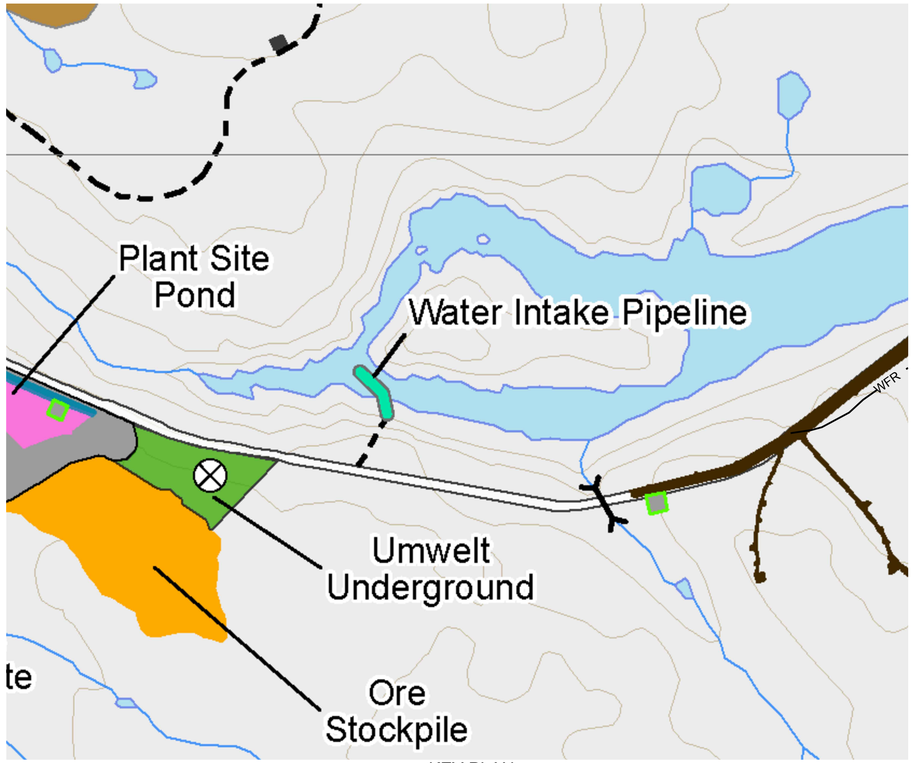
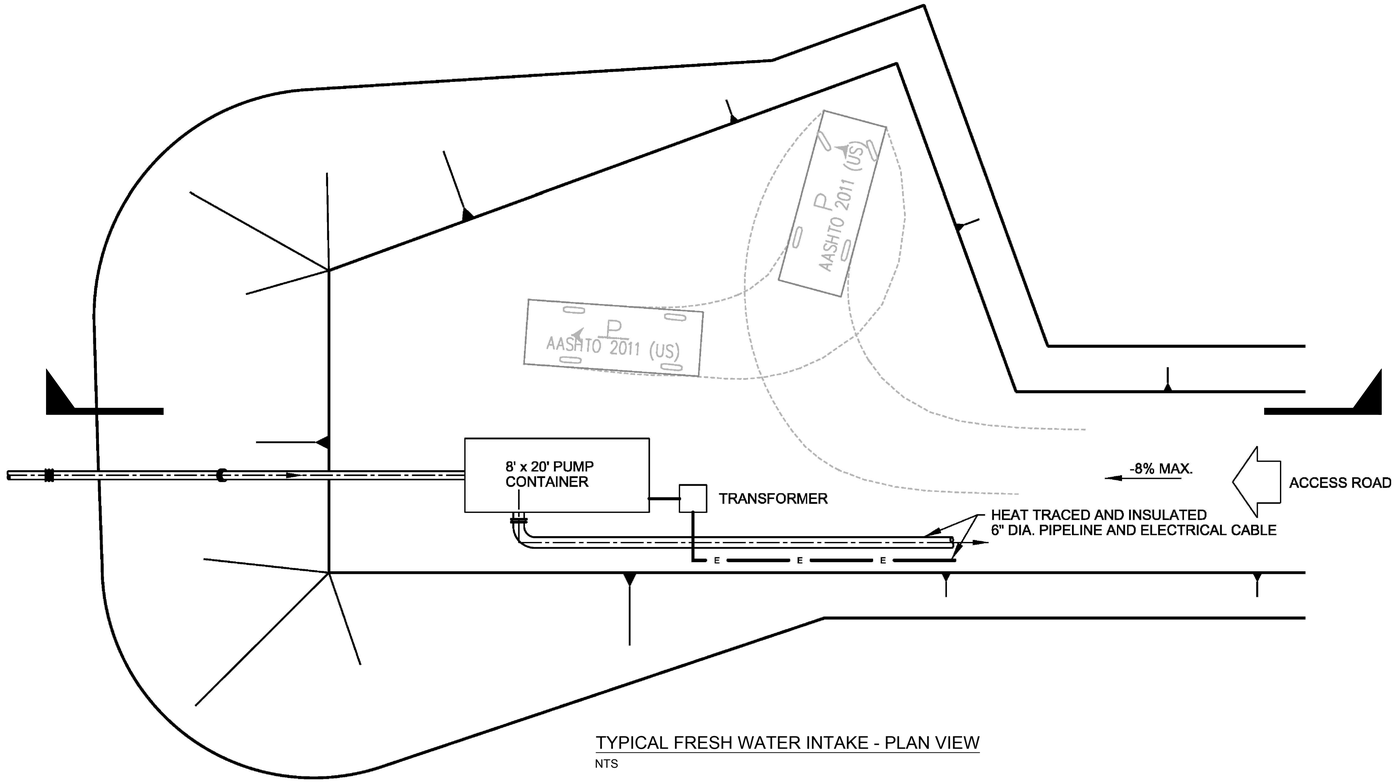
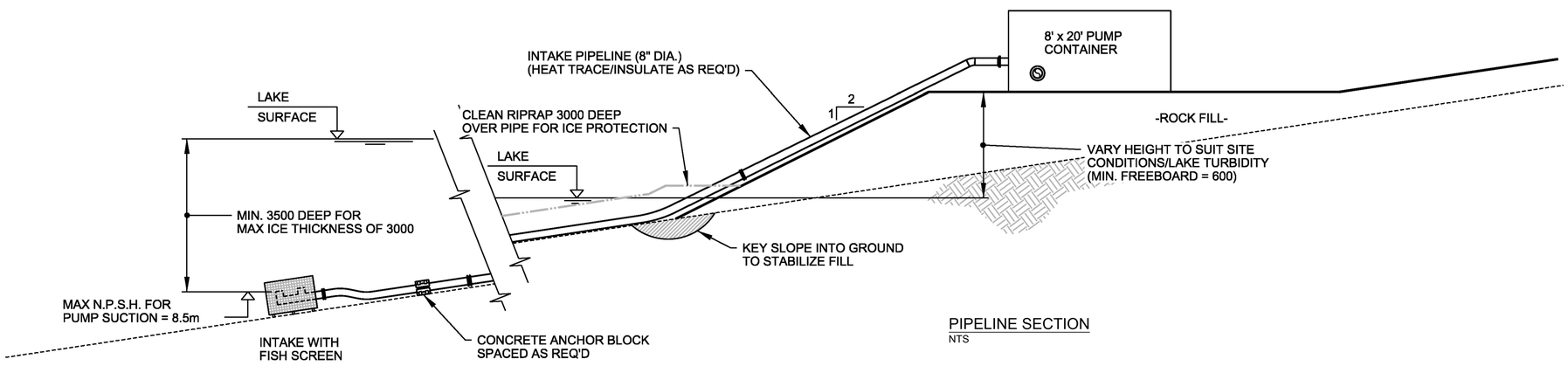


KEY PLAN
NTS



TYPICAL FRESH WATER INTAKE - PLAN VIEW
NTS



PIPELINE SECTION
NTS

LEGEND

- UNDERGROUND PORTAL
- WATER INTAKE PIPELINE
- WATER MANAGEMENT STRUCTURE
- TAILINGS EMERGENCY POND
- WATER BODIES

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. ENGINEERING DESIGN IS CONSISTENT FOR ALL FRESHWATER INTAKES (GOOSE LAKE AND BIG LAKE).

