APPENDIX 7A

Berry Pit Expansion: Hydrogeological Model Update

Valentine Gold Project – Berry Pit Expansion: Hydrogeological Model Update

August 2023

Prepared for:

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VALENTINE GOLD PROJECT – BERRY PIT EXPANSION: HYDROGEOLOGICAL MODEL UPDATE

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Abbreviations/Acronyms

µg/L	microgram per litre
amsl	above mean sea level
Approved Project	Valentine Gold Project
BWRP	Berry Waste Rock Pile
EA	Environmental Assessment
EIS	Environmental Impact Statement
Existing Model	Hydrogeological model created to support the Approved Project
GEMTEC	GEMTEC Consulting Engineers and Geoscientists Limited
GHB	General Head Boundary
HSU	hydrostratigraphic unit
IR	Information Requirement
km	kilometre
Kz/Kxy	ratio of vertical to horizontal hydraulic conductivity
LGO	Low-grade Ore
m	metre
m^2	square metre
m^3	cubic metre
m/s	metre per second
Marathon	Marathon Gold Corporation
mbgs	metre below ground surface
mg/L	milligram per litre
mm/year	millimetre per year
NL	Newfoundland and Labrador
Project Expansion	Berry Pit Expansion Project
RCL	Red Cross Lake Intrusion
RGC	Rogerson Conglomerate
RMSE	root mean squared error
SDG	Silurian-Devonian Granitoids
SPG	Snowshoe Pond Granite
TMF	Tailings Management Facility
Updated Model	Hydrogeological model to support the Environmental Registration/EA Update for the Project Expansion
USGS	United States Geological Survey
VLQ	Valentine Lake Quartz Monzonite
VLS	Victoria Lake Supergroup

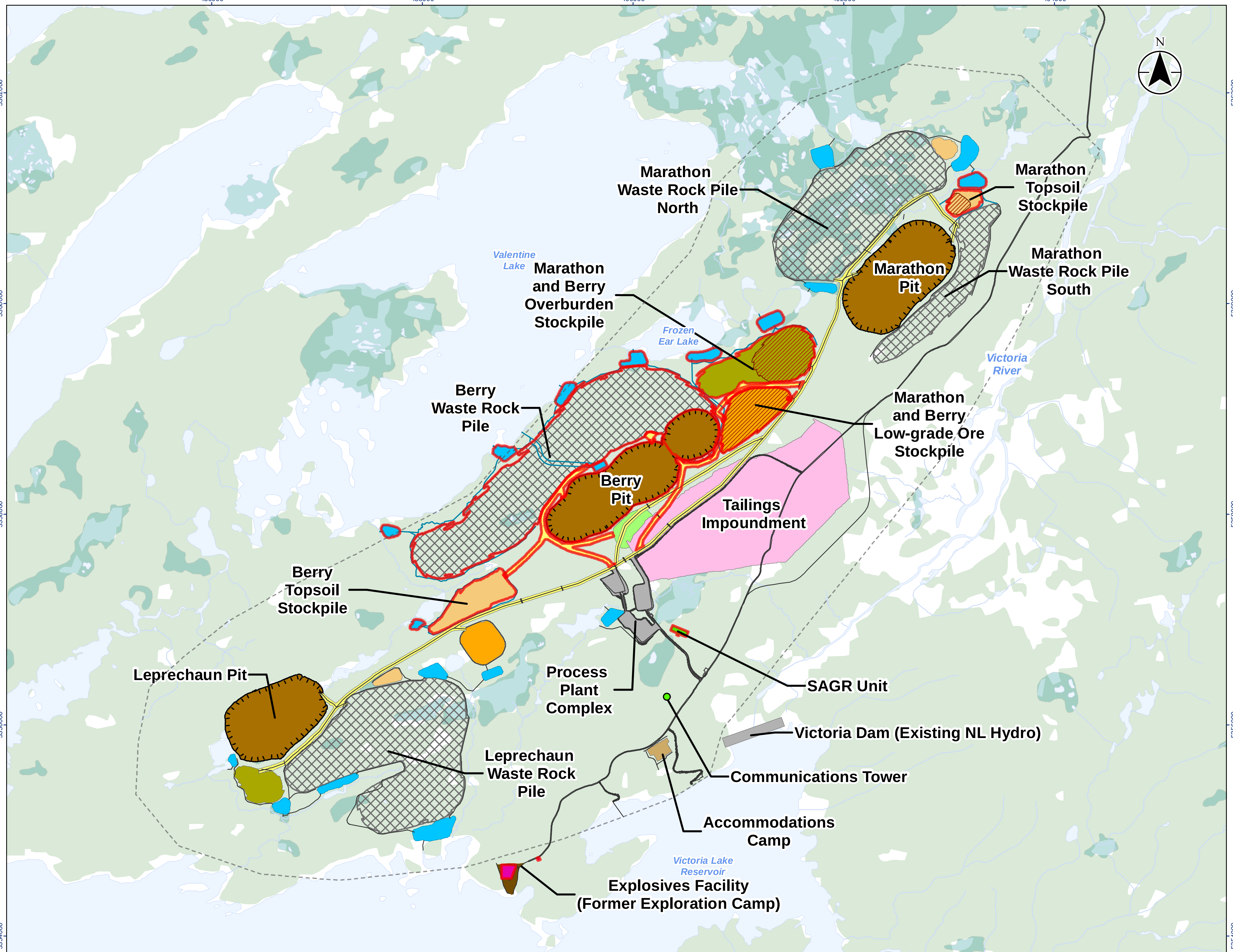
1.0 INTRODUCTION

Marathon Gold Corporation (Marathon) is currently constructing an open pit gold mine (the Valentine Gold Project) near Valentine Lake, located in the central region of the Island of Newfoundland, southwest of the Town of Millertown, Newfoundland and Labrador (NL). The Valentine Gold Project consists primarily of two open pits, associated waste rock piles, crushing and stockpiling areas, conventional milling and processing facilities (the mill), a tailings management facility (TMF), personnel accommodations, and supporting infrastructure including an upgraded access road from Millertown to the mine site, haul roads, on-site power lines, buildings, and water and effluent management facilities (Figure 1).

The Valentine Gold Project was subject to both federal and provincial environmental assessment (EA) under the federal *Canadian Environmental Assessment Act*, 2012, and the NL *Environmental Protection Act*, respectively. Marathon submitted an Environmental Impact Statement (EIS) to both regulators, federally on September 29, 2020, and provincially on November 3, 2020. Following submission of responses to a number of information requirements (IRs) and amendments, the Valentine Gold Project was released with conditions on March 17, 2022, from the provincial EA process, and on August 24, 2022, from the federal process.

Based on recent and successful geological exploration and assessment work, and associated feasibility assessment, Marathon is proposing the development of a third open pit within the mine site of the Valentine Gold Project (the Approved Project). The Berry Pit Expansion (the Project Expansion) is proposed to include an open pit (Berry pit), a new stockpile for waste rock and topsoil, expansion of the low-grade ore (LGO) and overburden stockpiles associated with Marathon pit, and additional water management infrastructure. In addition, the Approved Project planned for tailings to be disposed of in the exhausted Leprechaun pit near the end of mine life. As part of the Project Expansion, tailings will be deposited in the TMF for the first nine years of operation and into the southern basin of the Berry pit for the last five years of operation, reducing the distance that tailings would need to be transported by pipeline. Also, the explosives storage facility that is part of the Approved Project will need to be relocated as part of the Project Expansion. Safety regulations require this facility to be located a minimum distance from other Project features, and to maintain these setbacks from Project Expansion features, it will need to be moved from its currently approved location.

The Project Expansion will not result in an increase in annual production rates from the mine. There will be a slight increase in mine life of 1.4 years (from 13 years to 14.4 years). Components of the Approved Project such as the tailings impoundment area, the processing mill, access road, power distribution infrastructure, material shipping, gold shipment to market, and site buildings including accommodations, will not be affected by or require modification because of the Project Expansion.



Stantec

Legend

- Proposed Expansion Feature
- Communications Tower
- Ditch / Drainage Channel
- Accommodations Camp
- Existing Exploration Camp
- Explosives Facility
- HGO Stockpile
- Haul Road
- Low Grade Stockpile
- Overburden Stockpile
- Pit
- Pond
- Process Plant / Truck Wash
- SAGR Unit
- Tailings Management Facility
- Topsoil Stockpile
- Waste Rock Disposal Pile
- Site Feature Approved - Overlap
- Mine Site

0 1 2 km

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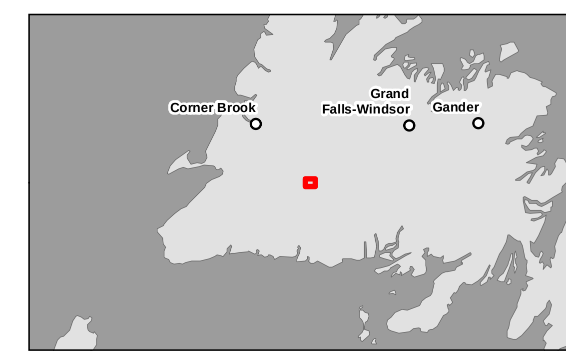
Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

XXXXXXXXX-XXXX REVA
Prepared by ABC on 2023-07-31
Technical Review by AD on 2023-06-12

Client/Project
PLEASE USE THE MAP DOCUMENT PROPERTIES/DESCRIPTION FOR THE CLIENT/PROJECT TEXT.

Figure No.
1

Title
Approved Project and Project Expansion Site Plan

1.1 STUDY OBJECTIVES

This Report entitled "Valentine Gold Project – Berry Pit Expansion: Hydrogeology Modelling" (Hydrogeology Modelling report) has been prepared to assess the potential effects of the construction, operation, and decommissioning, rehabilitation and closure phases of the Project Expansion on groundwater resources and the consequent indirect effects on surface water resources.

To evaluate the effects of the Project Expansion, the existing numerical groundwater model developed in support of the Approved Project (Stantec 2020) has been updated to provide estimates of:

- changes in groundwater levels (drawdown), including changes to water table position and groundwater flow in the Approved Project and Project Expansion areas, due to dewatering of the Berry open pit.
- the time to fill the open pits from groundwater inflow.
- changes to groundwater flow and discharge to creeks and lakes under baseline, operation, and decommissioning, rehabilitation and closure.
- groundwater recharge and flow pathways from LGO stockpiles, waste rock piles and the TMF developed for the Approved Project and Project Expansion under operation and decommissioning, rehabilitation, and closure.

Model calibration has been updated based on subsequent drilling and pumping test results from GEMTEC Consulting Engineers and Geoscientists Limited (GEMTEC [2022]).

This Hydrogeology Modelling report forms part of the supporting documentation for the Environmental Registration/EA Update being completed for the Project Expansion.

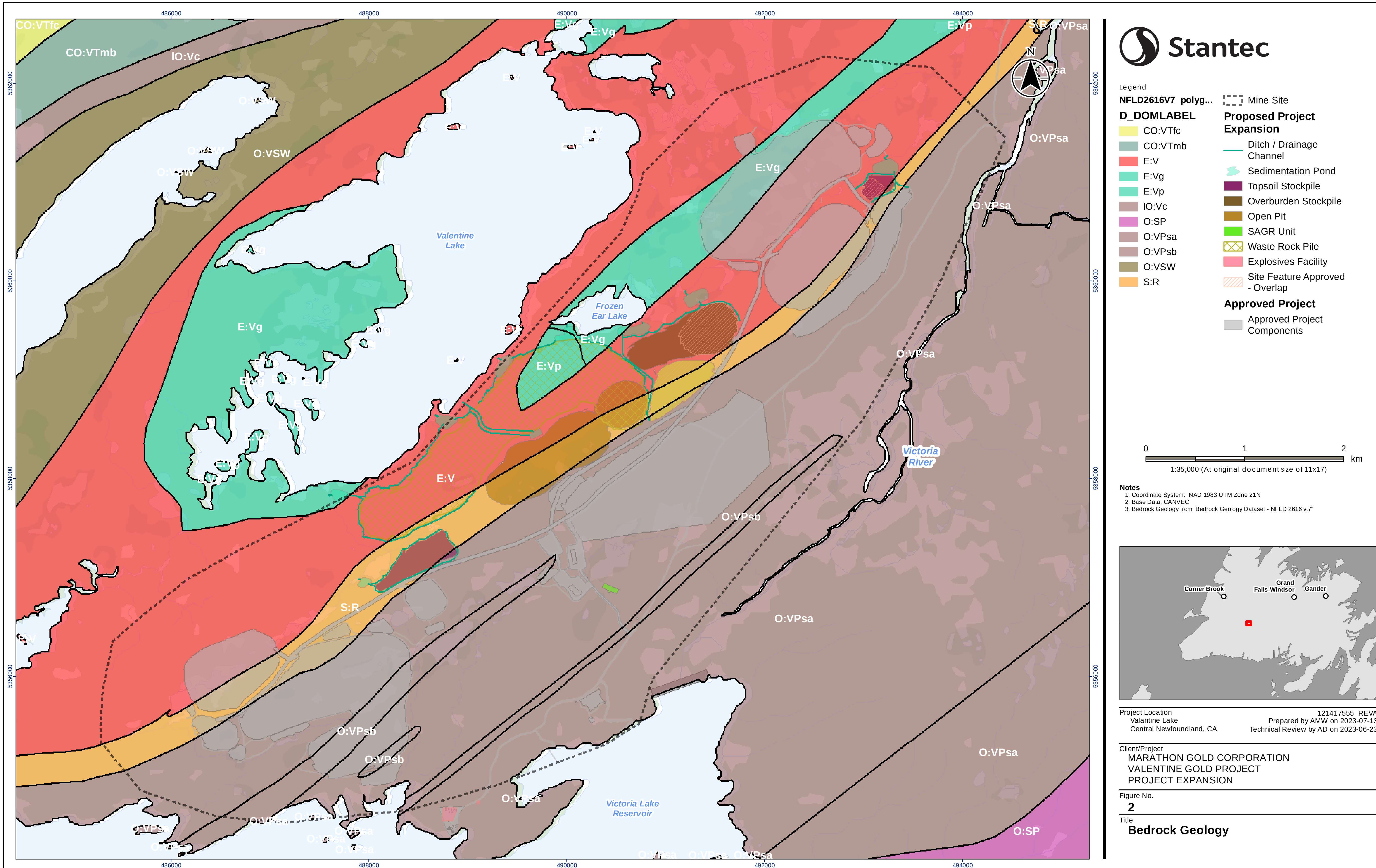
2.0 CONCEPTUAL MODEL

A conceptual model of a site is developed to guide the creation of a numerical groundwater model that accurately represents the natural environment. The conceptual model reflects the fundamental hydrogeological concepts considering geological, hydrogeological, and hydrological data pertinent to the site that will be modelled.

The conceptual model for the Project Expansion is the same as that from the Approved Project (Stantec 2020) with the exception that some hydrogeologic parameters have been updated based on additional drilling and pumping test analysis analyses (GEMTEC 2022a). Key aspects of the conceptual model are provided below:

- The Approved Project and Project Expansion areas are situated along a prominent northeast trending ridge with an approximately 100 metres (m) of relief above surrounding low-lying areas. The ridge is situated at the divide between three drainage catchment areas, sloping moderately downwards on its northwest side towards Valentine Lake, on its southeast side towards Victoria Lake to the south, and down to Victoria River to the north. Valentine Lake drains northeast into Victoria River. Victoria Lake was originally the headwater of the Victoria River watershed, which ultimately flows north into the Exploits River; but has been diverted to the south by a diversion dam located at the outlet of Victoria River from Victoria Lake (GEMTEC 2022d).

