff from CWP catchment	~1	81	0.34 Mm^3 (passive closure) 0.19 Mm^3 (post-closure)	Diffuse overland flow at surface
Groundwater inflows	~5	86	0.12 Mm^3 (passive and post-closure)	Diffuse seepage through overburden and near-surface fractured bedrock
Overflow from underground vent raises	~5	86	0.18 Mm^3/year (passive and post-closure)	Point source at surface
Pit wall runoff	~25	114	0.006 Mm^3/year (passive and post-closure)	Diffuse overland flow at surface
Direct precipitation	~5	-	0.5 Mm^3/yr (passive and post-closure)	Direct precipitation on lake surface

Notes:

1) TDS calculated based on relationships for sulphate and TDS derived from a mining area in northern Ontario, including background lakes and mining associated features.

Table 4-8: LP Central Pit Source Terms, Mine Rock and Ore

Material Type		Mine Rock									Ore
ARD Classification		NPAG / NML			NPAG / ML			Non-Acidic PAG			Non-Acidic PAG
Lithology		Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic
SO_4	mg/m²/wk	0.018	--[1]	0.026	0.024	--[1]	0.026	0.064	--[1]	0.031	0.079
Cl	mg/m²/wk	0.023	--[1]	0.023	0.023	--[1]	0.023	0.023	--[1]	0.023	0.023
Hg	mg/m²/wk	0.00000013	--[1]	0.00000013	0.00000013	--[1]	0.00000013	0.00000013	--[1]	0.00000013	0.00000013
Ag	mg/m²/wk	0.00000066	--[1]	0.00000066	0.00000066	--[1]	0.00000066	0.00000066	--[1]	0.00000066	0.00000066
Al	mg/m²/wk	0.00094	--[1]	0.00094	0.00094	--[1]	0.00094	0.00094	--[1]	0.00094	0.00094
As	mg/m²/wk	0.000029	--[1]	0.000051	0.00022	--[1]	0.00019	0.000054	--[1]	0.00017	0.00012
Be	mg/m²/wk	0.000000093	--[1]	0.000000093	0.000000093	--[1]	0.000000093	0.000000093	--[1]	0.000000093	0.000000093
B	mg/m²/wk	0.000027	--[1]	0.000027	0.000027	--[1]	0.000027	0.000027	--[1]	0.000027	0.000027
Ca	mg/m²/wk	0.014	--[1]	0.021	0.019	--[1]	0.021	0.050	--[1]	0.024	0.062
Cd	mg/m²/wk	0.00000014	--[1]	0.00000029	0.0000037	--[1]	0.00000099	0.0000037	--[1]	0.00000099	0.0000046
Co	mg/m²/wk	0.00000054	--[1]	0.00000054	0.00000054	--[1]	0.00000054	0.00000054	--[1]	0.00000054	0.00000054
Cr	mg/m²/wk	0.0000011	--[1]	0.0000011	0.0000011	--[1]	0.0000011	0.0000011	--[1]	0.0000011	0.0000011
Cu	mg/m²/wk	0.000013	--[1]	0.000013	0.000013	--[1]	0.000013	0.000013	--[1]	0.000013	0.000013
Fe	mg/m²/wk	0.000093	--[1]	0.000093	0.000093	--[1]	0.000093	0.000093	--[1]	0.000093	0.000093
K	mg/m²/wk	0.012	--[1]	0.012	0.012	--[1]	0.012	0.012	--[1]	0.012	0.012
Mg	mg/m²/wk	0.00057	--[1]	0.00063	0.00074	--[1]	0.00064	0.0020	--[1]	0.00074	0.0024
Mn	mg/m²/wk	0.00042	--[1]	0.00042	0.00042	--[1]	0.00042	0.00042	--[1]	0.00042	0.00042
Mo	mg/m²/wk	0.0000054	--[1]	0.0000054	0.0000054	--[1]	0.0000054	0.0000054	--[1]	0.0000054	0.0000054
Na	mg/m²/wk	0.0015	--[1]	0.0015	0.0015	--[1]	0.0015	0.0015	--[1]	0.0015	0.0015
Ni	mg/m²/wk	0.0000032	--[1]	0.0000032	0.0000032	--[1]	0.0000032	0.0000032	--[1]	0.0000032	0.0000032
P	mg/m²/wk	0.000082	--[1]	0.000082	0.000082	--[1]	0.000082	0.000082	--[1]	0.000082	0.000082
Pb	mg/m²/wk	0.0000028	--[1]	0.0000024	0.000020	--[1]	0.0000031	0.000020	--[1]	0.0000031	0.000052
Sb	mg/m²/wk	0.000012	--[1]	0.000012	0.000012	--[1]	0.000012	0.000012	--[1]	0.000012	0.000012
Se	mg/m²/wk	0.0000054	--[1]	0.0000014	0.000019	--[1]	0.0000022	0.000019	--[1]	0.0000022	0.000026
Tl	mg/m²/wk	0.000000075	--[1]	0.000000075	0.000000075	--[1]	0.000000075	0.000000075	--[1]	0.000000075	0.000000075
U	mg/m²/wk	0.0000049	--[1]	0.0000049	0.0000049	--[1]	0.0000049	0.0000049	--[1]	0.0000049	0.0000049
V	mg/m²/wk	0.0000047	--[1]	0.0000047	0.0000047	--[1]	0.0000047	0.0000047	--[1]	0.0000047	0.0000047
W	mg/m²/wk	0.0000027	--[1]	0.0000027	0.0000027	--[1]	0.0000027	0.0000027	--[1]	0.0000027	0.0000027
Zn	mg/m²/wk	0.000055	--[1]	0.000059	0.00011	--[1]	0.000066	0.00011	--[1]	0.000066	0.00015
Zr	mg/m²/wk	0.000027	--[1]	0.000027	0.000027	--[1]	0.000027	0.000027	--[1]	0.000027	0.000027
pH	pH Units	7.5	--[1]	7.5	7.5	--[1]	7.5	7.5	--[1]	7.5	7.5
Alkalinity	mg $CaCO_3$/L	31	--[1]	31	31	--[1]	31	31	--[1]	31	31

Notes:

1) No material matching this classification present in the LP Central pit.

Grey shading indicates source term is based primarily on detection limit values

Table 4-9: VMF Source Terms, Mine Rock and Ore

Material Type		Mine Rock									Ore
ARD Classification		NPAG / NML			NPAG / ML			Non-Acidic PAG			Non-Acidic PAG
Lithology		Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic
SO_4	$mg/m^2/wk$	0.012	0.032	0.026	0.017	--[1]	0.026	0.064	--[1]	0.031	0.079
Cl	$mg/m^2/wk$	0.023	0.023	0.023	0.023	--[1]	0.023	0.023	--[1]	0.023	0.023
Hg	$mg/m^2/wk$	0.00000013	0.00000013	0.00000013	0.00000013	--[1]	0.00000013	0.00000013	--[1]	0.00000013	0.00000013
Ag	$mg/m^2/wk$	0.00000066	0.00000066	0.00000066	0.00000066	--[1]	0.00000066	0.00000066	--[1]	0.00000066	0.00000066
Al	$mg/m^2/wk$	0.00094	0.00094	0.00094	0.00094	--[1]	0.00094	0.00094	--[1]	0.00094	0.00094
As	$mg/m^2/wk$	0.000029	0.000025	0.000051	0.00022	--[1]	0.00019	0.000054	--[1]	0.00017	0.00012
Be	$mg/m^2/wk$	0.000000093	0.000000093	0.000000093	0.000000093	--[1]	0.000000093	0.000000093	--[1]	0.000000093	0.000000093
B	$mg/m^2/wk$	0.000027	0.000027	0.000027	0.000027	--[1]	0.000027	0.000027	--[1]	0.000027	0.000027
Ca	$mg/m^2/wk$	0.0091	0.026	0.021	0.013	--[1]	0.021	0.050	--[1]	0.024	0.062
Cd	$mg/m^2/wk$	0.00000014	0.00000012	0.00000029	0.0000037	--[1]	0.00000099	0.0000037	--[1]	0.00000099	0.0000046
Co	$mg/m^2/wk$	0.00000054	0.00000054	0.00000054	0.00000054	--[1]	0.00000054	0.00000054	--[1]	0.00000054	0.00000054
Cr	$mg/m^2/wk$	0.0000011	0.0000011	0.0000011	0.0000011	--[1]	0.0000011	0.0000011	--[1]	0.0000011	0.0000011
Cu	$mg/m^2/wk$	0.000013	0.000013	0.000013	0.000013	--[1]	0.000013	0.000013	--[1]	0.000013	0.000013
Fe	$mg/m^2/wk$	0.000093	0.000093	0.000093	0.000093	--[1]	0.000093	0.000093	--[1]	0.000093	0.000093
K	$mg/m^2/wk$	0.012	0.012	0.012	0.012	--[1]	0.012	0.012	--[1]	0.012	0.012
Mg	$mg/m^2/wk$	0.00038	0.00078	0.00063	0.00054	--[1]	0.00063	0.0020	--[1]	0.00074	0.0024
Mn	$mg/m^2/wk$	0.00042	0.00042	0.00042	0.00042	--[1]	0.00042	0.00042	--[1]	0.00042	0.00042
Mo	$mg/m^2/wk$	0.0000054	0.0000054	0.0000054	0.0000054	--[1]	0.0000054	0.0000054	--[1]	0.0000054	0.0000054
Na	$mg/m^2/wk$	0.0015	0.0015	0.0015	0.0015	--[1]	0.0015	0.0015	--[1]	0.0015	0.0015
Ni	$mg/m^2/wk$	0.0000032	0.0000032	0.0000032	0.0000032	--[1]	0.0000032	0.0000032	--[1]	0.0000032	0.0000032
P	$mg/m^2/wk$	0.000082	0.000082	0.000082	0.000082	--[1]	0.000082	0.000082	--[1]	0.000082	0.000082
Pb	$mg/m^2/wk$	0.0000028	0.0000024	0.0000024	0.000020	--[1]	0.0000031	0.000020	--[1]	0.0000031	0.000052
Sb	$mg/m^2/wk$	0.000012	0.000012	0.000012	0.000012	--[1]	0.000012	0.000012	--[1]	0.000012	0.000012
Se	$mg/m^2/wk$	0.0000054	0.0000013	0.0000014	0.000019	--[1]	0.0000022	0.000019	--[1]	0.0000022	0.000026
Tl	$mg/m^2/wk$	0.000000075	0.000000075	0.000000075	0.000000075	--[1]	0.000000075	0.000000075	--[1]	0.000000075	0.000000075
U	$mg/m^2/wk$	0.0000049	0.0000049	0.0000049	0.0000049	--[1]	0.0000049	0.0000049	--[1]	0.0000049	0.0000049
V	$mg/m^2/wk$	0.0000047	0.0000047	0.0000047	0.0000047	--[1]	0.0000047	0.0000047	--[1]	0.0000047	0.0000047
W	$mg/m^2/wk$	0.0000027	0.0000027	0.0000027	0.0000027	--[1]	0.0000027	0.0000027	--[1]	0.0000027	0.0000027
Zn	$mg/m^2/wk$	0.000055	0.000054	0.000059	0.00011	--[1]	0.000066	0.00011	--[1]	0.000066	0.00015
Zr	$mg/m^2/wk$	0.000027	0.000027	0.000027	0.000027	--[1]	0.000027	0.000027	--[1]	0.000027	0.000027
pH	pH Units	7.5	7.5	7.5	7.5	--[1]	7.5	7.5	--[1]	7.5	7.5
Alkalinity	mg $CaCO_3$/L	31	31	31	31	--[1]	31	31	--[1]	31	31

Notes:

1) No material matching this classification present in the VMF.

Grey shading indicates source term is based primarily on detection limit values

Table 4-10: Underground Source Terms, Mine Rock and Ore

Material Type		Mine Rock									Ore
ARD Classification		NPAG / NML			NPAG / ML			Non-Acidic PAG			Non-Acidic PAG
Lithology		Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic
SO_4	mg/m^2/wk	0.018	0.028	0.026	0.020	0.028	0.026	0.062	0.049	0.032	0.075
Cl	mg/m^2/wk	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Hg	mg/m^2/wk	0.00000013	0.00000013	0.00000013	0.00000013	0.00000013	0.00000013	0.00000013	0.00000013	0.00000013	0.00000013
Ag	mg/m^2/wk	0.00000066	0.00000066	0.00000066	0.00000066	0.00000066	0.00000066	0.00000066	0.00000066	0.00000066	0.00000066
Al	mg/m^2/wk	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094	0.00094
As	mg/m^2/wk	0.000029	0.000025	0.000051	0.00022	0.00010	0.00019	0.000090	0.000039	0.00013	0.00010
Be	mg/m^2/wk	0.000000093	0.000000093	0.000000093	0.000000093	0.000000093	0.000000093	0.000000093	0.000000093	0.000000093	0.000000093
B	mg/m^2/wk	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027
Ca	mg/m^2/wk	0.014	0.023	0.021	0.015	0.022	0.021	0.048	0.039	0.025	0.059
Cd	mg/m^2/wk	0.00000013	0.00000012	0.000000089	0.0000074	0.00000039	0.00000086	0.0000074	0.00000081	0.00000078	0.0000045
Co	mg/m^2/wk	0.00000054	0.00000054	0.00000054	0.00000054	0.00000054	0.00000054	0.00000054	0.00000054	0.00000054	0.00000054
Cr	mg/m^2/wk	0.0000011	0.0000011	0.0000011	0.0000011	0.0000011	0.0000011	0.0000011	0.0000011	0.0000011	0.0000011
Cu	mg/m^2/wk	0.000013	0.000013	0.000013	0.000013	0.000013	0.000013	0.000013	0.000013	0.000013	0.000013
Fe	mg/m^2/wk	0.000093	0.000093	0.000093	0.000093	0.000093	0.000093	0.000093	0.000093	0.000093	0.000093
K	mg/m^2/wk	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Mg	mg/m^2/wk	0.00058	0.00069	0.00063	0.00062	0.00068	0.00063	0.0019	0.0012	0.00077	0.0023
Mn	mg/m^2/wk	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042	0.00042
Mo	mg/m^2/wk	0.0000054	0.0000054	0.0000054	0.0000054	0.0000054	0.0000054	0.0000054	0.0000054	0.0000054	0.0000054
Na	mg/m^2/wk	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
Ni	mg/m^2/wk	0.0000032	0.0000032	0.0000032	0.0000032	0.0000032	0.0000032	0.0000032	0.0000032	0.0000032	0.0000032
P	mg/m^2/wk	0.000082	0.000082	0.000082	0.000082	0.000082	0.000082	0.000082	0.000082	0.000082	0.000082
Pb	mg/m^2/wk	0.0000029	0.0000024	0.0000024	0.000021	0.0000024	0.0000032	0.000021	0.0000031	0.0000031	0.000051
Sb	mg/m^2/wk	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012
Se	mg/m^2/wk	0.0000057	0.0000013	0.0000012	0.000020	0.0000016	0.0000022	0.000019	0.0000022	0.0000022	0.000027
Tl	mg/m^2/wk	0.000000075	0.000000075	0.000000075	0.000000075	0.000000075	0.000000075	0.000000075	0.000000075	0.000000075	0.000000075
U	mg/m^2/wk	0.0000049	0.0000049	0.0000049	0.0000049	0.0000049	0.0000049	0.0000049	0.0000049	0.0000049	0.0000049
V	mg/m^2/wk	0.0000047	0.0000047	0.0000047	0.0000047	0.0000047	0.0000047	0.0000047	0.0000047	0.0000047	0.0000047
W	mg/m^2/wk	0.0000027	0.0000027	0.0000027	0.0000027	0.0000027	0.0000027	0.0000027	0.0000027	0.0000027	0.0000027
Zn	mg/m^2/wk	0.000055	0.000054	0.000054	0.00016	0.000062	0.000070	0.00016	0.000070	0.000068	0.00016
Zr	mg/m^2/wk	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027	0.000027
pH	pH Units	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Alkalinity	mg $CaCO_3$/L	31	31	31	31	31	31	31	31	31	31

Notes:

Grey shading indicates source term is based primarily on detection limit values

Table 4-11: Acidic PAG Mine Rock Source Term

Project Area		Open Pit & Underground
Scenario		Expected & Conservative
Lithology		All Lithologies
SO_4	$mg/m^2/wk$	4.4
Cl	$mg/m^2/wk$	0.011
Hg	$mg/m^2/wk$	0.000000092
Ag	$mg/m^2/wk$	0.00000088
Al	$mg/m^2/wk$	0.13
As	$mg/m^2/wk$	0.00038
Be	$mg/m^2/wk$	0.0000061
B	$mg/m^2/wk$	0.00062
Ca	$mg/m^2/wk$	0.16
Cd	$mg/m^2/wk$	0.000019
Co	$mg/m^2/wk$	0.00073
Cr	$mg/m^2/wk$	0.0011
Cu	$mg/m^2/wk$	0.00090
Fe	$mg/m^2/wk$	0.78
K	$mg/m^2/wk$	0.099
Mg	$mg/m^2/wk$	0.018
Mn	$mg/m^2/wk$	0.017
Mo	$mg/m^2/wk$	0.00000070
Na	$mg/m^2/wk$	0.018
Ni	$mg/m^2/wk$	0.0018
P	$mg/m^2/wk$	0.0033
Pb	$mg/m^2/wk$	0.00011
Sb	$mg/m^2/wk$	0.0000025
Se	$mg/m^2/wk$	0.0000030
Tl	$mg/m^2/wk$	0.0000020
U	$mg/m^2/wk$	0.000046
V	$mg/m^2/wk$	0.000036
W	$mg/m^2/wk$	0.00000031
Zn	$mg/m^2/wk$	0.0076
Zr	$mg/m^2/wk$	0.0000012
pH	pH Units	3.0
Alkalinity	mg $CaCO_3/L$	0

Notes:
Grey shading indicates source term is based primarily on detection limit values. One-half the detection limit concentration used to develop source term (see text).

Table 4-12: Pit Wall Flooding Source Terms

Material Type		Mine Rock									
ARD Classification		NPAG / NML			NPAG / ML			Non-Acidic PAG			Acidic PAG
Lithology		Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic	Basalt	Metasediment, Fragmental, and Argillite	Felsic Volcanic
SO_4	mg/m^2	1	0.22	2	1	--[1]	2	1	--[1]	2	84
Cl	mg/m^2	0.15	0.15	0.15	0.15	--[1]	0.15	0.15	--[1]	0.15	10
Hg	mg/m^2	0.00000069	0.00000069	0.00000069	0.00000069	--[1]	0.00000069	0.00000069	--[1]	0.00000069	0.000047
Ag	mg/m^2	0.0000034	0.0000034	0.0000034	0.0000034	--[1]	0.0000034	0.0000034	--[1]	0.0000034	0.00024
Al	mg/m^2	0.0080	0.0080	0.0080	0.0080	--[1]	0.0080	0.0080	--[1]	0.0080	0.55
As	mg/m^2	0.00081	0.00026	0.0013	0.0032	--[1]	0.0072	0.0011	--[1]	0.0066	0.076
Be	mg/m^2	0.00000049	0.00000049	0.00000049	0.00000049	--[1]	0.00000049	0.00000049	--[1]	0.00000049	0.000033
B	mg/m^2	0.0014	0.0014	0.0014	0.0014	--[1]	0.0014	0.0014	--[1]	0.0014	0.095
Ca	mg/m^2	0.96	0.18	2	0.96	--[1]	2	0.96	--[1]	2	66
Cd	mg/m^2	0.0000011	0.0000011	0.0000011	0.0000011	--[1]	0.0000011	0.0000011	--[1]	0.0000011	0.000073
Co	mg/m^2	0.0000061	0.0000061	0.0000061	0.0000061	--[1]	0.0000061	0.0000061	--[1]	0.0000061	0.00042
Cr	mg/m^2	0.000011	0.000011	0.000011	0.000011	--[1]	0.000011	0.000011	--[1]	0.000011	0.00076
Cu	mg/m^2	0.00034	0.00034	0.00034	0.00034	--[1]	0.00034	0.00034	--[1]	0.00034	0.024
Fe	mg/m^2	0.00083	0.00083	0.00083	0.00083	--[1]	0.00083	0.00083	--[1]	0.00083	0.057
K	mg/m^2	0.24	0.24	0.24	0.24	--[1]	0.24	0.24	--[1]	0.24	16
Mg	mg/m^2	0.036	0.0052	0.057	0.036	--[1]	0.057	0.036	--[1]	0.057	3
Mn	mg/m^2	0.0036	0.0036	0.0036	0.0036	--[1]	0.0036	0.0036	--[1]	0.0036	0.24
Mo	mg/m^2	0.000094	0.000094	0.000094	0.000094	--[1]	0.000094	0.000094	--[1]	0.000094	0.0065
Na	mg/m^2	0.22	0.22	0.22	0.22	--[1]	0.22	0.22	--[1]	0.22	15
Ni	mg/m^2	0.000058	0.000058	0.000058	0.000058	--[1]	0.000058	0.000058	--[1]	0.000058	0.0040
P	mg/m^2	0.00042	0.00042	0.00042	0.00042	--[1]	0.00042	0.00042	--[1]	0.00042	0.029
Pb	mg/m^2	0.0000086	0.0000086	0.0000086	0.0000086	--[1]	0.0000086	0.0000086	--[1]	0.0000086	0.00059
Sb	mg/m^2	0.00034	0.00034	0.00034	0.00034	--[1]	0.00034	0.00034	--[1]	0.00034	0.024
Se	mg/m^2	0.000098	0.0000092	0.00011	0.000098	--[1]	0.00011	0.000098	--[1]	0.00011	0.0067
Tl	mg/m^2	0.00000074	0.00000074	0.00000074	0.00000074	--[1]	0.00000074	0.00000074	--[1]	0.00000074	0.000051
U	mg/m^2	0.00034	0.00034	0.00034	0.00034	--[1]	0.00034	0.00034	--[1]	0.00034	0.023
V	mg/m^2	0.00012	0.00012	0.00012	0.00012	--[1]	0.00012	0.00012	--[1]	0.00012	0.0082
W	mg/m^2	0.000090	0.000090	0.000090	0.000090	--[1]	0.000090	0.000090	--[1]	0.000090	0.0062
Zn	mg/m^2	0.00016	0.00016	0.00016	0.00016	--[1]	0.00016	0.00016	--[1]	0.00016	0.011
Zr	mg/m^2	0.00014	0.00014	0.00014	0.00014	--[1]	0.00014	0.00014	--[1]	0.00014	0.0094
pH	pH Units	7.5	7.5	7.5	7.5	--[1]	7.5	7.5	--[1]	7.5	3.0
Alkalinity	mg $CaCO_3$/L	31	31	31	31	--[1]	31	31	--[1]	31	0

Notes:

1) No material matching this classification present in the open pit block model.

Table 4-13: Tailings and Tailings Process Water Source Terms

Material Type		Tailings			Tailings Process Water	
Source Term	Units	De-sulphurized Tailings	Concentrate Tailings	Units	De-sulphurized Tailings Process Water	Concentrate Tailings Process Water
SO_4	$mg/m^2/wk$	367	4293	mg/L	1315	1146
Cl	$mg/m^2/wk$	74	54	mg/L	18	19
Hg	$mg/m^2/wk$	0.000013	0.00021	mg/L	0.0000025	0.0000025
Ag	$mg/m^2/wk$	0.00013	0.0022	mg/L	0.000025	0.0000050
Al	$mg/m^2/wk$	0.67	0.32	mg/L	0.053	0.041
As	$mg/m^2/wk$	0.0042	0.011	mg/L	0.033	0.029
Be	$mg/m^2/wk$	0.00067	0.011	mg/L	0.0000050	0.0000050
B	$mg/m^2/wk$	0.34	5.4	mg/L	0.020	0.025
Ca	$mg/m^2/wk$	311	1613	mg/L	147	150
Cd	$mg/m^2/wk$	0.000067	0.0011	mg/L	0.000036	0.000042
Co	$mg/m^2/wk$	0.014	0.073	mg/L	0.051	0.034
Cr	$mg/m^2/wk$	0.014	0.11	mg/L	0.00025	0.00051
Cu	$mg/m^2/wk$	0.035	5.5	mg/L	0.019	0.017
Fe	$mg/m^2/wk$	0.63	0.54	mg/L	0.57	1.1
K	$mg/m^2/wk$	78	5.8	mg/L	23	16
Mg	$mg/m^2/wk$	6.2	59	mg/L	4.1	4.4
Mn	$mg/m^2/wk$	0.29	11	mg/L	0.10	0.19
Mo	$mg/m^2/wk$	0.038	0.11	mg/L	0.043	0.033
Na	$mg/m^2/wk$	6.9	204	mg/L	395	361
Ni	$mg/m^2/wk$	0.014	0.11	mg/L	0.0011	0.0025
P	$mg/m^2/wk$	0.041	1.1	mg/L	0.50	0.16
Pb	$mg/m^2/wk$	0.0013	0.022	mg/L	0.000061	0.00014
Sb	$mg/m^2/wk$	0.0034	0.054	mg/L	0.044	0.043
Se	$mg/m^2/wk$	0.0060	0.011	mg/L	0.0034	0.0021
Tl	$mg/m^2/wk$	0.000067	0.0011	mg/L	0.000013	0.000029
U	$mg/m^2/wk$	0.015	0.011	mg/L	0.0039	0.0028
V	$mg/m^2/wk$	0.034	0.54	mg/L	0.00050	0.00050
W	$mg/m^2/wk$	0.0067	0.096	mg/L	0.0085	0.0070
Zn	$mg/m^2/wk$	0.034	0.54	mg/L	0.0029	0.0049
Zr	$mg/m^2/wk$	0.00067	0.011	mg/L	0.000028	0.000044
pH	pH Units	6.4	na	pH Units	6.6	7.4
Alkalinity	$mg\ CaCO_3/m^2/wk$	475	na	$mg\ CaCO_3/L$	126	143

Notes:

Grey shading indicates source term is based primarily on detection limit values. One-half the detection limit concentration used to develop source term (see text).