REFERENCES

1. BASE DRAWING OBTAINED FROM SRK CONSULTING. FILE NAME: 1CS020.011_WMP_FIGURE_A-20.DWG. RECEIVED DATE: 2017-06-02.
2. KEY PLAN OBTAINED FROM SABINA GOLD & SILVER. FILE NAME: GSE_FEIS_NA_TAB_GOOSE_WL_2020_COPY.PDF

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DESIGNED	SRK
PREPARED	AF
REVIEWED	DRW
APPROVED	

CLIENT: Sabina GOLD & SILVER CORP.

CONSULTANT: GOLDER

PROJECT
BACK RIVER PROJECT
2020 MODIFICATION PACKAGE

TITLE
FRESH WATER INTAKE TYPICAL PLAN AND SECTION

PROJECT NO.	FIGURE	REV.
	A-18	A

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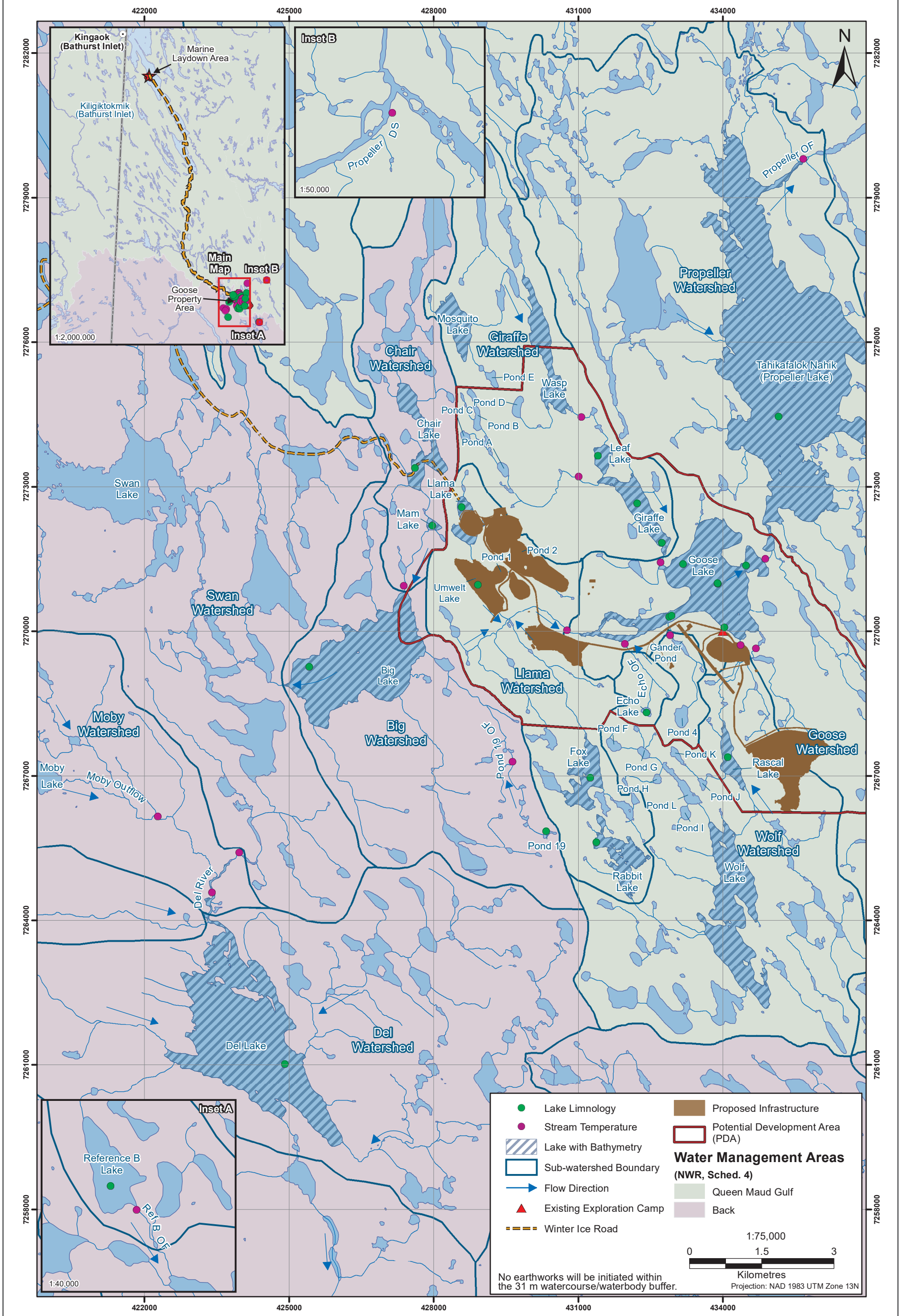
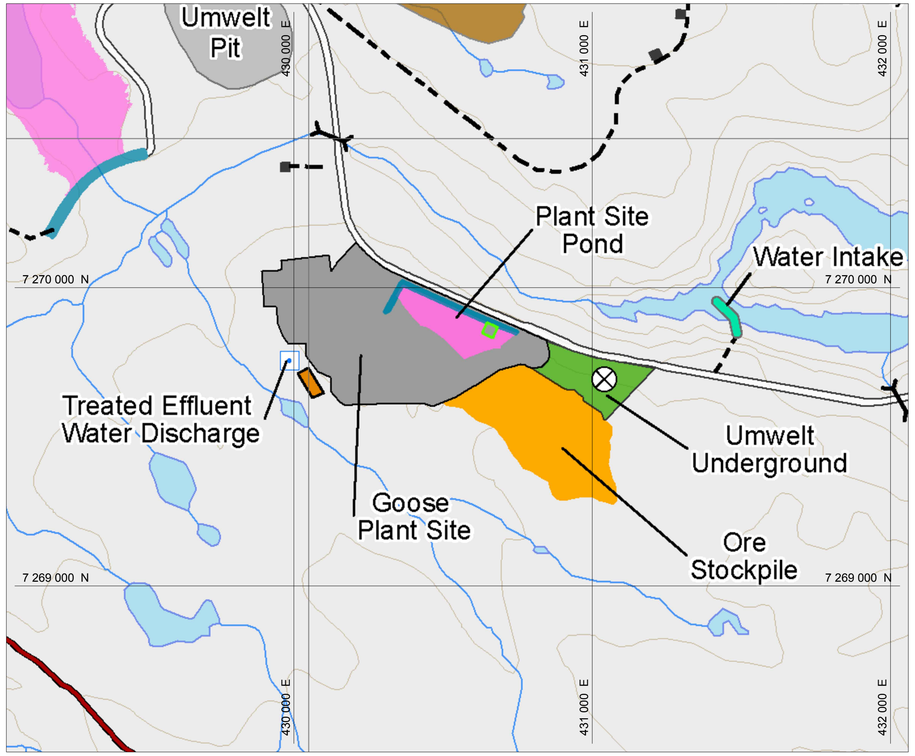