- Groundwater levels in the Approved Project and Project Expansion footprints are shallow, ranging from 2.7 metres below ground surface (mbgs) to -0.57 mbgs (artesian). Shallow groundwater flow follows topography and the direction of surface runoff at horizontal hydraulic gradients ranging from 1% in the northern portion of the plant site to 17% as groundwater flows north to Valentine Lake. Estimated vertical hydraulic gradients determined using paired well systems in the TMF, plant site, and Marathon, Leprechaun and Berry waste rock pile areas indicate vertical gradients ranging from less than 1% in the Marathon waste rock pile and TMF areas to 26% within the footprint of the Berry waste rock pile (BWRP). Both downwards and upwards components of flow are identified.
- There are seven primary hydrostratigraphic units (HSUs) considered in the development of the conceptual model. These units are based on the surficial geology and lithostratigraphic units of the bedrock. The overburden HSU overlies the entire model domain and is less than 10 m thick (less than 1 m in some areas). The HSUs that were based on lithostratigraphic units are described below. Regional bedrock geology is presented on Figure 2.
  - Victoria Lake Supergroup (VLS): The VLS HSU covers majority of the model domain, including underneath the majority of the surface water features. The lithology varies from volcanic to sedimentary rock, which suggest that there will be both heterogeneity and anisotropy in hydraulic conductivity. Greenschist facies metamorphism is present and will likely reduce the primary hydraulic conductivity of this unit. Hydraulic conductivity estimates from testing of this unit range from 7.9×10^{-7} metre per second (m/s) to 8.6×10^{-5} m/s in the upper and intermediate bedrock.
  - Valentine Lake Quartz Monzonite (VLQ): The VLQ HSU is an elongated intrusive suite in the center of the domain that runs parallel to the long axis of the southwest-northeast trend of this formation. Quartz monzonite is a felsic crystalline rock that would be expected to have low hydraulic conductivity unless significantly fractured. The geometric means of hydraulic conductivity from well tests range from 3.9×10^{-10} m/s to 1.7×10^{-6} m/s and generally decreases with depth; however, well tests show that the deepest wells had higher hydraulic conductivity than wells in the 170 m to 296 m range.
  - Rogerson Conglomerate (RGC): The RGC HSU is elongated in the NE-SW direction and forms the footwall of the Valentine Lake Thrust Fault. This HSU separates the southern terrane of the VLS from the VLQ. The Rogerson Lake Conglomerate consists of conglomerate deposits and coarse sandstones, suggesting a relatively higher hydraulic conductivity than the other HSUs, particularly the crystalline units. The geometric means of hydraulic conductivity from well tests range from 1.3×10^{-6} m/s to 1.5×10^{-5} m/s. Results from pumping tests conducted in 2022 suggest that the VLQ and RGC upper fractured bedrock act as a confined aquifer.
  - Red Cross Lake Intrusion (RCL): The RCL HSU covers a small proportion of the model domain and is located in the northeast lying just south of the Victoria Lake Thrust Fault.
  - Silurian-Devonian Granitoids (SDG): The SDG HSU covers a small portion of model domain and is located in the northeast adjacent to the RCL The conceptual model assumes that the upper 20 m of the SDG is weathered with the intermediate and deeper bedrock more competent. For the purpose of reducing the complexity of the conceptual model, and given the size and location within the domain, hydraulic properties have been assumed to be the same as VLQ.



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- Snowshoe Pond Granite (SPG): The SPG HSU is a large granitic intrusion that covers a small portion of model domain and is located in the southeast end of the domain on the south side of Victoria Lake Reservoir. The conceptual model assumes that the upper 20 m of SPG is weathered with the intermediate and deeper bedrock more competent. For the purpose of reducing the complexity of the conceptual model, and given the size and location being on the other side of Victoria Lake Reservoir from the open pits, hydraulic properties have been assumed to be the same as VLQ.

- The rocks within the model domain are cut by several large-scale faults, the most significant of which is the Valentine Lake Fault, a major regional structure that strikes northeast and dips between 70° to 90° northwest. The fault runs through the center of the Site and defines the structural contact between the VLQ and RGC (GEMTEC 2020). Packer testing of the Valentine Lake Fault found that the fault was not hydraulically distinct from the surrounding rock mass (Marathon 2021a). Pumping tests completed in 2022 showed no indication that faults play a significant role in groundwater response to pumping (GEMTEC 2022a).

3.0 UPDATED MODEL CONSTRUCTION AND CALIBRATION

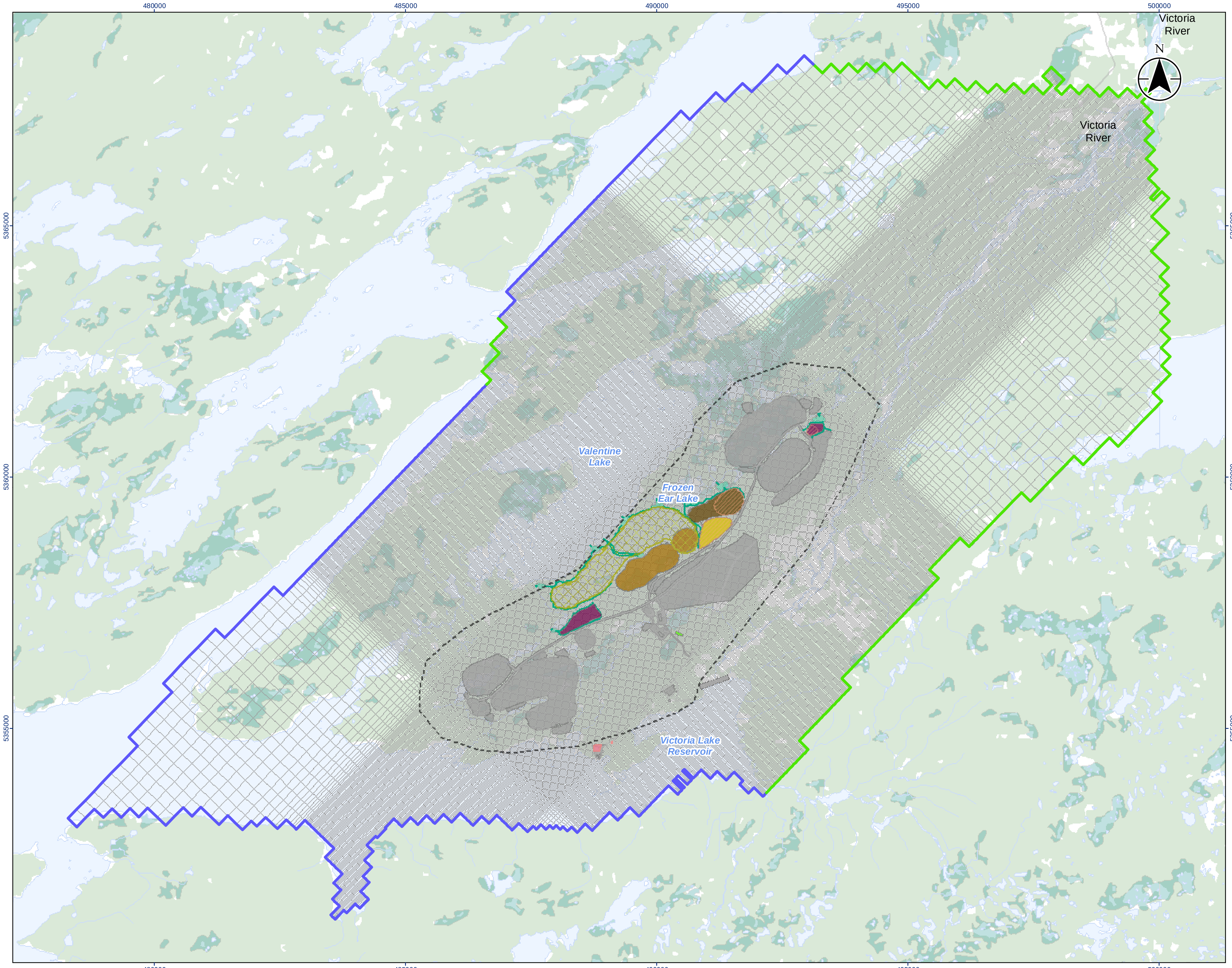
Details of the construction of hydrogeological model created to support the Approved Project (the "existing model") are provided elsewhere (Stantec 2020; and Marathon 2021a, 2021b, 2022a, and 2022b). This section describes the changes that were made to the existing model to create a hydrogeological model to support the Environmental Registration/EA Update for the Project Expansion (the "updated model").

Since submission of the Valentine Gold EIS and associated IRs, several additional hydrogeological field investigations have been completed in the areas of both the Approved Project and the Project Expansion as summarized in Project Expansion Environmental Registration/EA Update, Chapter 7: Groundwater Resources (Marathon 2023). The additional field investigation results were consistent with the existing conceptual model (Stantec 2020), indicating that the existing model was suitable for use for the prediction of effects from the Project Expansion.

3.1 MODEL DOMAIN AND GRID

The extent of the updated model domain is unchanged from the existing model and corresponds with the natural hydrogeological and hydrological boundaries, as shown on Figure 3.

The updated model grid is generally spaced at 250 m and is refined down to 25 m in the area encapsulating the Berry pit, which matches the grid refinement in the area of the Marathon and Leprechaun pits in the existing model. The refinement allows the updated model to simulate the anticipated changes in groundwater flow near the pits where hydraulic conditions change most rapidly.



![Stantec logo]

Stantec

Legend

- Groundwater Flow Model Domain

Boundary Condition

- Generalized Head Boundary
- No Flow

- Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

- Approved Project Components

0 2 4 km

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Notes
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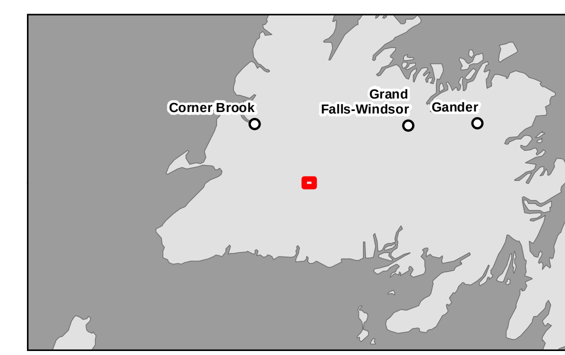
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVA
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
3

Title
Model Domain and Boundary Conditions

Revised: 2023-07-13 By: awhite

3.2 DISTRIBUTION OF HYDROGEOLOGIC PARAMETERS

The hydraulic conductivity and recharge rate were initially assigned to the updated model based on the calibration of the existing model and further refined during calibration of the updated model and model validation as described in Section 3.4.

3.3 BOUNDARY CONDITIONS

3.3.1 Updated Model Boundaries

As with the existing model, no-flow boundary conditions were applied at the extents of the updated model domain which coincided with watershed boundaries or with the center of large water bodies where the primary flow direction is considered to be vertical. A no-flow boundary condition was applied to the base of the updated model as groundwater is considered to be significantly impeded by the reduced hydraulic conductivity at depth. Model boundary conditions are depicted in Figure 3.

3.3.2 Recharge

To model the recharge conditions, a constant flux boundary condition, or recharge boundary condition, is applied to the top surface of the updated model domain. In accordance with the methodology used in the existing model (Marathon 2022b), recharge rates were refined by applying a linearly varying recharge multiplier to the net recharge based on surface slope. A recharge multiplier of 0.05 was assigned to slopes greater than 35°, and a recharge multiplier of 1.00 was assigned to slopes of 0°. The average recharge rate across the model domain is equal to 369 millimetres per year (mm/year).

3.3.3 Lakes and Watercourses

As presented in **Error! Reference source not found.**, there are many lakes and ponds within the study area. The largest and most influential to the functioning of the updated model are Victoria Lake Reservoir and Valentine Lake. As in the existing model, general head boundary conditions (GHB; also known as a Dirichlet boundary condition) were assigned to all lakes with head equal to the top of the updated model surface (based on lidar data) and a conductance parameter equal the hydraulic conductivity of the overburden layer in which the lake feature resides.

The largest river in the watershed, the Victoria River, was assigned a GHB with head equal to the updated model top elevation. The river feature extended from the model surface down to the overburden – bedrock interface. The remaining watercourses were modeled as head-dependent flux boundaries using the MODFLOW RIVER or DRAIN Package depending on origin of baseflow, size, and order of the watercourse. Heads and conductance parameters assigned to cells representing watercourses were unchanged from the existing model.

3.3.4 Wetlands

Potential wetland seepage areas were initially defined using the Saturated Soils layer from the Wooded Areas, Saturated Soils and Landscape in Canada – CanVec Series – Land Features (Natural Resources Canada 2019), and then extended to include low lying areas with ponded water as observed in imagery from Google Earth. The wetland seepage areas were incorporated into the updated model using the MODFLOW DRAIN package with the drain stage was assigned based on the ground surface elevation, and the conductance set at 1 m^2/day.

3.4 CALIBRATION

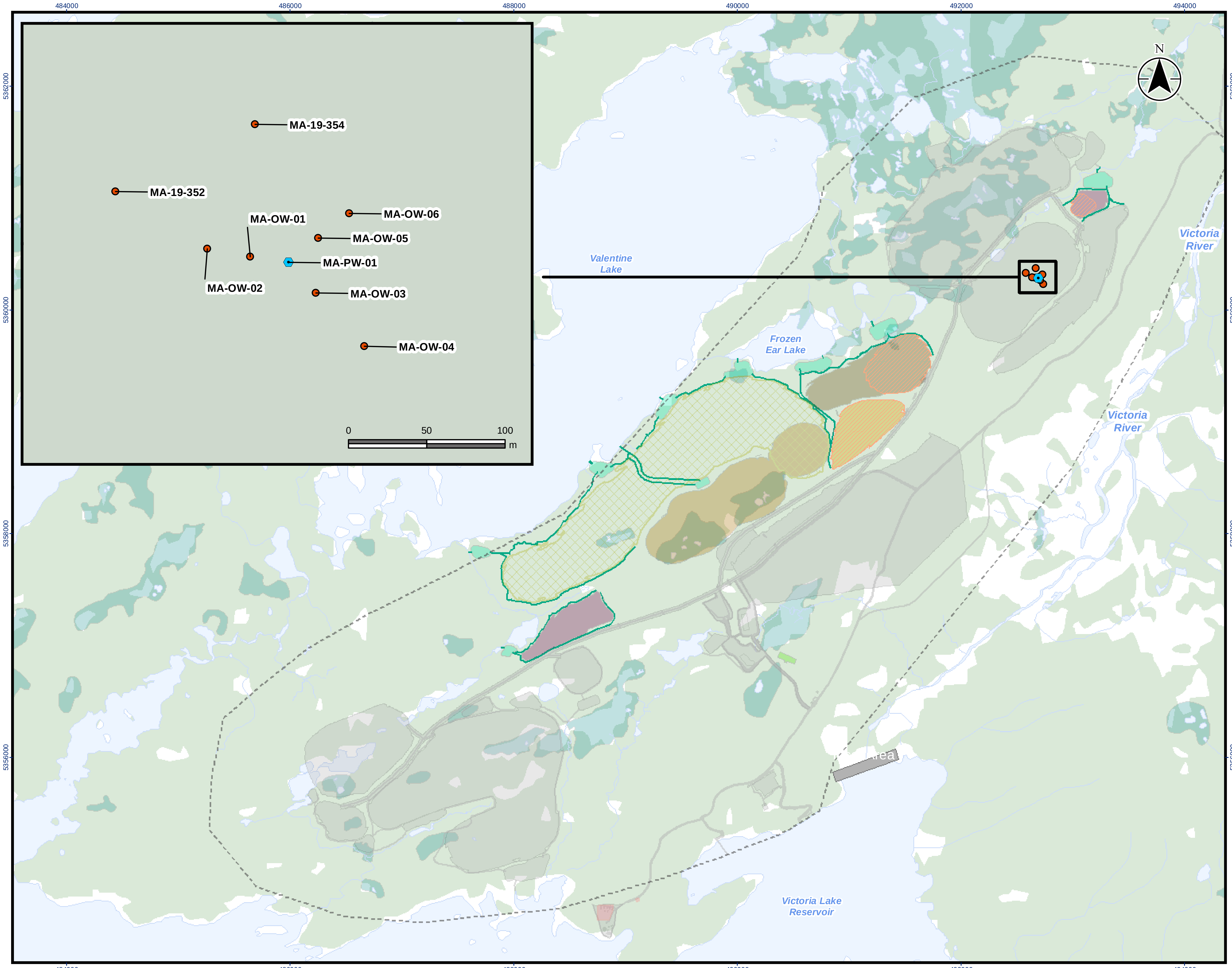
3.4.1 Transient Validation

A calibrated groundwater model can be validated using a transient data set to confirm that the model is an adequate representation of the physical system and can successfully predict alternate conditions (Spitz and Moreno 1996). GEMTEC (2022a) provides details of two pumping tests conducted for the Marathon and the Leprechaun deposit area. The exiting model was used to conduct a transient simulation of the 14-day pumping test in the Marathon deposit area; the Leprechaun deposit area test was not simulated due to a pump failure during testing. Figure 4 illustrates the location of pumping test observation wells with respect to the pumping well.

The transient model was set up to include three stress periods, each with 10 time steps, as follows:

- 1-day ambient pre-pumping conditions
- 7-day pumping test at a rate of 316.8 m^3/day
- 7-day recovery period (i.e., no pumping)

Hydraulic conductivity and vertical anisotropy in the VLQ and RGC Upper Bedrock HSUs were updated during the model validation process to provide a reasonable fit between observed and simulated groundwater elevations and drawdown. The updates were restricted to these two HSUs as they were the units where drawdown was measured during the pumping test. The updated model parameters are presented in Table 3.1. The expected ranges for hydraulic conductivity were primarily based on well-tests in the different aquifers. The most significant modifications were made to vertical anisotropy. Stantec (2020) describes the ratio of vertical to horizontal hydraulic conductivity (Kz/Kxy) of 0.05. A review of the existing model files found that the inverse of the intended anisotropy ratio had been applied (i.e., Kz/Kxy of 20). The vertical anisotropies in the updated model were based on the transient validation and range from 0.5 to 1, as presented in Table 3.1.