Table 4-14: Backfill and Membrane Filtration Reject Solution Source Terms

Parameter	Backfill					
	Units	Unsaturated Paste Backfill	Saturated Paste Backfill	Units	Membrane Filtration Reject Solution	Water Released from Paste Backfill when Curing
SO_4	$mg/m^2/wk$	16363	820	mg/L	8500	2200
Cl	$mg/m^2/wk$	171	3.4	mg/L	250	84
Hg	$mg/m^2/wk$	0.000029	0.000058	mg/L	0.0000096	0.0000045
Ag	$mg/m^2/wk$	0.00013	0.00093	mg/L	0.000065	0.000036
Al	$mg/m^2/wk$	0.21	0.24	mg/L	0.0020	0.038
As	$mg/m^2/wk$	0.036	0.063	mg/L	0.17	0.073
Be	$mg/m^2/wk$	0.00063	0.0012	mg/L	0.0000034	0.0000045
B	$mg/m^2/wk$	0.63	0.12	mg/L	0.50	0.16
Ca	$mg/m^2/wk$	2975	302	mg/L	300	400
Cd	$mg/m^2/wk$	0.000063	0.00012	mg/L	0.000056	0.000042
Co	$mg/m^2/wk$	0.14	0.0020	mg/L	0.085	0.061
Cr	$mg/m^2/wk$	0.046	0.0058	mg/L	0.0024	0.00085
Cu	$mg/m^2/wk$	0.11	0.64	mg/L	0.00064	0.013
Fe	$mg/m^2/wk$	16	0.23	mg/L	0.10	0.44
K	$mg/m^2/wk$	75	19	mg/L	250	88
Mg	$mg/m^2/wk$	45	6.6	mg/L	60	20
Mn	$mg/m^2/wk$	0.11	0.061	mg/L	0.18	0.12
Mo	$mg/m^2/wk$	1.1	0.017	mg/L	0.093	0.058
Na	$mg/m^2/wk$	322	2.6	mg/L	3500	1282
Ni	$mg/m^2/wk$	0.0063	0.0058	mg/L	0.0037	0.0018
P	$mg/m^2/wk$	0.0095	0.028	mg/L	6.5	2.2
Pb	$mg/m^2/wk$	0.0013	0.0058	mg/L	0.0000067	0.000045
Sb	$mg/m^2/wk$	0.011	0.0048	mg/L	0.16	0.078
Se	$mg/m^2/wk$	0.021	0.0059	mg/L	0.0065	0.0043
Tl	$mg/m^2/wk$	0.000063	0.00058	mg/L	0.000067	0.000028
U	$mg/m^2/wk$	0.012	0.0047	mg/L	0.0098	0.0056
V	$mg/m^2/wk$	0.032	0.012	mg/L	0.0056	0.0020
W	$mg/m^2/wk$	0.020	0.0046	mg/L	0.010	0.0090
Zn	$mg/m^2/wk$	0.063	0.051	mg/L	0.0042	0.0033
Zr	$mg/m^2/wk$	0.00063	0.0012	mg/L	0.0020	0.00059
pH	pH Units	5.8	na	pH Units	7.0	6.7
Alkalinity	mg $CaCO_3/m^2/wk$	87	na	mg $CaCO_3/L$	577	255

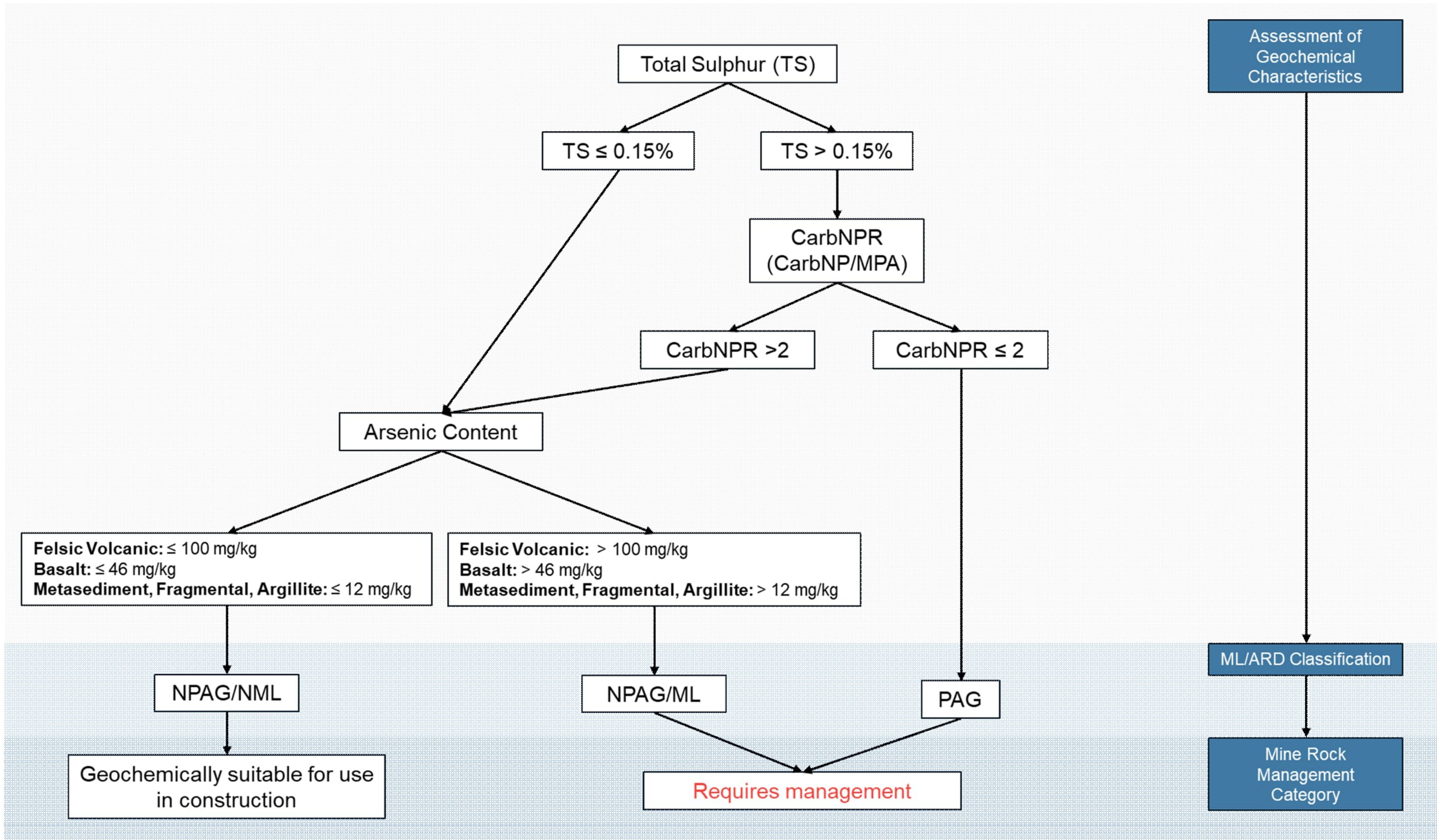
Notes:

Grey shading indicates source term is based primarily on detection limit values. One-half the detection limit concentration used to develop source term (see text).

Table 4-15: Other Source Terms

Parameter	Units	Overburden	Natural & Cleared Areas - Dixie Main Stem	Natural & Cleared Areas - TSF	Chukuni Make Up Water	Shallow Groundwater	Deep Groundwater
SO_4	mg/L	3.1	1.0	0.69	5.2	5.1	286
Cl	mg/L	3.0	0.74	0.35	2.5	0.32	124
Hg	mg/L	0.0000025	0.0000025	0.0000025	0.0000025	0.0000025	0.0000025
Ag	mg/L	0.000015	0.000011	0.0000050	0.0000050	0.0000050	0.0000050
Al	mg/L	0.0051	0.052	0.0032	0.021	0.0056	0.0094
As	mg/L	0.00079	0.0018	0.0017	0.0078	0.00069	0.00019
Be	mg/L	0.000015	0.000010	0.000010	0.000010	0.000010	0.000010
B	mg/L	0.010	0.0050	0.0050	0.0050	0.0050	0.79
Ca	mg/L	6.4	14	9.4	10	37	156
Cd	mg/L	0.0000035	0.0000025	0.0000025	0.0000025	0.0000039	0.0000025
Co	mg/L	0.000025	0.000079	0.000050	0.000050	0.00032	0.000050
Cr	mg/L	0.0017	0.00026	0.000050	0.000088	0.00015	0.00025
Cu	mg/L	0.0019	0.00095	0.00026	0.0013	0.00048	0.00010
Fe	mg/L	0.0070	0.35	0.063	0.045	0.14	0.0050
K	mg/L	2.7	1.3	0.72	0.99	2.4	2.0
Mg	mg/L	0.75	4.2	2.3	2.6	6.7	11
Mn	mg/L	0.00025	0.019	0.0034	0.0021	0.12	0.086
Mo	mg/L	0.0036	0.00028	0.00011	0.00021	0.0023	0.0011
Na	mg/L	1.1	1.9	1.2	2.3	6.2	85
Ni	mg/L	0.00037	0.00070	0.00025	0.0011	0.0010	0.00042
P	mg/L	0.0050	0.034	0.016	0.027	0.015	0.025
Pb	mg/L	0.000075	0.000075	0.000025	0.000035	0.000025	0.000025
Sb	mg/L	0.00021	0.00015	0.000050	0.00039	0.000050	0.000050
Se	mg/L	0.00035	0.00011	0.000077	0.000098	0.000069	0.000025
Tl	mg/L	0.0000060	0.0000050	0.0000050	0.0000050	0.0000050	0.0000050
U	mg/L	0.0014	0.00026	0.000036	0.000094	0.00060	0.00016
V	mg/L	0.0041	0.00064	0.00025	0.00025	0.00025	0.00025
W	mg/L	0.00030	0.000050	0.000050	0.000050	0.0015	0.040
Zn	mg/L	0.0022	0.0010	0.00075	0.0010	0.0013	0.00050
Zr	mg/L	0.000067	0.00064	0.00015	0.00015	0.00015	0.00015
pH	pH Units	7.5	7.0	7.5	7.5	7.8	7.9
Alkalinity	mg $CaCO_3$/L	18	50	32	30	146	65

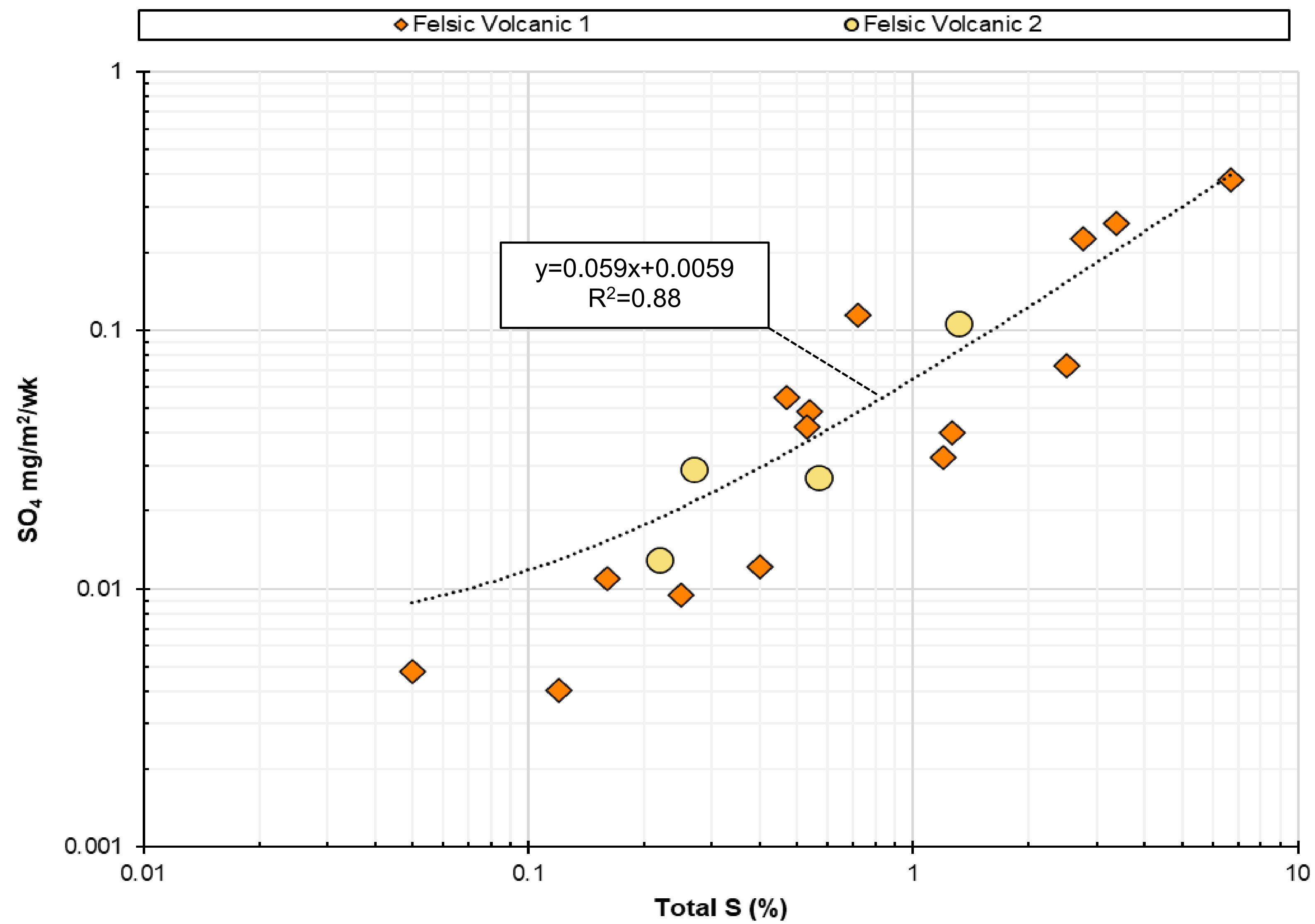
Notes:
Grey shading indicates source term is based primarily on detection limit values. One-half the detection limit concentration used to develop source term (see text).



Notes

ML/ARD classification decision tree as presented in WSP (2025a).

ML/ARD Classification Decision Tree	
Great Bear Project - Mine Site Water Quality Estimate	
Kinross Great Bear Project	
Figure Number	4-1
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG

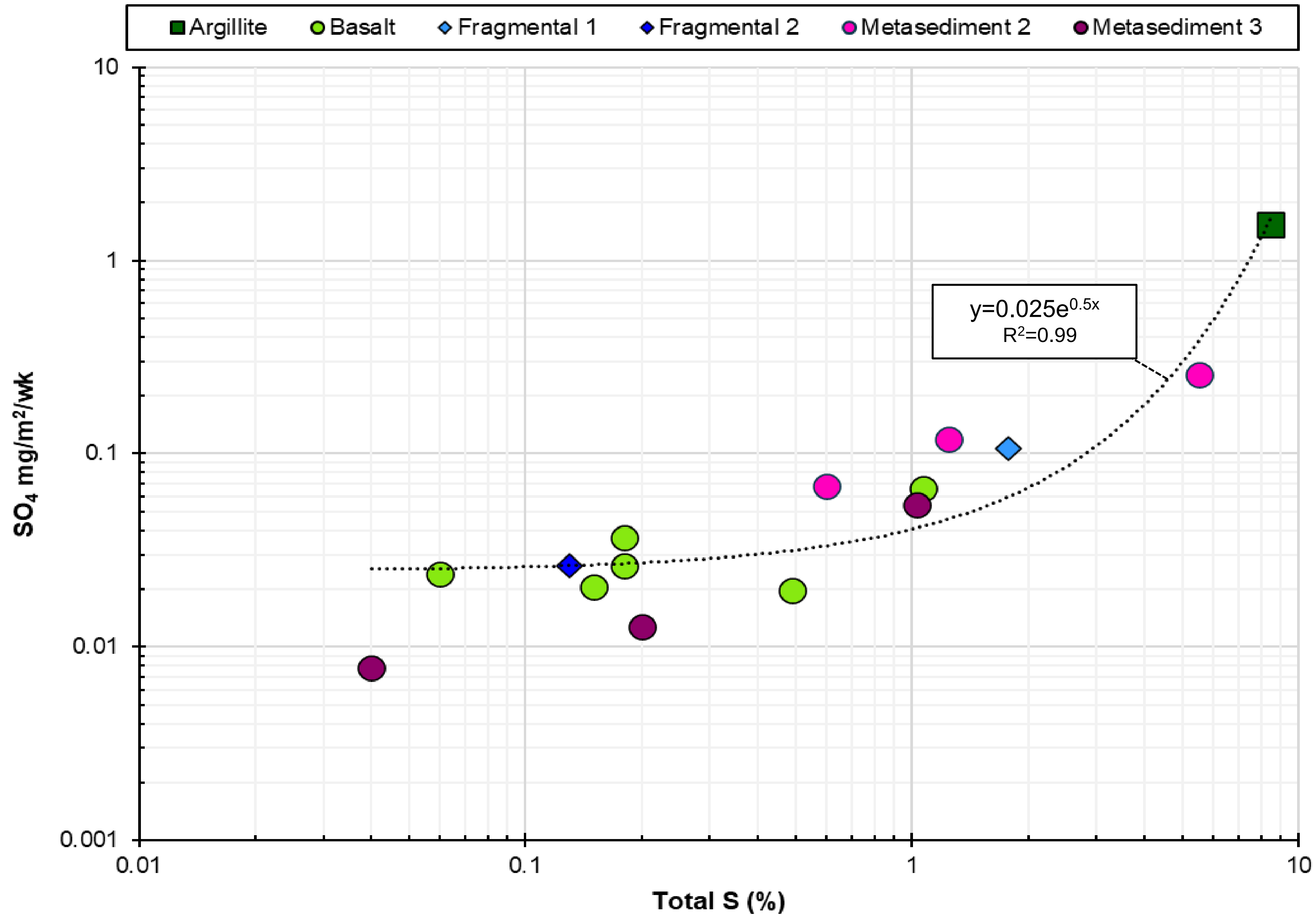


Notes

Excluded samples not shown (see text).

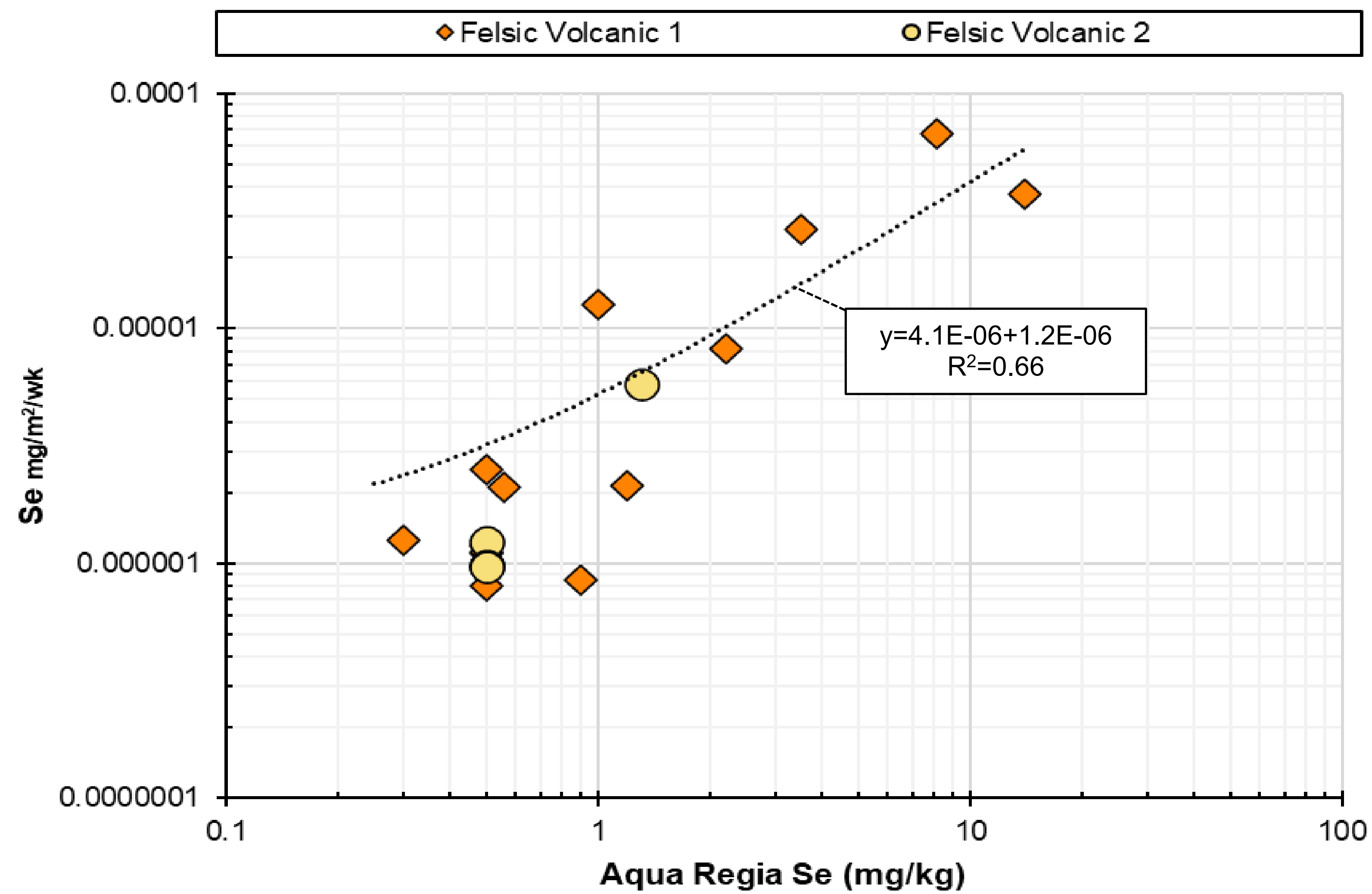
Total S measured by LECO furnace.

Regression Equation for Sulphate Source Term (Felsic Volcanic)	
Great Bear Project - Mine Site Water Quality Estimate	
Kinross Great Bear Project	
Figure Number	4-2
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG



Notes
Excluded samples not shown (see text).
Total S measured by LECO furnace.

Regression Equation for Sulphate Source Term (Basalt, Metasediment, Fragmental, and Argillite)	
Great Bear Project - Mine Site Water Quality Estimate	
Kinross Great Bear Project	
Figure Number	4-3
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG



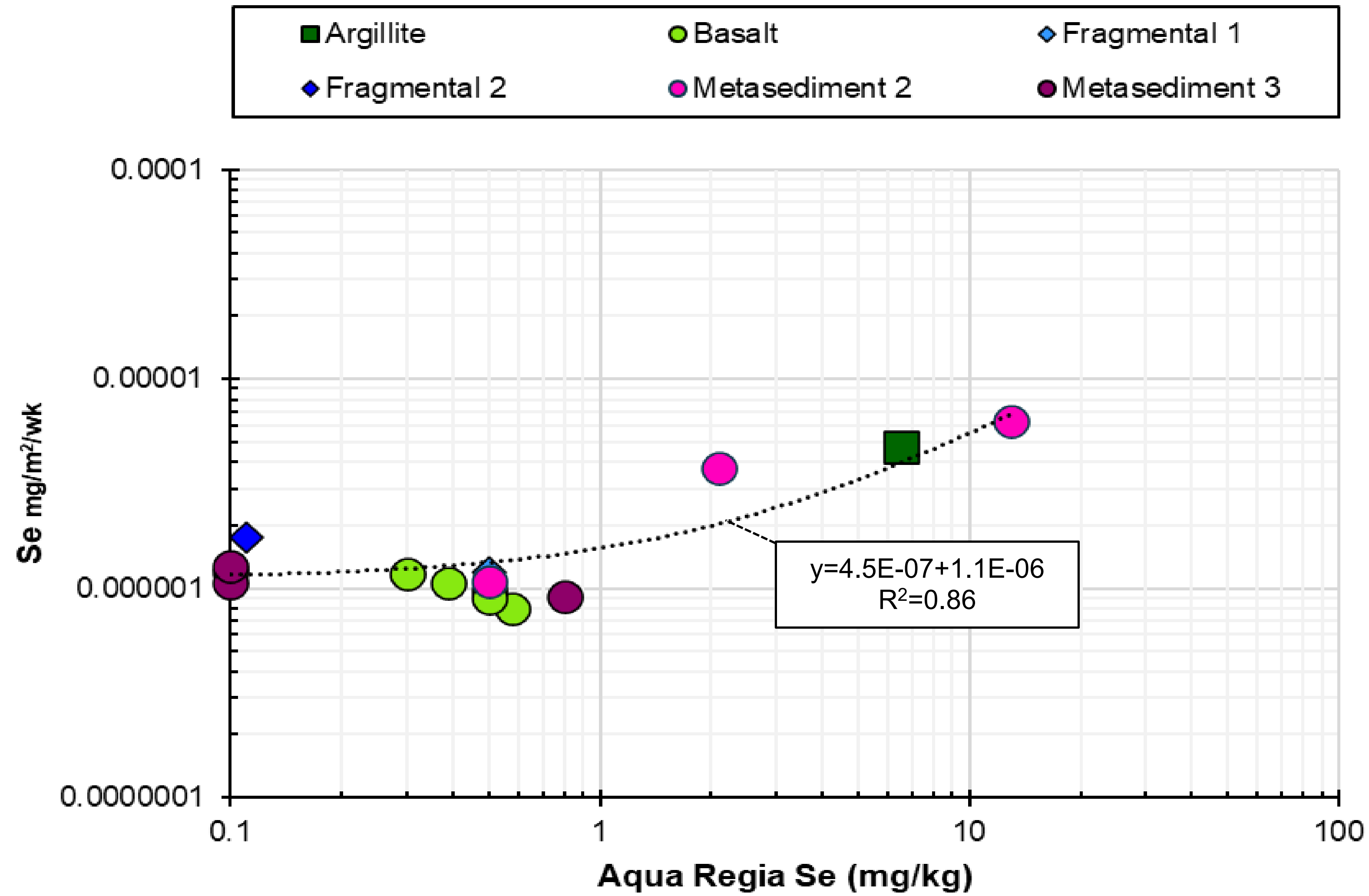
Notes
Excluded samples not shown (see text).
Se measured by aqua digest with ICP-MS finish.