Sabina

Figure A-19

Limnology and Bathymetry Sampling Conducted in the Goose Property Area for the Back River Project, 1994 to 2013



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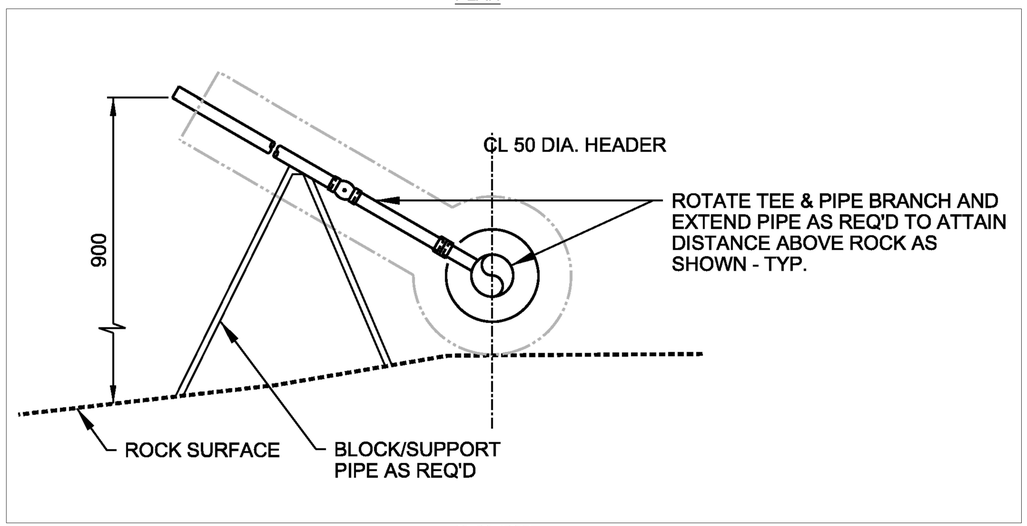

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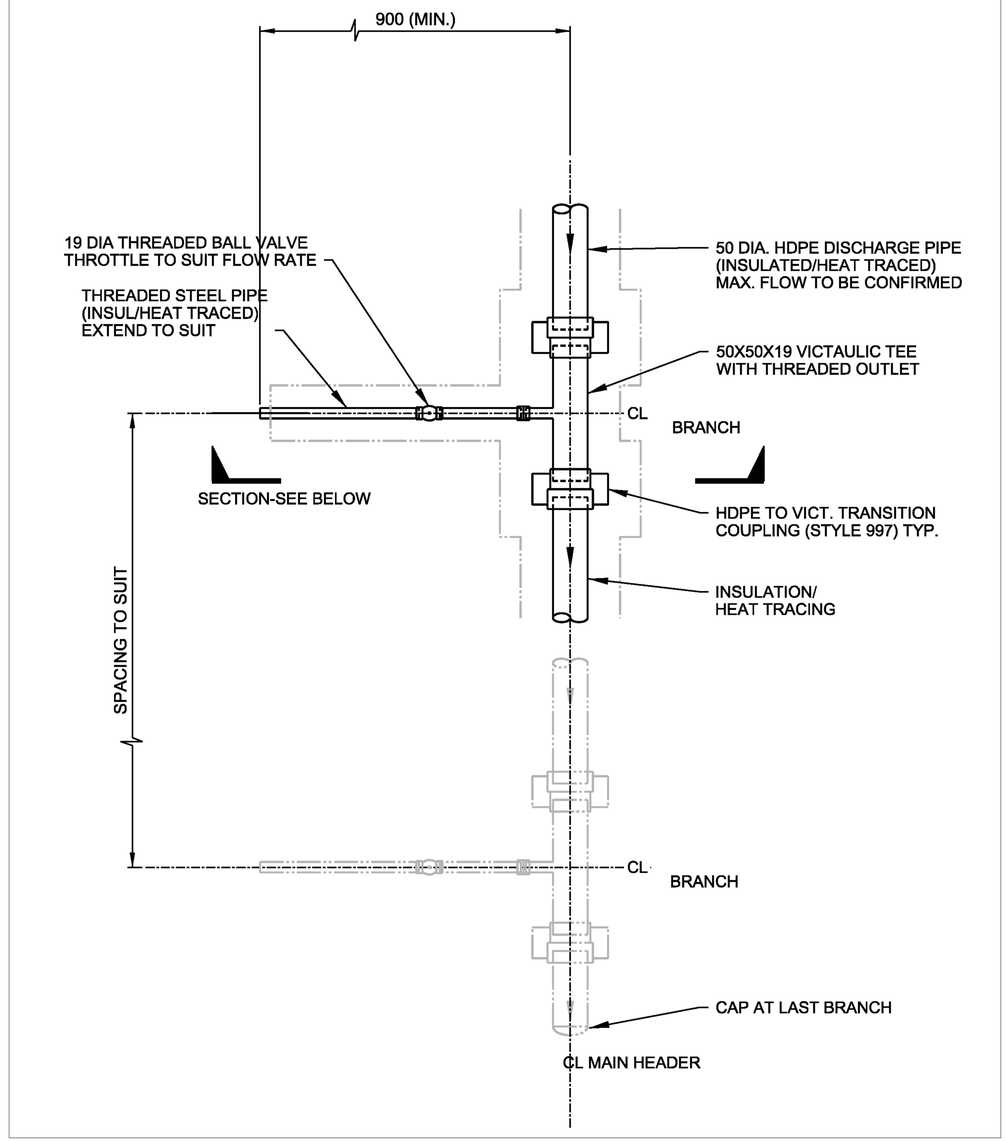

S.T.P. TREATED WATER OUTLETS - PLAN VIEW
(# OF OUTLETS AND PIPE DIA. TO SUIT FINAL S.T.P. DISCHARGE)

LEGEND

- UNDERGROUND PORTAL
- WATER INTAKE PIPELINE
- WATER MANAGEMENT STRUCTURE
- TAILINGS EMERGENCY POND
- WATER BODIES

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

REFERENCES

1. BASE DRAWING OBTAINED FROM SRK CONSULTING.
   FILE NAME: 1CS020.011_WMP_FIGURE_A-20.DWG. RECEIVED DATE: 2017-06-02.
2. KEY PLAN OBTAINED FROM SABINA GOLD & SILVER. FILE NAME:
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DESIGNED	SRK
PREPARED	AF
REVIEWED	DRW
APPROVED	

CLIENT: Sabina GOLD & SILVER CORP.