Stantec

Legend

- Marathon Pumping Well
- Marathon Observation Well
- Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

- Approved Project Components

0 1 2 km

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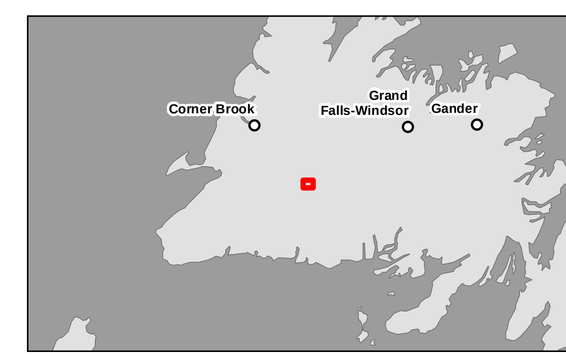
Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVA
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
4

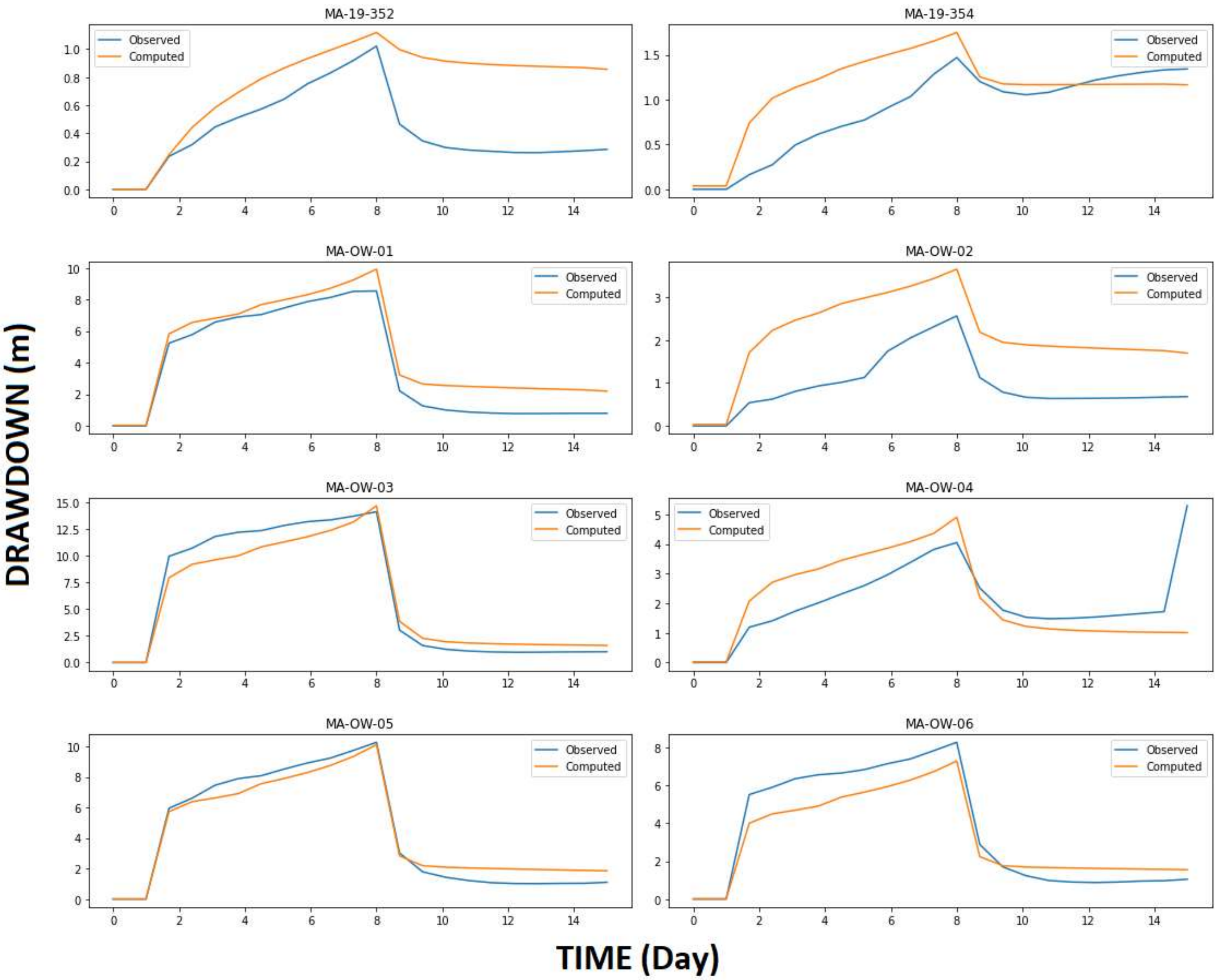
Title
Marathon Pumping Test Well Locations

Table 3.1 Parameter Values Modified During Validation of Updated Model

Parameter	Value in Existing Model	Value at End of Validation	Expected Range
Hydraulic Conductivity (m/s)			
VLQ Upper Bedrock	9.6×10^{-7}	1.1×10^{-6}	8.8×10^{-7} – 1.3×10^{-6}
RGC Upper Bedrock	3.5×10^{-7}	5.6×10^{-7}	1.3×10^{-6} – 1.5×10^{-5}
Vertical Anisotropy (Kz/Kxy)			
Overburden Vertical Anisotropy	20	1	0.05 – 5
VLQ Upper Bedrock	20	0.5	0.05 – 5
RGC Upper Bedrock	20	0.6	0.05 – 5
All remaining bedrock layers	20	1	0.05 – 5

In addition to modifying the parameters identified in Table 3.1, the pumping test results suggest that the VLQ and RGC upper fractured bedrock acts as a confined aquifer. This is consistent with GEMTEC's conclusions that there are localized confined conditions at depth over the Approved Project (GEMTEC 2022a). The representative model layers (VLQ and RCG) are represented as confined in the updated model.

Figure 5 presents hydrographs of simulated and observed groundwater elevations during the 14-day pumping test. This figure indicates a high degree of correlation between the observed and the simulated groundwater drawdown. Pertinent trends during the pumping test are accurately simulated within the model in most cases. Some difference in hydraulic head is expected given relatively small magnitude of pumping induced drawdown and the localized nature of the pumping test data.



Client/Project

Marathon Gold Corporation
Valentine Gold Project – Berry Complex Expansion
Hydrogeological Model Update

Figure No.

5

Title

Transient Validation
Simulated vs. Observed Groundwater Drawdown

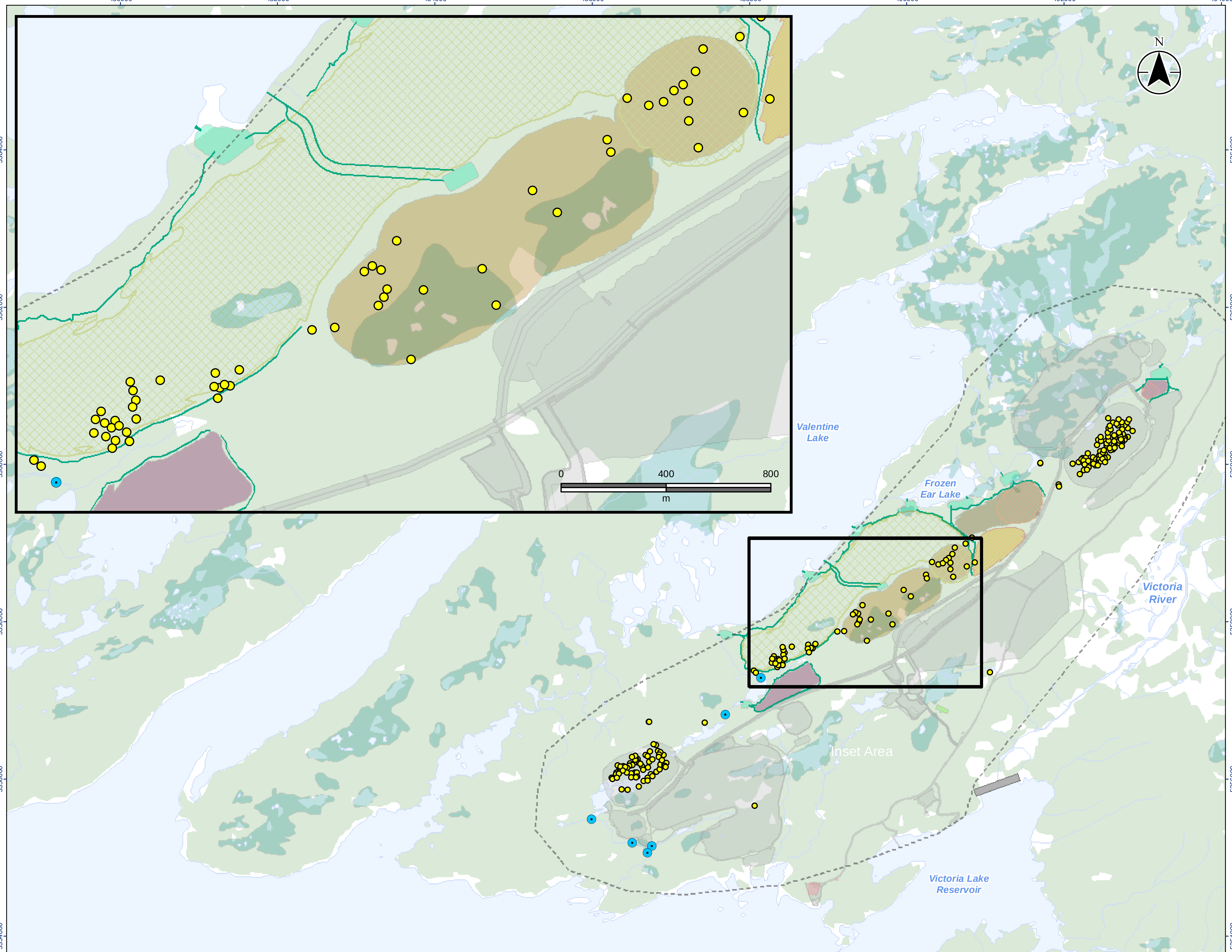
3.4.2 Calibration Results

3.4.2.1 Calibration to Groundwater Levels

Model calibration was evaluated by comparing measured versus simulated values of groundwater elevations and discharge to surface water bodies at target locations distributed over the model domain. Groundwater elevations from 27 monitoring wells installed within the footprint of the BWRP (GEMTEC 2022d) were added to the calibration set used for the existing model for a total of 227 groundwater elevation calibration targets. The quality of the updated model quality calibration was also assessed using the six groundwater discharge targets from the existing model. The location of groundwater elevation and discharge targets are displayed in Figure 6.

The groundwater elevation residuals and calibration statistics following calibration are displayed in Appendix A. A plot of the simulated vs measured groundwater elevations is displayed in Figure 7 relative to a line of 1:1 fit (zero residual or observed head = simulated head) for comparison. The closer a point is to the line of 1:1 fit, the smaller the calibration residual. As shown in Figure 7, there is a bias towards underestimating groundwater elevations. Twenty-two percent of the water level residuals are within 2 m of the target, with 35% of the residuals between 2 and 5 m, and 43% of residuals greater than 5 m (Appendix A).

The statistical measures used to evaluate the updated model calibration to groundwater elevations are summarized in Figure 7 and Appendix A. Normalized Root Mean Squared Error (RMSE) is generally regarded as the best measure for the level of agreement between simulated and measured conditions (Anderson and Woessner 1991). The normalized RMSE is compared to the overall range of observations to evaluate the overall hydraulic response of a model (Spitz and Morena 1996). The recommended threshold for the ratio between the RMSE and the range of observations is 10%. The normalized RMSE is 5.8% for the updated model, suggesting the updated model calibration is suitable for the simulation of groundwater movement.



Stantec

Legend

- Groundwater Elevation Calibration Target Location
- Groundwater Discharge Calibration Target Location
- Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

- Approved Project Components

0 1 2 km

1:50,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC

Corner Brook
Grand Falls-Windsor
Gander

Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVA
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
6

Title
Steady State Calibration Target Locations

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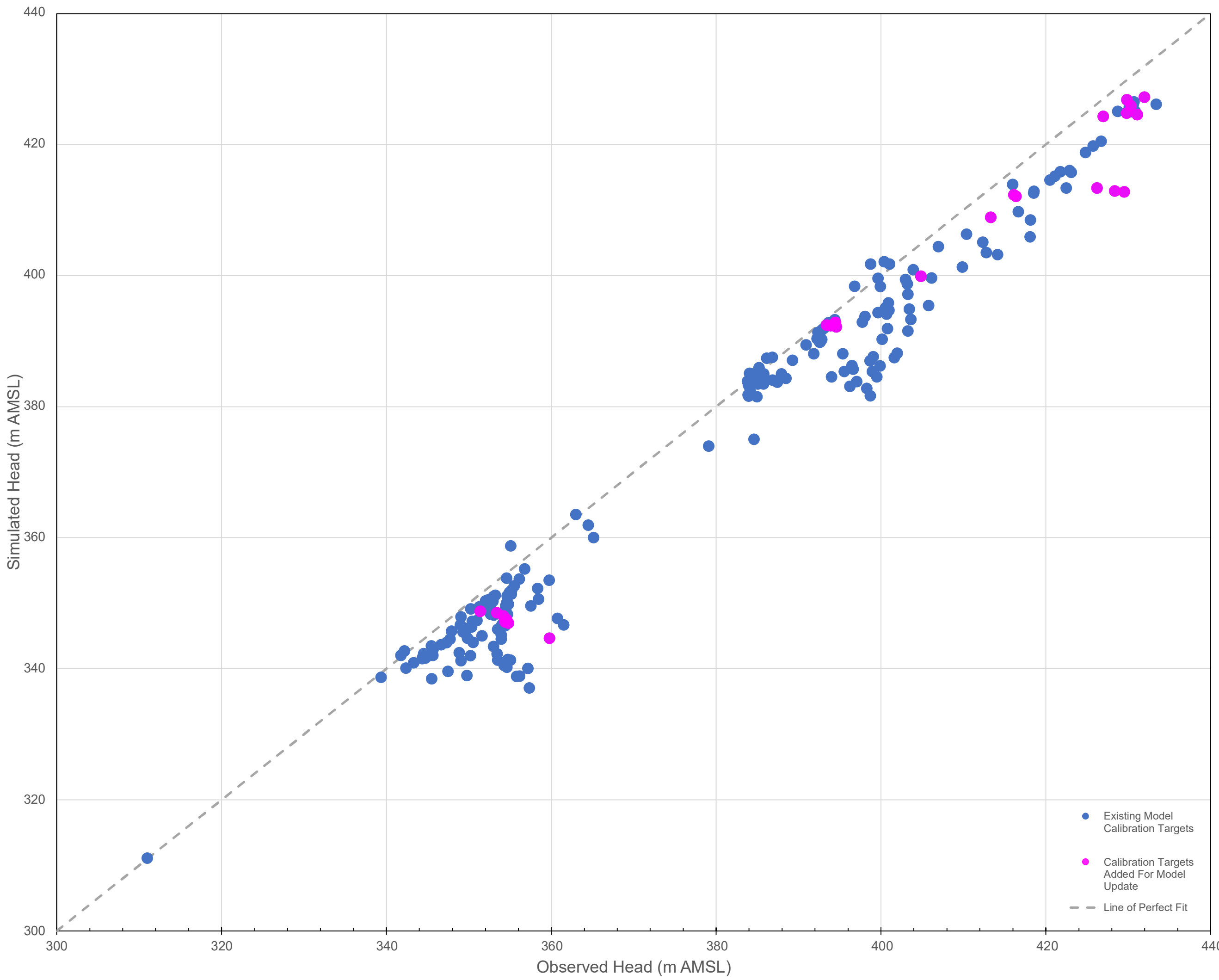


Range of Observations (m)	122.41
Mean Error (m)	-5.3052
Absolute Mean Error (m)	5.45
Root Mean Squared Error (m)	7.09
Normalized Mean Squared Error (%)	5.79%

Client/Project
Marathon Gold Corporation
Valentine Gold Project – Berry Complex Expansion
Hydrogeological Model Update

Figure No.
7

Title
Scatter Plot of Model Residuals

3.4.2.2 Model Mass Balance and Calibration to Groundwater Discharge Rates

As an additional evaluation of calibrated model, the mass balance (i.e., sum of groundwater inflows to outflows) from the calibrated groundwater flow model is presented in Table 3.2. The inflows match the outflows to within -0.00001% and are well within the acceptability criteria of 1% as recommended by Reilly and Harbaugh (2004) indicating a numerically stable model.

Table 3.2 Mass Balance for Calibrated Groundwater Flow Model

	Inflows (m^3/day)	**Outflows (m^3/day)**
Recharge	175,681	0
Drain Cells	0	55,396
River Cells	27,284	38,944
Groundwater Flow	103,965	212,590
Total	306,930.0	306,930.02
Inflows – Outflows	0.02	
Percent Discrepancy	1×10^{-5} %	

The model calibration also included groundwater discharge targets for six locations as presented on **Error! Reference source not found.**. The baseflow estimates were calculated using the derived relationships between mean annual flow and drainage area presented in the Chapter 7 of the Valentine Gold EIS (Marathon 2020), based on a mean annual baseflow index of 35%. Flow estimates and measurements typically have associated errors that are larger than water level measurements. However, flow calibration targets in addition to head calibration targets increase the likelihood a achieving a unique calibration solution (Anderson and Woessner 1992). The simulated groundwater flux at each location is presented in **Error! Reference source not found.** along with the estimated value as presented in the Chapter 7 (Surface Water Resources) of the Valentine Gold EIS (Marathon 2020). Absolute percent differences between the estimated and simulated groundwater discharge ranged from 5 to 28%. The RMSE of the flow residuals presented in Table 3.3 is 165 m^3/day, and the normalized RMSE over the range of discharge measurements is 3.5%.