Regression Equation for Selenium Source Term (Felsic Volcanic)

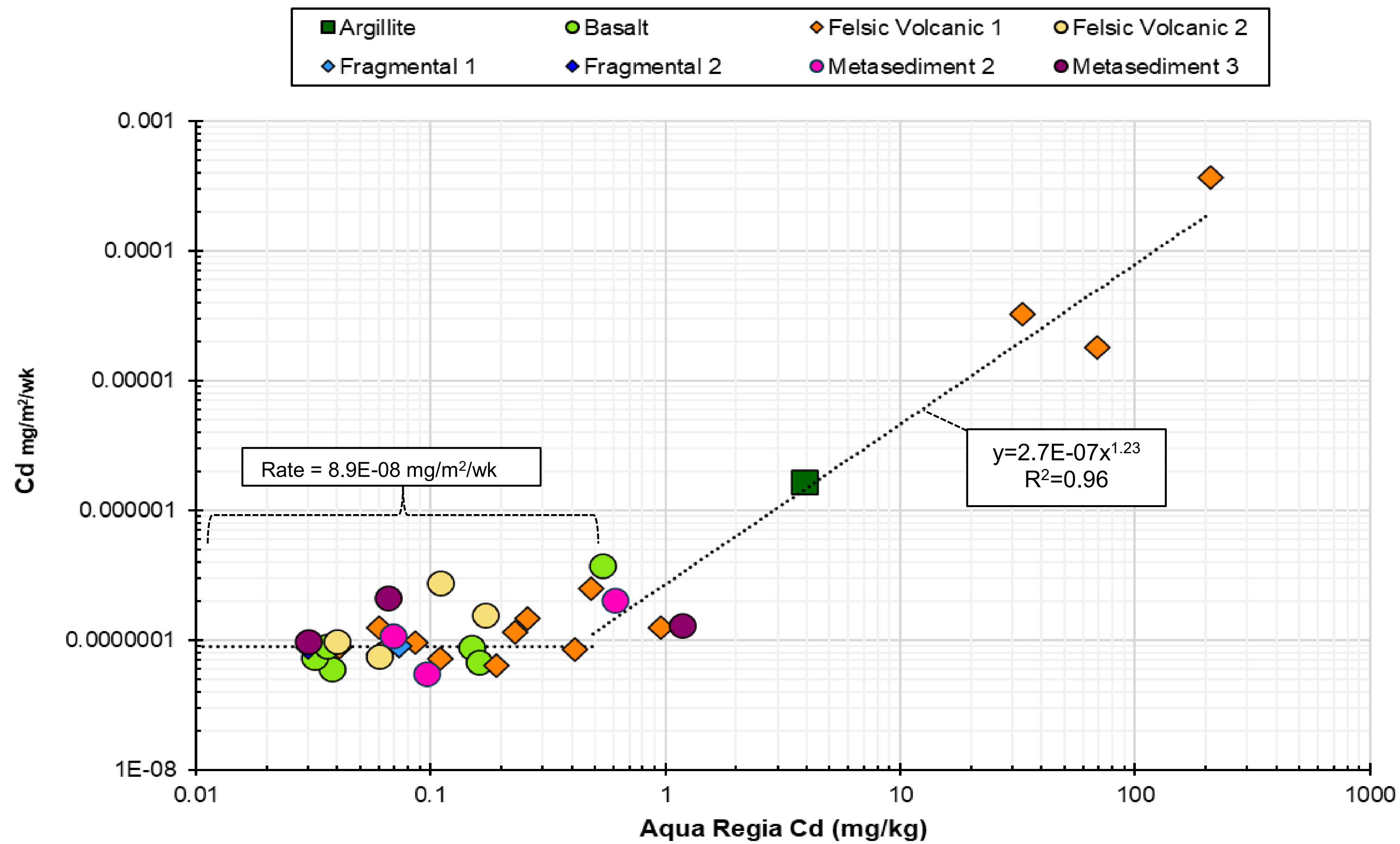
Great Bear Project - Mine Site Water Quality Estimate

Kinross Great Bear Project

Figure Number	4-4
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG



Notes	Regression Equation for Selenium Source Term (Basalt, Metasediment, Fragmental, and Argillite)	
Excluded samples not shown (see text).	Great Bear Project - Mine Site Water Quality Estimate	
Se measured by aqua digest with ICP-MS finish.	Kinross Great Bear Project	
	Figure Number	4-5
	Project Number	OMEMA2303.160
	Date	Nov. 2025
	Drawn / Reviewed	AK / KG



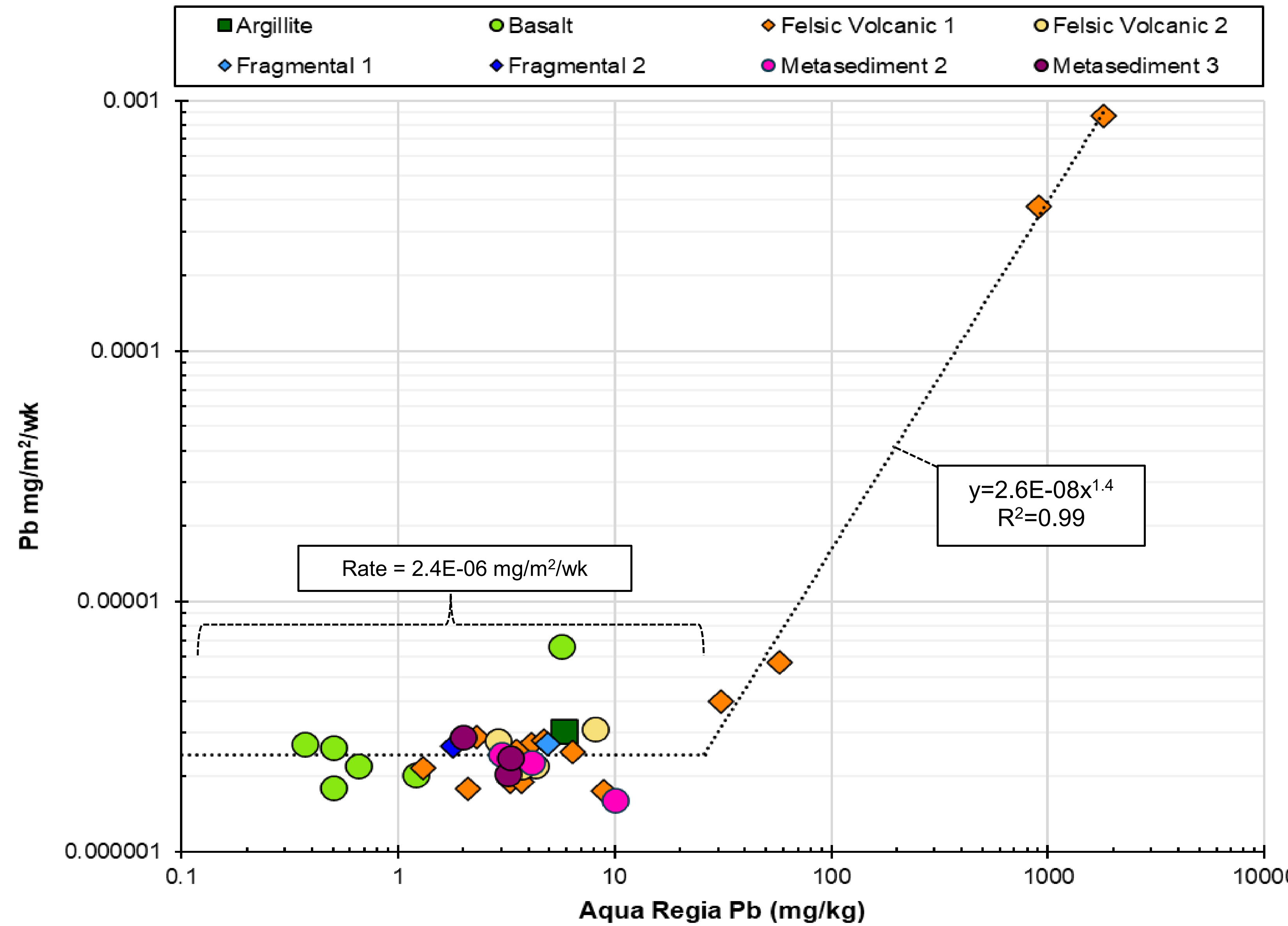
Notes
Excluded samples not shown (see text).
Cd measured by aqua regia digest with ICP-MS finish.
Regression equation applied to samples with solid phase Cd > 0.5 mg/kg.

Regression Equation for Cadmium Source Term (All Lithologies)

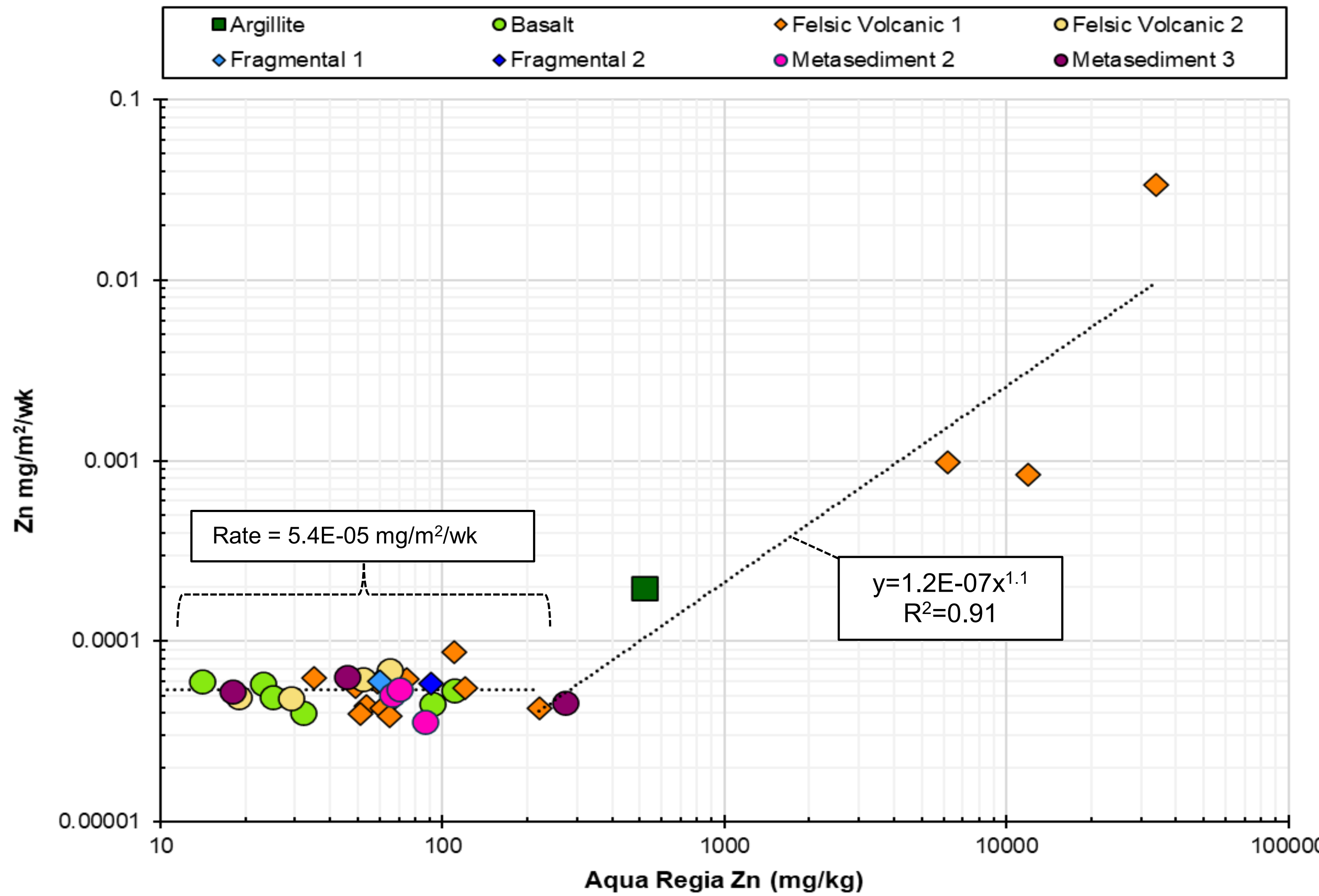
Great Bear Project - Mine Site Water Quality Estimate

Kinross Great Bear Project

Figure Number	4-6
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG

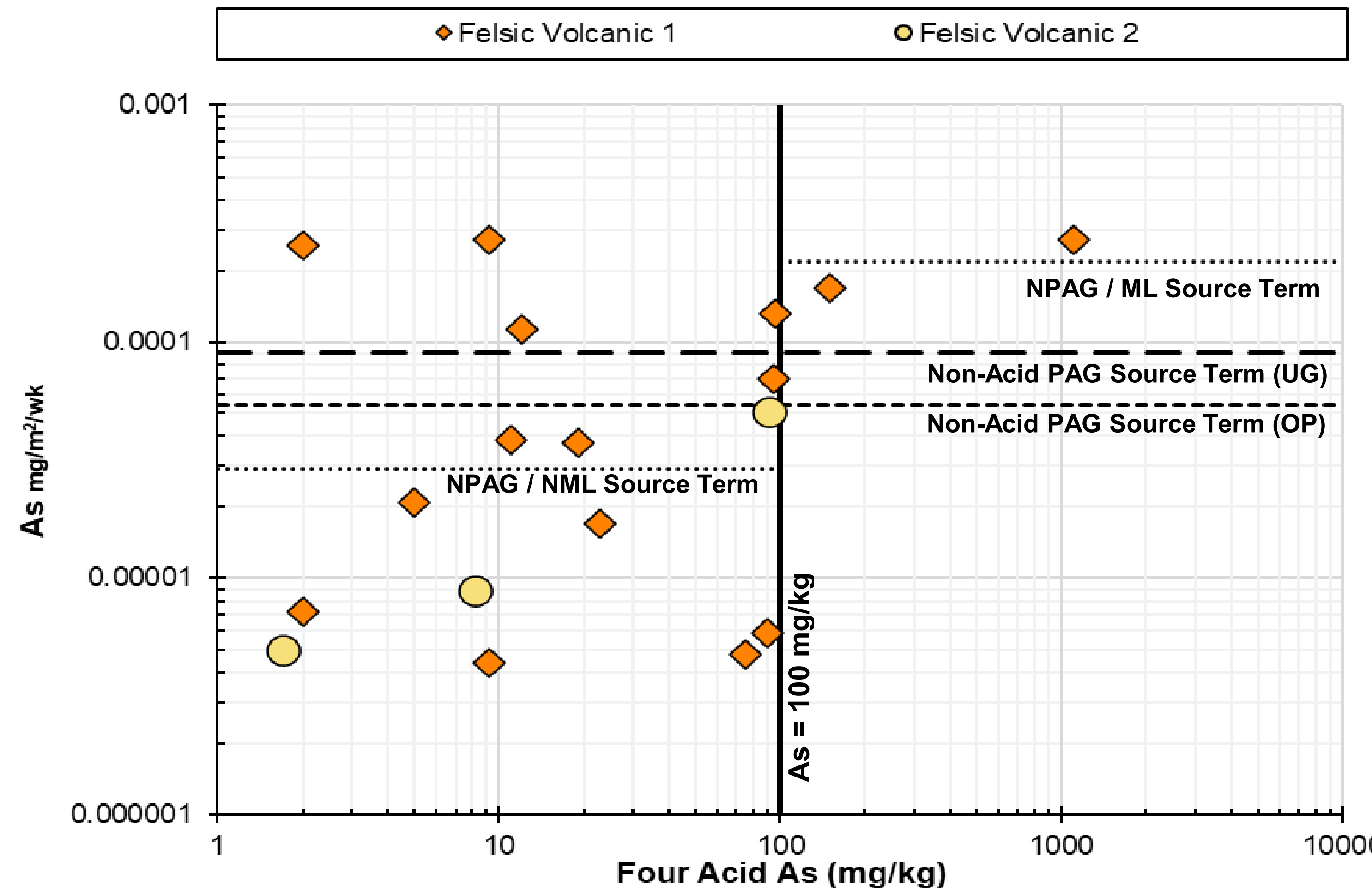


Notes	Regression Equation for Lead Source Term (All Lithologies)	
Excluded samples not shown (see text).	Great Bear Project - Mine Site Water Quality Estimate	
Pb measured by aqua regia digest with ICP-MS finish.	Kinross Great Bear Project	
Regression equation applied to samples with solid phase Pb > 28 mg/kg.	Figure Number	4-7
	Project Number	OMEMA2303.160
	Date	Nov. 2025
	Drawn / Reviewed	AK / KG



Notes
Excluded samples not shown (see text).
Zn measured by aqua regia digest with ICP-MS finish.
Regression equation applied to samples with solid phase Zn > 220 mg/kg.

Regression Equation for Zinc Source Term (All Lithologies)	
Great Bear Project - Mine Site Water Quality Estimate	
Kinross Great Bear Project	
Figure Number	4-8
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG



Source Term	Release Rate Used
NPAG/NML	Median of As ≤ 100 mg/kg HCTs
NPAG/ML	Average of As > 100 mg/kg HCTs
Non-Acidic PAG As ≤100 mg/kg	Median of As ≤ 100 mg/kg HCTs
Non-Acidic PAG As >100 mg/kg	Average of As > 100 mg/kg HCTs

Notes

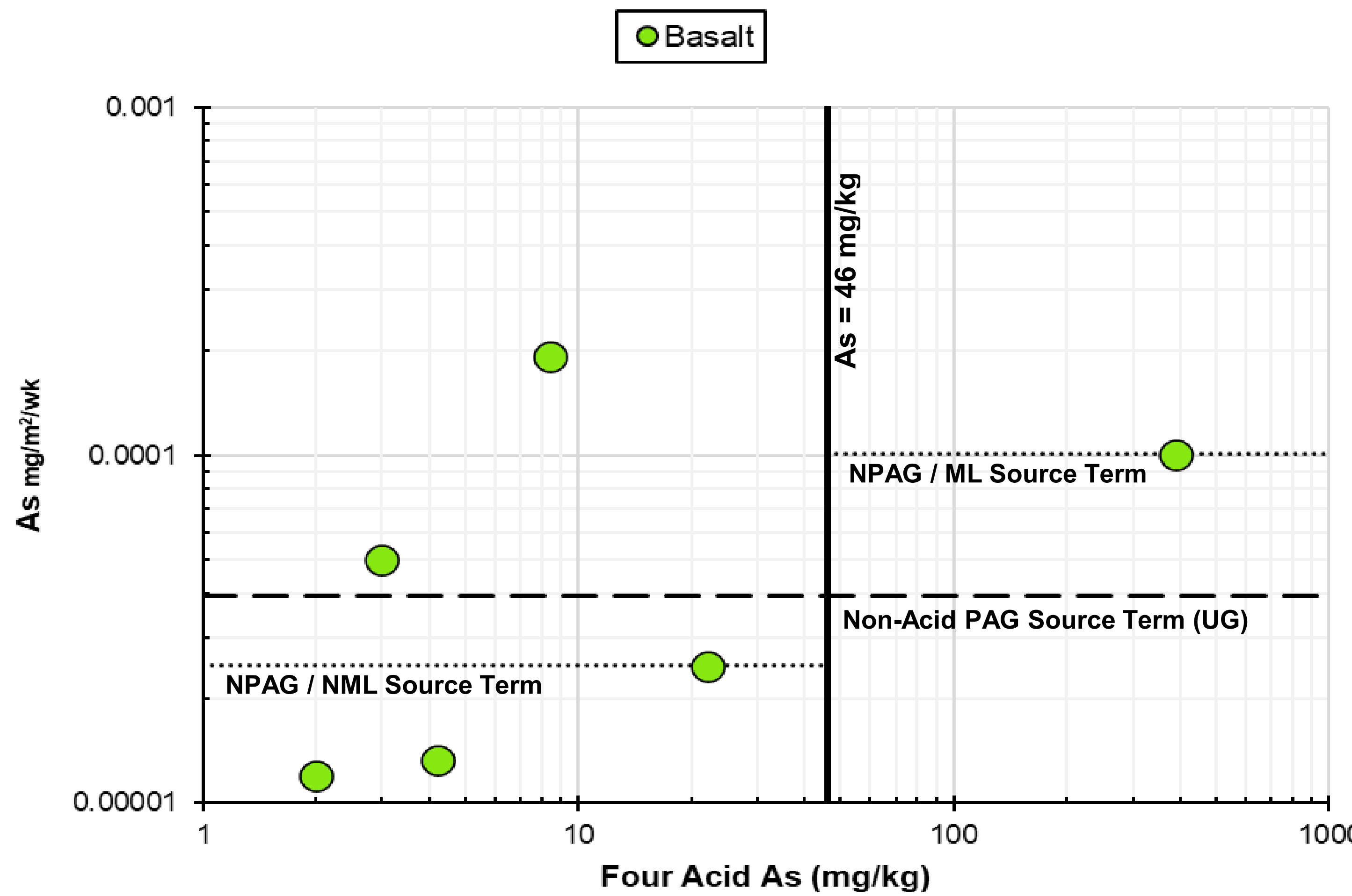
Non-acid PAG source terms weighted by block model proportions of PAG blocks with As above or below 100 mg/kg.
Excluded samples not shown (see text).
As measured by four acid digest with ICP-MS finish.

Arsenic Source Term (Felsic Volcanic)

Great Bear Project - Mine Site Water Quality Estimate

Kinross Great Bear Project

Figure Number	4-9
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG



Source Term	Release Rate Used
NPAG/NML	Median As ≤46 mg/kg HCTs
NPAG/ML	HC-23 release rate
Non-Acidic PAG As ≤46 mg/kg	Median As ≤46 mg/kg HCTs
Non-Acidic PAG As >46 mg/kg	HC-23 release rate

Notes

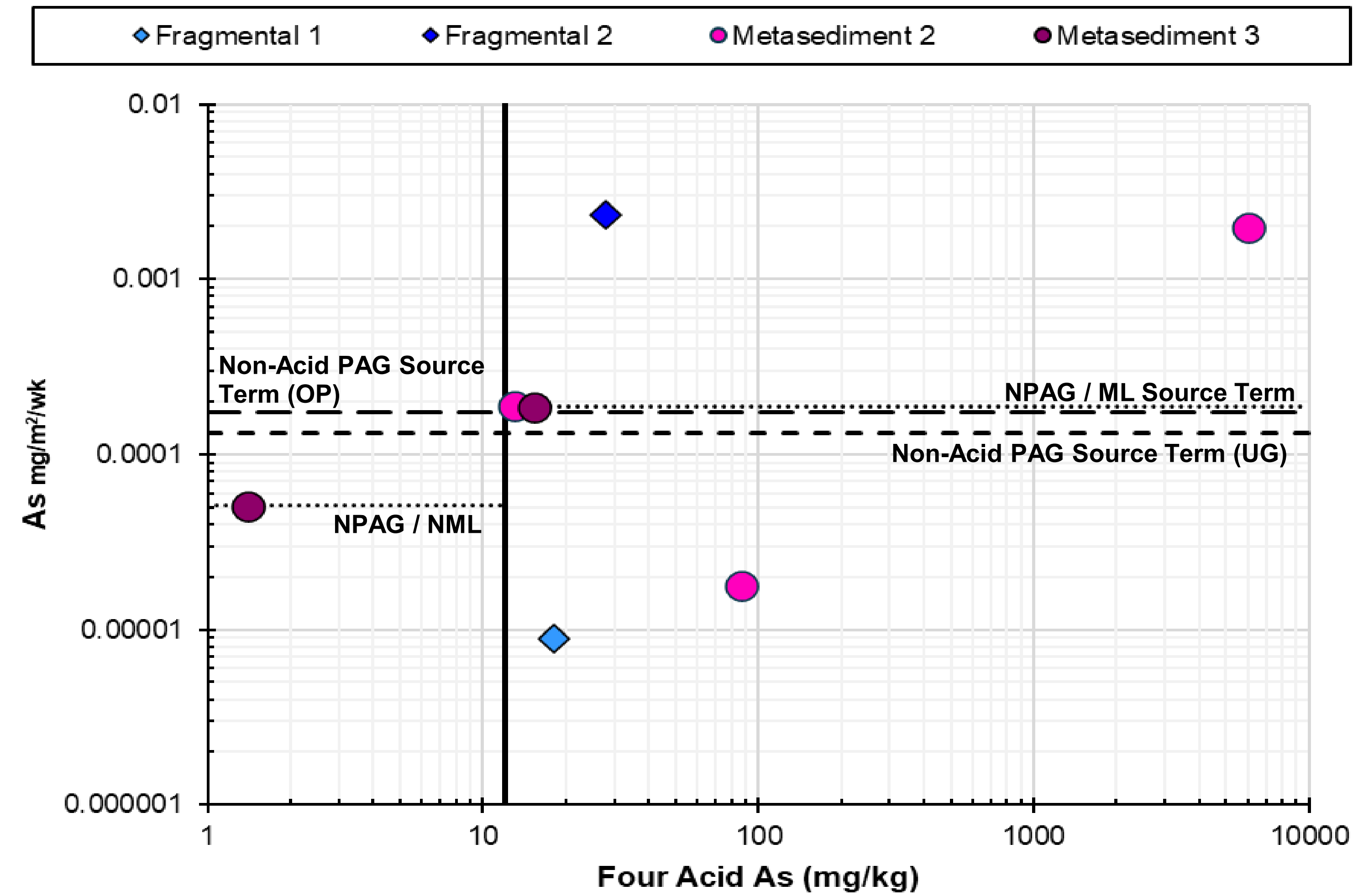
Non-acid PAG source terms weighted by block model proportions of PAG blocks with As above or below 46 mg/kg.

No PAG Basalt was present in the open pit block model.

Excluded samples not shown (see text).

As measured by four acid digest with ICP-MS finish.

Arsenic Source Term (Basalt)	
Great Bear Project - Mine Site Water Quality Estimate	
Kinross Great Bear Project	
Figure Number	4-10
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG



Source Term	Release Rate Used
NPAG/NML	HC-28 release rate
NPAG/ML	Median of As >12 mg/kg HCTs
Non-Acidic PAG As ≤12 mg/kg	HC-28 release rate
Non-Acidic PAG As >12 mg/kg	Median of As >12 mg/kg HCTs

Notes

Non-acid PAG source terms weighted by block model proportions of PAG blocks with As above or below 12 mg/kg.
Excluded samples not shown (see text).
As measured by four acid digest with ICP-MS finish.

Arsenic Source Term (Metasediment, Fragmental, and Argillite)

Great Bear Project - Mine Site Water Quality Estimate

Kinross Great Bear Project

Figure Number	4-11
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	AK / KG

5 RESULTS

5.1 OPERATIONS PHASE

Model results for the operations phase are provided for the following model nodes.

- WTP influent (drawn from the AEX mine water pond), along with inputs to the AEX mine water pond, including contact water from the east VMF, and underground mine dewatering.
- MFP influent (TMF pond).
- Fugitive seepages, including fugitive seepage from the TMF, TMF pond, and MWP.

Median annual concentrations (based on the monthly average results) are provided for these model nodes in Tables 5-1 through 5-9. Mass balance results are provided for all nodes. Equilibrated results are provided for selected nodes including fugitive seepage nodes (TMF pond seepage, MWP seepage, TMF seepage) and inputs to water treatment systems (AEX mine water pond and TMF pond).

Model results indicated that the concentration at the AEX mine water pond and TMF pond varied seasonally. Given the influence of these nodes on water treatment planning for the Project, equilibrated results are provided for winter and summer conditions for key milestone dates for those nodes as follows.

- AEX mine water pond: January and July of Year 10 (prior to acid onset in the underground mine) and Year 25 (after acid onset in the underground mine).
- TMF pond: January and July of Year 10 (mid-operations, representing average TMF pond water quality conditions) and Year 24 (near the end of operations, representing reduced process plant throughput conditions).

Key results for the operations phase are outlined below.