CONSULTANT: GOLDER

PROJECT
BACK RIVER PROJECT
2020 MODIFICATION PACKAGE

TITLE
S.T.P TREATED WATER DISCHARGE PLAN AND SECTION

PROJECT NO.	FIGURE	REV.
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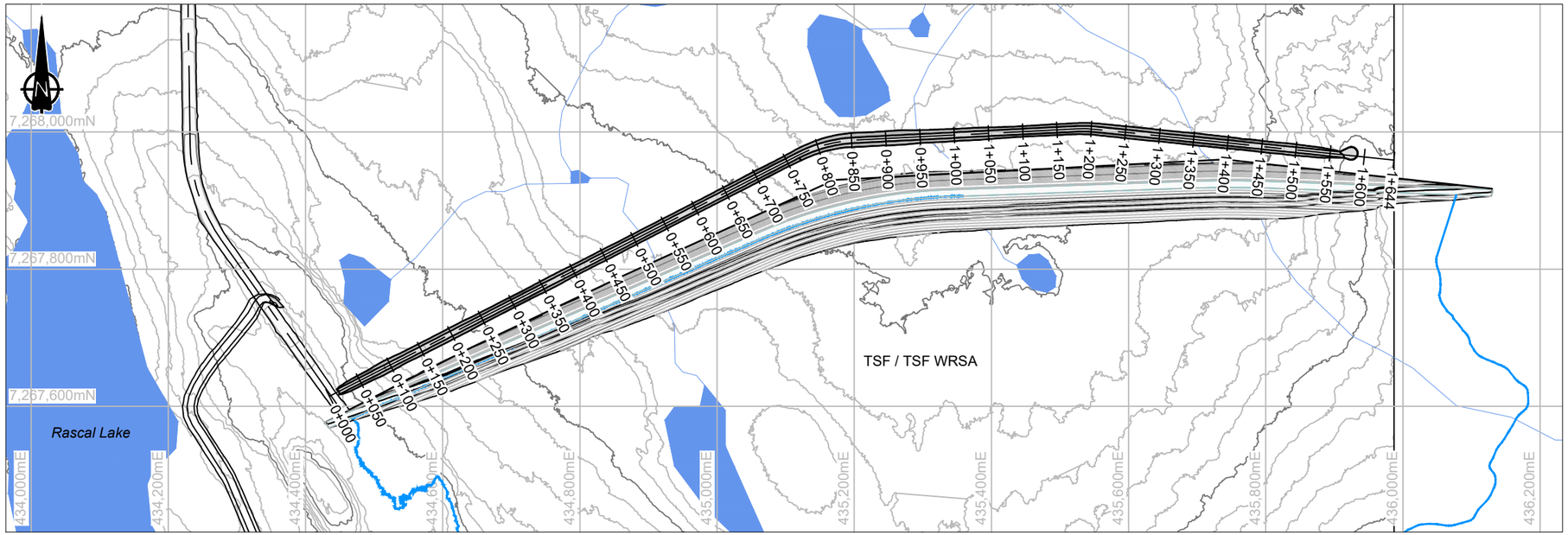


TSF WRSA Diversion Berm Plan

0m 50 100 150 200 250 300

LEGEND

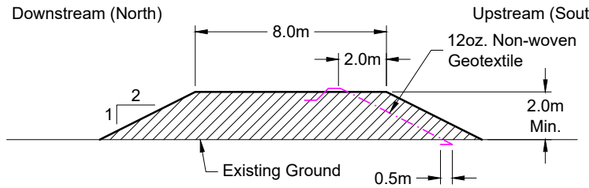
Design Infrastructure

NOTES

1. Contours shown at 1.0m intervals.
2. All units are in meters unless otherwise specified.
3. A minimum fill thickness of 2.0m or greater must be maintained for the entire TSF Containment Dam Berm.
4. Required key trench depth and dam and berm cross sections designs to be confirmed at detailed design stage.

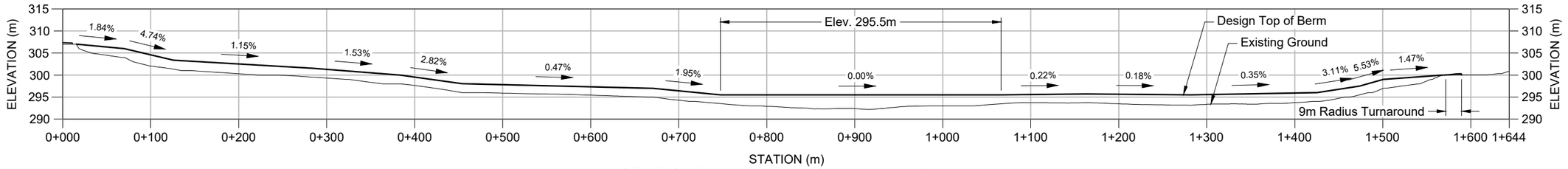
REFERENCES

NAD83 UTM Zone 13.



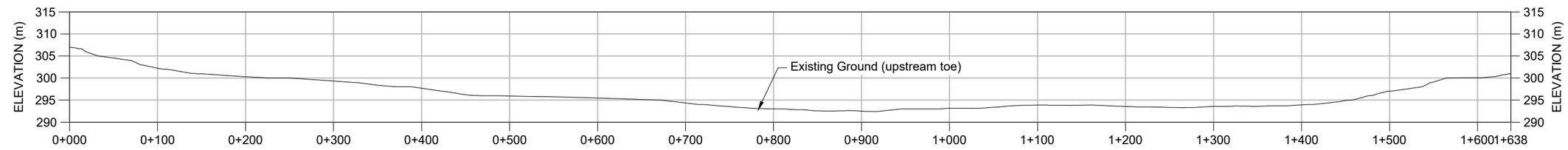
TSF WRSA Diversion Berm Typical Section

0m 2 4 6 8 10



TSF WRSA Diversion Berm Centerline Profile

0m 50 100 150 200



TSF WRSA Diversion Berm Upstream Toe Profile

0m 50 100 150 200

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JBK	CP	2020/06/05

FILE NAME: 1CS020.018 - TSF Berm.dwg

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SRK JOB NO.: 1CS020.018

Water Licence Phase

DRAWING TITLE:
TSF WRSA Diversion Berm Plan and Profile

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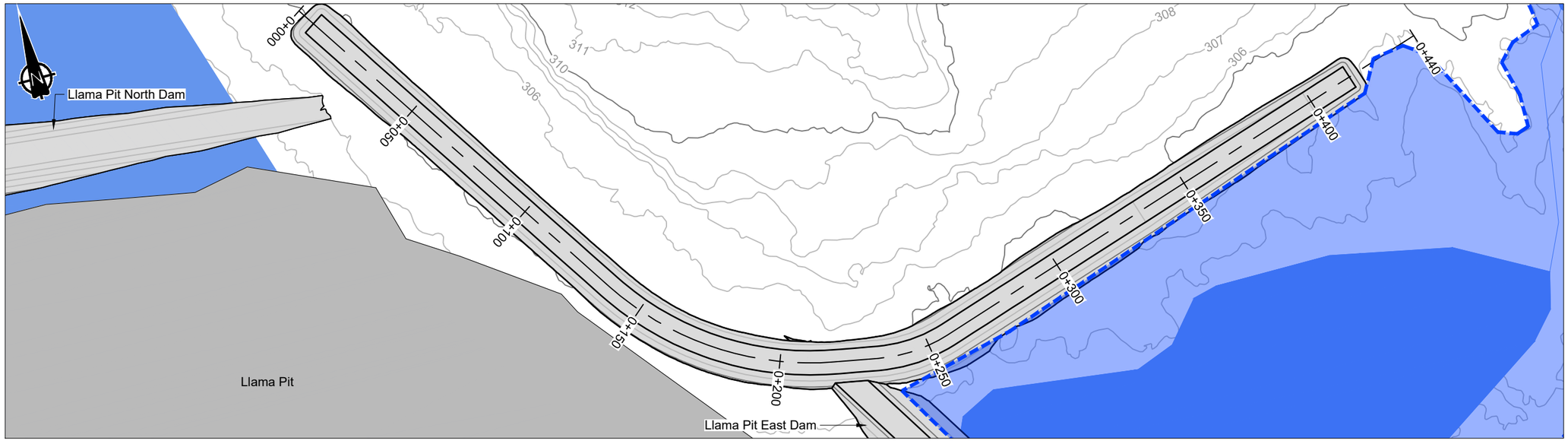