Table 3.3 Calibration to Estimated Groundwater Discharge Values

Flow Target Location	Estimated Baseflow (m^3/day)	Simulated Groundwater Discharge (m^3/day)
HS1	401	389
HS3	700	375
HS5	997	540
HS7	1,737	1,537
HS8	5,058	3,560
HS9	2,918	2,462

3.4.3 Calibration Sensitivity

For the existing model, the uncertainty of the calibration process was evaluated through the review of the relative sensitivities of the calibrated parameters. As the updated model did not incorporate any changes to the structure of the baseline model (the only updates were to hydraulic conductivity values as presented in Table 3.1), the sensitivity analysis conducted for the existing model is applicable to the updated model.

The most sensitive parameter in the both the existing and updated models is recharge followed by the hydraulic conductivity, with the shallower layers where there are more calibration targets more sensitive than the deep where there are fewer calibration targets.

4.0 MODEL APPLICATIONS

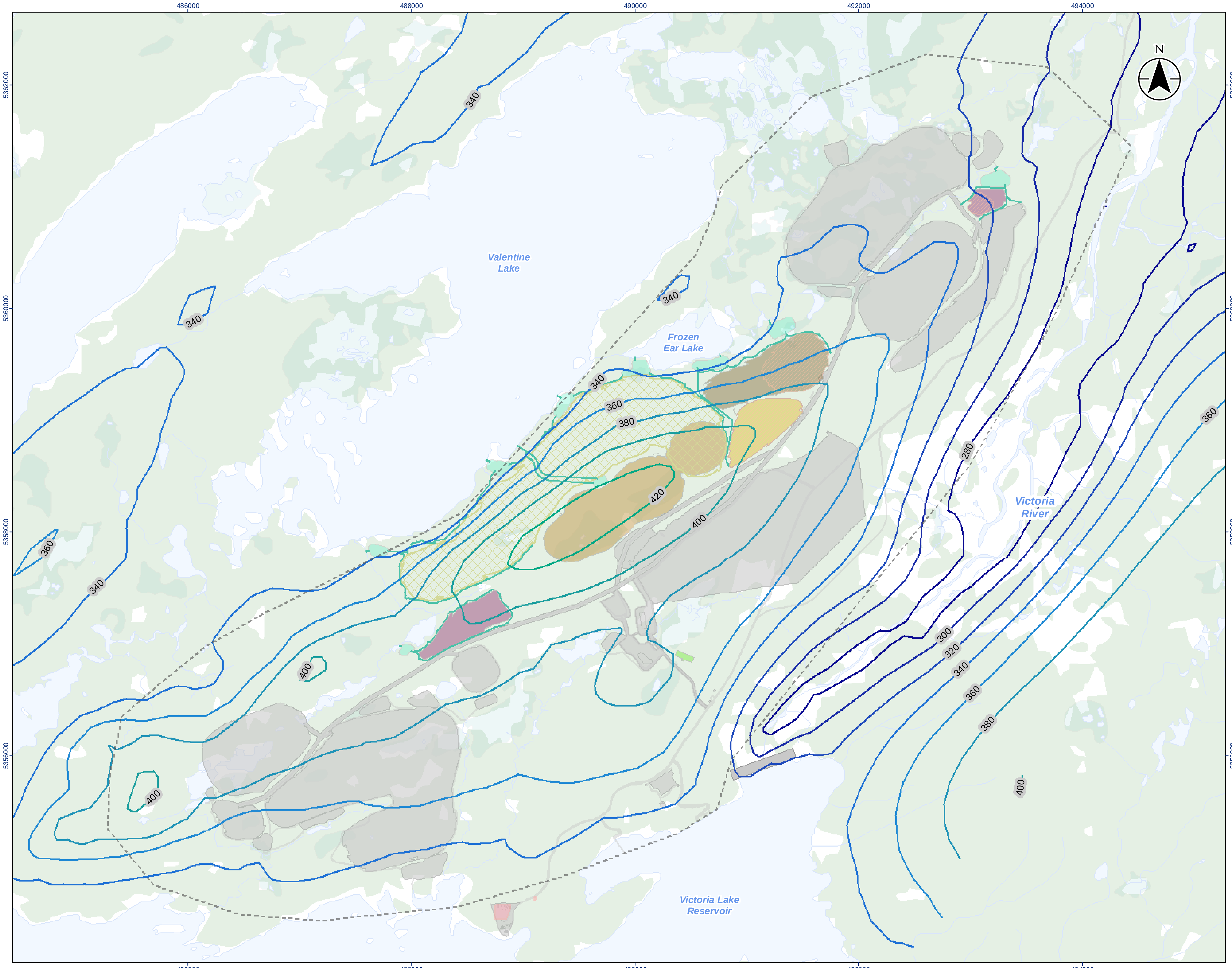
The calibrated updated model was used to quantify groundwater levels and flow and groundwater discharge to the receiving environment under baseline conditions. The updated model was then used to make predictions of the changes to the groundwater environment during construction, operation and closure phases of the Project Expansion, including combined effects with the Approved Project. Section 4.1 presents the results from the baseline simulations using the updated model.

4.1 BASELINE CONDITIONS

The calibrated updated model discussed in Section 3.0 was used to estimate the water table elevation and groundwater flow under baseline conditions.

Figure 8 shows the water table elevation under baseline conditions from the calibrated updated model. The updated model provides a good representation of groundwater flow conditions with groundwater in the area of the open pits flowing radially from the water table high near the local topographic highs towards Valentine Lake, Victoria Lake Reservoir, or Victoria River.

Groundwater discharge to the primary lakes and rivers/creeks was estimated from the updated model and is presented in Table 4.1. Groundwater discharge values presented in the table represent the groundwater contributions to the features, and do not include contributions from surface water storage or runoff. The locations of the surface water features included Table 4.1 are presented in Figure 9.



Stantec

Legend

Simulated Baseline Water Table Elevation Contour (m amsl)

- 260 - 280
- 280 - 300
- 300 - 320
- 320 - 340
- 340 - 360
- 360 - 380
- 380 - 400
- 400 - 420

Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

- Approved Project Components

0 1 2 km

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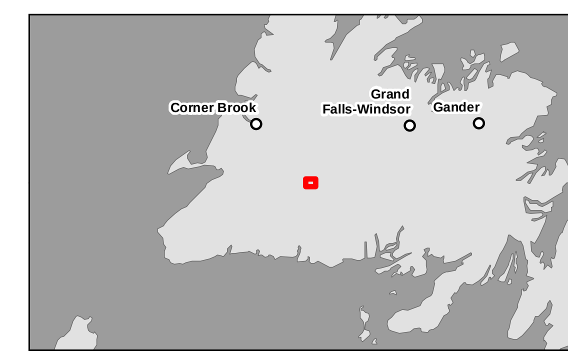
Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVA
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

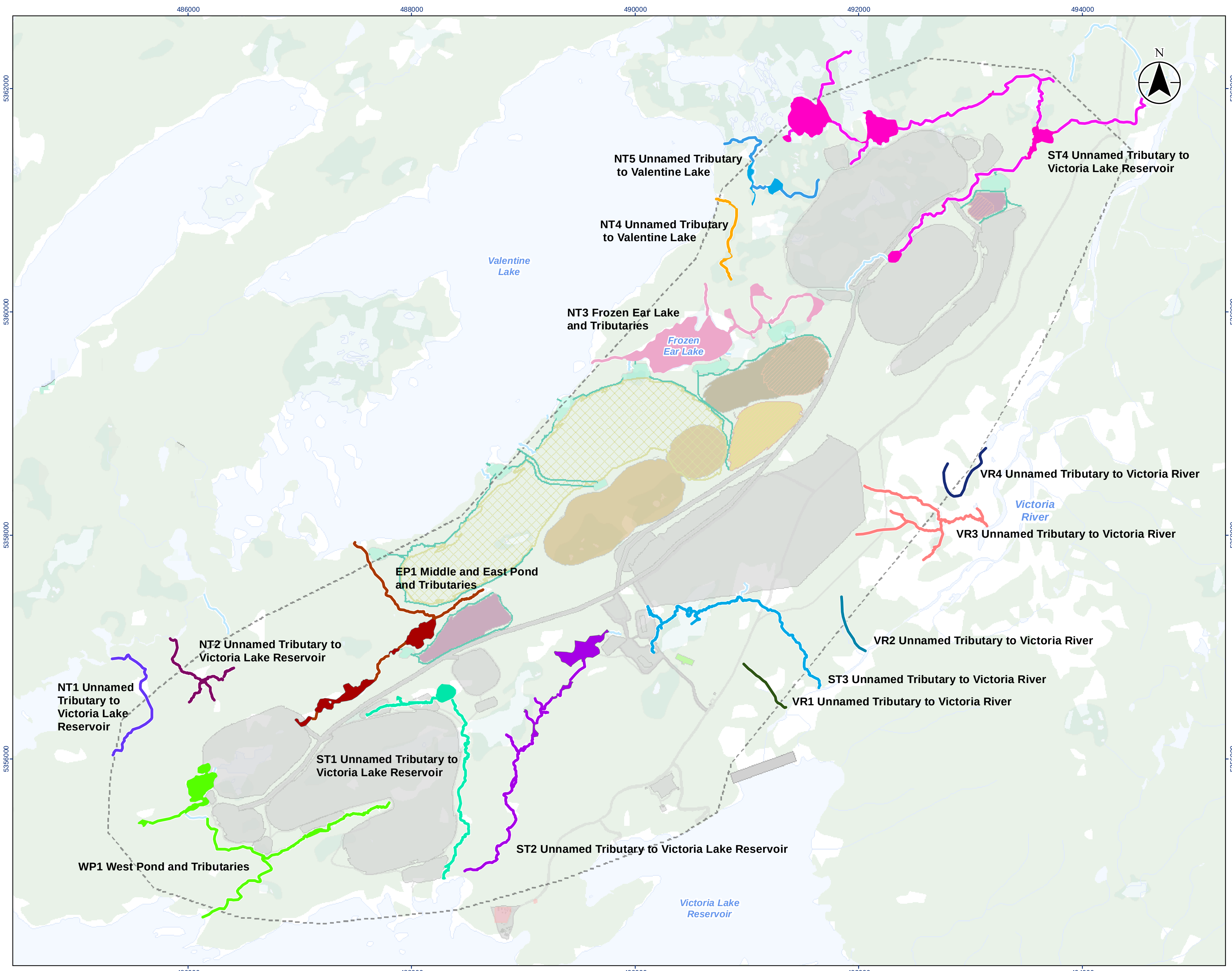
Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
8

Title
Baseline Water Table Elevation Contours

Table 4.1 Estimated Baseline Groundwater Discharge to Surface Water Features

Water Feature	Net Flow from Groundwater to Feature (m^3/day)
Unnamed Tributary to Victoria Lake Reservoir NT1	320
Unnamed Tributary to Victoria Lake Reservoir NT2	686
Frozen Ear Lake and Tributaries NT3	1,828
Unnamed Tributary to Valentine Lake NT4	199
Unnamed Tributary to Valentine Lake NT5	397
Middle and East Pond and Tributaries EP1	521
West Pond and Tributaries WP1	995
Unnamed Tributary to Victoria Lake Reservoir ST1	269
Unnamed Tributary to Victoria Lake Reservoir ST2	1,662
Unnamed Tributary to Victoria River ST3	489
Unnamed Tributary to Victoria River ST4	2,229
Unnamed Tributary to Victoria River VR1	106
Unnamed Tributary to Victoria River VR2	95
Unnamed Tributary to Victoria River VR3	306
Unnamed Tributary to Victoria River VR4	1,080



Stantec

Legend

Mine Site

Proposed Project Expansion

Ditch / Drainage Channel

Sedimentation Pond

Topsoil Stockpile

Overburden Stockpile

Open Pit

SAGR Unit

Waste Rock Pile

Explosives Facility

Site Feature Approved - Overlap

Approved Project

Approved Project Components

0 1 2 km

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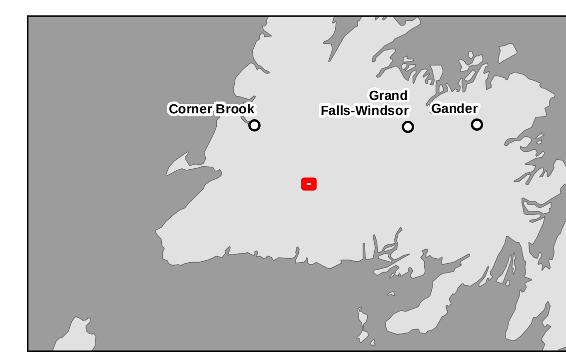
Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVA
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
9

Title
Assessed Surface Water Features

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4.2 MINE OPERATION PERIOD

The updated model was modified from the baseline condition to simulate the effects of the Project Expansion during mine operations on groundwater levels and flow. The fate of groundwater originating from the BWRP was simulated during operation. In order to assess the cumulative effects of the Approved Project and the Project Expansion, the LGO stockpiles and waste rock piles, and the TMF associated with the Approved Project were also simulated during operation. As part of these simulations, the updated model was used to predict groundwater inflows to the open pits. The resulting updated model was used to evaluate and predict the groundwater inflows into the pit, the zone of influence, and the associated effects on water table and baseflow to streams.

4.2.1 Model Setup

The updated baseline calibrated model was modified to include the following components of the Approved Project in the same locations and with the same model properties as with the existing model (Stantec 2020):

- TMF
- Leprechaun Complex:
  - Leprechaun open pit
  - LGO stockpile
  - Waste rock pile
  - Overburden stockpile
  - Topsoil stockpile
- Marathon Complex
  - Marathon open pit
  - North and south waste rock piles
  - North and south topsoil stockpiles

The extents of the following components of the existing model were modified to match the updated site plan (Figure 1) associated with the Project Expansion:

- Berry / Marathon overburden stockpile
- Berry / Marathon LGO stockpile

In addition, the following Project Expansion components were included in a manner consistent with the existing model:

- Berry Complex
  - Berry open pit
  - Berry waste rock pile
  - Berry topsoil stockpile

The details of how each Project Expansion component was implemented in the updated model are provided below, the location of each component is presented on **Error! Reference source not found.**.

4.2.1.1 Open Pit Dewatering

To evaluate the effects of groundwater inflows to the open pits, the baseline updated model was modified to include the fully developed extents and depths of the three basins of the open pit related to the Project Expansion.

Model cells that were intersected by the walls or floor of the open pits were identified and assigned as a seepage face boundary condition in the updated model. The seepage face was assigned using the MODFLOW DRAIN package at these locations. Model cells that were located above the drain cells within the footprint of the open pits were set as inactive cells.

The conductance of the drain cells was specified based on the hydraulic conductivity in the cells multiplied by the width, length and thickness of the cell. Blasting effects on the hydraulic conductivity of the bedrock were assumed to be localized to the first 25 m of the exposed bedrock face, coinciding with the width of the drain cells, and were incorporated as part of the conductance value for the drains.

Open pit dewatering was modelled with a steady-state approach as this provides the most conservative estimate of groundwater drawdown at the end of operation and as a result the potential effects on groundwater levels and reductions in groundwater discharge to surface water receivers.

4.2.1.2 Berry Waste Rock Pile

As recharge through the BWRP has the potential to affect groundwater quality, the updated model was used to determine the discharge location and flux of water recharging the groundwater flow system from beneath this feature.

In a manner consistent with the existing model, the BWRP was simulated by activating the two top inactive model layers above the ground surface layer within the footprint of the pile. The waste rock was assigned hydraulic conductivity of 1×10^{-3} m/s, representing coarse material. Recharge was applied to the top of the piles at an annual average rate of 56% of mean annual precipitation, or 694 mm/year, based on calculations presented in the Water Quantity and Water Quality Modelling report (Stantec 2023a).

Seepage collection ditches were incorporated in the updated model using the ditch profiles provided in the Water Management Plan (Stantec 2023b). The ditches were represented in the model using the MODFLOW DRAIN package. The stage of the drains was assigned to the base of the ditches, simulating no significant standing water in the ditches.

4.2.2 Methodology for Prediction of Effects

4.2.2.1 Particle Tracking to Estimate Discharge to Surface Water Features

The updated model was used to assess the fate of groundwater that originates from the BWRP and to estimate discharge rates to the receiving environment. A forward particle tracking approach using the United States Geological Survey's (USGS) particle tracking code MODPATH was applied, where a particle was released from each model cell within the footprint of these features. The travel paths of the particles were simulated through the model domain until they arrived at a receptor, such as a lake or stream/creek. The number of particle paths arriving at a receptor was expressed as a percentage of the total particle tracks leaving a mine component such as a waste rock pile or LGO stockpile. This is a conservative approach as it assumes that all recharge through the waste rock piles and LGO stockpiles is carried through to the final receptors.