- Water in the east VMF is primarily pumped to the AEX mine water pond and ultimately the WTP during the operations phase. The east VMF is estimated to receive neutral pH flows early in the operations phase and therefore have a neutral pH during that time. In Year 25, following acid onset of the pit walls in the LP Central pit, it was assumed that some form of pH management would be conducted at (or upstream of) the east VMF to maintain a neutral pH and stable geochemical conditions for the concentrate tailings stored therein.[2] Key loading sources to the east VMF during the operations phase include process water discharged with the concentrate tailings, contact water from the MRS (prior to placement of the closure cover), and contact water from LP Central pit dewatering. Mass loadings from the MRS that report to the east VMF are reduced following placement of the closure cover, decreasing the concentration of some model parameters in the east VMF water at that time. Prior to the acidification of the LP Central pit walls, process water discharged with the concentrate tailings represents the main loading source to the east VMF for most model parameters.
- The TMF pond is primarily pumped to the process plant and excess water is pumped to the MFP for treatment. The TMF pond has a slightly alkaline pH (Table 5-2). Concentrations in the pond vary seasonally due to the continual discharge of process water released with the tailings into the TMF with excess waters entering the TMF pond, and seasonal inputs of direct precipitation and runoff from the cleared area in the northeast portion of the catchment. Concentrations in the TMF pond decrease after Year 14 due to the use of water from the MWP as reclaim at the process plant, and a reduction in ore throughput at the plant. Concentrations decrease later in mine life (after Year 24) as process plant throughput is reduced further and lower process water volumes are discharged to the TMF. The main source of load to the TMF pond is ultimately the discharge of tailings process water to the TMF.

[2] There was no concurrent reduction in mass loadings due to assumed pH management of acidic inflows to the VMF (see Section 4.6) to be conservative.

- Water from underground mine dewatering is routed to the AEX mine water pond and ultimately to the WTP. Water from underground dewatering is estimated to have a neutral pH until approximately Year 17, following the acidification of PAG mine rock in the underground (Table 5-4). Prior to acidification key sources of mass load to underground dewatering include groundwater inflows (including deep and shallow groundwater), bleed water release from paste backfill, and mass load released from rock surface (walls and backfill). The main source of mass load release following acid onset of underground rock is from rock surfaces; however, groundwater inflows (including deep and shallow groundwater) are also an important loading source for some model parameters (including sulphate) at that time.
- The WTP influent (drawn from the AEX mine water pond) is estimated to have a slightly alkaline pH from Year 1 to Year 16. After that time, acid onset is estimated to progressively occur for PAG mine rock in the underground mine, and mildly acidic pH conditions could occur starting in Year 17 (Table 5-5 and 5-6). The WTP influent has an estimated pH of 4 by the end of the operations phase. As a result, concentrations of some parameters in the AEX mine water pond increase toward the end of the operations phase due to acid onset of wall rock in the LP Central pit wall rock, which is dewatered to the VMF and ultimately the AEX mine water pond.
- Fugitive seepage from the TMF and TMF pond are estimated to have a slightly alkaline pH (approximately pH 8; Table 5-7 and 5-8). The main loading source of sulphate and metals to the TMF seepage during the operations phase is process water discharged with the tailings.
- Fugitive seepage from the MWP is estimated to have a neutral pH (Table 5-9) with relatively low concentrations of sulphate and metals.

5.2 CLOSURE PHASE

5.2.1 ACTIVE CLOSURE PERIOD

Model results for the active closure period are presented in Tables 5-10 to 5-14. Results represent conditions during the progressive placement of the closure cover on the TMF, and accelerated filling with water of the underground mine, VMF (after removal of temporarily stored reject solution), and LP Central pit. The accelerated filling includes the addition of fresh water from the Chukuni River as well as contact water from around the site. Accelerated filling of the VMF ceases early in active closure following the formation of the VMF pit lake, and accelerated filling of the underground mine and LP Central pit continues to occur throughout the active closure period. It is assumed that there will be initial treatment of the VMF contact water to manage metal concentrations, if required, once filled in the active closure period and that the wall rock on the final highwall in the VMF pit lake will be covered with clay-rich overburden.

Results are provided for the following model nodes.

- AEX mine water pond water, representing the overall site contact water pumped to the LP Central pit as part of accelerated pit filling [3].
- VMF pit lake water and fugitive seepage.
- TMF pond water and fugitive seepage.
- TMF and MWP fugitive seepage.

Water quality estimates represent mass balance results. Equilibrated results for fugitive seepage are also provided. Median concentrations (based on monthly average results) over the active closure period are shown.

---

[3] Does not include water from the Chukuni River, which is added to the LP Central pit as its own inflow.

- The site contact water pumped to the LP Central pit (via the AEX mine water pond) as part of accelerated filling originates from the TMF pond, east VMF, AEX catchment, and the MWP. This water has a slightly alkaline pH and sulphate concentration on the order of 160 mg/L with relatively low concentrations of metals (Table 5-10). The main sources of load are seepage from the covered TMF (via the TMF pond) as well as periodic inputs from the VMF pit lake, as pumping from the VMF occurs during the active closure period to maintain the VMF water level below 354 masl.
- During the active closure period the VMF has been filled with water to form a pit lake. Concentrations of sulphate and metals in the VMF pit lake water and fugitive seepage decrease during the active closure period relative to the operations phase (Table 5-11). This decrease is due to several factors, including assumed initial water treatment of the pit lake water, as well as the cessation of concentrate tailings deposition and ongoing process water inputs to the VMF, dilution from accelerated filling, and loss of load via pumping to maintain the VMF water level.
- Fugitive seepage from the TMF is estimated to have a slightly alkaline pH (pH 8; Table 5-12). Process water retained within the pore spaces of the covered desulphurized tailings is a key loading source to seepage from the TMF. Over time residual process water will be released from the tailings pores via seepage. During the initial phases of closure, seepage from the TMF is expected to be of the same quality as the seepage water quality at the end of the operations phase.
- During the active closure period excess water from the TMF pond is routed to the AEX mine water pond and ultimately the LP Central pit. The TMF pond and TMF pond fugitive seepage are estimated to have a slightly alkaline pH (pH 8; Table 5-13). Concentrations within the pond are expected to decrease at the start of the active closure period reflecting the cover placement on the TMF and corresponding reduction in seepage volume from the TMF to the TMF pond. Residual process water seepage from the TMF to the TMF pond is the primary loading source to the TMF pond during the active closure period.
- Fugitive seepage from the MWP is estimated to have a neutral pH (Table 5-14) with relatively low concentrations of sulphate and metals.

5.2.2 PASSIVE CLOSURE PERIOD

Model results for the passive closure period are presented in Tables 5-15 to 5-20. Results represent conditions during Year 31, the first year of the passive closure period, immediately following completion of accelerated filling of the underground mine and LP Central pit (forming the LP Central pit lake). Results for the VMF pit lake and the LP Central pit lake represent conditions once the passive closure water levels of 354 masl and 343 masl, respectively, are reached.

Model results are provided for the following model nodes.

- Influent to the WTP (drawn from the AEX mine water pond), including contact water from the TMF pond, MWP, AEX catchment, and LP Central pit lake. LP Central pit lake results consider a fully mixed and stratified condition.
- VMF pit lake and fugitive seepage.
- TMF and MWP fugitive seepage.

Water quality estimates represent mass balance results. Equilibrated results for fugitive seepage (VMF pit lake, TMF, MWP), the LP Central pit lake, and the WTP influent (AEX mine water pond) are also provided. Results represent the median annual concentrations (based on average monthly values) for Year 31, the first year of the passive closure period, once accelerated filling is complete.

- Once accelerated filling of the LP Central pit lake is complete but passive discharge to the environment has not been initiated, site contact water is directed to the AEX mine water pond and thence to the WTP. The AEX mine water pond is expected to have a slightly alkaline pH (pH 8; Table 5-15). Primary loading sources include the TMF pond, and excess water from the LP Central pit lake pumped to the AEX mine water pond.

- Water from the TMF pond is assumed to be routed to the AEX mine water pond and WTP during the passive closure period. Sulphate and metal concentrations for the TMF pond are lower than the operations phase due to the cessation of process plant discharge and placement of a cover on the desulphurized tailings in the TMF (Table 5-16). The sources of mass load to the TMF pond are seepage from the covered TMF and the NPAG / NML rock used to construct the TMF dams.
- LP Central pit lake has a neutral pH (pH 7) and a sulphate concentration of approximately 60 mg/L after accelerated filling is complete (Table 5-17). Mass balance estimates (fully mixed condition) showed generally low metal concentrations and further polishing of metal concentrations is estimated to occur due to natural adsorption of metals to iron oxyhydroxide precipitates that form in the pit lake water column, as indicated in the equilibrated simulations. During passive closure, the primary loading source to the LP Central pit lake is contact water from the covered MRS, which enters the pit lake via the gravity channel / overland flow and direct seepage.
- Due to the overall low concentrations of model parameters in the pit lake inputs, estimates of pit lake water quality were not highly sensitive to assumed potential pit lake stratification conditions, as shown in Figures 5-1 to 5-5. For the two stratification conditions evaluated.

Summer thermal stratification conditions with full seasonal mixing, incremental increases to surface water quality during the summer months occurred as higher concentration inputs were isolated to the surface waters in the pit lake. However, increases were marginal, on the order of 2% as the volumes of inputs from reclaimed areas within the pit lake catchment also increased during the spring and summer relative to winter months, lowering the average concentration of the inflows. Following mixing in the autumn, concentrations were consistent with the fully mixed scenario.

Summer thermal stratification conditions with partial seasonal mixing had estimated concentrations lower than the fully mixed mass balanced results. This is because the overall inflows to the LP Central pit lake are estimated to have a lower concentration than the initial pit lake water quality (i.e., assuming partial mixing isolated some legacy load at depth in the pit lake).

- Concentrations of sulphate and metals in the VMF pit lake and fugitive seepage further decrease during the passive closure period (Table 5-18). This occurs as loading inputs decrease due to closure rehabilitation activities and continued mass load loss via fugitive seepage.
- Fugitive seepage from the TMF is estimated to have a slightly alkaline pH (pH 8; Table 5-19). Process water retained within the pore spaces of the covered tailings is a key loading source to seepage from the desulphurized tailings mass. Over time residual process water will be released from the tailings pores via seepage.
- The MWP and fugitive seepage from the MWP is estimated to have a neutral pH (pH 7.5; Table 5-20) with relatively low concentrations of sulphate and metals.

5.2.3 POST-CLOSURE

Model results for post-closure are presented in Table 5-21 to 5-24. Results are provided for the following model nodes and represent long-term steady state conditions after the Project is fully reclaimed.

- Drainage from rehabilitated areas including the MRS and TMF cover runoff, the former TMF pond and MWP catchment, the former OVB1 catchment, and other revegetated areas.
- TMF fugitive seepage.
- VMF pit lake water and fugitive seepage, including when the VMF initially reaches its long-term elevation (354 masl) and long-term steady state conditions. VMF results assume a fully mixed condition.
- LP Central pit lake, including when the pit lake initially reaches its long-term elevation (348 masl) and long-term steady state conditions. LP Central pit lake results consider a fully mixed and stratified condition.

Water quality estimates represent mass balance results. Equilibrated results for fugitive seepage (TMF and VMF pit lake) and the LP Central pit lake overflow are also provided. Results represent median monthly concentrations for an average year during long-term steady state conditions during the post-closure period.

- Drainage from rehabilitated areas including the MRS and TMF cover runoff is estimated to have a neutral pH and be consistent with drainage from site overburden (Table 5-21). Drainage from the former TMF pond and MWP catchment, and other revegetated areas are estimated to have a neutral pH and low concentrations of sulphate and metals, similar to natural runoff from the site (Table 5-21), based on the previously described closure approaches for the Project (Section 3.2). The catchment containing OVB1 is revegetated and its drainage is estimated to have similarly low concentrations of model parameters (Table 5-21).
- Fugitive seepage from the TMF is estimated to have a neutral pH and notably lower sulphate and metal concentrations at post-closure relative to the operations and closure phases (Table 5-22). Post-closure conditions represent the long-term steady state condition for the TMF, whereby residual process water within the tailings pores has been depleted and mass load contributions are only from the covered desulphurized tailings and the NPAG / NML mine rock used to construct the TMF dams. Preliminary estimates indicate that the steady state condition may be reached within approximately 70 years after the beginning of the passive closure period. This is largely driven by the time required for residual process water within the tailings to be released with seepage from the facility.
- Concentrations of sulphate and metals in the VMF pit lake water and fugitive seepage continue to decrease into post-closure (Table 5-23) as mass load continues to be slowly lost via fugitive seepage and loading inputs decrease due to the rehabilitation of major loading sources as part of closure activities.
- The LP Central pit lake is estimated to have relatively low sulphate and metal concentrations which continue to decline into post-closure as shown in Table 5-24 and Figures 5-2 to 5-5. The pit lake water is estimated to have a neutral pH (approximately pH 7.5), with sufficient buffering capacity in the pit lake waters to neutralize any acidic inputs from the small areas of acidic PAG pit walls exposed above the pit lake surface. During post-closure the primary loading source to the LP Central pit lake is contact water from the MRS (via the gravity channel and direct seepage).
- Concentrations in post-closure were similar for the fully mixed LP Central pit lake and the potential stratification scenarios assessed (Figure 5-1 to 5-5). The stratified scenarios showed incrementally higher concentrations compared to the fully mixed results in Year 34 and Year 35 as water and mass load are accumulating in the pit lake as the water level passively increases to its final elevation of 348 masl (Figure 5-1). Once the final water level is reached and outflow from the pit lake occurs, stratified concentrations are slightly lower than the fully mixed scenario (Figures 5-2 to 5-5).

Table 5-1: East VMF - Operations Phase (Mass Balance)

Parameter	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
SO4	mg/L	251	406	410	426	421	419	415	418	421	430	427	438	452
Cl	mg/L	11	16	18	21	23	24	25	24	22	20	19	19	20
Hg	mg/L	0.000029	0.000038	0.000047	0.000057	0.000066	0.000074	0.000082	0.000072	0.000054	0.000043	0.000040	0.000040	0.000041
Ag	mg/L	0.00015	0.00019	0.00024	0.00029	0.00033	0.00038	0.00041	0.00037	0.00027	0.00022	0.00020	0.00020	0.00021
Al	mg/L	0.22	0.28	0.35	0.41	0.48	0.54	0.59	0.52	0.39	0.32	0.29	0.30	0.30
As	mg/L	0.024	0.032	0.039	0.045	0.050	0.055	0.057	0.052	0.042	0.034	0.032	0.031	0.032
Be	mg/L	0.000032	0.000039	0.000048	0.000055	0.000062	0.000069	0.000073	0.000067	0.000057	0.000048	0.000046	0.000047	0.000049
B	mg/L	0.025	0.037	0.039	0.044	0.046	0.049	0.051	0.053	0.053	0.053	0.052	0.054	0.055
Ca	mg/L	48	69	72	75	77	80	81	79	75	72	70	71	72
Cd	mg/L	0.00057	0.00080	0.0011	0.0013	0.0015	0.0017	0.0019	0.0017	0.0012	0.00093	0.00083	0.00083	0.00085
Co	mg/L	0.0075	0.012	0.012	0.012	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.012	0.012
Cr	mg/L	0.00079	0.00094	0.0010	0.0011	0.0012	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0012
Cu	mg/L	0.0083	0.011	0.013	0.013	0.015	0.016	0.016	0.015	0.014	0.013	0.013	0.013	0.014
Fe	mg/L	0.38	0.46	0.45	0.44	0.44	0.44	0.44	0.44	0.43	0.43	0.43	0.43	0.44
K	mg/L	7.5	12	13	14	15	15	16	15	14	13	13	13	13
Mg	mg/L	4.1	4.9	4.8	5.1	5.1	5.2	5.2	5.2	5.2	5.2	5.1	5.2	5.3
Mn	mg/L	0.13	0.18	0.21	0.25	0.28	0.31	0.32	0.29	0.24	0.20	0.19	0.19	0.19
Mo	mg/L	0.0088	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.014
Na	mg/L	77	126	126	133	130	127	125	128	132	137	137	141	147
Ni	mg/L	0.0016	0.0020	0.0023	0.0026	0.0028	0.0030	0.0031	0.0029	0.0025	0.0022	0.0021	0.0021	0.0022
P	mg/L	0.093	0.16	0.17	0.19	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.19	0.20
Pb	mg/L	0.0033	0.0044	0.0058	0.0072	0.0084	0.0095	0.010	0.0094	0.0070	0.0055	0.0048	0.0047	0.0046
Sb	mg/L	0.011	0.017	0.018	0.018	0.019	0.020	0.020	0.019	0.018	0.017	0.016	0.017	0.017
Se	mg/L	0.0034	0.0048	0.0061	0.0073	0.0085	0.0096	0.010	0.0091	0.0069	0.0055	0.0051	0.0050	0.0051
Tl	mg/L	0.000024	0.000031	0.000036	0.000042	0.000047	0.000052	0.000054	0.000049	0.000040	0.000034	0.000032	0.000032	0.000033
U	mg/L	0.0020	0.0028	0.0032	0.0036	0.0040	0.0043	0.0044	0.0041	0.0035	0.0030	0.0029	0.0029	0.0030
V	mg/L	0.0023	0.0027	0.0032	0.0035	0.0039	0.0042	0.0045	0.0043	0.0038	0.0034	0.0033	0.0034	0.0035
W	mg/L	0.0024	0.0038	0.0039	0.0041	0.0043	0.0045	0.0047	0.0047	0.0045	0.0043	0.0042	0.0043	0.0043
Zn	mg/L	0.022	0.029	0.037	0.044	0.052	0.059	0.065	0.057	0.043	0.034	0.031	0.031	0.031
Zr	mg/L	0.0059	0.0076	0.0096	0.012	0.013	0.015	0.017	0.015	0.011	0.0087	0.0080	0.0081	0.0083

Table 5-1: East VMF - Operations Phase (Mass Balance) (cont'd)

Parameter	Units	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26
SO4	mg/L	393	391	386	384	382	381	379	371	369	359	357	478	484
Cl	mg/L	20	20	19	19	19	19	19	19	19	18	18	13	9.5
Hg	mg/L	0.000043	0.000043	0.000043	0.000043	0.000043	0.000043	0.000043	0.000043	0.000043	0.000042	0.000042	0.000040	0.000039
Ag	mg/L	0.00022	0.00022	0.00022	0.00022	0.00022	0.00022	0.00022	0.00022	0.00022	0.00022	0.00021	0.00023	0.00024
Al	mg/L	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.33	0.33	0.34	3.2	10
As	mg/L	0.032	0.032	0.031	0.032	0.032	0.032	0.032	0.031	0.031	0.031	0.031	0.046	0.054
Be	mg/L	0.000050	0.000050	0.000051	0.000051	0.000051	0.000051	0.000052	0.000051	0.000052	0.000052	0.000053	0.00018	0.00050
B	mg/L	0.056	0.056	0.053	0.053	0.053	0.053	0.053	0.052	0.053	0.051	0.052	0.083	0.092
Ca	mg/L	66	65	64	64	64	64	64	63	63	61	61	50	41
Cd	mg/L	0.00089	0.00089	0.00089	0.00089	0.00090	0.00090	0.00091	0.00090	0.00090	0.00089	0.00089	0.0014	0.0021
Co	mg/L	0.0094	0.0093	0.0092	0.0091	0.0091	0.0090	0.0090	0.0088	0.0088	0.0086	0.0086	0.025	0.057
Cr	mg/L	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0013	0.0013	0.0015	0.027	0.086
Cu	mg/L	0.013	0.013	0.013	0.013	0.013	0.013	0.014	0.013	0.013	0.013	0.014	0.039	0.076
Fe	mg/L	0.40	0.40	0.40	0.41	0.41	0.41	0.42	0.42	0.47	0.51	0.60	19	60
K	mg/L	13	12	12	12	12	12	12	12	12	12	12	14	14
Mg	mg/L	5.1	5.1	5.1	5.1	5.1	5.1	5.0	5.0	5.0	4.9	4.9	5.1	4.9
Mn	mg/L	0.19	0.19	0.19	0.19	0.19	0.19	0.20	0.19	0.19	0.19	0.19	0.54	1.4
Mo	mg/L	0.012	0.012	0.012	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.0061	0.0033
Na	mg/L	129	128	126	126	125	125	124	121	121	117	116	55	16
Ni	mg/L	0.0021	0.0021	0.0021	0.0022	0.0022	0.0022	0.0022	0.0022	0.0023	0.0024	0.0026	0.043	0.14
P	mg/L	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.30	0.34
Pb	mg/L	0.0048	0.0048	0.0048	0.0048	0.0049	0.0049	0.0049	0.0048	0.0047	0.0047	0.0047	0.0072	0.011
Sb	mg/L	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.0077	0.0038
Se	mg/L	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0052	0.0051	0.0051	0.0051	0.0039	0.0034
Tl	mg/L	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033	0.000033	0.000072	0.00017
U	mg/L	0.0029	0.0029	0.0028	0.0029	0.0029	0.0029	0.0029	0.0028	0.0028	0.0028	0.0028	0.0044	0.0054
V	mg/L	0.0035	0.0035	0.0035	0.0035	0.0036	0.0036	0.0036	0.0036	0.0036	0.0035	0.0036	0.0051	0.0064
W	mg/L	0.0040	0.0040	0.0039	0.0038	0.0038	0.0038	0.0038	0.0037	0.0038	0.0036	0.0036	0.0025	0.0016
Zn	mg/L	0.032	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.034	0.034	0.20	0.60
Zr	mg/L	0.0086	0.0086	0.0086	0.0086	0.0087	0.0087	0.0087	0.0087	0.0086	0.0086	0.0086	0.0068	0.0061

Table 5-2: TMF Pond - Mass Balance - Operations Phase

Parameter	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
SO4	mg/L	935	1418	1391	1282	1221	1178	1124	1089	1061	1052	1045	1044	1038
Cl	mg/L	16	27	26	26	25	25	23	23	23	23	23	23	23
Hg	mg/L	0.0000083	0.000011	0.000012	0.000010	0.0000093	0.0000086	0.0000079	0.0000075	0.0000073	0.0000087	0.0000095	0.0000094	0.0000094
Ag	mg/L	0.000045	0.000067	0.000071	0.000059	0.000056	0.000051	0.000048	0.000047	0.000047	0.000054	0.000057	0.000057	0.000057
Al	mg/L	0.075	0.12	0.13	0.11	0.10	0.100	0.095	0.093	0.095	0.10	0.11	0.11	0.11
As	mg/L	0.027	0.039	0.039	0.034	0.032	0.031	0.029	0.028	0.028	0.028	0.028	0.028	0.028
Be	mg/L	0.000023	0.000033	0.000037	0.000037	0.000036	0.000035	0.000035	0.000034	0.000034	0.000036	0.000037	0.000037	0.000037
B	mg/L	0.027	0.047	0.047	0.049	0.048	0.047	0.045	0.045	0.045	0.045	0.045	0.046	0.045
Ca	mg/L	112	165	162	139	133	129	124	120	117	116	116	116	115
Cd	mg/L	0.000056	0.00010	0.00011	0.000065	0.000054	0.000045	0.000034	0.000032	0.000033	0.000034	0.000034	0.000034	0.000034
Co	mg/L	0.035	0.050	0.049	0.041	0.039	0.038	0.036	0.035	0.034	0.034	0.033	0.033	0.033
Cr	mg/L	0.00067	0.00099	0.0011	0.0011	0.00100	0.00098	0.00096	0.00095	0.00094	0.00097	0.00099	0.00099	0.0010
Cu	mg/L	0.014	0.021	0.020	0.017	0.016	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014
Fe	mg/L	0.46	0.65	0.63	0.52	0.49	0.47	0.45	0.43	0.42	0.42	0.42	0.42	0.41
K	mg/L	19	31	30	30	28	28	27	26	26	26	25	26	25
Mg	mg/L	5.3	7.5	7.3	7.1	6.8	6.5	6.2	6.0	5.9	5.8	5.8	5.8	5.7
Mn	mg/L	0.086	0.13	0.14	0.12	0.11	0.10	0.10	0.097	0.10	0.10	0.10	0.10	0.10
Mo	mg/L	0.030	0.044	0.044	0.037	0.036	0.034	0.033	0.032	0.031	0.031	0.031	0.031	0.030
Na	mg/L	286	441	433	414	394	380	362	351	342	340	337	337	335
Ni	mg/L	0.0013	0.0022	0.0022	0.0019	0.0019	0.0018	0.0018	0.0017	0.0018	0.0018	0.0018	0.0018	0.0018
P	mg/L	0.39	0.61	0.60	0.61	0.58	0.56	0.53	0.52	0.51	0.50	0.50	0.50	0.50
Pb	mg/L	0.00026	0.00051	0.00058	0.00037	0.00030	0.00025	0.00020	0.00019	0.00018	0.00021	0.00023	0.00023	0.00023
Sb	mg/L	0.031	0.045	0.045	0.039	0.037	0.036	0.034	0.033	0.032	0.032	0.032	0.032	0.031
Se	mg/L	0.0027	0.0040	0.0040	0.0034	0.0031	0.0030	0.0029	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028
Tl	mg/L	0.000016	0.000024	0.000024	0.000021	0.000020	0.000019	0.000019	0.000018	0.000018	0.000019	0.000019	0.000019	0.000019
U	mg/L	0.0032	0.0049	0.0048	0.0042	0.0041	0.0039	0.0038	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037
V	mg/L	0.0017	0.0024	0.0027	0.0026	0.0024	0.0024	0.0023	0.0023	0.0023	0.0024	0.0024	0.0024	0.0025
W	mg/L	0.0060	0.0087	0.0085	0.0071	0.0068	0.0066	0.0063	0.0061	0.0059	0.0059	0.0059	0.0058	0.0058
Zn	mg/L	0.0057	0.0082	0.0086	0.0070	0.0067	0.0062	0.0057	0.0056	0.0056	0.0062	0.0065	0.0065	0.0065
Zr	mg/L	0.00096	0.0015	0.0017	0.0014	0.0013	0.0011	0.00096	0.00089	0.00093	0.0012	0.0013	0.0013	0.0013

Table 5-2: TMF Pond - Mass Balance - Operations Phase (cont'd)