LEGEND

- Full Supply Level (Elev. 304.0m)
- Design Infrastructure
- Rockfill
- Maximum Water Level (304.0m)

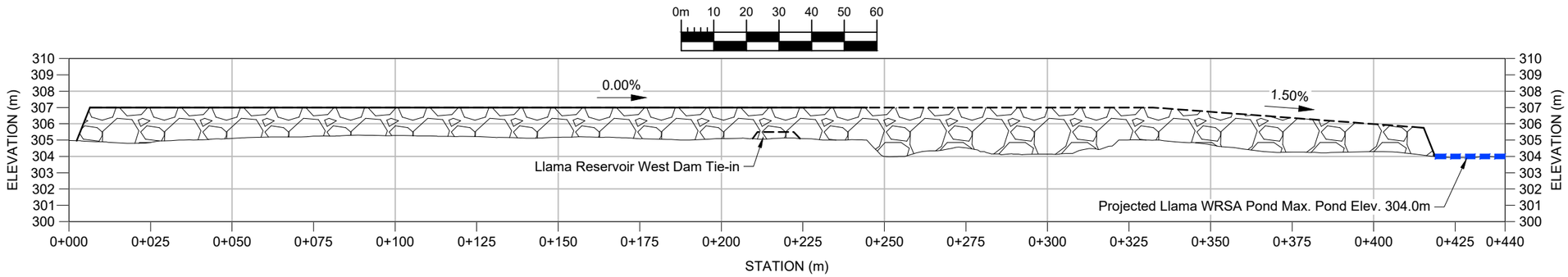
NOTES

1. Contours shown at 1.0m intervals.
2. All units are in meters unless otherwise specified.
3. Water diversion / conveyance will be at the upstream / upslope toe. Contours will be required to be confirmed to ensure that minimum 0.5% grade established / maintained.
4. Additional fill material or alignment adjustment expected to be required to ensure that water will not pond against berm. Final alignment optimizations to be based on field ground survey.
5. Required key trench depth and dam and berm cross sections designs to be confirmed at detailed design stage.

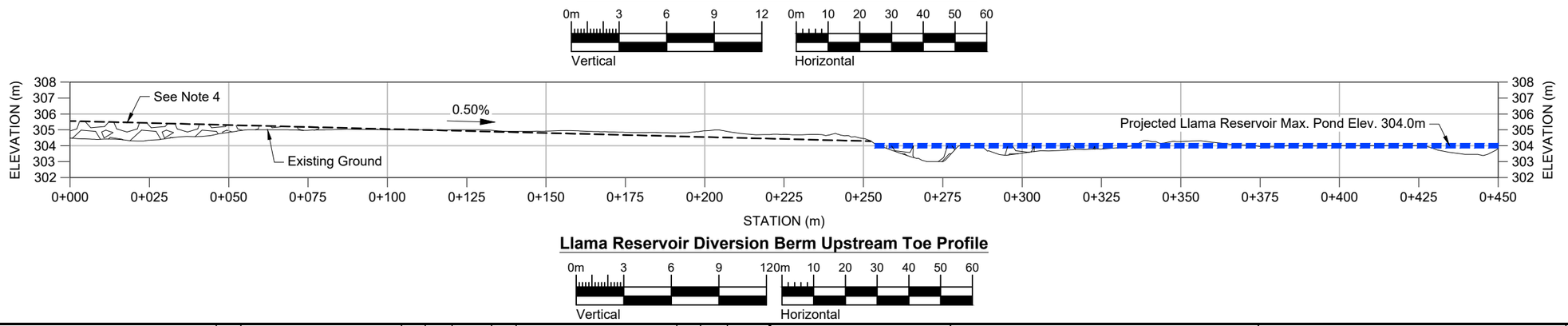
REFERENCES

NAD83 UTM Zone 13.

Llama Reservoir Diversion Berm



Llama Reservoir Diversion Berm Centerline Profile



Llama Reservoir Diversion Berm Upstream Toe Profile

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Water Licence Phase

DRAWING TITLE:
Llama Reservoir Diversion Berm Plan and Profile

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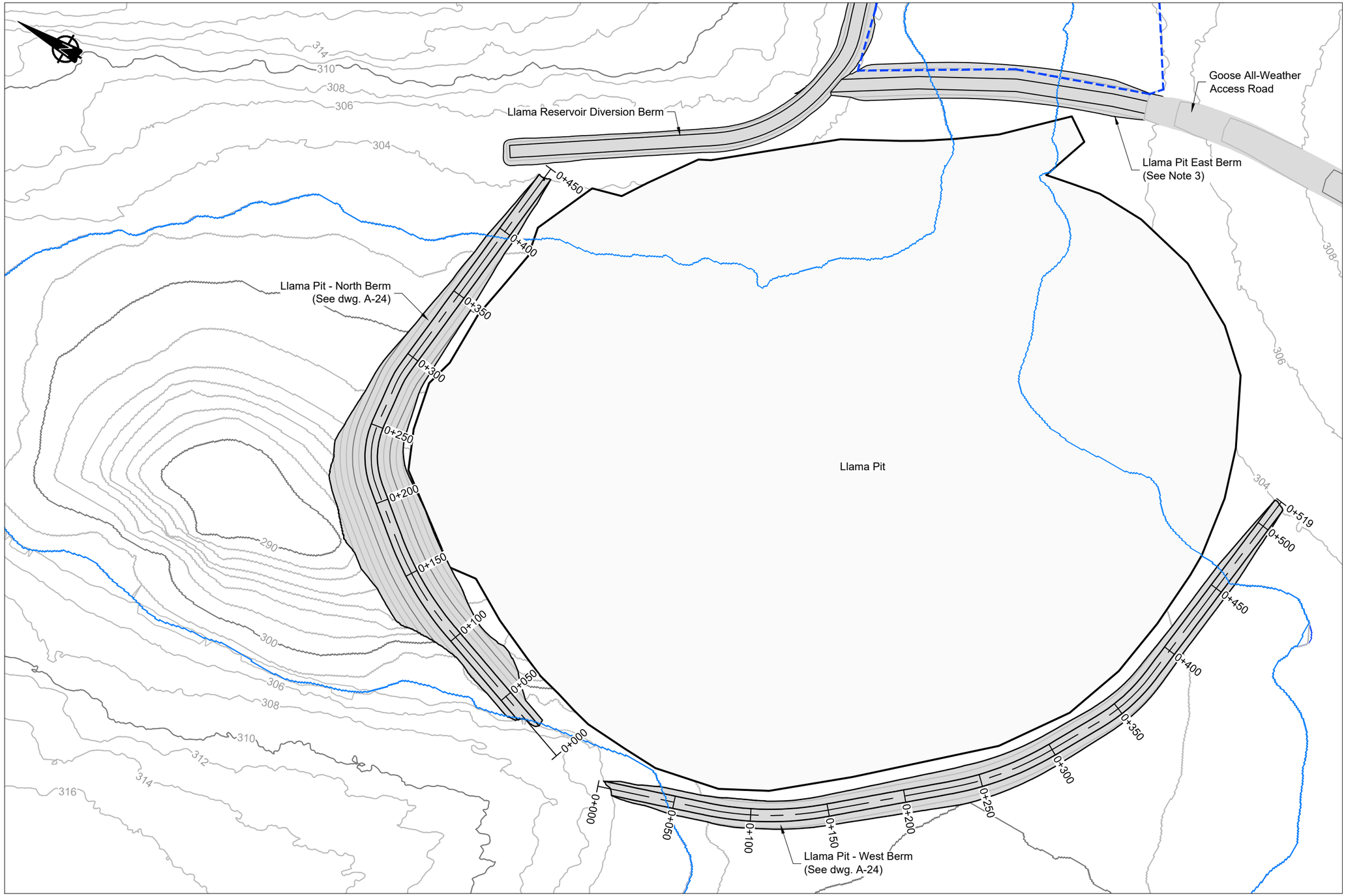

LEGEND

- Full Supply Level (Elev. 304.0m)
- Design Infrastructure
- Pit Outline
- Previous Llama Lake Water Level

NOTES

1. Contours are shown at 2.0m intervals.
2. All units are in meters unless otherwise specified.
3. Required key trench depth and dam and berm cross sections designs to be confirmed at detailed design stage.
4. Any backfill at or around the mined out Llama Pit to have a minimum 5.0m water cover.