4.2.2.2 Solute Transport Modelling

In the existing model, seepage fate from the TMF was originally simulated using particle tracking as described in Section 4.2.2.1. In the subsequent Valentine Gold EIS (Chapter 7 – Groundwater Resources; Marathon 2020), this method was deemed overly conservative for this location based on the predicted water quality in the TMF, and the relatively small receiving water volume in Victoria River downstream of the Victoria Dam. Therefore, a contaminant transport approach using the USGS contaminant fate and transport code MT3D was applied. This method accounts for the partial attenuation of solutes from seepage, based on mixing of the solute with upgradient groundwater and recharge. A conservative solute with a nominal concentration of 1 milligram per litre (mg/L) was simulated as a non-depleting source within the TMF, and simulated concentrations were assessed downstream, along a particle track with an average travel time between the TMF and the Victoria River to determine the attenuation of potential contaminant concentrations. The transport parameters implemented in MT3D are presented in **Error! Reference source not found.**.

Table 4.2 Solute Transport Model Parameters - TMF

Parameter	Assigned Value
Porosity	
Overburden Units	0.25
Weathered Bedrock	0.1
Competent Bedrock	0.05
Tailings	0.45
DIspersivity (All Geological Units)	
Longitudinal (m)	10
Transverse and Vertical (m)	1
Solute Species Parameters	
Diffusion Coefficient M^2/s)	1.4×10^{-9}

4.2.3 Results

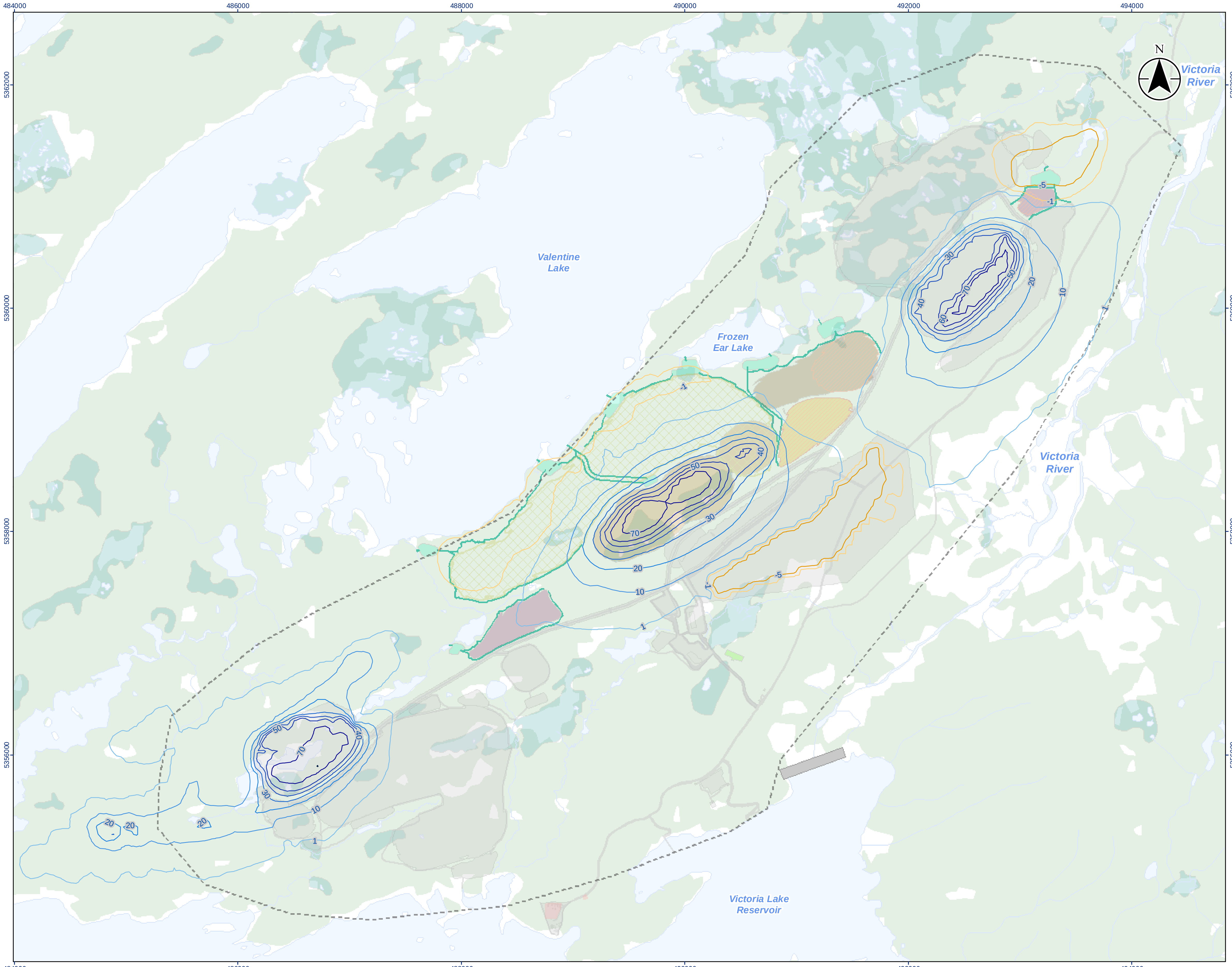
Results of updated modelling indicate that as dewatering progresses with development of the open pits, the average annual groundwater inflow rate to the open pits will increase, with maximum rates of approximately 1,790, 1,650, and 1,770 m^3/day for the Marathon, Leprechaun, and Berry pits, respectively. The change in water table elevation due to dewatering (e.g., drawdown) of the open pits at the end of mining in comparison to baseline conditions is shown on Figure 10.

Dewatering of the Berry open pit is predicted to lower the water table by up to 1 m over an area extending up to approximately 3 kilometre (km) long by 1.3 km wide. As indicated on Figure 10, the effect on the water table from dewatering the Berry open pit does not overlap the effects on the water table from dewatering the Marathon and Leprechaun pits. Mounding of the water table is predicted in the vicinity of the Marathon and Berry waste rock piles and beneath the TMF due to the increased recharge compared to baseline conditions.

The effects of the Approved Project with the addition of the Project Expansion (i.e., open pits at their full extent, the waste rock piles, and the TMF) on the groundwater discharge to surface water features are assessed by comparing the predicted operation and baseline discharge rates presented in Table 4.3.

Table 4.3 Estimated Groundwater Discharge to Water Features During Operation

Surface Water Feature	Net Flow from Groundwater to Surface Water Feature (m^3/day)		
	Baseline	Operation	Percent Reduction
Unnamed Tributary to Victoria Lake Reservoir NT1	320	298	3%
Unnamed Tributary to Victoria Lake Reservoir NT2	686	566	-4%
Frozen Ear Lake and Tributaries NT3	1,828	1,783	-3%
Unnamed Tributary to Valentine Lake NT4	199	195	2%
Unnamed Tributary to Valentine Lake NT5	397	414	1%
Middle and East Pond and Tributaries EP1	521	372	7%
West Pond and Tributaries WP1	995	352	30%
Unnamed Tributary to Victoria Lake Reservoir ST1	269	399	-7%
Unnamed Tributary to Victoria Lake Reservoir ST2	1,662	1,534	1%
Unnamed Tributary to Victoria River ST3	489	422	2%
Unnamed Tributary to Victoria River ST4	2,229	2,510	8%
Unnamed Tributary to Victoria River VR1	106	0	100%
Unnamed Tributary to Victoria River VR2	95	0	100%
Unnamed Tributary to Victoria River VR3	306	312	-8%
Unnamed Tributary to Victoria River VR4	1,080	1,046	-3%
Victoria River	11,566	11,992	-4%



Stantec

Legend

Predicted Water Table Mounding Contour (above baseline) (m)

- -1
- -5

Predicted Water Table Drawdown Contour (below baseline) (m)

- 1
- 10
- 20
- 30
- 40
- 50
- 60
- 70
- 80

Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

- Approved Project Components

0 1 2 km

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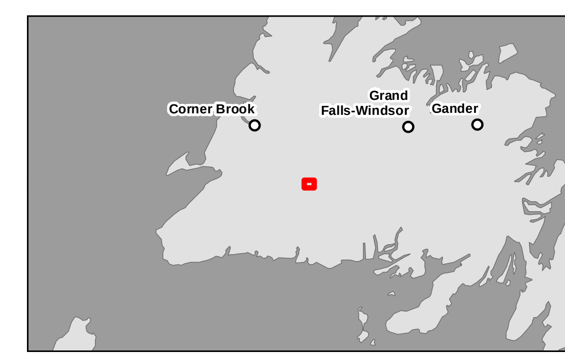
Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVA
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
10

Title
Water Table Drawdown at End of Approved Project and Project Expansion Operation

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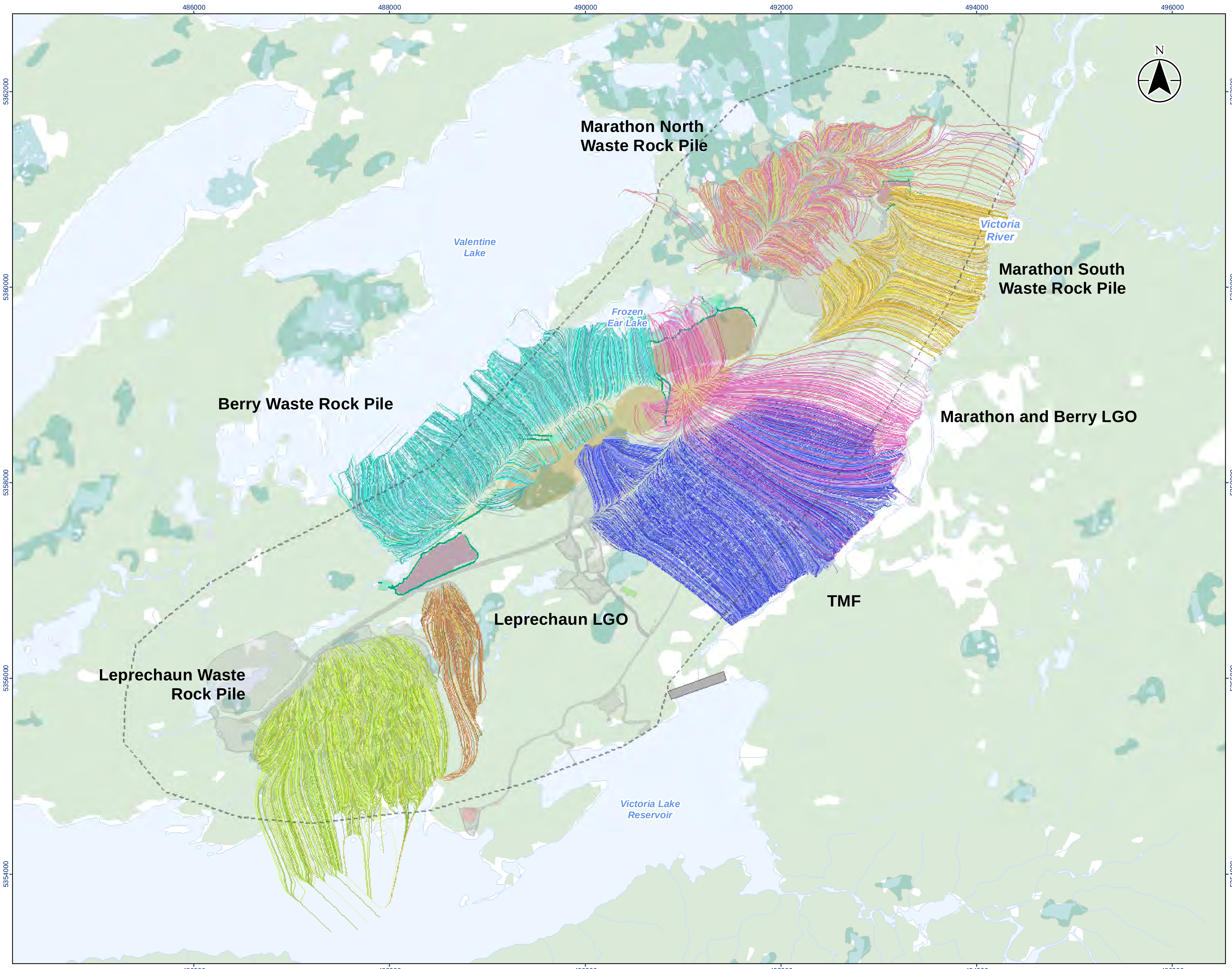
The direction of groundwater discharge to each surface water feature from baseline conditions to end of operation remains consistent with water features receiving groundwater. The rate of groundwater discharge is generally decreased for water features closest to the open pits, particularly for West Pond and tributaries (WP1), and Middle and East Ponds and tributaries (EP1), due to the removal of a portion of the ponds where they are overprinted by the Leprechaun pit. The rate of groundwater discharge to surface water features is predicted to increase in the unnamed tributary to the Victoria River (ST4), and the unnamed tributary to the Victoria Lake Reservoir (ST1) during operations due to the increased rate of groundwater recharge through the Leprechaun and Marathon waste rock piles, respectively. The effect of the increased recharge through the Marathon and Berry waste rock piles can also be seen in the mounding contours presented on Figure 10. Two unnamed tributaries of the Victoria River south of the TMF (VR1 and VR2) receive no groundwater discharge during operation due to the interception of baseflow by ditches that collect seepage from the TMF.

Seepage from the base of the waste rock piles and LGO stockpiles during operation will move to the receiving environment following the flow paths presented on Figure 11. The mean travel times for each set of particle tracks from each mine feature to each receptor are presented in Table 4.4. The percentage of particles tracks form each source arriving at each surface water feature was multiplied by the total recharge through the source (Stantec 2023a) to estimate the discharge into each surface water feature that originates at each source. These discharge rates are presented on Table 4.5. The locations of the ditches included on Table 4.4 and on Table 4.5 are presented in Appendix B. These rates are used in determining the groundwater discharge to the receiving surface water in the Water Quantity and Water Quality Modelling report (Stantec 2023a). For the Leprechaun and Marathon components (Leprechaun and Marathon waste rock piles; Leprechaun LGO stockpile), most seepage is predicted to be captured by the pit dewatering system and drainage ditches. For the Berry components (BWRP and Berry / Marathon LGO stockpile), most seepage is predicted to be collected by the Berry pit dewatering system. For the TMF, most seepage is predicted to be collected by the Berry pit dewatering system.



Stantec

Legend

Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

- Approved Project Components

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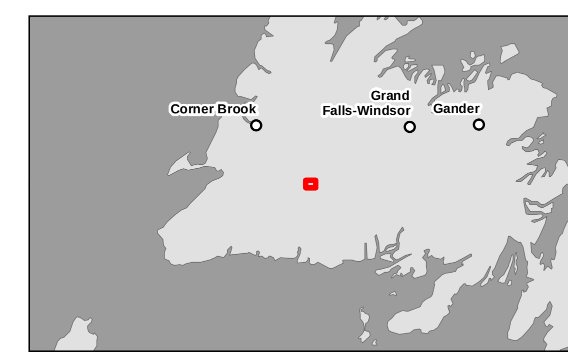
Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVA
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
11

Title
Particle Traces Illustrating Flow Paths from Waste Rock Piles, LGO Stockpiles, and TMF at End of Approved Project and Project Expansion Operation

The groundwater seepage rates to the receiving environment from the topsoil and overburden stockpiles are presented on Table 4.5. These rates are used in determining the water quantity and water quality in the receiving surface water in the Water Quantity and Water Quality Modelling Update Report (Stantec 2023a) and the Assimilative Capacity Update Report (Stantec 2023c).

Table 4.4 Mean Groundwater Travel Times (Years) from Waste Rock Piles, LGO Stockpiles, and TMF - Operation Phase

Leprechaun Complex Components		
Receptor	**Leprechaun Waste Rock Pile**	**Leprechaun LGO Stockpile**
Leprechaun Pit	87,226	-
LP-SP-01A	-	8
LP-SP-02	21	2,074
LP-SP-03A	6	-
LP-SP-03C	26	-
Victoria Lake Reservoir	$>1x10^6$	$>1x10^6$
Victoria River	-	$>1x10^6$
Marathon Complex Components		
Receptor	**Marathon North Waste Rock Pile**	**Marathon South Waste Rock Pile**
Marathon Pit	55,628	96,000
MA-SP-01C	15	-
MA-SP-03	17	-
MA-SP-04	18	-
Frozen Ear Lake and Tributaries NT3	21	-
Unnamed Tributary to Victoria River ST4	225	-
Victoria River	-	85
Berry Complex Components		
Receptor	**Berry Waste Rock Pile**	**Berry / Marathon LGO Stockpile**
Berry Pit – Northern Basin	-	133,000
Berry Pit - Central Basin	22,000	-
Berry Pit – Southern Basin	8,200	-
Valentine Lake	$>1x10^6$	-
Victoria River	-	108
Frozen Ear Lake	$>1x10^6$	$>1x10^6$

Table 4.4 Mean Groundwater Travel Times (Years) from Waste Rock Piles, LGO Stockpiles, and TMF - Operation Phase

Shared Components	
Receptor	**Tailings Management Facility (min | mean | max)**
Berry Pit – Northern Basin	1,150
Victoria River	72
Unnamed Tributary to Victoria River ST3	61
Note: '-' indicates that seepage from the specified mine component is not predicted to discharge to the specified receptor.	