Parameter	Units	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26
SO4	mg/L	812	792	776	770	762	766	760	741	762	762	760	432	127
Cl	mg/L	19	19	18	18	18	18	18	18	18	18	18	12	5.8
Hg	mg/L	0.0000088	0.0000082	0.0000080	0.0000077	0.0000077	0.0000077	0.0000078	0.0000079	0.0000078	0.0000078	0.0000078	0.0000071	0.0000062
Ag	mg/L	0.000050	0.000049	0.000048	0.000046	0.000046	0.000046	0.000046	0.000047	0.000047	0.000047	0.000047	0.000040	0.000034
Al	mg/L	0.095	0.093	0.091	0.088	0.088	0.088	0.089	0.090	0.090	0.090	0.090	0.078	0.067
As	mg/L	0.022	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.012	0.0044
Be	mg/L	0.000037	0.000035	0.000035	0.000034	0.000034	0.000034	0.000035	0.000035	0.000035	0.000035	0.000035	0.000035	0.000033
B	mg/L	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.028	0.019
Ca	mg/L	91	86	85	85	84	85	84	83	84	84	84	55	28
Cd	mg/L	0.000027	0.000026	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000018	0.000011
Co	mg/L	0.026	0.024	0.024	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.013	0.0045
Cr	mg/L	0.00096	0.00092	0.00092	0.00090	0.00090	0.00091	0.00092	0.00093	0.00092	0.00093	0.00093	0.00086	0.00076
Cu	mg/L	0.011	0.010	0.0099	0.0099	0.0098	0.0099	0.0098	0.0098	0.0099	0.0099	0.0098	0.0065	0.0036
Fe	mg/L	0.32	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.19	0.099
K	mg/L	20	20	20	20	20	20	20	20	20	20	20	13	6.0
Mg	mg/L	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.0	1.5
Mn	mg/L	0.082	0.080	0.080	0.079	0.079	0.080	0.080	0.080	0.080	0.080	0.080	0.059	0.040
Mo	mg/L	0.024	0.022	0.022	0.022	0.022	0.022	0.022	0.021	0.022	0.022	0.022	0.013	0.0054
Na	mg/L	263	260	254	253	250	251	249	243	250	250	249	139	36
Ni	mg/L	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0012	0.00092
P	mg/L	0.39	0.40	0.39	0.38	0.38	0.38	0.38	0.37	0.38	0.38	0.38	0.21	0.057
Pb	mg/L	0.00022	0.00020	0.00020	0.00019	0.00019	0.00019	0.00019	0.00020	0.00020	0.00020	0.00020	0.00018	0.00017
Sb	mg/L	0.024	0.023	0.023	0.023	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.013	0.0041
Se	mg/L	0.0022	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0013	0.00072
Tl	mg/L	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000011	0.0000080
U	mg/L	0.0029	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0020	0.0012
V	mg/L	0.0024	0.0023	0.0023	0.0022	0.0022	0.0022	0.0022	0.0023	0.0023	0.0023	0.0023	0.0021	0.0019
W	mg/L	0.0045	0.0042	0.0042	0.0041	0.0041	0.0041	0.0041	0.0040	0.0041	0.0041	0.0041	0.0025	0.0011
Zn	mg/L	0.0057	0.0056	0.0054	0.0053	0.0053	0.0053	0.0053	0.0054	0.0054	0.0054	0.0054	0.0047	0.0040
Zr	mg/L	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0011	0.0012	0.0012	0.0012	0.0012	0.0011	0.0010

Table 5-3: TMF Pond - Equilibrated - Operations Phase

Parameter	Units	Equilibrated				Mass Balance			
		Year 10 (January) Mid-operations, representing 'average' TMF pond water quality conditions	Year 10 (May) Mid-operations, representing 'average' TMF pond water quality conditions	Year 24 (January) Near the end of operations, representing reduced mill throughput conditions	Year 24 (May) Near the end of operations, representing reduced mill throughput conditions	Year 10 (January) Mid-operations, representing 'average' TMF pond water quality conditions	Year 10 (May) Mid-operations, representing 'average' TMF pond water quality conditions	Year 24 (January) Near the end of operations, representing reduced mill throughput conditions	Year 24 (May) Near the end of operations, representing reduced mill throughput conditions
pH[1]	pH units	8.0	8.0	8.0	8.0	-	-	-	-
SO4	mg/L	1281	951	1005	752	1279	950	1003	751
Chloride	mg/L	26	20	22	18	26	20	22	18
Hg	mg/L	0.0000086	0.0000081	0.0000078	0.0000073	0.0000087	0.0000082	0.0000078	0.0000073
Ag	mg/L	0.000052	0.000047	0.000046	0.000042	0.000054	0.000049	0.000047	0.000043
Al	mg/L	0.0091	0.0091	0.0091	0.0091	0.10	0.092	0.091	0.083
As	mg/L	0.010	0.0075	0.0091	0.0068	0.033	0.025	0.026	0.020
Be	mg/L	0.0000043	0.0000045	0.0000050	0.0000056	0.000036	0.000034	0.000035	0.000035
B	mg/L	0.047	0.037	0.044	0.037	0.047	0.037	0.044	0.037
Ca	mg/L	139	107	105	82	139	107	105	82
Cd	mg/L	0.000018	0.000014	0.000014	0.000011	0.000038	0.000030	0.000029	0.000024
Co	mg/L	0.036	0.027	0.026	0.020	0.042	0.032	0.030	0.023
Cr	mg/L	0.00098	0.00088	0.00093	0.00089	0.00098	0.00088	0.00093	0.00089
Cu	mg/L	0.0032	0.0027	0.0028	0.0025	0.017	0.013	0.012	0.0096
Fe	mg/L	0.018	0.015	0.017	0.015	0.50	0.39	0.37	0.28
K	mg/L	29	22	25	19	29	22	25	19
Mg	mg/L	6.5	5.0	5.6	4.4	6.5	5.0	5.6	4.4
Mn	mg/L	0.11	0.092	0.093	0.076	0.11	0.091	0.093	0.076
Mo	mg/L	0.038	0.029	0.028	0.021	0.038	0.029	0.028	0.021
Na[2]	mg/L	410	302	331	246	410	302	331	246
Ni	mg/L	0.00088	0.00072	0.00078	0.00068	0.0018	0.0015	0.0016	0.0014
P	mg/L	0.59	0.43	0.49	0.37	0.60	0.44	0.50	0.37
Pb	mg/L	0.00000013	0.00000014	0.00000014	0.00000016	0.00021	0.00020	0.00020	0.00019
Sb	mg/L	0.039	0.029	0.029	0.022	0.039	0.029	0.029	0.022
Se	mg/L	0.0032	0.0025	0.0025	0.0020	0.0032	0.0025	0.0025	0.0020
Tl[3]	mg/L	0.000020	0.000016	0.000016	0.000014	0.000020	0.000016	0.000016	0.000014
U	mg/L	0.0042	0.0033	0.0033	0.0027	0.0042	0.0033	0.0033	0.0027
V[3]	mg/L	0.0024	0.0022	0.0023	0.0022	0.0024	0.0022	0.0023	0.0022
W[3]	mg/L	0.0072	0.0055	0.0053	0.0040	0.0072	0.0055	0.0053	0.0040
Zn	mg/L	0.00070	0.00065	0.00069	0.00067	0.0061	0.0055	0.0054	0.0050
Zr	mg/L	0.0012	0.0012	0.0012	0.0011	0.0012	0.0012	0.0012	0.0011

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum, and copper results assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-4: Underground Mine Dewatering - Mass Balance - Operations Phase

Parameter	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
SO4	mg/L	186	183	179	201	191	188	185	183	184	186	189	192	194
Cl	mg/L	63	63	63	64	64	64	64	64	64	64	65	65	65
Hg	mg/L	0.0000047	0.0000054	0.0000060	0.0000067	0.0000073	0.0000080	0.0000085	0.0000091	0.000010	0.000012	0.000014	0.000016	0.000018
Ag	mg/L	0.000016	0.000020	0.000023	0.000027	0.000030	0.000033	0.000036	0.000039	0.000044	0.000053	0.000064	0.000076	0.000085
Al	mg/L	0.023	0.028	0.032	0.037	0.041	0.046	0.049	0.054	0.061	0.073	0.088	0.10	0.12
As	mg/L	0.0029	0.0032	0.0035	0.0044	0.0047	0.0051	0.0053	0.0057	0.0064	0.0077	0.0093	0.011	0.012
Be	mg/L	0.000012	0.000012	0.000013	0.000013	0.000014	0.000014	0.000015	0.000015	0.000016	0.000017	0.000019	0.000020	0.000022
B	mg/L	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Ca	mg/L	103	102	102	105	104	104	104	104	104	105	106	107	108
Cd	mg/L	0.000092	0.00012	0.00015	0.00018	0.00020	0.00024	0.00026	0.00028	0.00033	0.00041	0.00051	0.00061	0.00069
Co	mg/L	0.0013	0.0012	0.0010	0.0016	0.0014	0.0012	0.0011	0.0010	0.00099	0.0010	0.0010	0.0011	0.0011
Cr	mg/L	0.00025	0.00025	0.00026	0.00028	0.00028	0.00029	0.00029	0.00030	0.00031	0.00033	0.00036	0.00038	0.00040
Cu	mg/L	0.00081	0.00085	0.00087	0.0011	0.0011	0.0011	0.0012	0.0012	0.0013	0.0015	0.0017	0.0020	0.0022
Fe	mg/L	0.088	0.089	0.089	0.095	0.094	0.094	0.094	0.094	0.096	0.099	0.10	0.11	0.11
K	mg/L	3.6	3.4	3.3	4.1	3.8	3.7	3.7	3.6	3.7	3.9	4.1	4.3	4.5
Mg	mg/L	9.1	9.1	9.0	9.2	9.1	9.1	9.1	9.1	9.1	9.1	9.2	9.2	9.2
Mn	mg/L	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.14	0.15	0.15
Mo	mg/L	0.0031	0.0031	0.0030	0.0036	0.0035	0.0034	0.0034	0.0034	0.0035	0.0037	0.0039	0.0041	0.0043
Na	mg/L	63	60	57	68	63	61	59	58	57	57	57	58	58
Ni	mg/L	0.00079	0.00080	0.00082	0.00084	0.00086	0.00087	0.00088	0.00089	0.00092	0.00096	0.0010	0.0011	0.0011
P	mg/L	0.051	0.046	0.041	0.060	0.052	0.048	0.046	0.044	0.044	0.045	0.047	0.048	0.049
Pb	mg/L	0.00029	0.00038	0.00047	0.00055	0.00062	0.00072	0.00077	0.00085	0.00098	0.0012	0.0015	0.0018	0.0020
Sb	mg/L	0.0014	0.0013	0.0012	0.0019	0.0017	0.0016	0.0015	0.0015	0.0015	0.0016	0.0019	0.0021	0.0023
Se	mg/L	0.00036	0.00043	0.00050	0.00060	0.00066	0.00074	0.00079	0.00085	0.00097	0.0012	0.0014	0.0017	0.0019
Tl	mg/L	0.0000065	0.0000068	0.0000072	0.0000077	0.0000079	0.0000083	0.0000085	0.0000088	0.0000094	0.000010	0.000012	0.000013	0.000014
U	mg/L	0.00055	0.00056	0.00057	0.00064	0.00065	0.00067	0.00068	0.00069	0.00074	0.00081	0.00089	0.00098	0.0011
V	mg/L	0.00037	0.00039	0.00041	0.00046	0.00047	0.00050	0.00051	0.00053	0.00058	0.00064	0.00073	0.00081	0.00088
W	mg/L	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
Zn	mg/L	0.0031	0.0039	0.0046	0.0052	0.0059	0.0066	0.0071	0.0077	0.0088	0.011	0.013	0.016	0.017
Zr	mg/L	0.00059	0.00074	0.00088	0.0010	0.0011	0.0013	0.0014	0.0015	0.0017	0.0021	0.0026	0.0030	0.0034

Table 5-4: Underground Mine Dewatering - Mass Balance - Operations Phase (cont'd)

Parameter	Units	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26
SO4	mg/L	197	200	200	205	208	211	215	218	231	246	264	272	285
Cl	mg/L	66	66	66	67	67	67	68	68	68	69	69	69	69
Hg	mg/L	0.000020	0.000022	0.000023	0.000024	0.000026	0.000028	0.000030	0.000032	0.000034	0.000036	0.000037	0.000038	0.000038
Ag	mg/L	0.000095	0.00010	0.00011	0.00011	0.00012	0.00013	0.00015	0.00016	0.00017	0.00018	0.00019	0.00019	0.00019
Al	mg/L	0.13	0.14	0.15	0.24	0.26	0.29	0.34	0.41	0.72	1.1	1.6	2.2	2.9
As	mg/L	0.014	0.015	0.015	0.016	0.018	0.019	0.021	0.023	0.024	0.026	0.028	0.030	0.031
Be	mg/L	0.000023	0.000024	0.000025	0.000030	0.000032	0.000034	0.000037	0.000041	0.000056	0.000076	0.000100	0.00013	0.00016
B	mg/L	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.42
Ca	mg/L	109	110	110	111	112	113	114	115	116	117	118	117	117
Cd	mg/L	0.00077	0.00085	0.00089	0.00095	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017	0.0018
Co	mg/L	0.0011	0.0011	0.0011	0.0015	0.0016	0.0017	0.0019	0.0023	0.0040	0.0062	0.0089	0.012	0.015
Cr	mg/L	0.00042	0.00044	0.00045	0.0012	0.0013	0.0014	0.0017	0.0023	0.0048	0.0082	0.012	0.017	0.023
Cu	mg/L	0.0023	0.0025	0.0026	0.0034	0.0036	0.0039	0.0044	0.0050	0.0072	0.010	0.014	0.018	0.022
Fe	mg/L	0.11	0.11	0.12	0.65	0.68	0.76	0.97	1.3	3.1	5.5	8.4	12	16
K	mg/L	4.7	4.9	4.9	5.1	5.3	5.5	5.7	6.0	6.3	6.8	7.3	7.3	7.5
Mg	mg/L	9.3	9.3	9.3	9.3	9.3	9.4	9.4	9.4	9.5	9.6	9.7	9.7	9.7
Mn	mg/L	0.16	0.17	0.17	0.18	0.19	0.20	0.21	0.23	0.27	0.33	0.39	0.47	0.56
Mo	mg/L	0.0045	0.0047	0.0047	0.0049	0.0051	0.0053	0.0056	0.0057	0.0059	0.0061	0.0062	0.0059	0.0057
Na	mg/L	58	58	58	58	58	58	58	58	58	58	58	52	47
Ni	mg/L	0.0012	0.0012	0.0012	0.0025	0.0026	0.0028	0.0034	0.0042	0.0084	0.014	0.021	0.029	0.038
P	mg/L	0.051	0.052	0.051	0.054	0.056	0.057	0.060	0.062	0.071	0.082	0.095	0.099	0.11
Pb	mg/L	0.0023	0.0025	0.0026	0.0028	0.0031	0.0034	0.0037	0.0040	0.0044	0.0048	0.0053	0.0059	0.0064
Sb	mg/L	0.0024	0.0026	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035	0.0036	0.0038	0.0039	0.0035	0.0033
Se	mg/L	0.0022	0.0024	0.0025	0.0026	0.0028	0.0031	0.0033	0.0036	0.0037	0.0038	0.0039	0.0040	0.0040
Tl	mg/L	0.000015	0.000016	0.000016	0.000018	0.000019	0.000021	0.000022	0.000024	0.000030	0.000037	0.000045	0.000054	0.000064
U	mg/L	0.0011	0.0012	0.0012	0.0013	0.0014	0.0015	0.0016	0.0017	0.0018	0.0020	0.0022	0.0024	0.0026
V	mg/L	0.00095	0.0010	0.0011	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016	0.0018	0.0019	0.0021	0.0023
W	mg/L	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.022
Zn	mg/L	0.019	0.021	0.022	0.029	0.031	0.034	0.038	0.044	0.063	0.087	0.12	0.15	0.19
Zr	mg/L	0.0038	0.0042	0.0043	0.0046	0.0050	0.0054	0.0059	0.0063	0.0066	0.0070	0.0071	0.0072	0.0072

Table 5-5: WTP Influent (AEX Mine Water Pond) - Mass Balance - Operations Phase

Parameter	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
SO4	mg/L	257	399	387	421	398	386	376	376	383	389	380	375	354
Cl	mg/L	15	29	32	36	37	35	37	37	37	35	35	35	36
Hg	mg/L	0.000029	0.000039	0.000043	0.000053	0.000060	0.000065	0.000066	0.000057	0.000045	0.000035	0.000034	0.000035	0.000037
Ag	mg/L	0.00014	0.00019	0.00021	0.00027	0.00030	0.00033	0.00033	0.00029	0.00022	0.00018	0.00017	0.00017	0.00018
Al	mg/L	0.22	0.29	0.31	0.39	0.43	0.46	0.47	0.41	0.31	0.25	0.24	0.25	0.27
As	mg/L	0.023	0.032	0.033	0.039	0.041	0.044	0.045	0.040	0.032	0.027	0.027	0.027	0.027
Be	mg/L	0.000032	0.000042	0.000044	0.000052	0.000055	0.000058	0.000060	0.000055	0.000045	0.000041	0.000041	0.000042	0.000043
B	mg/L	0.052	0.12	0.13	0.15	0.14	0.13	0.12	0.13	0.14	0.14	0.15	0.15	0.15
Ca	mg/L	58	86	91	97	96	94	96	99	99	96	94	94	92
Cd	mg/L	0.00056	0.00083	0.00095	0.0012	0.0014	0.0015	0.0016	0.0014	0.0010	0.00083	0.00082	0.00084	0.00089
Co	mg/L	0.0076	0.011	0.0089	0.0099	0.0087	0.0085	0.0080	0.0078	0.0076	0.0079	0.0083	0.0086	0.0079
Cr	mg/L	0.00078	0.00094	0.00095	0.0010	0.0011	0.0011	0.0011	0.0011	0.0010	0.00096	0.00097	0.00099	0.0010
Cu	mg/L	0.0078	0.010	0.010	0.011	0.012	0.012	0.012	0.011	0.0098	0.0093	0.0097	0.010	0.010
Fe	mg/L	0.38	0.44	0.39	0.41	0.38	0.37	0.36	0.35	0.34	0.35	0.36	0.37	0.36
K	mg/L	7.8	11	11	13	13	13	13	12	11	11	11	11	10
Mg	mg/L	4.9	6.6	6.7	7.2	7.0	6.6	6.8	7.0	7.2	7.3	7.3	7.4	7.4
Mn	mg/L	0.14	0.20	0.22	0.26	0.28	0.29	0.29	0.26	0.23	0.20	0.19	0.19	0.20
Mo	mg/L	0.0089	0.012	0.011	0.012	0.012	0.012	0.011	0.011	0.010	0.011	0.011	0.011	0.010
Na	mg/L	79	124	120	133	124	119	116	118	120	123	120	119	111
Ni	mg/L	0.0016	0.0021	0.0022	0.0025	0.0025	0.0027	0.0027	0.0024	0.0021	0.0020	0.0020	0.0020	0.0020
P	mg/L	0.10	0.15	0.14	0.17	0.16	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.14
Pb	mg/L	0.0032	0.0043	0.0052	0.0066	0.0075	0.0083	0.0085	0.0074	0.0055	0.0043	0.0040	0.0040	0.0042
Sb	mg/L	0.011	0.015	0.014	0.015	0.015	0.015	0.015	0.014	0.012	0.012	0.012	0.013	0.012
Se	mg/L	0.0034	0.0048	0.0055	0.0067	0.0074	0.0080	0.0081	0.0071	0.0055	0.0044	0.0042	0.0043	0.0044
Tl	mg/L	0.000023	0.000031	0.000033	0.000038	0.000041	0.000043	0.000044	0.000039	0.000032	0.000028	0.000028	0.000028	0.000029
U	mg/L	0.0020	0.0028	0.0028	0.0032	0.0034	0.0034	0.0036	0.0032	0.0027	0.0025	0.0025	0.0025	0.0025
V	mg/L	0.0023	0.0027	0.0028	0.0032	0.0034	0.0035	0.0036	0.0034	0.0030	0.0027	0.0026	0.0027	0.0029
W	mg/L	0.0040	0.0080	0.0087	0.0096	0.0094	0.0086	0.0090	0.0092	0.0095	0.0095	0.0097	0.0097	0.0099
Zn	mg/L	0.022	0.030	0.033	0.042	0.047	0.051	0.052	0.045	0.035	0.028	0.027	0.028	0.029
Zr	mg/L	0.0056	0.0076	0.0086	0.011	0.012	0.013	0.013	0.012	0.0088	0.0070	0.0066	0.0068	0.0074

Table 5-5: WTP Influent (AEX Mine Water Pond) - Mass Balance - Operations Phase (cont'd)

Parameter	Units	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26
SO4	mg/L	283	284	267	270	272	273	275	293	283	311	321	349	353
Cl	mg/L	36	35	35	36	35	36	36	36	36	35	36	33	29
Hg	mg/L	0.000036	0.000037	0.000036	0.000037	0.000038	0.000039	0.000040	0.000041	0.000042	0.000042	0.000043	0.000039	0.000037
Ag	mg/L	0.00018	0.00019	0.00018	0.00018	0.00019	0.00019	0.00020	0.00020	0.00021	0.00021	0.00022	0.00021	0.00020
Al	mg/L	0.26	0.27	0.26	0.28	0.32	0.33	0.34	0.36	0.40	0.48	0.63	3.0	6.9
As	mg/L	0.025	0.026	0.025	0.025	0.026	0.027	0.028	0.029	0.029	0.030	0.031	0.036	0.039
Be	mg/L	0.000041	0.000042	0.000041	0.000043	0.000044	0.000045	0.000047	0.000049	0.000056	0.000062	0.000068	0.00016	0.00035
B	mg/L	0.16	0.15	0.15	0.16	0.15	0.16	0.16	0.16	0.16	0.15	0.16	0.17	0.19
Ca	mg/L	89	89	85	86	86	87	87	84	94	88	91	80	69
Cd	mg/L	0.00093	0.00097	0.00094	0.00097	0.00099	0.0010	0.0010	0.0011	0.0011	0.0011	0.0011	0.0016	0.0019
Co	mg/L	0.0053	0.0053	0.0050	0.0050	0.0051	0.0051	0.0051	0.0058	0.0058	0.0074	0.0088	0.019	0.038
Cr	mg/L	0.00096	0.00097	0.00094	0.0010	0.0013	0.0013	0.0014	0.0015	0.0019	0.0025	0.0037	0.024	0.058
Cu	mg/L	0.0088	0.0089	0.0084	0.0086	0.0087	0.0088	0.0090	0.0099	0.010	0.012	0.014	0.029	0.052
Fe	mg/L	0.31	0.31	0.30	0.38	0.56	0.57	0.61	0.69	0.94	1.4	2.2	17	40
K	mg/L	9.0	9.1	8.7	8.8	8.9	9.0	9.2	9.7	9.2	10.0	10	10	10
Mg	mg/L	7.2	7.3	7.1	7.1	7.1	7.2	7.2	7.1	7.3	7.2	7.3	6.7	6.5
Mn	mg/L	0.19	0.20	0.19	0.20	0.20	0.20	0.21	0.21	0.24	0.25	0.27	0.50	1.0
Mo	mg/L	0.0081	0.0082	0.0078	0.0079	0.0081	0.0081	0.0083	0.0088	0.0083	0.0090	0.0091	0.0060	0.0042
Na	mg/L	89	89	83	83	84	83	83	90	82	92	91	51	28
Ni	mg/L	0.0018	0.0019	0.0018	0.0022	0.0025	0.0026	0.0027	0.0029	0.0035	0.0046	0.0065	0.040	0.094
P	mg/L	0.12	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.12	0.13	0.14	0.18	0.21
Pb	mg/L	0.0041	0.0042	0.0041	0.0042	0.0044	0.0045	0.0046	0.0047	0.0049	0.0050	0.0052	0.0068	0.0086
Sb	mg/L	0.0094	0.0094	0.0088	0.0089	0.0089	0.0089	0.0089	0.0096	0.0090	0.0091	0.0094	0.0057	0.0034
Se	mg/L	0.0042	0.0043	0.0041	0.0042	0.0044	0.0045	0.0046	0.0047	0.0047	0.0048	0.0049	0.0040	0.0034
Tl	mg/L	0.000027	0.000028	0.000027	0.000027	0.000028	0.000029	0.000030	0.000031	0.000033	0.000036	0.000039	0.000065	0.00012
U	mg/L	0.0022	0.0023	0.0022	0.0022	0.0023	0.0023	0.0024	0.0025	0.0025	0.0026	0.0027	0.0033	0.0038
V	mg/L	0.0028	0.0027	0.0027	0.0027	0.0028	0.0028	0.0029	0.0029	0.0029	0.0030	0.0031	0.0034	0.0039
W	mg/L	0.0097	0.0091	0.0093	0.0094	0.0093	0.0094	0.0094	0.0094	0.0095	0.0089	0.0094	0.0088	0.0080
Zn	mg/L	0.030	0.031	0.030	0.032	0.034	0.035	0.037	0.038	0.041	0.045	0.054	0.18	0.42
Zr	mg/L	0.0073	0.0075	0.0072	0.0073	0.0076	0.0078	0.0080	0.0082	0.0083	0.0084	0.0085	0.0072	0.0063

Table 5-6: AEX Mine Water Pond - Equilibrated - Operations Phase

Parameter	Units	Equilibrated				Mass Balance			
		Year 10 (January) Prior to acid onset in the underground mine	Year 10 (July) Prior to acid onset in the underground mine	Year 25 (January) After acid onset in the underground mine	Year 25 (July) After acid onset in the underground mine	Year 10 (January) Prior to acid onset in the underground mine	Year 10 (July) Prior to acid onset in the underground mine	Year 25 (January) After acid onset in the underground mine	Year 25 (July) After acid onset in the underground mine
pH[1]	pH units	7.5	7.5	4.0	4.0	-	-	-	-
SO4	mg/L	475	238	513	200	475	238	513	200
Chloride	mg/L	70	18	68	15	70	18	68	15
Hg	mg/L	0.000036	0.000028	0.000048	0.000026	0.000037	0.000028	0.000048	0.000026
Ag	mg/L	0.00018	0.00014	0.00024	0.00014	0.00018	0.00014	0.00024	0.00014
Al	mg/L	0.0029	0.0030	1.5	3.4	0.26	0.21	1.5	3.4
As	mg/L	0.022	0.016	0.039	0.024	0.028	0.021	0.039	0.024
Be	mg/L	0.0000027	0.0000020	0.00011	0.00018	0.000045	0.000033	0.00011	0.00018
B	mg/L	0.39	0.070	0.37	0.082	0.39	0.070	0.37	0.082
Ca	mg/L	142	52	139	39	142	52	138	39
Cd	mg/L	0.00090	0.00061	0.0017	0.0010	0.00091	0.00061	0.0017	0.0010
Co	mg/L	0.0091	0.0058	0.015	0.019	0.0092	0.0058	0.015	0.019
Cr	mg/L	0.00093	0.00092	0.011	0.028	0.00093	0.00092	0.011	0.028
Cu	mg/L	0.0019	0.00063	0.021	0.028	0.0099	0.0075	0.021	0.028
Fe	mg/L	0.033	0.027	7.7	19	0.36	0.31	7.7	19
K	mg/L	12	8.0	14	7.1	12	8.0	14	7.1
Mg	mg/L	11	4.7	11	4.3	11	4.7	11	4.3
Mn	mg/L	0.25	0.13	0.44	0.52	0.25	0.13	0.44	0.52
Mo	mg/L	0.013	0.0078	0.013	0.0039	0.013	0.0078	0.013	0.0039
Na[2]	mg/L	150	76	143	28	150	76	143	28
Ni	mg/L	0.0022	0.0015	0.019	0.045	0.0022	0.0015	0.019	0.045
P	mg/L	0.16	0.10	0.20	0.13	0.17	0.11	0.20	0.13
Pb	mg/L	0.00031	0.00018	0.0064	0.0052	0.0044	0.0035	0.0064	0.0052
Sb	mg/L	0.013	0.0091	0.013	0.0039	0.013	0.0091	0.013	0.0039
Se	mg/L	0.0045	0.0035	0.0055	0.0026	0.0045	0.0035	0.0055	0.0026
Tl[3]	mg/L	0.000030	0.000022	0.000054	0.000066	0.000030	0.000022	0.000054	0.000066
U	mg/L	0.0026	0.0020	0.0033	0.0026	0.0026	0.0020	0.0033	0.0026
V[3]	mg/L	0.0025	0.0026	0.0032	0.0032	0.0025	0.0026	0.0032	0.0032
W[3]	mg/L	0.021	0.0044	0.020	0.0037	0.021	0.0044	0.020	0.0037
Zn	mg/L	0.027	0.020	0.11	0.20	0.030	0.022	0.11	0.20
Zr	mg/L	0.0071	0.0057	0.0093	0.0048	0.0071	0.0057	0.0093	0.0048
Total Cyanide	mg/L	--	--	--	--	0.0050	0.0050	0.0050	0.0050
WAD Cyanide	mg/L	--	--	--	--	0.0050	0.0050	0.0050	0.0050
Nitrate-N	mg/L as N	--	--	--	--	29	29	29	29
Nitrite-N	mg/L as N	--	--	--	--	0.78	0.78	0.78	0.78
Ammonia-N	mg/L as N	--	--	--	--	12	12	12	12