REFERENCES

NAD83 UTM Zone 13.

0m 20 40 60 80 100

REFERENCE DRAWINGS		REVISIONS								
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JBK	CP	2020/06/05

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Back River Project

SRK JOB NO.: 1CS020.018

Water Licence Phase

DRAWING TITLE: Llama Pit North and West Diversion Berms

DRAWING NO.	SHEET	REVISION NO.
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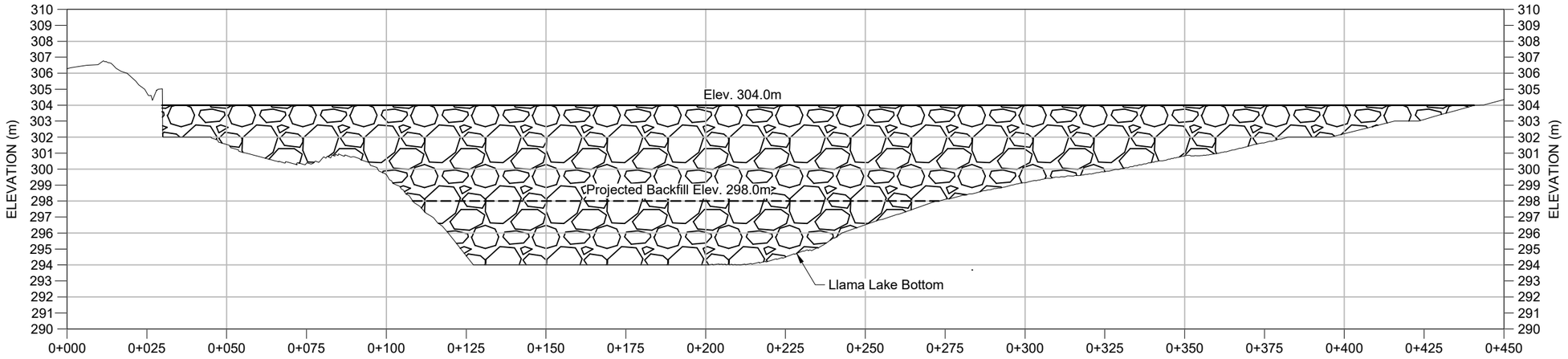
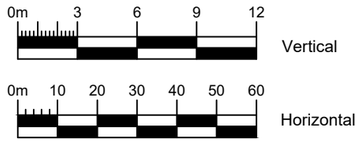
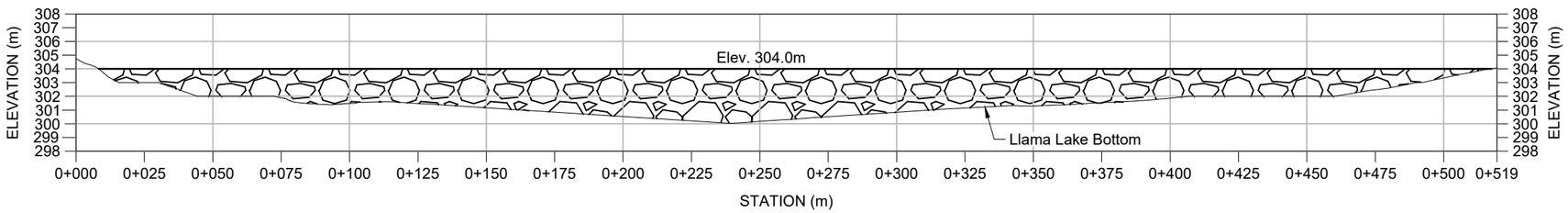
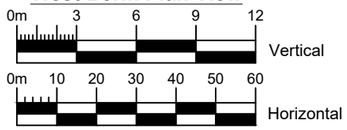


North Berm Plan View





West Berm Plan View



LEGEND

Rockfill

NOTES

1. All units are in meters unless otherwise specified.
2. Required key trench depth and dam and berm cross sections designs to be confirmed at detailed design stage.
3. Any backfill at or around the mined out Llama Pit to have a minimum 5.0m water cover.

REFERENCES

NAD83 UTM Zone 13.

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JBK	CP	2020/06/05

FILE NAME: 1CS020.18 - Llama Pit.dwg

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Water Licence Phase

DRAWING TITLE:
Llama Pit North Berm and West Berm Profiles

DRAWING NO.	SHEET	REVISION NO.
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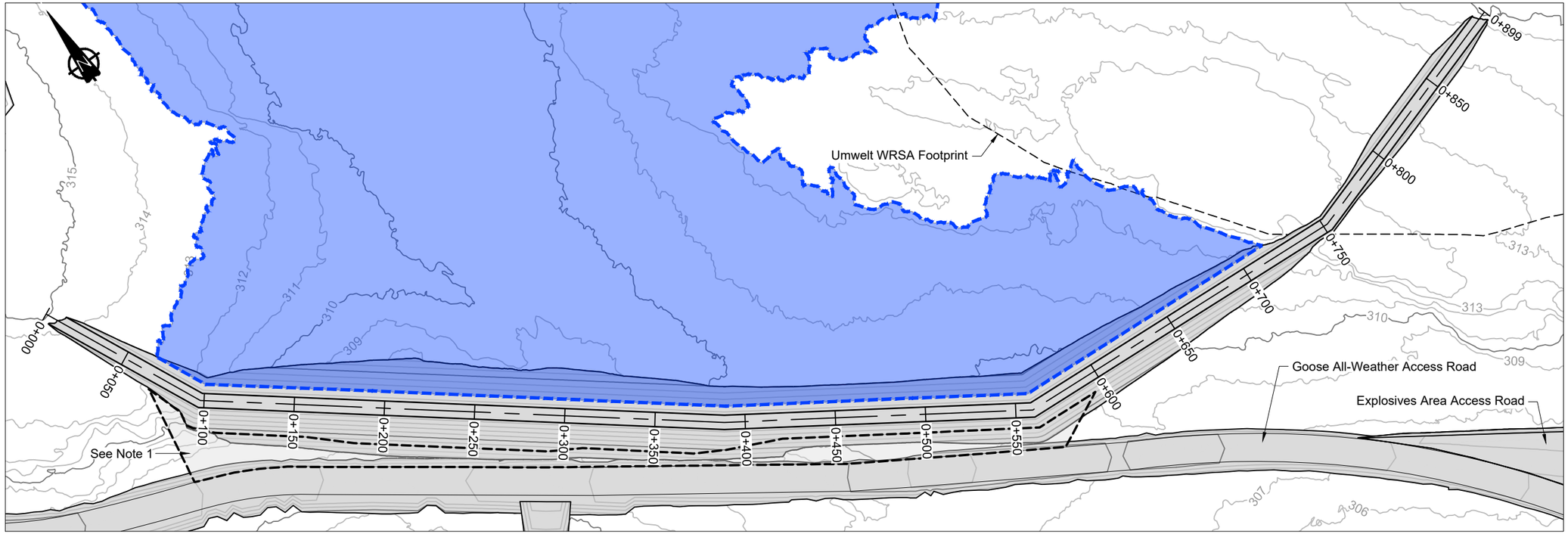
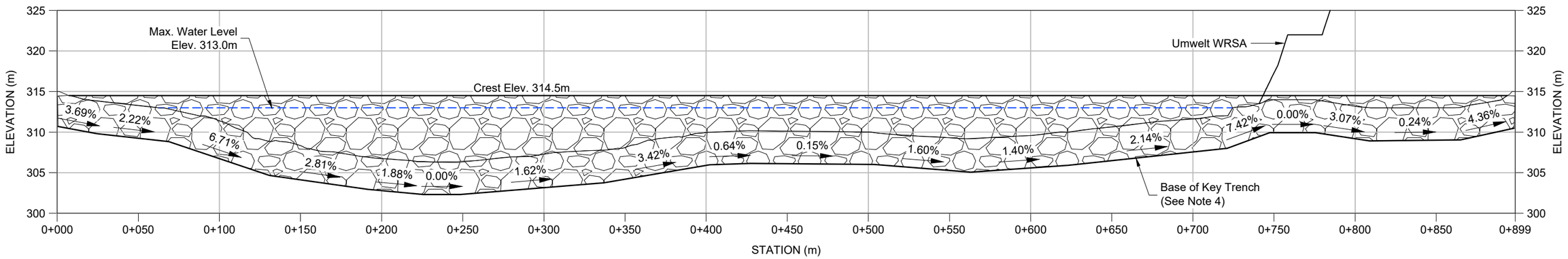