Table 4.5 Estimated Groundwater Seepage Rates (m^3/day) from Waste Rock Piles, LGO Stockpiles, and TMF - Operation Phase

Leprechaun Complex Components		
Receptor	**Leprechaun Waste Rock Pile**	**Leprechaun LGO Stockpile**
Leprechaun Pit	342	-
LP-SP-01A	-	61
LP-SP-02	621	29
LP-SP-03A	435	-
LP-SP-03C	62	-
Victoria Lake Reservoir	1,553	11
Unnamed Tributary to Victoria Lake WP1	93	0
Unnamed Tributary to Victoria Lake Reservoir ST2	0	163
Marathon Complex Components		
Receptor	**Marathon North Waste Rock Pile**	**Marathon South Waste Rock Pile**
Marathon Pit	238	362
MA-SP-01C	26	-
MA-SP-03	462	-
MA-SP-04	291	-
Frozen Ear Lake and Tributaries NT3	92	-
Unnamed Tributary to Valentine Lake NT5	119	-
Unnamed Tributary to Victoria River ST4	92	-
Victoria River	0	409

Table 4.5 Estimated Groundwater Seepage Rates (m^3/day) from Waste Rock Piles, LGO Stockpiles, and TMF - Operation Phase

Berry Complex Components		
Receptor	**Berry Waste Rock Pile**	**Berry / Marathon LGO Stockpile**
Berry Pit – Central Basin	63	-
Berry Pit – Southern Basin	78	-
Valentine Lake	2,283	-
Victoria River	-	189
Frozen Ear Lake and Tributaries NT3	704	352
Shared Components		
Receptor	**Tailings Management Facility**	
Berry Pit – Central and Southern Basins	99	
Victoria River	612	
Unnamed Tributary to Victoria River ST3	189	
Note: '-' indicates that seepage from the specified mine component is not predicted to discharge to the specified receptor.		

4.3 DECOMMISSIONING, REHABILITATION AND CLOSURE

In the decommissioning, rehabilitation and closure phase of the combined Projects, the main effect to groundwater levels and flow is expected to result from the filling of the open pits once dewatering is terminated. The updated model was subsequently modified to evaluate the filling time of the open pit from groundwater inflow only, and to simulate the effects on groundwater levels and flow and the fate of groundwater originating from the waste rock piles and TMF once water levels in the open pits have fully recovered to the intended design elevations.

4.3.1 Model Setup

Starting with updated model simulations from the end of operation as the initial condition, the following modifications were completed to represent the backfilling of the open pits, filling of the open pits with groundwater, and changes in recharge rates related to the closure of the waste rock piles, as discussed below.

4.3.1.1 Backfilling of Berry Pit

Once exhausted, the southern basin of the Berry pit will be backfilled with approximately 11 metric tons of tailings slurry. This represents 15% of the total volumetric capacity of the open pit below the discharge crest elevation.

The backfilled southern basin was simulated in the numerical model with a GHB boundary package. The design level of 418 m was used as the stage for the GHB boundary with conductivity of 1×10^{-7} m/s to represent consolidated tailings.

The transport parameters implemented in MT3D are consistent with those presented in **Error! Reference source not found.** for the contaminant transport modelling of the fate of seepage from the TMF. The additional parameter needed to model the fate of groundwater in contact with the waste rock and tailings backfill in the Berry pit was the porosity of the waste rock which was set to a value of 0.23.

4.3.1.2 Open Pit Filling by Groundwater

The groundwater inflow to the open pits after dewatering is terminated was simulated to provide estimated volumes for use in the water balance model. Groundwater inflow was simulated by adjusting the stage of the drain cells representing the seepage faces described in Section 4.2.1.1.

Pit inflows were estimated for stages of the water level forming a pit lake at 25 m intervals over the entire depth of the open pits. The GHB package was used to represent the pit lakes in the numerical model. GHB boundary conditions were based on the water level stages with conductivities based on the hydraulic conductivity in the cells multiplied by the width, length and thickness of the respective cells. Steady-state model runs were conducted at each of the pit lake stages to predict the groundwater inflow rate into the open pits.

4.3.1.3 Waste Rock Piles and TMF

In the post-closure portion of the decommissioning, rehabilitation and closure phase of the combined Projects, the waste rock benches and plateaus are rehabilitated with a soil cover and vegetated to promote runoff and reduce infiltration. The LGO stockpiles are removed and rehabilitated with soil from the overburden and topsoil stockpiles thereby depleting these piles. The groundwater recharge rate for LGO, overburden, and topsoil stockpiles was assumed to return to the baseline rate applied during the calibration of the updated model. For the waste rock piles, the recharge rate was decreased in post-closure period based on the increased runoff due to rehabilitation of the piles, resulting in reductions in infiltration. Recharge was applied to the top of the piles at an annual average rate of 30% of mean annual precipitation, or 365 mm/year, based on calculations presented in the Water Quantity and Water Quality Modelling report (Stantec 2023a).

As in the operation period, seepage from the base of the waste rock piles is simulated using a conservative particle tracking method, and seepage from the TMF is simulated using a solute transport approach. The fate of groundwater passing through and over the tailings placed as backfill into the Berry pit was also simulated using a solute transport approach.

4.3.2 Results

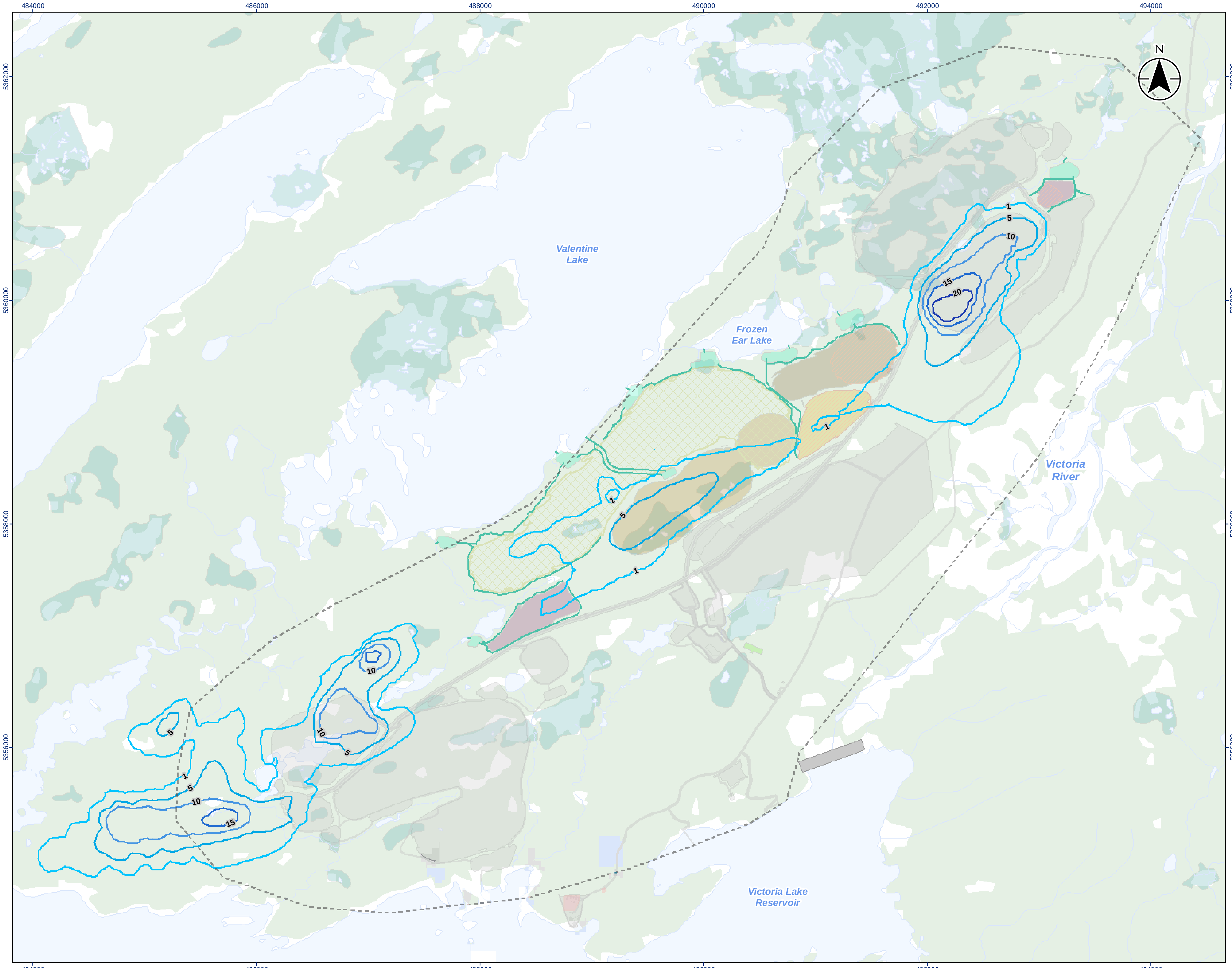
Following completion of the operation phase, dewatering of the open pits will cease and water levels will begin to rise within the open pits until an overflow elevation is reached. The water level will rise to a maximum design water elevation of approximately 377 m above mean sea level (amsl) at Leprechaun pit, approximately 330 m amsl at Marathon pit, and approximately 418 m amsl, 418 m amsl, and 400 m amsl for the southern, central, and northern basins of the Berry pit, respectively. These elevations will represent the local water table elevation at closure. The groundwater inflow rates to the open pits as the pits fill are presented on Table 4.6.

Table 4.6 Estimated Inflow to Open Pits During Filling

Pit Lake Water Level Elevation (m amsl)	Estimated Inflow into Open Pits (m^3/day)				
	Marathon Pit	Leprechaun Pit	Berry Pit		
			Southern Basin	Central Basin	Northern Basin
100	1,786	- (1)	- (1)	- (1)	- (1)
125	1,786	1,646	- (1)	- (1)	- (1)
150	1,786	1,646	- (1)	- (1)	- (1)
175	1,786	1,646	- (1)	- (1)	- (1)
200	1,786	1,646	780	680	305
225	1,786	1,646	780	680	305
250	1,680	1,644	780	680	305
275	1,524	1,572	780	680	305
300	1,316	1,541	780	680	305
325	992	1,390	780	680	305
350	- (2)	1,200	684	585	275
375	- (2)	971	505	415	201
400	- (2)	- (2)	260	195	115
425	- (2)	- (2)	25	25	25

Notes:
- (1) indicates groundwater not flowing into pit as base of pit is above specified pit lake water elevation
- (2) indicates groundwater not flowing into pit as top of pit lake is below specified pit lake water elevation

The simulated drawdown (relative to baseline conditions) after the pits have filled to their expected overflow levels (i.e., the minimum pit edge elevation) are presented on Figure 12. As shown, at the end of closure the water table is predicted to return to near baseline conditions except in the vicinity of the open pits where groundwater elevation is controlled by the minimum pit edge elevation. As with the existing model, the water table is also predicted to be lowered downgradient of the Leprechaun pit due to the presence of an exposed rock wall approximately 30 m above the overflow elevation and will result in a permanently lowered water table elevation of up to approximately 25 m at this location following closure.



Stantec

Legend

Predicted Water Table Drawdown Contour (below baseline) (m)

- 1
- 5
- 10
- 15
- 20

Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

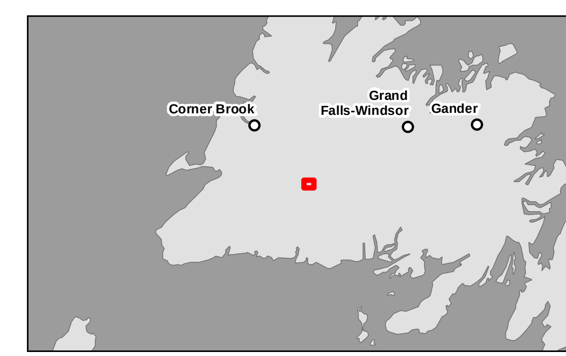
- Approved Project Components

0 1 2 km

1:35,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVA
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
12

Title
Water Table Drawdown Following Closure

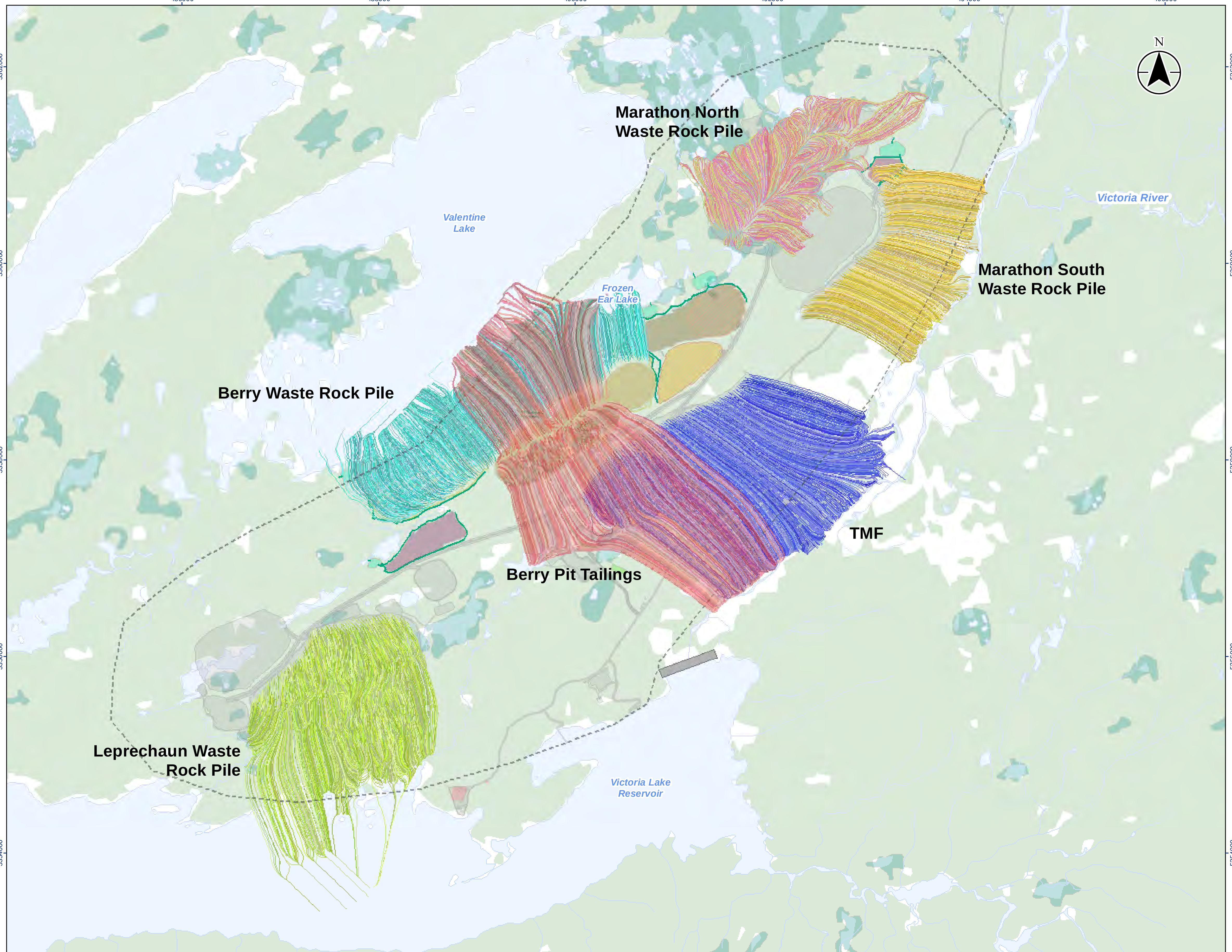
Table 4.7 presents the comparison of baseline groundwater discharge rates at closure (i.e., after the pit lakes are full). The seepage collection ditches around the perimeter of the TMF and waste rock piles were simulated in the updated model because the seepage collection ditches will not be decommissioned until the water quality meets applicable regulatory discharge criteria.

Table 4.7 Estimated Groundwater Discharge to Surface Water Post-Closure (i.e., Pit-Full)

Surface Water Feature	Net Flow from Groundwater to Surface Water Feature (m^3/day)		
	Baseline	Post-Closure	Percent Reduction
Unnamed Tributary to Victoria Lake Reservoir NT1	320	310	3%
Unnamed Tributary to Victoria Lake Reservoir NT2	686	711	-4%
Frozen Ear Lake and Tributaries NT3	1,828	1886	-3%
Unnamed Tributary to Valentine Lake NT4	199	195	2%
Unnamed Tributary to Valentine Lake NT5	397	396	1%
Middle and East Pond and Tributaries EP1	521	483	7%
West Pond and Tributaries WP1	995	693	30%
Unnamed Tributary to Victoria Lake Reservoir ST1	269	289	-7%
Unnamed Tributary to Victoria Lake Reservoir ST2	1,662	1641	1%
Unnamed Tributary to Victoria River ST3	489	451	2%
Unnamed Tributary to Victoria River ST4	2,229	2052	8%
Unnamed Tributary to Victoria River VR1	106	0	100%
Unnamed Tributary to Victoria River VR2	95	0	100%
Unnamed Tributary to Victoria River VR3	306	293	-8%
Unnamed Tributary to Victoria River VR4	1,080	1084	-3%
Victoria River	11,566	12038	-4%

Groundwater flow to the receptors is predicted to return to within 10% of baseline rates in most surface water features once the pits are full. Groundwater discharge to West Pond and tributaries (WP1) continues to be below baseline during closure due to the permanent lowering of the water table downgradient of the Leprechaun pit as described above and depicted on Figure 12. The two unnamed tributaries of the Victoria River south of the TMF (VR1 and VR2) which receive no groundwater discharge during operation due to the interception of baseflow by ditches that collect seepage from the TMF, continue to receive no discharge as the ditches are included in the post-closure model as described above.