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum results assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-7: TMF Seepage - Operations Phase

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	8.0	-
SO4	mg/L	1209	1207
Chloride	mg/L	25	25
Hg	mg/L	0.0000078	0.0000079
Ag	mg/L	0.000048	0.000049
Al	mg/L	0.0091	0.097
As	mg/L	0.0097	0.031
Be	mg/L	0.0000047	0.000038
B	mg/L	0.046	0.046
Ca	mg/L	131	131
Cd	mg/L	0.000023	0.000049
Co	mg/L	0.034	0.039
Cr	mg/L	0.00097	0.00097
Cu	mg/L	0.0032	0.016
Fe	mg/L	0.018	0.47
K	mg/L	28	28
Mg	mg/L	6.2	6.2
Mn	mg/L	0.10	0.10
Mo	mg/L	0.035	0.035
Na[2]	mg/L	387	387
Ni	mg/L	0.00086	0.0018
P	mg/L	0.55	0.56
Pb	mg/L	0.00000016	0.00026
Sb	mg/L	0.037	0.037
Se	mg/L	0.0031	0.0031
Tl[3]	mg/L	0.000019	0.000019
U	mg/L	0.0039	0.0039
V[3]	mg/L	0.0024	0.0024
W[3]	mg/L	0.0068	0.0068
Zn	mg/L	0.00070	0.0060
Zr	mg/L	0.0010	0.0010
Total Cyanide	mg/L	--	1.6
WAD Cyanide	mg/L	--	0.10
Nitrate-N	mg/L as N	--	3.3
Nitrite-N	mg/L as N	--	2.1
Ammonia-N	mg/L as N	--	26

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum and copper result assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-8: TMF Pond Seepage - Operations Phase

Parameter	Units	Equilibrated												
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
pH[1]	pH units	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
SO4	mg/L	936	1421	1393	1285	1223	1180	1126	1091	1062	1054	1046	1045	1040
Chloride	mg/L	16	27	26	26	25	25	24	23	23	23	23	23	23
Hg	mg/L	0.0000083	0.000011	0.000012	0.000010	0.0000093	0.0000086	0.0000078	0.0000075	0.0000073	0.0000086	0.0000094	0.0000094	0.0000093
Ag	mg/L	0.000043	0.000065	0.000069	0.000058	0.000055	0.000050	0.000047	0.000046	0.000046	0.000052	0.000056	0.000056	0.000056
Al	mg/L	0.0091	0.0087	0.0088	0.0090	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091
As	mg/L	0.0061	0.010	0.010	0.010	0.0099	0.0095	0.0090	0.0088	0.0087	0.0088	0.0088	0.0088	0.0087
Be	mg/L	0.0000025	0.0000030	0.0000035	0.0000043	0.0000043	0.0000043	0.0000042	0.0000043	0.0000044	0.0000046	0.0000048	0.0000049	0.0000049
B	mg/L	0.027	0.047	0.047	0.049	0.048	0.047	0.045	0.045	0.045	0.045	0.045	0.046	0.045
Ca	mg/L	112	165	162	139	134	129	124	120	117	117	116	116	116
Cd	mg/L	0.000023	0.000045	0.000047	0.000030	0.000025	0.000021	0.000016	0.000015	0.000015	0.000016	0.000016	0.000016	0.000016
Co	mg/L	0.029	0.042	0.042	0.035	0.034	0.033	0.031	0.030	0.029	0.029	0.029	0.029	0.029
Cr	mg/L	0.00066	0.00099	0.0011	0.0011	0.00100	0.00098	0.00096	0.00095	0.00094	0.00097	0.00099	0.00099	0.0010
Cu	mg/L	0.0024	0.0032	0.0033	0.0031	0.0031	0.0030	0.0029	0.0029	0.0029	0.0030	0.0030	0.0030	0.0030
Fe	mg/L	0.014	0.019	0.019	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.016
K	mg/L	19	31	30	30	29	28	27	26	26	26	26	26	26
Mg	mg/L	5.3	7.5	7.3	7.1	6.8	6.5	6.2	6.0	5.9	5.8	5.8	5.8	5.7
Mn	mg/L	0.086	0.13	0.14	0.12	0.11	0.10	0.10	0.097	0.10	0.10	0.10	0.10	0.10
Mo	mg/L	0.030	0.045	0.044	0.037	0.036	0.034	0.033	0.032	0.031	0.031	0.031	0.031	0.031
Na[2]	mg/L	286	441	433	414	394	380	362	351	342	340	337	337	335
Ni	mg/L	0.00056	0.00097	0.00098	0.00091	0.00088	0.00086	0.00083	0.00082	0.00083	0.00086	0.00086	0.00086	0.00087
P	mg/L	0.39	0.60	0.59	0.60	0.57	0.55	0.52	0.51	0.50	0.50	0.49	0.49	0.49
Pb	mg/L	0.00000014	0.00000025	0.00000029	0.00000021	0.00000018	0.00000015	0.00000012	0.00000012	0.00000012	0.00000014	0.00000015	0.00000016	0.00000016
Sb	mg/L	0.031	0.046	0.045	0.039	0.037	0.036	0.034	0.033	0.032	0.032	0.032	0.032	0.031
Se	mg/L	0.0027	0.0041	0.0040	0.0034	0.0032	0.0030	0.0029	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028
Tl[3]	mg/L	0.000016	0.000024	0.000024	0.000021	0.000020	0.000019	0.000019	0.000018	0.000018	0.000019	0.000019	0.000019	0.000019
U	mg/L	0.0032	0.0049	0.0049	0.0042	0.0041	0.0039	0.0038	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037
V[3]	mg/L	0.0017	0.0024	0.0027	0.0026	0.0024	0.0024	0.0023	0.0023	0.0023	0.0024	0.0024	0.0024	0.0025
W[3]	mg/L	0.0060	0.0087	0.0085	0.0071	0.0068	0.0066	0.0063	0.0061	0.0059	0.0059	0.0059	0.0058	0.0058
Zn	mg/L	0.00056	0.00084	0.00091	0.00079	0.00076	0.00071	0.00066	0.00065	0.00066	0.00074	0.00078	0.00078	0.00078
Zr	mg/L	0.00096	0.0015	0.0017	0.0014	0.0013	0.0012	0.00096	0.00090	0.00093	0.0012	0.0013	0.0013	0.0013
Total Cyanide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
WAD Cyanide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate-N	mg/L as N	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite-N	mg/L as N	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia-N	mg/L as N	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum and copper results assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-8: TMF Pond Seepage - Operations Phase (cont'd)

Parameter	Units	Equilibrated												
		Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26
pH[1]	pH units	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
SO4	mg/L	813	793	777	771	763	767	761	742	762	763	761	432	127
Chloride	mg/L	19	19	18	18	18	18	18	18	18	18	18	12	5.8
Hg	mg/L	0.0000087	0.0000081	0.0000079	0.0000077	0.0000077	0.0000076	0.0000078	0.0000078	0.0000078	0.0000078	0.0000078	0.0000070	0.0000061
Ag	mg/L	0.000049	0.000048	0.000047	0.000045	0.000045	0.000045	0.000045	0.000046	0.000046	0.000046	0.000046	0.000039	0.000033
Al	mg/L	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0091	0.0092	0.00092
As	mg/L	0.0070	0.0072	0.0070	0.0069	0.0068	0.0068	0.0068	0.0065	0.0068	0.0068	0.0068	0.0036	0.00069
Be	mg/L	0.0000055	0.0000054	0.0000055	0.0000053	0.0000054	0.0000055	0.0000056	0.0000057	0.0000056	0.0000056	0.0000056	0.0000067	0.0000084
B	mg/L	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.028	0.019
Ca	mg/L	91	86	85	85	84	85	84	83	84	84	84	55	28
Cd	mg/L	0.000013	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.0000083	0.0000052
Co	mg/L	0.022	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.012	0.0040
Cr	mg/L	0.00096	0.00092	0.00092	0.00090	0.00090	0.00091	0.00092	0.00093	0.00092	0.00093	0.00093	0.00086	0.00076
Cu	mg/L	0.0026	0.0026	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0026	0.0026	0.0026	0.0021	0.00016
Fe	mg/L	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.014	0.015	0.015	0.015	0.011	0.0081
K	mg/L	20	20	20	20	20	20	20	20	20	20	20	13	6.0
Mg	mg/L	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.0	1.5
Mn	mg/L	0.083	0.080	0.080	0.080	0.079	0.080	0.080	0.080	0.080	0.080	0.080	0.059	0.040
Mo	mg/L	0.024	0.022	0.022	0.022	0.022	0.022	0.022	0.021	0.022	0.022	0.022	0.013	0.0054
Na[2]	mg/L	263	260	254	253	250	251	249	243	250	250	249	139	36
Ni	mg/L	0.00073	0.00074	0.00073	0.00073	0.00073	0.00074	0.00074	0.00074	0.00074	0.00074	0.00074	0.00058	0.00046
P	mg/L	0.39	0.39	0.38	0.38	0.37	0.38	0.37	0.36	0.37	0.37	0.37	0.21	0.055
Pb	mg/L	0.00000017	0.00000017	0.00000016	0.00000016	0.00000016	0.00000016	0.00000016	0.00000017	0.00000016	0.00000016	0.00000016	0.00000019	0.00000026
Sb	mg/L	0.024	0.023	0.023	0.023	0.022	0.023	0.022	0.022	0.022	0.022	0.022	0.013	0.0041
Se	mg/L	0.0022	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0013	0.00072
Tl[3]	mg/L	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000011	0.0000080
U	mg/L	0.0029	0.0029	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0020	0.0012
V[3]	mg/L	0.0024	0.0023	0.0023	0.0022	0.0022	0.0022	0.0022	0.0023	0.0023	0.0023	0.0023	0.0021	0.0019
W[3]	mg/L	0.0045	0.0042	0.0042	0.0041	0.0041	0.0041	0.0041	0.0040	0.0041	0.0041	0.0041	0.0025	0.0011
Zn	mg/L	0.00073	0.00074	0.00072	0.00070	0.00070	0.00070	0.00071	0.00071	0.00072	0.00072	0.00072	0.00067	0.00065
Zr	mg/L	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0011	0.0012	0.0012	0.0012	0.0012	0.0011	0.0010
Total Cyanide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
WAD Cyanide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrate-N	mg/L as N	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrite-N	mg/L as N	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia-N	mg/L as N	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum and copper results assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-8: TMF Pond Seepage - Operations Phase (cont'd)

Parameter	Units	Mass Balance												
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
pH	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-
SO4	mg/L	935	1418	1391	1282	1221	1178	1124	1089	1061	1052	1045	1044	1038
Chloride	mg/L	16	27	26	26	25	25	23	23	23	23	23	23	23
Hg	mg/L	0.0000083	0.000011	0.000012	0.000010	0.0000093	0.0000086	0.0000079	0.0000075	0.0000073	0.0000087	0.0000095	0.0000094	0.0000094
Ag	mg/L	0.000045	0.000067	0.000071	0.000059	0.000056	0.000051	0.000048	0.000047	0.000047	0.000054	0.000057	0.000057	0.000057
Al	mg/L	0.075	0.12	0.13	0.11	0.10	0.100	0.095	0.093	0.095	0.10	0.11	0.11	0.11
As	mg/L	0.027	0.039	0.039	0.034	0.032	0.031	0.029	0.028	0.028	0.028	0.028	0.028	0.028
Be	mg/L	0.000023	0.000033	0.000037	0.000037	0.000036	0.000035	0.000035	0.000034	0.000034	0.000036	0.000037	0.000037	0.000037
B	mg/L	0.027	0.047	0.047	0.049	0.048	0.047	0.045	0.045	0.045	0.045	0.045	0.046	0.045
Ca	mg/L	112	165	162	139	133	129	124	120	117	116	116	116	115
Cd	mg/L	0.000056	0.00010	0.00011	0.000065	0.000054	0.000045	0.000034	0.000032	0.000033	0.000034	0.000034	0.000034	0.000034
Co	mg/L	0.035	0.050	0.049	0.041	0.039	0.038	0.036	0.035	0.034	0.034	0.033	0.033	0.033
Cr	mg/L	0.00067	0.00099	0.0011	0.0011	0.00100	0.00098	0.00096	0.00095	0.00094	0.00097	0.00099	0.00099	0.0010
Cu	mg/L	0.014	0.021	0.020	0.017	0.016	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014
Fe	mg/L	0.46	0.65	0.63	0.52	0.49	0.47	0.45	0.43	0.42	0.42	0.42	0.42	0.41
K	mg/L	19	31	30	30	28	28	27	26	26	26	25	26	25
Mg	mg/L	5.3	7.5	7.3	7.1	6.8	6.5	6.2	6.0	5.9	5.8	5.8	5.8	5.7
Mn	mg/L	0.086	0.13	0.14	0.12	0.11	0.10	0.10	0.097	0.10	0.10	0.10	0.10	0.10
Mo	mg/L	0.030	0.044	0.044	0.037	0.036	0.034	0.033	0.032	0.031	0.031	0.031	0.031	0.030
Na	mg/L	286	441	433	414	394	380	362	351	342	340	337	337	335
Ni	mg/L	0.0013	0.0022	0.0022	0.0019	0.0019	0.0018	0.0018	0.0017	0.0018	0.0018	0.0018	0.0018	0.0018
P	mg/L	0.39	0.61	0.60	0.61	0.58	0.56	0.53	0.52	0.51	0.50	0.50	0.50	0.50
Pb	mg/L	0.00026	0.00051	0.00058	0.00037	0.00030	0.00025	0.00020	0.00019	0.00018	0.00021	0.00023	0.00023	0.00023
Sb	mg/L	0.031	0.045	0.045	0.039	0.037	0.036	0.034	0.033	0.032	0.032	0.032	0.032	0.031
Se	mg/L	0.0027	0.0040	0.0040	0.0034	0.0031	0.0030	0.0029	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028
Tl	mg/L	0.000016	0.000024	0.000024	0.000021	0.000020	0.000019	0.000019	0.000018	0.000018	0.000019	0.000019	0.000019	0.000019
U	mg/L	0.0032	0.0049	0.0048	0.0042	0.0041	0.0039	0.0038	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037
V	mg/L	0.0017	0.0024	0.0027	0.0026	0.0024	0.0024	0.0023	0.0023	0.0023	0.0024	0.0024	0.0024	0.0025
W	mg/L	0.0060	0.0087	0.0085	0.0071	0.0068	0.0066	0.0063	0.0061	0.0059	0.0059	0.0059	0.0058	0.0058
Zn	mg/L	0.0057	0.0082	0.0086	0.0070	0.0067	0.0062	0.0057	0.0056	0.0056	0.0062	0.0065	0.0065	0.0065
Zr	mg/L	0.00096	0.0015	0.0017	0.0014	0.0013	0.0011	0.00096	0.00089	0.00093	0.0012	0.0013	0.0013	0.0013
Total Cyanide	mg/L	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
WAD Cyanide	mg/L	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Nitrate-N	mg/L as N	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Nitrite-N	mg/L as N	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Ammonia-N	mg/L as N	26	26	26	26	26	26	26	26	26	26	26	26	26

Table 5-8: TMF Pond Seepage - Operations Phase (cont'd)

Parameter	Units	Mass Balance												
		Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26
pH	pH units	-	-	-	-	-	-	-	-	-	-	-	-	-
SO4	mg/L	812	792	776	770	762	766	760	741	762	762	760	432	127
Chloride	mg/L	19	19	18	18	18	18	18	18	18	18	18	12	5.8
Hg	mg/L	0.0000088	0.0000082	0.0000080	0.0000077	0.0000077	0.0000077	0.0000078	0.0000079	0.0000078	0.0000078	0.0000078	0.0000071	0.0000062
Ag	mg/L	0.000050	0.000049	0.000048	0.000046	0.000046	0.000046	0.000046	0.000047	0.000047	0.000047	0.000047	0.000040	0.000034
Al	mg/L	0.095	0.093	0.091	0.088	0.088	0.088	0.089	0.090	0.090	0.090	0.090	0.078	0.067
As	mg/L	0.022	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.012	0.0044
Be	mg/L	0.000037	0.000035	0.000035	0.000034	0.000034	0.000034	0.000035	0.000035	0.000035	0.000035	0.000035	0.000035	0.000033
B	mg/L	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.028	0.019
Ca	mg/L	91	86	85	85	84	85	84	83	84	84	84	55	28
Cd	mg/L	0.000027	0.000026	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000025	0.000018	0.000011
Co	mg/L	0.026	0.024	0.024	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.013	0.0045
Cr	mg/L	0.00096	0.00092	0.00092	0.00090	0.00090	0.00091	0.00092	0.00093	0.00092	0.00093	0.00093	0.00086	0.00076
Cu	mg/L	0.011	0.010	0.0099	0.0099	0.0098	0.0099	0.0098	0.0098	0.0099	0.0099	0.0098	0.0065	0.0036
Fe	mg/L	0.32	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.19	0.099
K	mg/L	20	20	20	20	20	20	20	20	20	20	20	13	6.0
Mg	mg/L	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.0	1.5
Mn	mg/L	0.082	0.080	0.080	0.079	0.079	0.080	0.080	0.080	0.080	0.080	0.080	0.059	0.040
Mo	mg/L	0.024	0.022	0.022	0.022	0.022	0.022	0.022	0.021	0.022	0.022	0.022	0.013	0.0054
Na	mg/L	263	260	254	253	250	251	249	243	250	250	249	139	36
Ni	mg/L	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0012	0.00092
P	mg/L	0.39	0.40	0.39	0.38	0.38	0.38	0.38	0.37	0.38	0.38	0.38	0.21	0.057
Pb	mg/L	0.00022	0.00020	0.00020	0.00019	0.00019	0.00019	0.00019	0.00020	0.00020	0.00020	0.00020	0.00018	0.00017
Sb	mg/L	0.024	0.023	0.023	0.023	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.013	0.0041
Se	mg/L	0.0022	0.0021	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0013	0.00072
Tl	mg/L	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0.000011	0.0000080
U	mg/L	0.0029	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0020	0.0012
V	mg/L	0.0024	0.0023	0.0023	0.0022	0.0022	0.0022	0.0022	0.0023	0.0023	0.0023	0.0023	0.0021	0.0019
W	mg/L	0.0045	0.0042	0.0042	0.0041	0.0041	0.0041	0.0041	0.0040	0.0041	0.0041	0.0041	0.0025	0.0011
Zn	mg/L	0.0057	0.0056	0.0054	0.0053	0.0053	0.0053	0.0053	0.0054	0.0054	0.0054	0.0054	0.0047	0.0040
Zr	mg/L	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0011	0.0012	0.0012	0.0012	0.0012	0.0011	0.0010
Total Cyanide	mg/L	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
WAD Cyanide	mg/L	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Nitrate-N	mg/L as N	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Nitrite-N	mg/L as N	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Ammonia-N	mg/L as N	26	26	26	26	26	26	26	26	26	26	26	26	26

Table 5-9: MWP Seepage - Operations Phase

Parameter	Units	Equilibrated										
		Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26
pH[1]	pH units	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
SO4	mg/L	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Chloride	mg/L	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Hg	mg/L	0.0000072	0.0000070	0.0000070	0.0000070	0.0000070	0.0000070	0.0000070	0.0000070	0.0000070	0.0000070	0.0000068
Ag	mg/L	0.000036	0.000035	0.000035	0.000035	0.000035	0.000035	0.000035	0.000035	0.000035	0.000035	0.000034
Al	mg/L	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030	0.00030
As	mg/L	0.00020	0.00026	0.00026	0.00026	0.00026	0.00026	0.00025	0.00026	0.00026	0.00026	0.00026
Be	mg/L	0.000000035	0.000000041	0.000000041	0.000000041	0.000000041	0.000000041	0.000000040	0.000000041	0.000000041	0.000000041	0.000000041
B	mg/L	0.0027	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024
Ca	mg/L	4.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5
Cd	mg/L	0.0000023	0.0000026	0.0000026	0.0000026	0.0000026	0.0000026	0.0000026	0.0000026	0.0000026	0.0000026	0.0000026
Co	mg/L	0.000036	0.000035	0.000035	0.000035	0.000035	0.000034	0.000034	0.000035	0.000034	0.000034	0.000034
Cr	mg/L	0.000043	0.000045	0.000045	0.000045	0.000045	0.000045	0.000045	0.000045	0.000045	0.000045	0.000044
Cu	mg/L	0.0000047	0.0000055	0.0000055	0.0000055	0.0000055	0.0000055	0.0000055	0.0000055	0.0000055	0.0000056	0.0000055
Fe	mg/L	0.0096	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092	0.0092
K	mg/L	0.96	0.85	0.85	0.86	0.85	0.85	0.85	0.86	0.85	0.85	0.85
Mg	mg/L	1.1	0.87	0.87	0.87	0.87	0.87	0.88	0.87	0.87	0.86	0.86
Mn	mg/L	0.027	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Mo	mg/L	0.00036	0.00033	0.00033	0.00033	0.00033	0.00033	0.00033	0.00033	0.00033	0.00033	0.00032
Na[2]	mg/L	0.58	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.45	0.45
Ni	mg/L	0.00012	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00012
P	mg/L	0.011	0.0100	0.0100	0.0100	0.0100	0.0100	0.010	0.0100	0.0100	0.0099	0.0098
Pb	mg/L	0.000000025	0.000000031	0.000000031	0.000000031	0.000000031	0.000000031	0.000000031	0.000000031	0.000000031	0.000000031	0.000000031
Sb	mg/L	0.00068	0.00065	0.00065	0.00065	0.00065	0.00065	0.00065	0.00065	0.00065	0.00065	0.00064
Se	mg/L	0.00026	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00024
Tl[3]	mg/L	0.0000050	0.0000045	0.0000044	0.0000044	0.0000044	0.0000044	0.0000044	0.0000045	0.0000044	0.0000044	0.0000044
U	mg/L	0.00033	0.00031	0.00030	0.00030	0.00030	0.00030	0.00030	0.00031	0.00030	0.00030	0.00030
V[3]	mg/L	0.00041	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037	0.00036
W[3]	mg/L	0.00016	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015
Zn	mg/L	0.00037	0.00044	0.00044	0.00044	0.00044	0.00044	0.00044	0.00044	0.00044	0.00044	0.00043
Zr	mg/L	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

MWP is built in 2045.

Annualized concentrations assumed to represent seepage.