Primary Pond Diversion Berm

0m 20 40 60 80 100



Primary Pond Diversion Berm Profile

0m 5 10 15 20 Vertical

0m 20 40 60 80 100 Horizontal

LEGEND

- Design Infrastructure
- Rockfill
- Maximum Water Level (313.0m)

NOTES

1. Contours shown at 1.0m intervals.
2. All units in meters unless otherwise stated.
3. The downstream area between the Goose All-Weather Road (AWR) and downstream side of the Primary Pond Dam to be filled with a minimum 2.0m thick layer of bulk rockfill to assist with thermal protection of the downstream toe of the Primary Pond. Extreme care must be taken when building the AWR in the area and the road should be built to a minimum 2.0m thickness in this area to ensure that the downstream areas from the Primary Pond does not become thermally degraded / impacted.
4. Required key trench and dam and berm cross sections designs to be confirmed at detailed design stage.

REFERENCES

NAD83 UTM Zone 13.

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FILE NAME: 1CS020.018 - Primary Pond.dwg

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Back River Project

SRK JOB NO.: 1CS020.018

Water Licence Phase

DRAWING TITLE:

Primary Pond Dam
Plan and Profile

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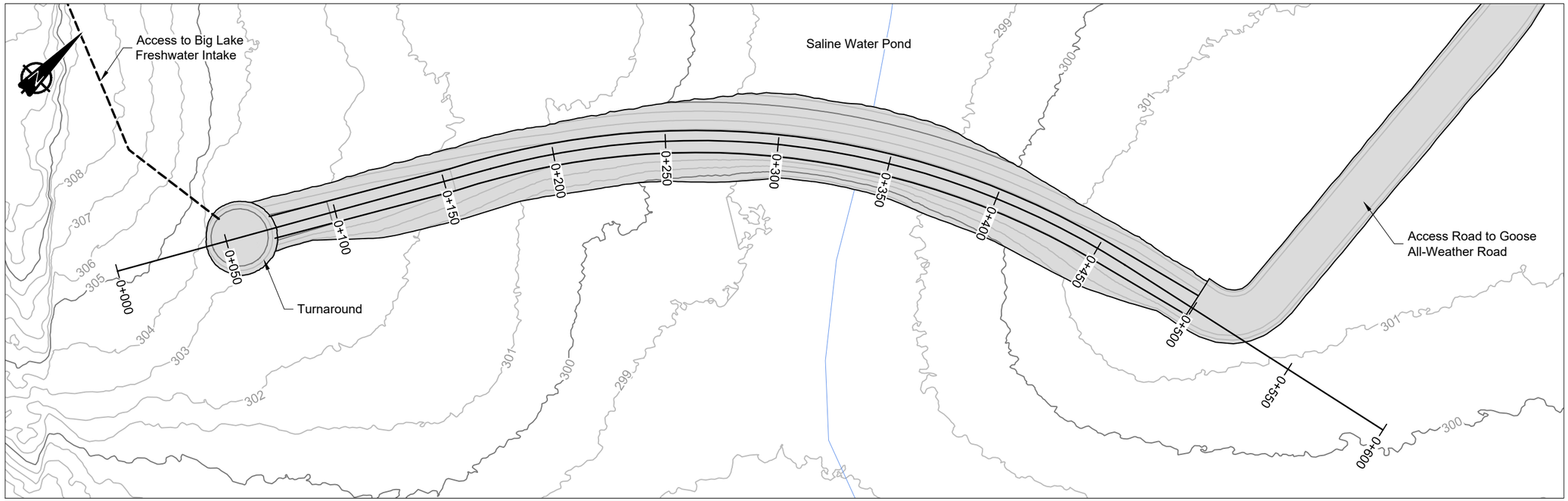
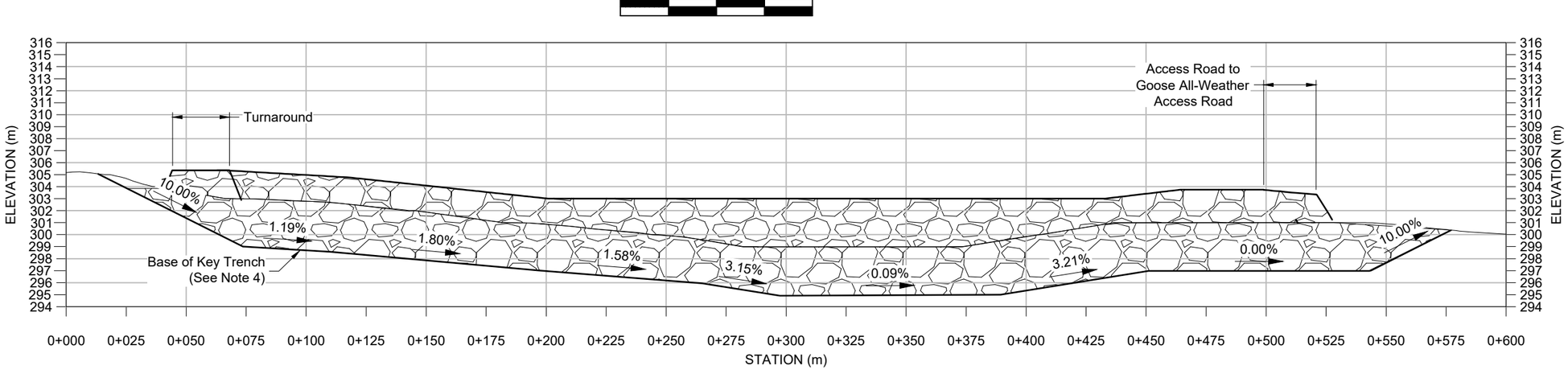


Saline Water Pond Dam

0m 20 40 60 80



Saline Water Pond Dam Profile

0m 4 8 12 16 Vertical

0m 20 40 60 80 Horizontal

LEGEND

- Design Infrastructure
- Rockfill

NOTES

1. Contours shown at 1.0m contours.
2. All dimensions shown in meters unless otherwise stated.
3. Overburden may be placed off the upstream face for the Saline Water Pond to help spread out the seepage pathway and limit long-term thermal impacts on the foundation.
4. Required key trench and dam and berm cross sections designs to be confirmed at detailed design stage.