Seepage from the base of the waste rock piles and LGO stockpiles during the post-closure period in the decommissioning, rehabilitation and closure phase will move the receiving environment following the flow paths presented on Figure 13. The mean travel times for each set of particle tracks from each mine feature to each receptor are presented in Table 4.8. The percentage of particle tracks form each source arriving at each surface water feature was multiplied by the total recharge through the source (Stantec 2023a) to estimate the discharge into each surface water feature that originates at each source. These discharge rates are presented on Table 4.9. These rates are used in determining the water quantity and water quality in the receiving surface water in the Water Quantity and Water Quality Modelling report (Stantec 2023a) and the Assimilative Capacity Report (Stantec 2023c). The locations of the ditches included on Table 4.8 and Table 4.9 are presented in Appendix B. The majority of seepage from the Leprechaun waste rock pile is predicted to report to Victoria Lake post-closure. For the Marathon waste rock piles, most seepage is predicted to report directly or indirectly to Valentine Lake and the Victoria River. For Berry waste rock pile, seepage is predicted to report directly or indirectly to Valentine Lake. For the TMF, seepage is predicted to report directly or indirectly to the Victoria River.



Stantec

Legend

Mine Site

Proposed Project Expansion

- Ditch / Drainage Channel
- Sedimentation Pond
- Topsoil Stockpile
- Overburden Stockpile
- Open Pit
- SAGR Unit
- Waste Rock Pile
- Explosives Facility
- Site Feature Approved - Overlap

Approved Project

- Approved Project Components

0 1 2 km

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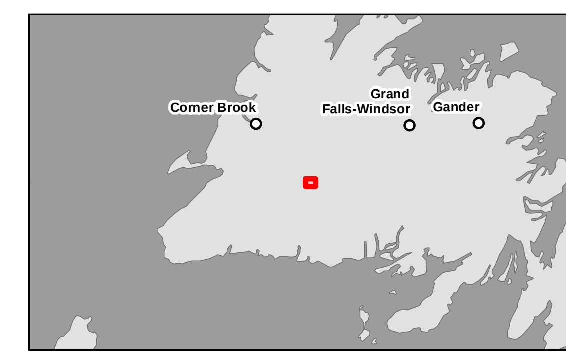
Notes

1. Coordinate System: NAD 1983 UTM Zone 21N
2. Base Data: CANVEC



Project Location
Valantine Lake
Central Newfoundland, CA

121417555 REVB
Prepared by AMW on 2023-07-13
Technical Review by AD on 2023-06-12

Client/Project
MARATHON GOLD CORPORATION
VALENTINE GOLD PROJECT
PROJECT EXPANSION

Figure No.
13

Title
Particle Traces Illustrating Flow Paths from Waste Rock Piles, Backfilled Berry Pit, and TMF Following Closure of Approved Project and Project Expansion

Table 4.8 Mean Groundwater Travel Times (Years) from Waste Rock Piles, Backfilled Berry Pit, and TMF – Post-Closure Phase

Leprechaun Complex Components		
Receptor	**Leprechaun Waste Rock Pile**	
LP-SP-02	<1	
LP-SP-03A	33	
LP-SP-03C	2	
Victoria Lake Reservoir	>1 x 10^6	
Unnamed Tributary to Victoria Lake WP1	10	
Marathon Complex Components		
Receptor	**Marathon North Waste Rock Pile**	**Marathon South Waste Rock Pile**
Marathon Pit	>1 x 10^6	-
MA-SP-01C	8	-
MA-SP-03	2	-
MA-SP-04	3	-
Frozen Ear Lake and Tributaries NT3	5	-
Unnamed Tributary to Valentine Lake NT5	24	-
Unnamed Tributary to Victoria River ST4	34	32
Victoria River (direct)	-	34
Berry Complex Components		
Receptor	**Berry Waste Rock Pile**	**Backfilled Berry Pit (**
Valentine Lake	>1 x 10^6	**103**
Frozen Ear Lake and Tributaries NT3	>1 x 10^6	**42**
Unnamed Tributary to Victoria River ST2	-	204
Unnamed Tributary to Victoria River ST3	-	101
Victoria River (direct)	-	146
Shared Components		
Receptor	**Tailings Management Facility**	
Victoria River	60	
Unnamed Tributary to Victoria River ST3	52	

Note: '-' indicates that seepage from the specified mine component is not predicted to discharge to the specified receptor.

Table 4.9 Estimated Groundwater Seepage Rates from Waste Rock Piles and TMF (m^3/day) - Post-Closure Period

Leprechaun Complex Components		
Receptor	**Leprechaun Waste Rock Pile**	
LP-SP-02	244	
LP-SP-03A	187	
LP-SP-03C	33	
PP-SP01	0	
Victoria Lake Reservoir	1162	
Marathon Complex Components		
Receptor	**Marathon North Waste Rock Pile**	**Marathon South Waste Rock Pile**
Marathon Pit	71	8
MA-SP-01C	21	-
MA-SP-03	248	-
MA-SP-04	206	-
Frozen Ear Lake and Tributaries NT3	7	-
Unnamed Tributary to Valentine Lake NT5	57	-
Unnamed Tributary to Victoria River ST4	50	-
Victoria River	-	414
Berry Complex Components		
Receptor	**Berry Waste Rock Pile**	
Valentine Lake	1,430	
Frozen Ear Lake and Tributaries NT3	477	
Shared Components		
Receptor	**Tailings Management Facility**	
Victoria River	385	
Unnamed Tributary to Victoria River ST3	115	
Note: '-' indicates that seepage from the specified mine component is not predicted to discharge to the specified receptor.		

The predicted attenuation ratio for seepage from the base of the TMF discharging to Victoria River post-closure conditions is 0.05. This indicates that if a solute is released from the TMF at a concentration of 1 mg/L, it will be attenuated to a concentration of 0.05 mg/L (or 50 micrograms per liter [µg/L]) when it is discharged to Victoria River.

The predicted attenuation ratio for groundwater flowing over the tailings and waste rock backfill in the Berry pit discharging to Valentine Lake and the Victoria River post-closure are 0.006 and 0.07, respectively. This indicates that if a solute is released into groundwater flowing through the backfilled

Berry pit at a concentration of 1 mg/L, it will be attenuated to concentrations of 0.006 mg/L and 0.07 mg/L (or 6 µg/L and 70 µg/L) when it is discharged to Valentine Lake or the Victoria River, respectively.

5.0 CONCLUSIONS

Numerical hydrogeologic modelling was conducted to identify changes to groundwater levels and flow pathways to inform the assessment of potential effects of the Project Expansion on groundwater and surface water resources. Groundwater flow modelling was conducted using MODFLOW-NWT and was calibrated to baseline conditions within acceptable industry standards. Transport modelling using MT3D and particle tracking using MODPATH were used in conjunction with the flow model results to predict potential impacts of mining operations and post-closure conditions.

The construction and operation of the open pit will require the open pit to be dewatered due to groundwater inflows (and surface water inflows which are considered outside of this report). The dewatering of the open pit will result in the of drawdown of the water table by up to 1.0 m over an area extending up to approximately 3 km long by 1.3 km wide. The effect on the water table from dewatering the Berry open pit does not overlap the effects on the water table from dewatering the Marathon and Leprechaun pits.

The fate of groundwater seepage beneath the waste rock piles, LGO stockpiles, and the TMF during operation was determined by conducting particle tracking in the groundwater flow model. Flow rates to seepage collection ditches, the open pit, or surface water receivers are generated for use in the Water Quantity and Water Quality Modelling report (Stantec 2023a) to assess the effects on surface water.

Upon the termination of combined Project activities (i.e., the closure phase of the combined Projects), the open pits will be allowed to fill to form pit lakes. The groundwater model was used to predict the groundwater inflow rates to the open pits for use in the site-wide water balance. Groundwater levels around the open pits are expected to recover, however a permanent lowering of the water table is expected in limited areas, due to maintaining a pit lake level that is many metres below the pre-development water table surface where hills at the sides of the pits are excavated. The fate of groundwater seepage beneath the waste rock piles and TMF, in addition to groundwater in contact with the tailings backfill in the Berry open pit following closure, was determined by conducting particle tracking in the groundwater flow model. Flow rates to seepage collection ditches or surface water receivers are generated for use in the Water Quantity and Quality Modelling, and Assimilative Capacity reports (Stantec 2023a and 2023c) to assess the effects on surface water. The attenuation factor of solutes originating from the TMF and discharging to Victoria River after closure is 0.05. Groundwater in contact with the tailings backfill in the Berry pit and travelling to Valentine Lake is attenuated by a factor of 0.006 following termination of Project activities. The attenuation factor for groundwater in contact with the tailings backfill in the Berry pit and travelling to the Victoria River following the termination of Project activities is 0.07.

Groundwater discharge to surface water features associated with Approved Project and Project Expansion facilities represents a minor component of the overall surface water flow systems. The results of this flow and transport modelling are considered in the assessment of potential effects on the receiving environment.

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APPENDIX A

Water Level Calibration Results

Appendix A
Water Level Calibration Residuals
Hydrogeological Model Update
Marathon Gold Corporation

Well ID	Observed Water Level (m amsl)	Simulated Water Level (m amsl)	Residual (m)
VLOW01	394.30	392.56	-1.74
VLOW02	394.30	392.62	-1.68
VLOW03	394.40	392.73	-1.67
VLOW04	394.50	392.86	-1.64
VLOW05	393.90	392.37	-1.53
VLOW06	394.60	392.18	-2.42
VLPW01	393.40	392.44	-0.96
MAOW01	353.40	348.56	-4.84
MAOW02	351.40	348.76	-2.64
MAOW03	354.40	347.15	-7.25
MAOW04	359.80	344.67	-15.13
MAOW05	354.60	347.51	-7.09
MAOW06	354.80	346.97	-7.83
MAPW01	354.20	348.04	-6.16
BGT2201	429.53	412.78	-16.75
BGT2202	431.97	427.25	-4.72
BGT2203	426.23	413.36	-12.87
BGT2204	431.11	424.57	-6.54
BGT2205	430.32	425.93	-4.39
BGT2206	429.81	424.79	-5.02
BGT2207	426.98	424.30	-2.68
BGT2208	429.84	426.81	-3.03
BGT2209	428.39	412.92	-15.47
BGT2210	413.31	408.91	-4.40
BGT2211	416.13	412.30	-3.83
BGT2212	404.87	399.91	-4.96
BGT2213	416.40	412.10	-4.30
MW1	311.00	311.10	0.10
MW2	418.10	405.92	-12.18
MW3	384.60	375.04	-9.56
MW4	364.50	361.89	-2.61
MW5	363.00	363.53	0.53
MW6	379.10	373.97	-5.13
MW7	341.75	342.05	0.30
MW8	342.20	342.71	0.51
VL10168	385.79	385.01	-0.78
VL11319	385.54	384.69	-0.85
VL11237	389.29	387.08	-2.21
VL11275	390.92	389.40	-1.52
VL11234	392.59	389.84	-2.75
VL11286	397.73	392.87	-4.86
VL12409	398.09	393.74	-4.35
VL11289	394.41	393.24	-1.17
VL11291	393.67	392.82	-0.85
VL10200	393.07	391.95	-1.12
VL11249	392.36	391.34	-1.02
VL11241	392.26	390.39	-1.87
VL11318	384.34	383.76	-0.58
VL17656	384.01	383.06	-0.95
VL10153	384.08	383.04	-1.04
VL17655	383.97	381.62	-2.35
VL10140	384.22	382.15	-2.07
VL12439	400.69	394.12	-6.57
VL16617	400.92	395.83	-5.09
VL13538	400.98	394.73	-6.25
VL17618	403.65	393.28	-10.37
VL12502	400.79	391.90	-8.89
VL17619	403.27	391.55	-11.72
VL12447	395.40	388.08	-7.32
VL12384	391.86	388.06	-3.80
VL11360	386.83	387.54	0.71
VL11339	385.22	385.93	0.71
VL11326	386.15	387.37	1.22
VL12406	392.84	390.23	-2.61
VL12395	392.82	391.68	-1.14
VL11290	383.88	381.78	-2.10
VL11336	384.06	385.08	1.02
VL11342	384.55	384.71	0.16
VL11332	383.82	383.85	0.03
VL11327	383.93	383.33	-0.60
VL11344	384.55	385.01	0.46
VL11320	384.32	384.62	0.30
VL12468	388.48	384.34	-4.14
VL12398	386.87	384.05	-2.82
VL17643	387.45	383.75	-3.70
VL17651	387.33	383.84	-3.49
VL11293	385.71	383.77	-1.94
VL17624	385.07	383.44	-1.63
VL12438	385.76	383.45	-2.31
VL12462	399.07	387.61	-11.46
VL13521	402.00	388.16	-13.84
VL17650	401.64	387.46	-14.18
VL13524	399.89	386.21	-13.68
VL13527	399.49	384.56	-14.93
VL12444	398.66	387.00	-11.66
VL12465	398.97	385.36	-13.61
VL12410	396.63	385.72	-10.91
VL12407	396.50	386.24	-10.26
VL13537	395.54	385.37	-10.17
VL17645	394.02	384.56	-9.46
VL17652	387.93	385.00	-2.93

Appendix A
Water Level Calibration Residuals
Hydrogeological Model Update
Marathon Gold Corporation

Well ID	Observed Water Level (m amsl)	Simulated Water Level (m amsl)	Residual (m)
VL12504	397.06	383.83	-13.23
VL13533	396.23	383.10	-13.13
VL13532	398.27	382.80	-15.47
VL17649	398.74	381.66	-17.08
VL11267	392.66	389.86	-2.80
VL14599	400.57	395.04	-5.53
VL14600	399.95	398.33	-1.62
VL14545	407.00	404.42	-2.58
VL14555	400.39	402.12	1.73
VL14556	401.06	401.74	0.68
VL14595	409.89	401.31	-8.58
VL14597	403.22	398.71	-4.51
VL14572	410.40	406.29	-4.11
VL14576	424.83	418.76	-6.07
VL15610	430.39	425.01	-5.38
VL15611	428.74	425.07	-3.67
VL18663	433.41	426.13	-7.28
VL15612	430.87	425.06	-5.81
VL18660	425.77	419.78	-5.99
VL18659	426.71	420.50	-6.21
VL18672	412.37	405.09	-7.28
VL14562	383.93	383.79	-0.14
VL14560	384.97	381.49	-3.48
VL14557	398.75	401.74	2.99
VL14569	399.66	394.34	-5.32
VL14553	403.28	397.14	-6.14
VL14554	406.16	399.62	-6.54
VL14542	402.99	399.41	-3.58
VL14544	399.67	399.57	-0.10
VL14558	396.83	398.36	1.53
VL14589	403.94	400.87	-3.07
VL14590	403.45	394.87	-8.58
VL14596	414.14	403.21	-10.93
VL14598	412.80	403.50	-9.30
VL14577	423.10	415.77	-7.33
VL14575	421.11	415.18	-5.93
VL14604	415.99	413.90	-2.09
VL14602	421.76	415.87	-5.89
VL14605	422.90	416.03	-6.87
VL14601	420.51	414.56	-5.95
VL18661	430.71	426.50	-4.21
VL18676	430.62	426.03	-4.59
VL18678	430.14	425.70	-4.44
VL18669	422.48	413.37	-9.11
VL18674	418.55	412.59	-5.96
VL18671	416.68	409.74	-6.94
VL18667	418.17	408.47	-9.70
VL18673	418.57	412.85	-5.72
MA18293	400.15	390.30	-9.85
MA18292	405.81	395.43	-10.38
MA17158	351.60	345.01	-6.59
MA17218	349.83	344.66	-5.17
MA17250	344.54	342.30	-2.24
MA18282	355.06	341.30	-13.76
MA18288	365.14	360.01	-5.13
MA18287	355.09	358.72	3.63
MA16129	357.17	340.05	-17.12
MA16111	354.28	340.51	-13.77
MA18307	354.72	341.41	-13.31
MA16141	353.42	342.26	-11.16
MA14012	353.01	343.38	-9.63
MA14009	350.53	344.01	-6.52
MA14019	348.85	342.41	-6.44
MA17186	350.22	342.00	-8.22
MA18306	353.52	341.32	-12.20
MA17235	354.61	340.21	-14.40
MA16128	356.18	338.86	-17.32
MA18291	355.82	338.85	-16.97
MA16130	357.34	337.05	-20.29
MA17225	345.65	342.04	-3.61
MA17251	344.33	341.55	-2.78
MA17201	342.37	340.08	-2.29
MA16095	349.05	341.20	-7.85
MA18276	354.58	350.02	-4.56
MA18278	345.50	338.45	-7.05
MA18266	347.48	339.61	-7.87
MA17254	343.30	340.91	-2.39
MA18289	339.38	338.66	-0.72
MA18314	344.41	341.78	-2.63
MA18310	345.47	343.47	-2.00
MA18312	345.69	342.98	-2.71
MA17199	346.67	343.68	-2.99
MA17169	347.92	345.71	-2.21
MA17173	349.88	346.14	-3.74
MA18297	353.94	345.13	-8.81
MA15028	353.96	344.52	-9.44
MA17246	353.50	346.01	-7.49
MA15031	354.40	346.53	-7.87
MA18295	354.01	346.68	-7.33
MA17241	351.00	347.34	-3.66