Table 5-9: MWP Seepage - Operations Phase (cont'd)

Parameter	Units	Mass Balance										
		Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26
pH	pH units	-	-	-	-	-	-	-	-	-	-	-
SO4	mg/L	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Chloride	mg/L	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Hg	mg/L	0.0000076	0.0000073	0.0000073	0.0000073	0.0000073	0.0000073	0.0000073	0.0000073	0.0000073	0.0000073	0.0000071
Ag	mg/L	0.000038	0.000037	0.000037	0.000037	0.000037	0.000037	0.000037	0.000036	0.000037	0.000037	0.000036
Al	mg/L	0.061	0.056	0.055	0.055	0.055	0.055	0.055	0.056	0.055	0.055	0.055
As	mg/L	0.0022	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
Be	mg/L	0.0000073	0.0000065	0.0000065	0.0000065	0.0000065	0.0000065	0.0000065	0.0000065	0.0000065	0.0000065	0.0000064
B	mg/L	0.0027	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024
Ca	mg/L	4.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5
Cd	mg/L	0.0000075	0.0000072	0.0000072	0.0000072	0.0000072	0.0000072	0.0000072	0.0000072	0.0000072	0.0000072	0.0000070
Co	mg/L	0.000046	0.000042	0.000042	0.000042	0.000042	0.000042	0.000042	0.000042	0.000042	0.000042	0.000041
Cr	mg/L	0.00012	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011	0.00011
Cu	mg/L	0.00093	0.00083	0.00083	0.00083	0.00083	0.00083	0.00083	0.00084	0.00083	0.00083	0.00083
Fe	mg/L	0.097	0.075	0.075	0.075	0.075	0.075	0.076	0.075	0.075	0.074	0.074
K	mg/L	0.96	0.85	0.85	0.86	0.85	0.85	0.85	0.86	0.85	0.85	0.85
Mg	mg/L	1.1	0.87	0.87	0.87	0.87	0.87	0.88	0.87	0.87	0.86	0.86
Mn	mg/L	0.027	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Mo	mg/L	0.00036	0.00033	0.00033	0.00033	0.00033	0.00033	0.00033	0.00033	0.00033	0.00033	0.00032
Na	mg/L	0.58	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.45	0.45
Ni	mg/L	0.00035	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00031	0.00030	0.00030
P	mg/L	0.013	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
Pb	mg/L	0.00016	0.00016	0.00015	0.00015	0.00015	0.00015	0.00015	0.00016	0.00015	0.00015	0.00015
Sb	mg/L	0.00068	0.00065	0.00065	0.00065	0.00065	0.00065	0.00065	0.00065	0.00065	0.00065	0.00064
Se	mg/L	0.00026	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00024
Tl	mg/L	0.0000050	0.0000045	0.0000044	0.0000044	0.0000044	0.0000044	0.0000044	0.0000045	0.0000044	0.0000044	0.0000044
U	mg/L	0.00033	0.00031	0.00030	0.00030	0.00030	0.00030	0.00030	0.00031	0.00030	0.00030	0.00030
V	mg/L	0.00041	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037	0.00036
W	mg/L	0.00016	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015	0.00015
Zn	mg/L	0.0032	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0030
Zr	mg/L	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015

Table 5-10: AEX Mine Water Pond Contact Water Pumped to LP Central Pit - Active Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	8.0	-
SO4	mg/L	158	158
Chloride	mg/L	6.8	6.8
Hg	mg/L	0.0000073	0.0000074
Ag	mg/L	0.000039	0.000039
Al	mg/L	0.0092	0.080
As	mg/L	0.0040	0.0064
Be	mg/L	0.000024	0.000038
B	mg/L	0.021	0.021
Ca	mg/L	32	32
Cd	mg/L	0.000015	0.000016
Co	mg/L	0.0056	0.0057
Cr	mg/L	0.0012	0.0012
Cu	mg/L	0.00073	0.0045
Fe	mg/L	0.0086	0.14
K	mg/L	6.9	6.9
Mg	mg/L	2.2	2.2
Mn	mg/L	0.048	0.048
Mo	mg/L	0.0067	0.0067
Na[2]	mg/L	46	46
Ni	mg/L	0.0010	0.0011
P	mg/L	0.076	0.077
Pb	mg/L	0.000021	0.00022
Sb	mg/L	0.0050	0.0050
Se	mg/L	0.00084	0.00084
Tl[3]	mg/L	0.000011	0.000011
U	mg/L	0.0016	0.0016
V[3]	mg/L	0.0027	0.0027
W[3]	mg/L	0.0013	0.0013
Zn	mg/L	0.0039	0.0051
Zr	mg/L	0.0012	0.0012

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum result assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-11: VMF Pit Lake - Active Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	7.5	-
SO4	mg/L	90	91
Chloride[2]	mg/L	30	30
Hg	mg/L	0.000025	0.000026
Ag	mg/L	0.000073	0.000073
Al	mg/L	0.00028	0.075
As	mg/L	0.000083	0.0049
Be	mg/L	0.00000056	0.00011
B	mg/L	0.065	0.065
Ca	mg/L	24	24
Cd	mg/L	0.000055	0.000098
Co	mg/L	0.00078	0.00089
Cr	mg/L	0.00028	0.00099
Cu	mg/L	0.000048	0.0049
Fe	mg/L	0.0096	0.30
K	mg/L	18	18
Mg	mg/L	23	23
Mn	mg/L	0.12	0.12
Mo	mg/L	0.0055	0.0056
Na	mg/L	145	149
Ni	mg/L	0.0090	0.017
P	mg/L	0.014	0.020
Pb	mg/L	0.00000020	0.00098
Sb	mg/L	0.0094	0.0096
Se	mg/L	0.0015	0.0015
Tl[3]	mg/L	0.000054	0.000055
U	mg/L	0.0016	0.0016
V[3]	mg/L	0.0028	0.0028
W[3]	mg/L	0.0011	0.0011
Zn	mg/L	0.0038	0.020
Zr	mg/L	0.0024	0.0024
Notes:			

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Table 5-12: TMF Seepage - Active Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	8.0	-
SO4	mg/L	1209	1207
Chloride	mg/L	25	25
Hg	mg/L	0.0000078	0.0000079
Ag	mg/L	0.000048	0.000049
Al	mg/L	0.0091	0.097
As	mg/L	0.0097	0.031
Be	mg/L	0.0000047	0.000038
B	mg/L	0.046	0.046
Ca	mg/L	131	131
Cd	mg/L	0.000023	0.000049
Co	mg/L	0.034	0.039
Cr	mg/L	0.00097	0.00097
Cu	mg/L	0.0032	0.016
Fe	mg/L	0.018	0.47
K	mg/L	28	28
Mg	mg/L	6.2	6.2
Mn	mg/L	0.10	0.10
Mo	mg/L	0.035	0.035
Na[2]	mg/L	387	387
Ni	mg/L	0.00086	0.0018
P	mg/L	0.55	0.56
Pb	mg/L	0.00000016	0.00026
Sb	mg/L	0.037	0.037
Se	mg/L	0.0031	0.0031
Tl[3]	mg/L	0.000019	0.000019
U	mg/L	0.0039	0.0039
V[3]	mg/L	0.0024	0.0024
W[3]	mg/L	0.0068	0.0068
Zn	mg/L	0.00070	0.0060
Zr	mg/L	0.0010	0.0010

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum, and copper result assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-13: TMF Pond - Active Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	8.0	-
SO4	mg/L	165	165
Chloride	mg/L	7.0	7.0
Hg	mg/L	0.0000076	0.0000076
Ag	mg/L	0.000039	0.000041
Al	mg/L	0.00092	0.074
As	mg/L	0.0010	0.0058
Be	mg/L	0.0000091	0.000038
B	mg/L	0.021	0.021
Ca	mg/L	34	34
Cd	mg/L	0.0000067	0.000014
Co	mg/L	0.0050	0.0058
Cr	mg/L	0.0011	0.0011
Cu	mg/L	0.00017	0.0043
Fe	mg/L	0.0086	0.12
K	mg/L	7.2	7.2
Mg	mg/L	2.1	2.1
Mn	mg/L	0.046	0.046
Mo	mg/L	0.0070	0.0070
Na[2]	mg/L	49	49
Ni	mg/L	0.00050	0.0010
P	mg/L	0.078	0.080
Pb	mg/L	0.00000029	0.00021
Sb	mg/L	0.0053	0.0053
Se	mg/L	0.00087	0.00087
Tl[3]	mg/L	0.000010	0.000010
U	mg/L	0.0017	0.0017
V[3]	mg/L	0.0029	0.0029
W[3]	mg/L	0.0014	0.0014
Zn	mg/L	0.00075	0.0048
Zr	mg/L	0.0012	0.0012

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Table 5-14: MWP Seepage - Active Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	7.5	-
SO4	mg/L	1.2	1.2
Chloride	mg/L	1.3	1.3
Hg	mg/L	0.0000065	0.0000068
Ag	mg/L	0.000033	0.000034
Al	mg/L	0.00030	0.056
As	mg/L	0.00021	0.0020
Be	mg/L	0.000000036	0.0000068
B	mg/L	0.0025	0.0025
Ca	mg/L	4.0	4.0
Cd	mg/L	0.0000022	0.0000068
Co	mg/L	0.000034	0.000043
Cr	mg/L	0.000043	0.00012
Cu	mg/L	0.0000048	0.00085
Fe	mg/L	0.0094	0.086
K	mg/L	0.89	0.89
Mg	mg/L	1.0	1.0
Mn	mg/L	0.025	0.025
Mo	mg/L	0.00033	0.00033
Na[2]	mg/L	0.52	0.52
Ni	mg/L	0.00012	0.00033
P	mg/L	0.011	0.012
Pb	mg/L	0.000000025	0.00015
Sb	mg/L	0.00061	0.00061
Se	mg/L	0.00023	0.00023
Tl[3]	mg/L	0.0000046	0.0000046
U	mg/L	0.00030	0.00030
V[3]	mg/L	0.00038	0.00038
W[3]	mg/L	0.00014	0.00014
Zn	mg/L	0.00035	0.0029
Zr	mg/L	0.0014	0.0014

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Table 5-15: AEX Mine Water Pond - Passive Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	8.0	-
SO4	mg/L	99	99
Chloride	mg/L	5.3	5.5
Hg	mg/L	0.0000068	0.0000080
Ag	mg/L	0.000040	0.000040
Al	mg/L	0.0054	0.32
As	mg/L	0.00053	0.0078
Be	mg/L	0.0000014	0.000042
B	mg/L	0.017	0.018
Ca	mg/L	23	23
Cd	mg/L	0.000057	0.000078
Co	mg/L	0.0039	0.0046
Cr	mg/L	0.0031	0.0032
Cu	mg/L	0.00057	0.0056
Fe	mg/L	0.0096	1.7
K	mg/L	5.1	5.1
Mg	mg/L	2.5	2.5
Mn	mg/L	0.077	0.077
Mo	mg/L	0.0044	0.0044
Na[2]	mg/L	27	27
Ni	mg/L	0.0028	0.0046
P	mg/L	0.039	0.062
Pb	mg/L	0.0000017	0.00053
Sb	mg/L	0.0031	0.0031
Se	mg/L	0.00076	0.00076
Tl[3]	mg/L	0.000015	0.000015
U	mg/L	0.0013	0.0013
V[3]	mg/L	0.0025	0.0025
W[3]	mg/L	0.00087	0.00087
Zn	mg/L	0.0057	0.020
Zr	mg/L	0.0013	0.0013

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum and copper result assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-16: TMF Pond - Passive Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	8.0	-
SO4	mg/L	154	154
Chloride	mg/L	7.4	7.4
Hg	mg/L	0.0000091	0.0000092
Ag	mg/L	0.000047	0.000048
Al	mg/L	0.0092	0.076
As	mg/L	0.0011	0.0062
Be	mg/L	0.0000085	0.000036
B	mg/L	0.022	0.022
Ca	mg/L	32	32
Cd	mg/L	0.0000072	0.000016
Co	mg/L	0.0044	0.0051
Cr	mg/L	0.0013	0.0013
Cu	mg/L	0.00017	0.0044
Fe	mg/L	0.0086	0.12
K	mg/L	7.4	7.4
Mg	mg/L	2.4	2.4
Mn	mg/L	0.047	0.047
Mo	mg/L	0.0072	0.0072
Na[2]	mg/L	47	47
Ni	mg/L	0.00050	0.0010
P	mg/L	0.078	0.080
Pb	mg/L	0.00000032	0.00023
Sb	mg/L	0.0051	0.0051
Se	mg/L	0.00092	0.00092
Tl[3]	mg/L	0.000012	0.000012
U	mg/L	0.0018	0.0018
V[3]	mg/L	0.0034	0.0034
W[3]	mg/L	0.0013	0.0013
Zn	mg/L	0.00083	0.0054
Zr	mg/L	0.0015	0.0015

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum result assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-17: LP Pit Lake Pumped to AEX Mine Water Pond - Passive Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	7.0	-
SO4	mg/L	58	58
Chloride	mg/L	4.1	4.1
Hg	mg/L	0.0000044	0.0000073
Ag	mg/L	0.000034	0.000035
Al	mg/L	0.0014	0.81
As	mg/L	0.00035	0.010
Be	mg/L	0.000000077	0.000052
B	mg/L	0.015	0.015
Ca	mg/L	17	17
Cd	mg/L	0.00017	0.00020
Co	mg/L	0.0050	0.0052
Cr	mg/L	0.00011	0.0068
Cu	mg/L	0.00066	0.0073
Fe	mg/L	0.011	4.6
K	mg/L	3.0	3.0
Mg	mg/L	2.8	2.8
Mn	mg/L	0.12	0.12
Mo	mg/L	0.0016	0.0016
Na[2]	mg/L	10.0	10.0
Ni	mg/L	0.0097	0.012
P	mg/L	0.0050	0.055
Pb	mg/L	0.000011	0.0011
Sb	mg/L	0.0014	0.0014
Se	mg/L	0.00025	0.00065
Tl[3]	mg/L	0.000019	0.000019
U	mg/L	0.00082	0.00082
V[3]	mg/L	0.0012	0.0012
W[3]	mg/L	0.00051	0.00051
Zn	mg/L	0.027	0.049
Zr	mg/L	0.0011	0.0011

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum, arsenic, copper and lead result assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-18: VMF Pit Lake - Passive Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	7.5	-
SO4	mg/L	85	85
Chloride[2]	mg/L	29	29
Hg	mg/L	0.000024	0.000024
Ag	mg/L	0.000069	0.000069
Al	mg/L	0.00028	0.073
As	mg/L	0.000080	0.0048
Be	mg/L	0.00000049	0.00011
B	mg/L	0.062	0.062
Ca	mg/L	24	24
Cd	mg/L	0.000050	0.000092
Co	mg/L	0.00074	0.00084
Cr	mg/L	0.00026	0.00096
Cu	mg/L	0.000042	0.0047
Fe	mg/L	0.0097	0.30
K	mg/L	17	17
Mg	mg/L	22	22
Mn	mg/L	0.12	0.12
Mo	mg/L	0.0053	0.0053
Na	mg/L	140	140
Ni	mg/L	0.0082	0.016
P	mg/L	0.014	0.021
Pb	mg/L	0.00000018	0.00093
Sb	mg/L	0.0090	0.0090
Se	mg/L	0.0014	0.0014
Tl[3]	mg/L	0.000052	0.000052
U	mg/L	0.0015	0.0015
V[3]	mg/L	0.0027	0.0027
W[3]	mg/L	0.0010	0.0010
Zn	mg/L	0.0034	0.019
Zr	mg/L	0.0023	0.0023

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Table 5-19: TMF Seepage - Passive Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	8.0	-
SO4	mg/L	1209	1207
Chloride	mg/L	25	25
Hg	mg/L	0.0000078	0.0000079
Ag	mg/L	0.000048	0.000049
Al	mg/L	0.0091	0.097
As	mg/L	0.0097	0.031
Be	mg/L	0.0000047	0.000038
B	mg/L	0.046	0.046
Ca	mg/L	131	131
Cd	mg/L	0.000023	0.000049
Co	mg/L	0.034	0.039
Cr	mg/L	0.00097	0.00097
Cu	mg/L	0.0032	0.016
Fe	mg/L	0.018	0.47
K	mg/L	28	28
Mg	mg/L	6.2	6.2
Mn	mg/L	0.10	0.10
Mo	mg/L	0.035	0.035
Na[2]	mg/L	387	387
Ni	mg/L	0.00086	0.0018
P	mg/L	0.55	0.56
Pb	mg/L	0.00000016	0.00026
Sb	mg/L	0.037	0.037
Se	mg/L	0.0031	0.0031
Tl[3]	mg/L	0.000019	0.000019
U	mg/L	0.0039	0.0039
V[3]	mg/L	0.0024	0.0024
W[3]	mg/L	0.0068	0.0068
Zn	mg/L	0.00070	0.0060
Zr	mg/L	0.0010	0.0010

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum and copper result assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-20: MWP Quality and Seepage - Passive Closure Period

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	7.5	-
SO4	mg/L	1.3	1.3
Chloride	mg/L	1.5	1.5
Hg	mg/L	0.0000078	0.0000082
Ag	mg/L	0.000039	0.000041
Al	mg/L	0.00030	0.062
As	mg/L	0.00028	0.0022
Be	mg/L	0.000000044	0.0000072
B	mg/L	0.0027	0.0027
Ca	mg/L	3.9	3.9
Cd	mg/L	0.0000029	0.0000081
Co	mg/L	0.000038	0.000046
Cr	mg/L	0.000049	0.00012
Cu	mg/L	0.0000060	0.00092
Fe	mg/L	0.0094	0.080
K	mg/L	0.96	0.96
Mg	mg/L	0.94	0.94
Mn	mg/L	0.028	0.028
Mo	mg/L	0.00037	0.00037
Na[2]	mg/L	0.49	0.49
Ni	mg/L	0.00014	0.00034
P	mg/L	0.011	0.012
Pb	mg/L	0.000000034	0.00017
Sb	mg/L	0.00074	0.00074
Se	mg/L	0.00028	0.00028
Tl[3]	mg/L	0.0000050	0.0000050
U	mg/L	0.00034	0.00034
V[3]	mg/L	0.00041	0.00041
W[3]	mg/L	0.00017	0.00017
Zn	mg/L	0.00048	0.0035
Zr	mg/L	0.0017	0.0017

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Table 5-21: Rehabilitated Areas - Post-Closure

Parameter	Units	MRS & TMF Covers[1]	Revegetated Areas[2]	Former TMF Pond and MWP Catchment	Rehabilitated OVB1 Stockpile
pH[3]	pH units	7.5	7.0	-	-
SO4	mg/L	3.1	1.0	2.4	1.0
Chloride	mg/L	3.0	0.74	2.3	0.74
Hg	mg/L	0.0000025	0.0000025	0.0000057	0.0000025
Ag	mg/L	0.000015	0.000011	0.000028	0.000011
Al	mg/L	0.0051	0.052	0.033	0.052
As	mg/L	0.00079	0.0018	0.0019	0.0018
Be	mg/L	0.000015	0.000010	0.000014	0.000010
B	mg/L	0.010	0.0050	0.0077	0.0050
Ca	mg/L	6.4	14	7.4	14
Cd	mg/L	0.0000035	0.0000025	0.0000062	0.0000025
Co	mg/L	0.000025	0.000079	0.000046	0.000079
Cr	mg/L	0.0017	0.00026	0.0010	0.00026
Cu	mg/L	0.0019	0.00095	0.0015	0.00095
Fe	mg/L	0.0070	0.35	0.054	0.35
K	mg/L	2.7	1.3	2.0	1.3
Mg	mg/L	0.75	4.2	1.4	4.2
Mn	mg/L	0.00025	0.019	0.014	0.019
Mo	mg/L	0.0036	0.00028	0.0021	0.00028
Na	mg/L	1.1	1.9	1.1	1.9
Ni	mg/L	0.00037	0.00070	0.00041	0.00070
P	mg/L	0.0050	0.034	0.012	0.034
Pb	mg/L	0.000075	0.000075	0.00013	0.000075
Sb	mg/L	0.00021	0.00015	0.00047	0.00015
Se	mg/L	0.00035	0.00011	0.00034	0.00011
Tl	mg/L	0.0000060	0.0000050	0.0000067	0.0000050
U	mg/L	0.0014	0.00026	0.00089	0.00026
V	mg/L	0.0041	0.00064	0.0025	0.00064
W	mg/L	0.00030	0.000050	0.00025	0.000050
Zn	mg/L	0.0022	0.0010	0.0029	0.0010
Zr	mg/L	0.000067	0.00064	0.00088	0.00064

Notes:

1) Overburden Stockpile source term.

2) Natural Ground - Dixie Creek Main Stem.

3) pH based on source term data for rehabiilitated areas.

Table 5-22: TMF Seepage - Post-Closure

Parameter	Units	Equilibrated	Mass Balance
pH[1]	pH units	8.0	-
SO4	mg/L	88	88
Chloride	mg/L	23	23
Hg	mg/L	0.000036	0.000036
Ag	mg/L	0.00020	0.00020
Al	mg/L	0.0081	0.38
As	mg/L	0.00060	0.0091
Be	mg/L	0.000077	0.00018
B	mg/L	0.084	0.084
Ca	mg/L	72	74
Cd	mg/L	0.000036	0.000048
Co	mg/L	0.0032	0.0033
Cr	mg/L	0.0035	0.0035
Cu	mg/L	0.0015	0.011
Fe	mg/L	0.0075	0.17
K	mg/L	21	21
Mg	mg/L	1.5	1.5
Mn	mg/L	0.17	0.17
Mo	mg/L	0.010	0.010
Na[2]	mg/L	1.9	1.9
Ni	mg/L	0.0031	0.0040
P	mg/L	0.029	0.030
Pb	mg/L	0.0000041	0.00099
Sb	mg/L	0.0038	0.0038
Se	mg/L	0.0026	0.0026
Tl[3]	mg/L	0.000033	0.000033
U	mg/L	0.0047	0.0047
V[3]	mg/L	0.0089	0.0089
W[3]	mg/L	0.0022	0.0022
Zn	mg/L	0.0090	0.022
Zr	mg/L	0.0070	0.0070
Total Cyanide	mg/L	--	0.0050
WAD Cyanide	mg/L	--	0.0040
Nitrate-N	mg/L as N	--	0.13
Nitrite-N	mg/L as N	--	0.0050
Ammonia-N	mg/L as N	--	1.0

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum result assumed to be 10x higher than PHREEQC estimate (see Section 4.13).

Table 5-23: VMF Pit Lake - Post-Closure

Parameter	Units	VMF - Initial Long Term Elevation (355 masl)		VMF - Long Term Steady State Conditions	
		Equilibrated	Mass Balance	Equilibrated	Mass Balance
pH[1]	pH units	7.5	-	7.5	-
SO4	mg/L	80	80	48	48
Chloride[2]	mg/L	27	27	16	16
Hg	mg/L	0.000023	0.000023	0.000014	0.000014
Ag	mg/L	0.000065	0.000066	0.000040	0.000040
Al	mg/L	0.00028	0.071	0.00029	0.044
As	mg/L	0.000078	0.0045	0.000056	0.0028
Be	mg/L	0.00000045	0.00010	0.00000037	0.000062
B	mg/L	0.058	0.058	0.036	0.036
Ca	mg/L	24	24	18	18
Cd	mg/L	0.000045	0.000087	0.000027	0.000051
Co	mg/L	0.00069	0.00080	0.00046	0.00052
Cr	mg/L	0.00025	0.00093	0.00026	0.00074
Cu	mg/L	0.000037	0.0045	0.000027	0.0029
Fe	mg/L	0.0098	0.30	0.0090	0.19
K	mg/L	16	16	10	10
Mg	mg/L	21	21	13	13
Mn	mg/L	0.11	0.11	0.077	0.077
Mo	mg/L	0.0051	0.0051	0.0036	0.0036
Na	mg/L	131	131	76	76
Ni	mg/L	0.0075	0.015	0.0047	0.0090
P	mg/L	0.015	0.022	0.010	0.015
Pb	mg/L	0.00000016	0.00087	0.00000012	0.00051
Sb	mg/L	0.0084	0.0084	0.0049	0.0049
Se	mg/L	0.0013	0.0013	0.00081	0.00081
Tl[3]	mg/L	0.000049	0.000049	0.000029	0.000029
U	mg/L	0.0015	0.0015	0.0011	0.0011
V[3]	mg/L	0.0026	0.0026	0.0020	0.0020
W[3]	mg/L	0.00097	0.00097	0.00074	0.00074
Zn	mg/L	0.0030	0.017	0.0021	0.010
Zr	mg/L	0.0021	0.0021	0.0013	0.0013

Notes:

1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output.

3) Not in thermochimie database, set equal to mass balance model output.

Table 5-24: LP Central Pit Lake - Post-Closure

Parameter	Units	LP Central - Initial Long Term Elevation (348 masl)		LP Central - Long Term Steady State Conditions	
		Equilibrated	Mass Balance	Equilibrated	Mass Balance
pH[1]	pH units	7.5	-	7.5	-
SO4	mg/L	50	50	21	21
Chloride[2]	mg/L	4.0	4.0	3.7	3.7
Hg	mg/L	0.0000054	0.0000085	0.000013	0.000014
Ag	mg/L	0.000041	0.000041	0.000070	0.000070
Al	mg/L	0.0015	0.71	0.0017	0.30
As	mg/L	0.00045	0.010	0.0036	0.0096
Be	mg/L	0.000000085	0.000047	0.00000017	0.000028
B	mg/L	0.014	0.014	0.010	0.010
Ca	mg/L	17	17	19	19
Cd	mg/L	0.00019	0.00022	0.00030	0.00032
Co	mg/L	0.0043	0.0044	0.0014	0.0014
Cr	mg/L	0.00012	0.0059	0.00017	0.0022
Cu	mg/L	0.00063	0.0065	0.00072	0.0036
Fe	mg/L	0.011	4.0	0.013	1.3
K	mg/L	3.0	3.0	3.0	3.0
Mg	mg/L	2.9	2.9	3.4	3.4
Mn	mg/L	0.12	0.12	0.081	0.089
Mo	mg/L	0.0016	0.0017	0.0019	0.0019
Na[3]	mg/L	8.9	8.9	4.3	4.3
Ni	mg/L	0.0084	0.0099	0.0033	0.0036
P	mg/L	0.0056	0.051	0.012	0.035
Pb	mg/L	0.000013	0.0012	0.000051	0.0017
Sb	mg/L	0.0014	0.0014	0.0014	0.0014
Se	mg/L	0.00036	0.00081	0.0013	0.0015
Tl[4]	mg/L	0.000018	0.000018	0.000014	0.000014
U	mg/L	0.00085	0.00085	0.0010	0.0010
V[4]	mg/L	0.0013	0.0013	0.0016	0.0016
W[4]	mg/L	0.00053	0.00053	0.00063	0.00063
Zn	mg/L	0.025	0.043	0.016	0.021
Zr	mg/L	0.0014	0.0014	0.0028	0.0028
Total Cyanide	mg/L	--	--	0.0050	0.0050
WAD Cyanide	mg/L	--	--	0.0021	0.0021
Nitrate-N	mg/L as N	--	--	0.10	0.10
Nitrite-N	mg/L as N	--	--	0.0050	0.0050
Ammonia-N	mg/L as N	--	--	0.030	0.030

Notes:

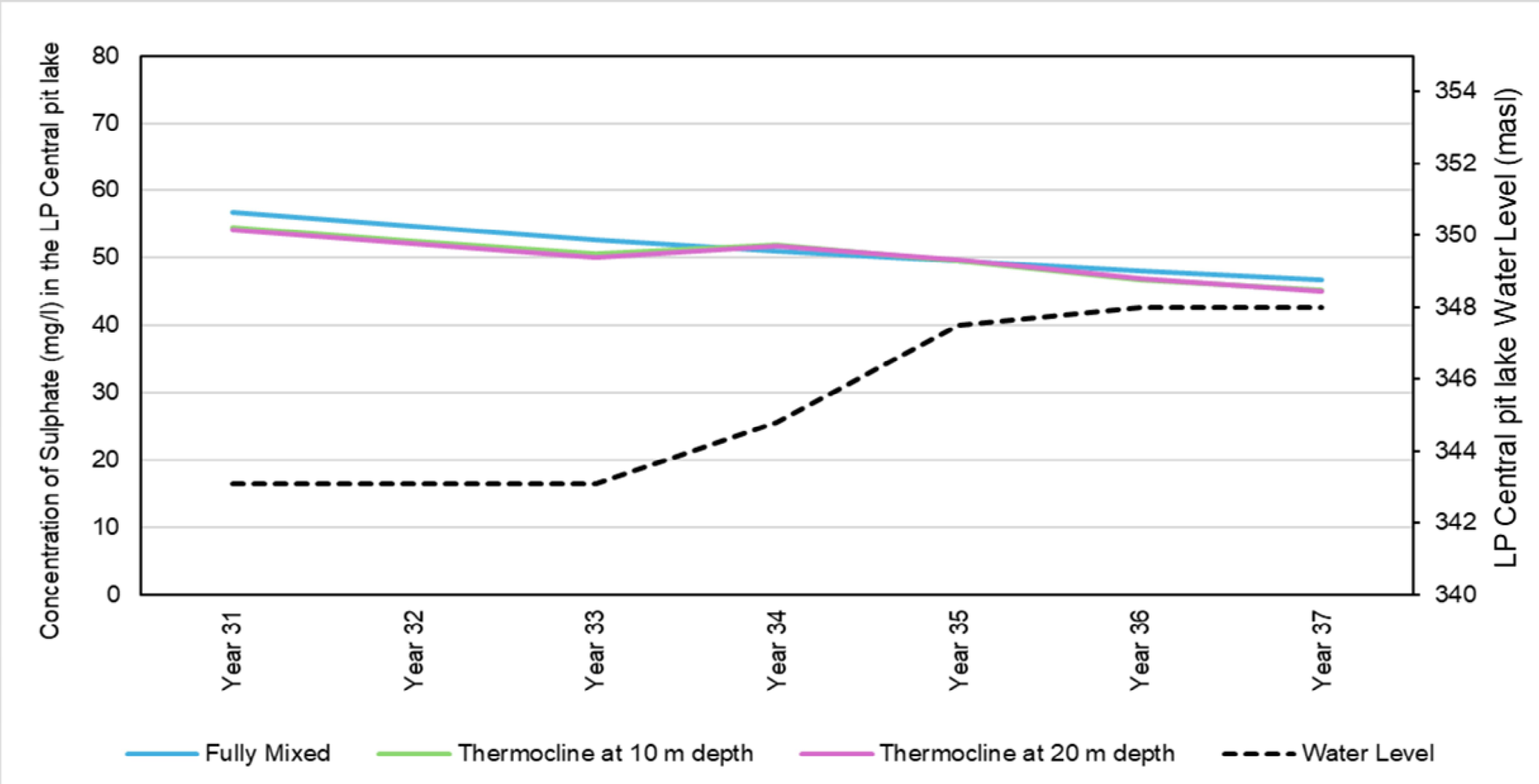
1) pH estimated based on simulations in PHREEQC and in consideration of the proportion of acidic and neutral inflows to each node. pH values reported to the nearest 0.5 pH units.

2) Charge balance parameter, set equal to mass balance model output for LP Central long term steady state conditions.

3) Charge balance parameter, set equal to mass balance model output for LP Central initial long term elevation.

4) Not in thermochimie database, set equal to mass balance model output.

Equilibrated results represented by the results of PHREEQC simulations, aluminum, arsenic, copper and lead results assumed to be 10x higher than PHREEQC estimate (see Section 4.13).



Notes

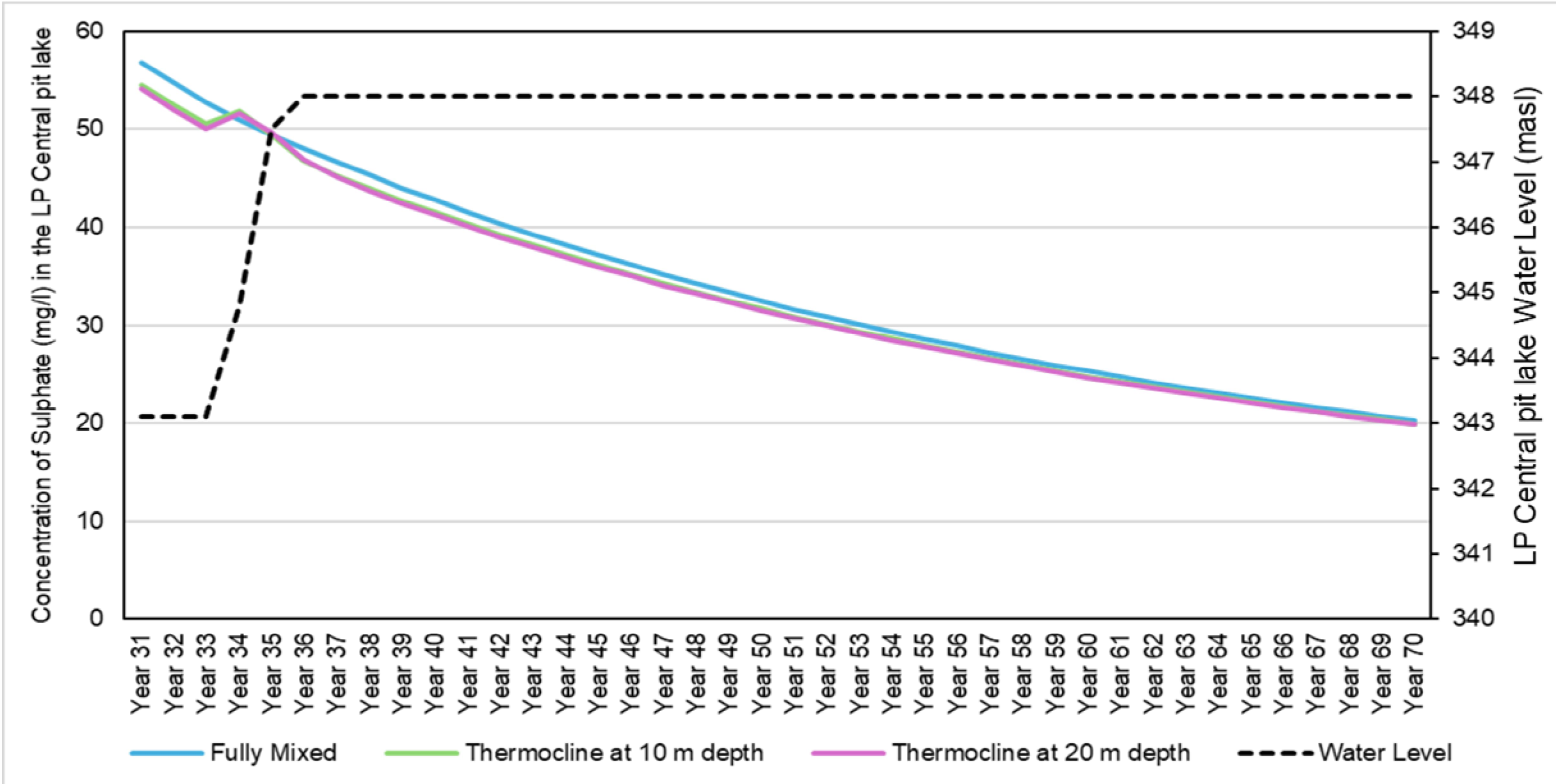
Differences in concentration between scenarios reflect a period of mass acumulation during the water level increase in Year 34 and Year 35, and load release during passive discharge beginnning in Year 36 in the thermocline scenarios.

LP Central Pit Lake Mass Balance Concentrations - Sulphate (Years 31 to 37)

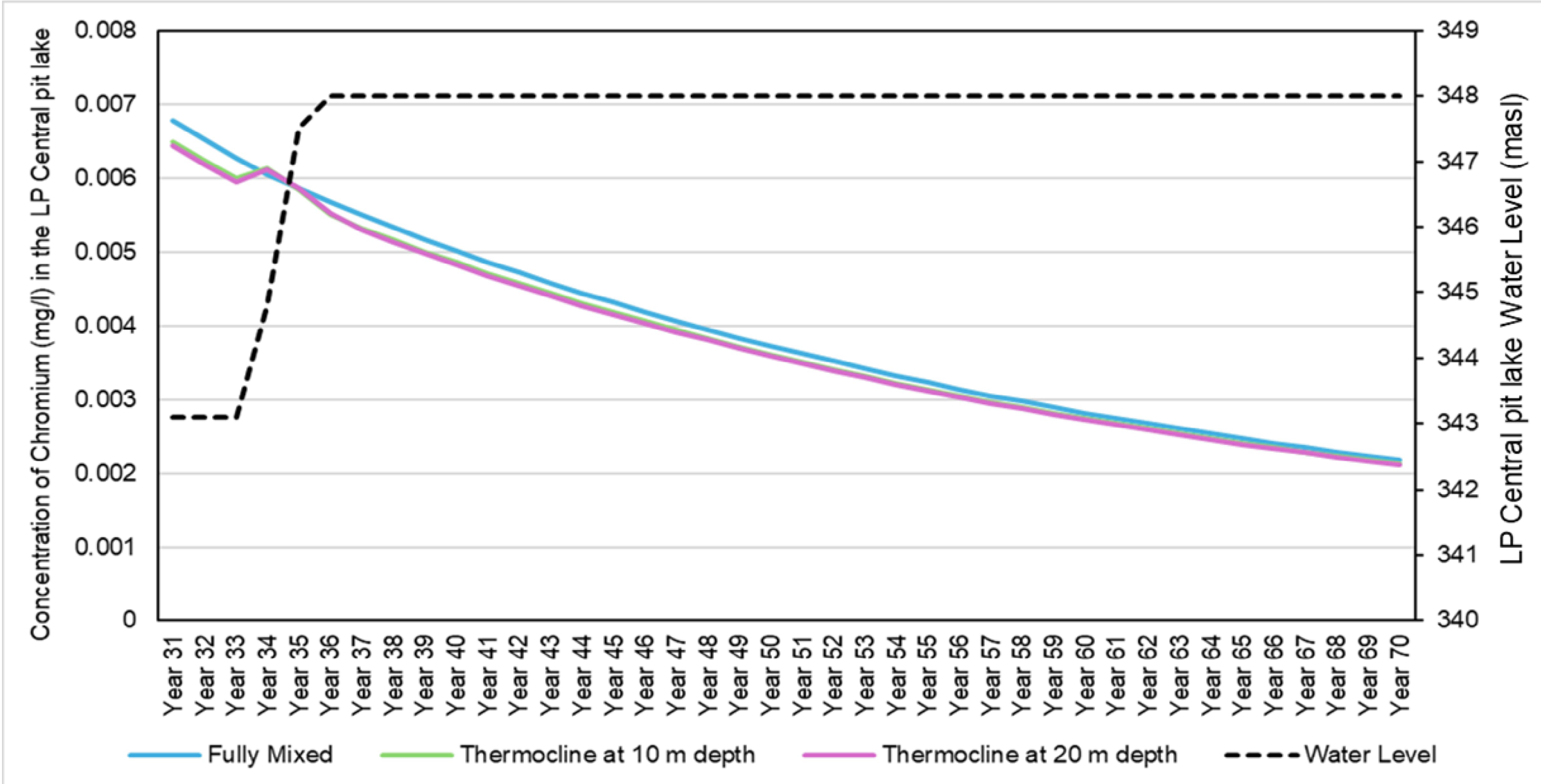
Great Bear Project - Mine Site Water Quality Estimate

Kinross Great Bear Project

Figure Number	5-1
Project Number	OMEMA2303.160
Date	Nov. 2025
Drawn / Reviewed	NL / KG



Notes	LP Central Pit Lake Mass Balance Concentrations - Sulphate (Years 31 to 70)	
	Great Bear Project - Mine Site Water Quality Estimate	
	Kinross Great Bear Project	
	Figure Number	5-2
	Project Number	OMEMA2303.160
	Date	Nov. 2025
	Drawn / Reviewed	NL / KG



Notes	LP Central Pit Lake Mass Balance Concentrations - Chromium (Years 31 to 70)	
	Great Bear Project - Mine Site Water Quality Estimate	
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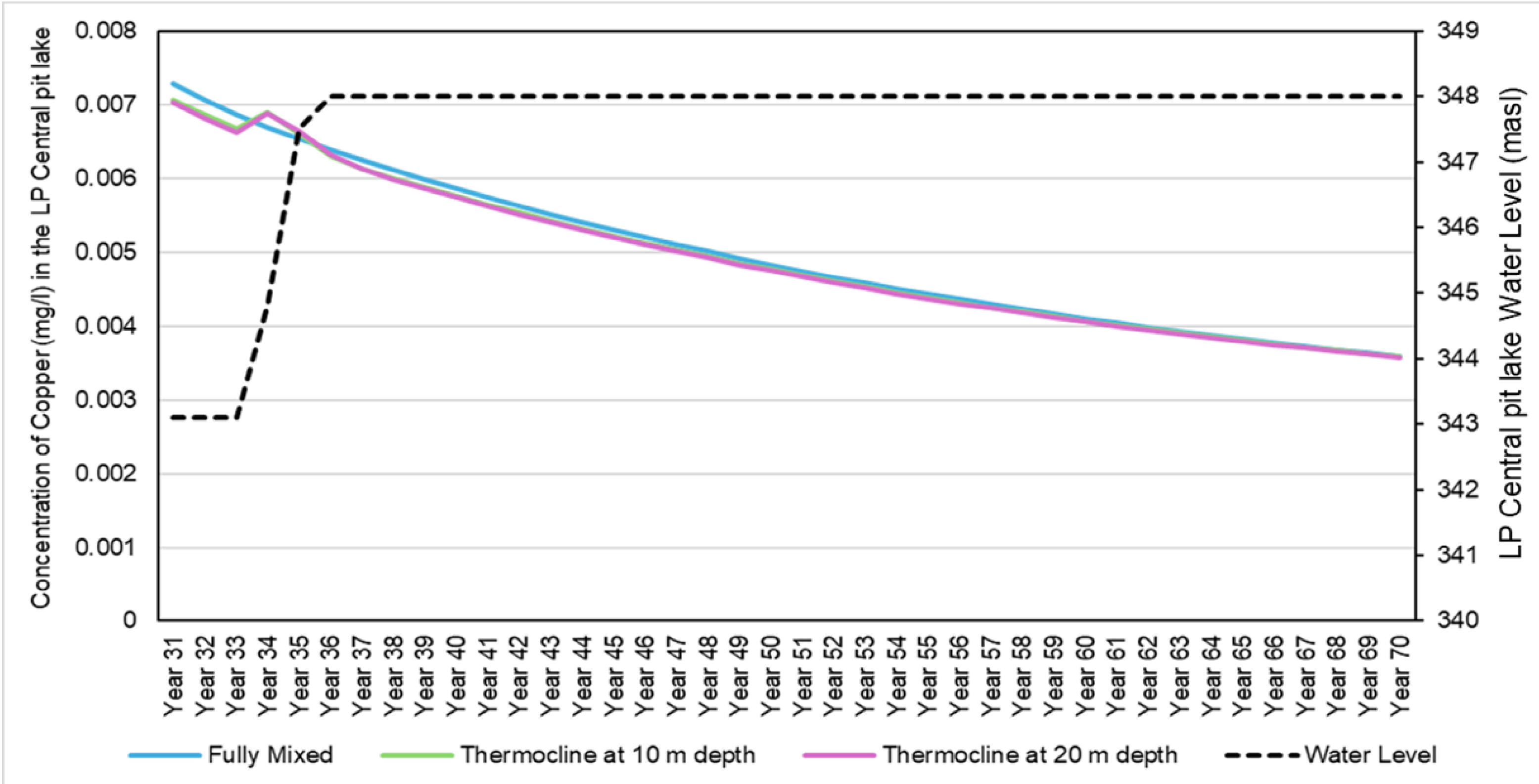
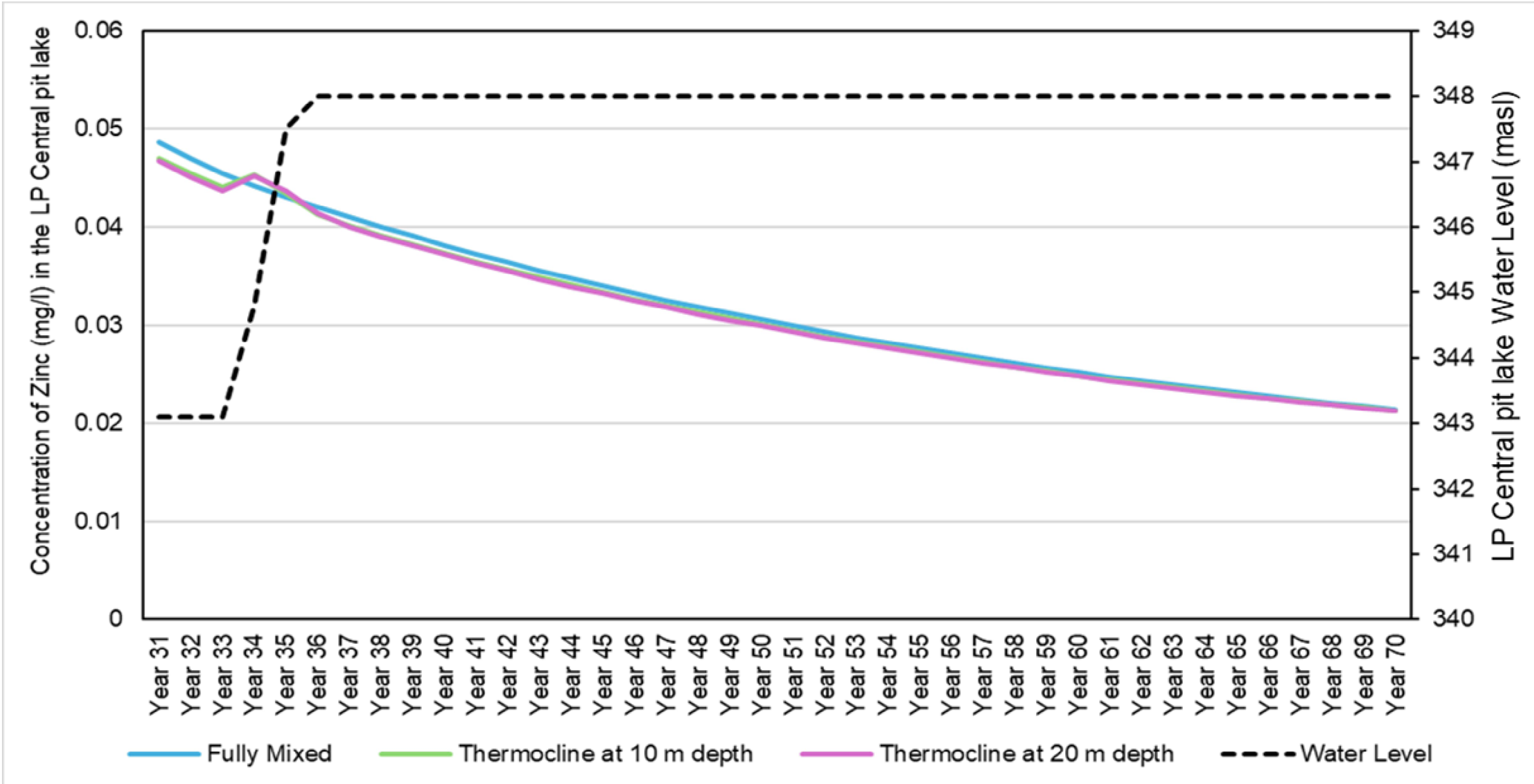
	Figure Number	5-3
	Project Number	OMEMA2303.160
	Date	Nov. 2025
	Drawn / Reviewed	NL / KG



Notes	LP Central Pit Lake Mass Balance Concentrations - Copper (Years 31 to 70)	
	Great Bear Project - Mine Site Water Quality Estimate	
	Kinross Great Bear Project	
	Figure Number	5-4
	Project Number	OMEMA2303.160
	Date	Nov. 2025
	Drawn / Reviewed	NL / KG



Notes	LP Central Pit Lake Mass Balance Concentrations - Zinc (Years 31 to 70)	
	Great Bear Project - Mine Site Water Quality Estimate	
	Kinross Great Bear Project	
	Figure Number	5-5
	Project Number	OMEMA2303.160
	Date	Nov. 2025
	Drawn / Reviewed	NL / KG

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- WSP. 2025d. Great Bear Project, Groundwater Modelling Report – Draft.
- WSP. 2025e. Great Bear Project, Evaluation of Conceptual Closure Cover Performance – Draft. In Progress
- WSP. 2025f. Great Bear Project, Hydrology Baseline Report. September 2025.

Appendix A

Cyanide and Nitrogen Contact Water Quality Estimates

MEMO

TO: Aaron MacDonell (Great Bear Resources)

FROM: Amy Elliott (WSP)

CC: Kristen Gault, Sheila Daniel, Heather Lindsay (WSP)

SUBJECT: Great Bear Project, Cyanide and Nitrogen Contact Water Quality Estimates

WSP No.: OMEMA2303

DATE: October 20, 2025

1 INTRODUCTION

This memorandum has been prepared by WSP Canada Inc. (WSP) on behalf of Great Bear Resources in support of the Great Bear Project (the Project) Impact Statement. It presents water quality estimates for cyanide and nitrogen species in contact water from tailings process and blasting activities during the operations phase of the Project.

These estimates were prepared to support water quality estimates for the Project, including estimates for the mine site contact water for:

- Contact water in the tailings management facility (TMF)
- Influent to the water treatment plant (WTP). Influent includes excess mine dewatering water (WTP) and TMF water (membrane filtration plant). Additional details regarding water treatment for the Project and other contact water sources are provided in WSP (2025a).

Note, cyanide and nitrogen species are non-conservative parameters and are therefore not typically represented through mass balance models for a Project at this stage of development. Cyanide and nitrogen species concentrations within the TMF, mine dewatering waters, and influent to WTP will depend primarily on:

- Site-specific water management practices
- Operational performance and optimization of the cyanide destruction circuit
- Operational performance and optimization of the WTP
- Effectiveness of explosives handling and management.

Cyanide and nitrogen species undergo transformation, degradation, and volatilization rather than behaving conservatively, therefore strict mass balance calculations are not appropriate for estimation. A conservative modelling approach was applied herein to estimate these concentrations, using available site-specific test work and analogue data from operating gold mines in northern Ontario to preparation of water quality estimates for the Impact Statement for the Project, and support water management planning at the Project site.

2 APPROACH

Cyanide and nitrogen concentrations as loadings to the receiving environment, from the TMF seepage and as excess TMF water directed to water treatment, were conservatively assumed to be equivalent to the composition of tailings process water. This represents a highly conservative assumption, as concentrations in seepage and / or directed to the water treatment would be expected to decrease due to dilution, entrainment, adsorption, and degradation processes occurring within theTMF.

WSP Canada Inc
6925 Century Avenue, Suite 600
Mississauga, Ontario, Canada L5N 7K2
T+ 1-905-567-4444
wsp.com

Cyanide destruction is planned to be carried out using the SO_2/air process, with sodium metabisulphite serving as the source of sulphur dioxide. Laboratory testing on representative composite tailings slurry samples has demonstrated that this treatment method is effective for cyanide destruction (Table 1), and shows that the SO_2/air process can achieve Weak Acid Dissociable (WAD) cyanide concentrations below 1 mg/L (Worley 2024). Final target concentrations for total and WAD cyanide in the tailings, following treatment in the process plant cyanide destruction circuit, will comply with the International Cyanide Management Code (ICMI 2021), which sets limits protective of wildlife and avian species. The residual cyanide concentrations will naturally degrade when exposed to sunlight within the TMF.

Process water source terms used in the water quality model were based on both Project-specific laboratory test results and analogue data from operating gold mines (Table 1). Analogue data was included as a means to account for potentially non-idealised destruction conditions (that can arise in laboratory settings where the test work was performed). Among the analogue sites reviewed, Site A exhibited the closest alignment with site-specific test data (Table 1). Most parameter concentrations in the analogue data were higher than those observed in laboratory tests; thus the final source terms from laboratory testwork were conservatively adjusted upward to account for this variance. The resulting process water source terms applied in the model were as follows:

- WAD cyanide, 0.1 mg/L
- Total cyanide, 1.6 mg/L
- Ammonia-N, 26 mg/L
- Nitrite-N, 2.4 mg/L
- Nitrate-N, 3.3 mg/L

A similar approach was taken to represent nitrogen concentrations in mine dewatering waters, sourced from blasting residuals, that are directed as influent to the WTP. Explosives are typically the dominant source of nitrogen compounds (i.e., total ammonia, nitrate and nitrite) in mine dewatering waters.

For the Project, annual explosives consumption has been estimated to be up to approximately 10,500 tonnes per annum when mining at the LP Central pit and underground mine are occurring simultaneously. Explosive consumption decreases to approximately 5,000 tonnes per annum later in the operations phase when only underground mining is occurring. At the time of preparation of this memo, blasting is planned to use ammonium nitrate fuel oil emulsion and emulsion blend explosives. The nitrogen compounds ammonia, nitrate, and nitrite will be the primary constituents of blasting residues available to load mine dewatering waters. The relative distribution of these nitrogen species will ultimately be influenced by numerous factors including the:

- Distribution of nitrogen (as ammonia and nitrate) in the explosives
- Production of nitrite from blasting by-products
- Natural degradation and / or microbial process that may be active along the contact water flow path.

For the purpose of estimating water quality, the nitrogen species distribution established by Ferguson and Leask (1988), along with proportional nitrogen loading observed in analogue data, were used to model concentrations of ammonia, nitrate, and nitrite in mine dewatering waters. These estimates conservatively assume an annual explosives usage of 10,500 tonnes per annum and dewatering flows based on the average annual monthly water balance (WSP 2025b).

Results for concentrations of nitrogen species in mine dewatering waters directed to water treatment are summarised in Table 2. Note, final effluent quality will be appropriate for discharge to the environment in accordance with applicable regulatory requirements, including the federal Metal and Diamond Mine Effluent Regulations, and the effluent concentrations required by the province to protect the receiving water and aquatic resources, set during the provincial approvals process. Water treatment engineering will be expanded upon and refined as part of the provincial approvals process, consistent with the regulatory regime in Ontario for proposed mines. Additional details regarding water treatment are provided as well as expected treatment efficiencies are provided in WSP 2025a.

3 REFERENCES

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Table 1. Tailings Pond Supernatant Data, Proxy for Process Water Chemistry

Sample	Zone	Nitrate-N	Nitrite-N	Ammonia-N	Total Cyanide	Cyanide WAD
		mg/L	mg/L	mg/L	mg/L	mg/L
Flotation Tailings Samples, Great Bear Project						
F9-RO, Post-Detox	LP Fault	0.059	2.54	20.3	0.07	0.03
F7-RO, Post-Detox	LP Fault	0.045	1.96	17.3	1.8	0.04
F4-RO, Post-Detox	LP Fault	0.030	3.00	24.3	0.05	0.03
F6-R-RO, Post-Detox	LP Fault	0.024	2.1	25.4	0.75	0.06
Average, site-specific test work		0.040	2.4	21.8	0.68	0.042
75th Percentile, site-specific test work		0.049	2.7	24.6	1.0	0.048
Analogue Data, Operating Gold Mines						
Mine A		3.7	0.5	56.2	0.10	0.07
Mine B		8.3	2.10	64.6	3.2	2.3
Mine C		1.4	0.15	36.0	1.6	1.1
Mine D		-	-	-	0.001	0.001
Average, Analogue Data		4.5	0.9	52.3	1.2	0.9
75th Percentile, Analogue Data		6.0	1.3	60.4	2.0	1.4

\- *Data not available*

Table 2a. Nitrogen Species Distribution, Modelled and Analogue Data Distribution

Source	Units	Nitrate-N	Nitrite-N	Ammonia-N
Modelled Monthly Maximum (calculated)	% of total N	65	1.4	34
Analogue Data, Mine A	% of total N	64	0.5	35
Analogue Data, Mine B	% of total N	78	2.8	19
Analogue Data, Mine C	% of total N	49	0.9	50

Table 2b. Nitrogen Species Distribution, Modelled and Analogue Data Distribution as Concentrations

Source	Units	Nitrate-N	Nitrite-N	Ammonia-N
Modelled Monthly Maximum (calculated)	mg/L	23	0.5	12
Analogue Data, Mine A	mg/L	12	0.1	6.5
Analogue Data, Mine B	mg/L	65	2.3	16
Analogue Data, Mine C	mg/L	12	0.2	12