Appendix A
Water Level Calibration Residuals
Hydrogeological Model Update
Marathon Gold Corporation

Well ID	Observed Water Level (m amsl)	Simulated Water Level (m amsl)	Residual (m)
MA15045	350.43	347.21	-3.22
MA17248	348.99	346.69	-2.30
MA18311	349.30	345.61	-3.69
MA17253	347.31	343.95	-3.36
MA17260	347.74	344.50	-3.24
MA17231	352.67	348.32	-4.35
MA16100	344.74	341.63	-3.11
MA18263	349.77	338.98	-10.79
MA15064	359.74	353.50	-6.24
MA18336	356.15	353.67	-2.48
MA18340	352.47	350.36	-2.11
MA16120	357.54	349.60	-7.94
MA18329	353.21	351.23	-1.98
MA18337	351.28	349.43	-1.85
MA18334	350.24	349.14	-1.10
MA18332	352.94	350.28	-2.66
MA16126	352.28	350.46	-1.82
MA18342	351.49	349.52	-1.97
MA18330	355.22	351.96	-3.26
MA18343	355.51	352.63	-2.88
MA18345	349.06	347.91	-1.15
MA16106	352.99	351.03	-1.96
MA18347	355.14	351.38	-3.76
MA17191	352.39	350.29	-2.10
MA16103	354.64	351.10	-3.54
MA16118	358.47	350.61	-7.86
MA17258	354.58	353.83	-0.75
MA18316	350.35	346.39	-3.96
MA16110	352.78	350.31	-2.47
MA18323	354.81	349.84	-4.97
MA17255	354.49	349.60	-4.89
MA16143	358.35	352.27	-6.08
MA15071	360.77	347.66	-13.11
MA17259	354.70	348.30	-6.40
MA17262	354.47	349.12	-5.35
MA18268	354.51	349.25	-5.26
MA18335	352.91	348.57	-4.34
MA17227	352.83	348.58	-4.25
MA16094	352.61	349.27	-3.34
MA18324	353.35	348.56	-4.79
MA17233	353.06	348.18	-4.88
MA16155	361.53	346.67	-14.86
MA16117	354.95	351.65	-3.30
MA18328	356.79	355.21	-1.58
MA18333	352.04	350.33	-1.71
VL09134	384.21	383.99	-0.22

Residual Statistics	
Mean Error (m)	-5.31
Absolute Mean Error (m)	5.45
Root Mean Squared Error (m)	7.09
Normalized Mean Squared Error (%)	5.8%

APPENDIX B

Catchment Area Plans

LEGEND:

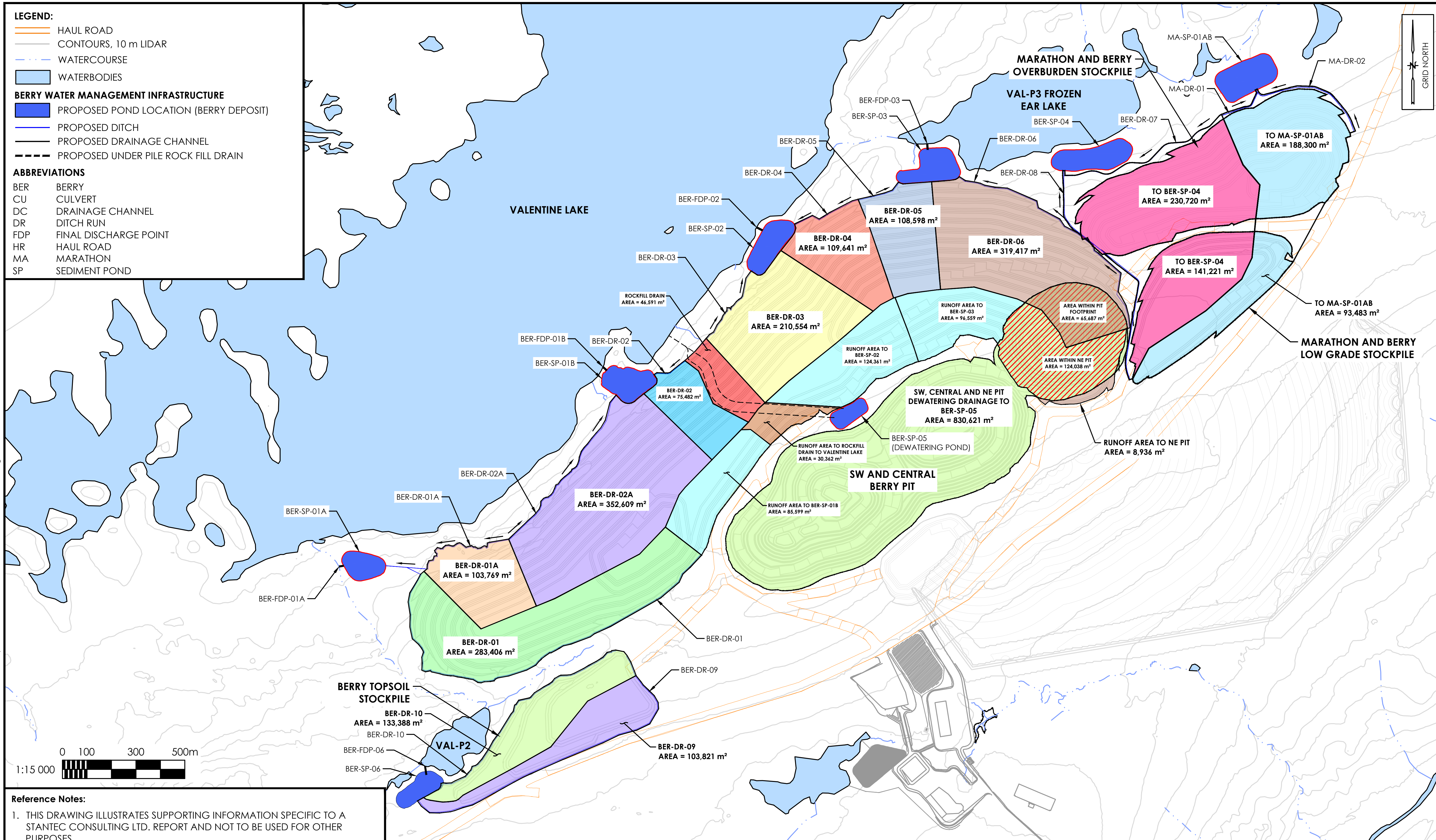
- HAUL ROAD
- CONTOURS, 10 m LIDAR
- WATERCOURSE
- WATERBODIES

BERRY WATER MANAGEMENT INFRASTRUCTURE

- PROPOSED POND LOCATION (BERRY DEPOSIT)
- PROPOSED DITCH
- PROPOSED DRAINAGE CHANNEL
- PROPOSED UNDER PILE ROCK FILL DRAIN

ABBREVIATIONS

BER	BERRY
CU	CULVERT
DC	DRAINAGE CHANNEL
DR	DITCH RUN
FDP	FINAL DISCHARGE POINT
HR	HAUL ROAD
MA	MARATHON
SP	SEDIMENT POND



Reference Notes:

1. THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND NOT TO BE USED FOR OTHER PURPOSES.
2. LIDAR DERIVED CONTOURS JUNE 6-7, 2019 (AETHON AERIAL SOLUTIONS); VERTICAL DATUM: CGVD28.
3. WATERCOURSES AND WATERBODIES: SURVEYED FISH BEARING OR HAS CONNECTIVITY TO FISH BEARING WATER (STANTEC 2012, 2019 & 2020, 2022), SUPPLEMENTED WITH CANVEC 2011 WATERCOURSES AND WATERBODIES.
4. ALL NON-WATER MANAGEMENT INFRASTRUCTURE DESIGN BY: AUSENCO, GOLDER & MOOSE MOUNTAIN TECHNICAL SERVICES DESIGN.

BERRY PILE CATCHMENT AREA PLAN

WATER MANAGEMENT DESIGN

Client: MARATHON GOLD CORPORATION

Job No.:	121623045	Fig. No.: 1-2	Rev. No.: 1
Scale:	1 : 15 000		
Date:	2023-06-02		
Dwn. By:	CP		
App'd By:	AS		

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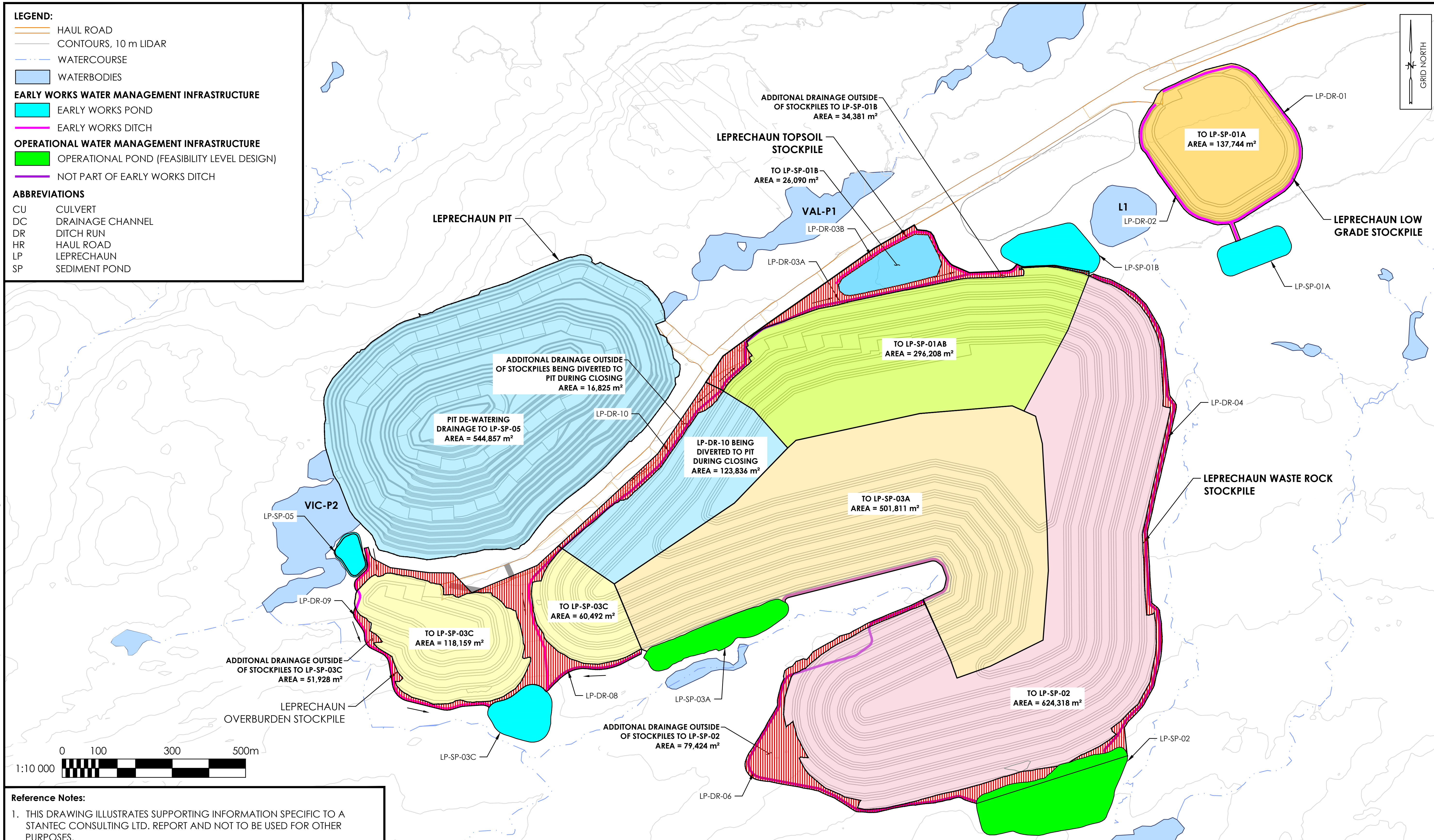

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LEPRECHAUN PILE CATCHMENT AREA PLAN

WATER MANAGEMENT DESIGN

Client: MARATHON GOLD

Job No.:	121620514
Scale:	1 : 10 000
Date:	2023-05-04
Dwn. By:	CP
App'd By:	RJ
Fig. No.:	01
Rev. No.:	01

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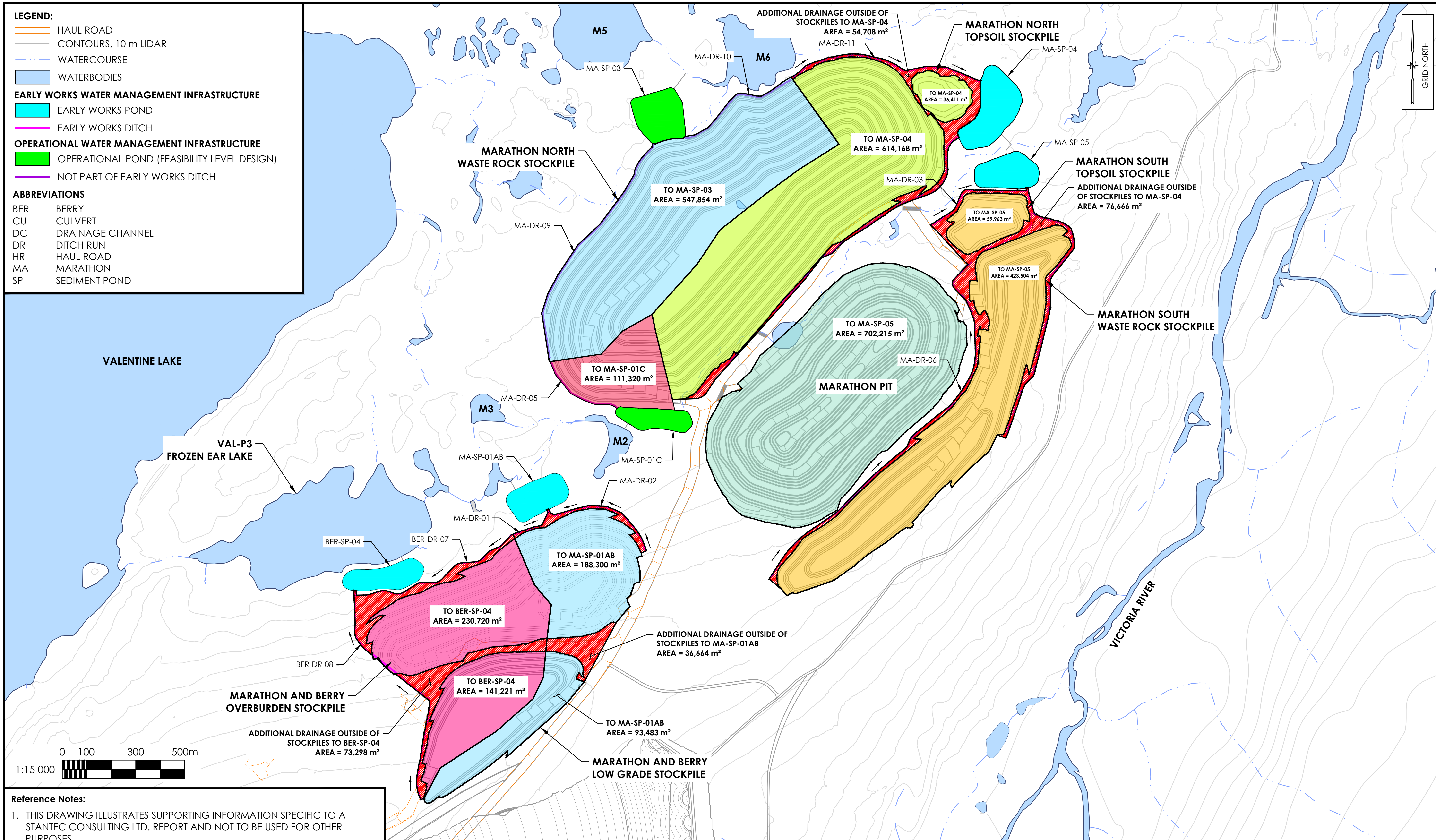

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MARATHON PILE CATCHMENT AREA PLAN
WATER MANAGEMENT DESIGN

Client: MARATHON GOLD

Job No.:	121623045	Fig. No.: 02	Rev. No.: 01
Scale:	1 : 15 000		
Date:	2023-05-04	Stantec	
Dwn. By:	CP		
App'd By:	RJ		