REFERENCES

NAD83 UTM Zone 13.

DRAWING NO.	DRAWING TITLE
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REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
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Back River Project

SRK JOB NO.: 1CS020.018

Water Licence Phase

DRAWING TITLE:
Saline Water Pond Dam
Plan and Profile

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Appendix B. Water Quality Monitoring

All water on the Project is categorized into three types: contact water (i.e., impacted by mine workings), non-contact water (i.e., undisturbed areas runoff), and saline water (i.e., groundwater). Only non-contact water will be diverted off-site without treatment.

Each type of water will be managed separately throughout each Project Phase.

Construction Phase

The following monitoring activities are proposed during the Construction Phase:

- Visual inspections to confirm that mitigation measures identified in this document and other relevant management plans (i.e., the Environmental Management and Protection Plan [WL SD-20], Borrow Pits and Quarry Management Plan [WL SD-03]) are implemented satisfactorily.
- Visual inspections to monitor the effectiveness of sediment and erosion control and runoff collection measures on a regular basis (daily or weekly as appropriate).
- Monitor treated sewage effluent discharges on a weekly basis for key indicators (i.e., TSS and ammonia), and monthly sampling using laboratory analysis for the parameters listed in Table B-01.
- Periodically sample runoff at active construction fronts for the parameters listed in Table B-03.
- Monitoring of runoff from quarries and borrow pits in relation to the quarry runoff criteria identified in Table 7.5-1.
- Monitoring of runoff at the Umwelt WRSA Pond and the Plant Site Pond for compliance with MDMER limits.
- Recording daily and monthly water consumption.
- Monitoring of waste and water management aspects including remediated soil, oily water, and landfill seepage.
- Monitoring of water quantity and quality will occur during all dewatering activities. The volume of water transferred will be measured on a continuous basis using appropriate flow meters.
- Field turbidity and TSS will be monitored daily. As data becomes available, a TSS and turbidity curve will be generated to manage dewatering activities. Water transferred during dewatering activities will meet a TSS or turbidity threshold discharge criteria. The trigger level to suspend dewatering activities will be 90% of the limit to avoid releasing water above the threshold. Clean lake water will be transferred and monitored until the trigger level is reached. When the TSS trigger level is reached, lake water will be treated for TSS through the WTP before discharge into Goose Lake.
- If released volumes of water change stream base flows or water levels by greater than 10% of baseline, then water transfer rates will be adjusted as required.
- During Construction, the emphasis of monitoring will be on the implementation and success of mitigation at construction areas. Toward the end of Construction, Operations Phase monitoring activities will be implemented, and monitoring will shift to include the relevant aspects of Operations Phase monitoring. Operations Phase activities beginning before the end of the Construction Phase will include the installation of Operations Phase water management facilities, milling, pre-stripping and mining of open pits and underground facilities, and the development of WRSAs.

Operations Phase

In addition to the above efforts during Construction, the following is proposed for monitoring during the Operations Phase:

- Recording daily and monthly water consumption;
- Regular visual monitoring of Operations Phase water management facilities;
- Visual inspections and monitoring of construction areas as described in Section 8.4 of the Environmental Management and Protection Plan (WL SD-20);
- Daily monitoring of the tailings discharge and the supernatant water level within the TSF;
- Monitoring of effluents prior to discharge in relation to the criteria identified for various effluents within the tables of Section 7.5;
- Underground mine inflows will be sampled to verify water quantity predictions and verify storage requirements;
- Monitoring of desalination discharge water to Bathurst Inlet to ensure that the salinity of the water remains within natural variability or CCME guidelines in sensitive marine areas;
- Monitoring of mine contact water effluent discharges as prescribed by a study design developed under the MDMER; and
- Implementation of the future AEMP to monitor effects to downstream aquatic environments.

During Operations, the emphasis will be on inspecting and monitoring construction fronts as aspects of construction will be ongoing throughout the mine life. The Operations Phase monitoring program will also incorporate the monitoring of mining activities and water management systems associated with the active tailings management facilities, pits, WRSA ponds, and the Saline Water Pond.

Closure Phase

The following is proposed for monitoring during Closure:

- Regular inspections to confirm that closure activities are being undertaken as identified in the final approved Mine Closure and Reclamation Plan;
- Construction-type monitoring is undertaken during decommissioning activities as described above;
- TSF/TF water quality monitoring until water quality objectives are met;
- Water quality monitoring of water being discharged from pits and the WRSAs to confirm all meet water quality objectives; and
- Water quality monitoring in Llama TF to confirm treatment is progressing as planned such that the discharge schedule may go ahead.

Due to the relatively long Closure Phase, there will be sufficient opportunities to conduct post-closure monitoring of the closed-out Project features. The WRSAs will be substantively closed during Operations, and the open pits will overtop and be closed early in the Closure Phase; this will allow for a number of years of post-closure monitoring during the Passive Closure Stage. Closure monitoring at receiving waters will be measured against water quality objectives.

Post-Closure Phase

Post-Closure monitoring is expected to be required for five years after completion of closure activities and the completion of water treatment in Llama TF. This is consistent with mine reclamation at other northern sites and is believed to be a reasonable monitoring period given the amount of verification monitoring that can performed during the Operations and Closure phases. Post-Closure monitoring is expected to include:

- Water quality sampling at mine contact water discharge locations in accordance with water quality objectives; and
- Final Environmental Effects Monitoring studies in accordance with the water quality objectives needed to obtain status as a recognized closed mine from ECCC.

Sampling Plan

The sampling plan has been designed to consider the various phases of the Project, but updates will be made as based on advancement of the Project and outcome of monitoring results.

Environmental monitoring station locations are shown on Figure B-01 and Figure B-02 for the Goose Property and MLA, respectively. In addition, Table B-01 and Table B-02 summarizes proposed water quality and flow monitoring of the Project during the Construction, Operations, Closure phases, and includes monitoring station location, monitoring type, description, purpose, mine phase, parameters grouping, and sample frequency for each location. The list of constituents in each parameter group is provided in Table B-03. It is anticipated that some locations will be initiated in Construction and maintained through Post-Closure, while other locations will come on-line in Operations once water is present. Proposed locations will be confirmed in the field.

To the extent practical, water samples will be analyzed for the same suite of constituents as analyzed for the AEMP. This will aid interpretation of AEMP results and linkages to mine related effects.

Figures and details regarding physical, chemical, and biological parameters in the AEMP sampling program are provided in the AEMP (WL SD-21); full details regarding marine monitoring are provided in the Marine Monitoring Plan (WL SD-23).

Sabina committed to developing a stand-alone marine monitoring plan (Term and Condition FA-ECCC-T-1). While, marine monitoring is outside the jurisdiction of the NWB, details on marine monitoring can be found in the Marine Monitoring Plan (WL SD-23).

Sample Collection

Field measurements of specific conductivity, pH, and temperature will be recorded whenever samples are collected using a multi-meter (e.g., YSI 6-Series Multimeter), along with measurements of total water depth, and sample collection depth.

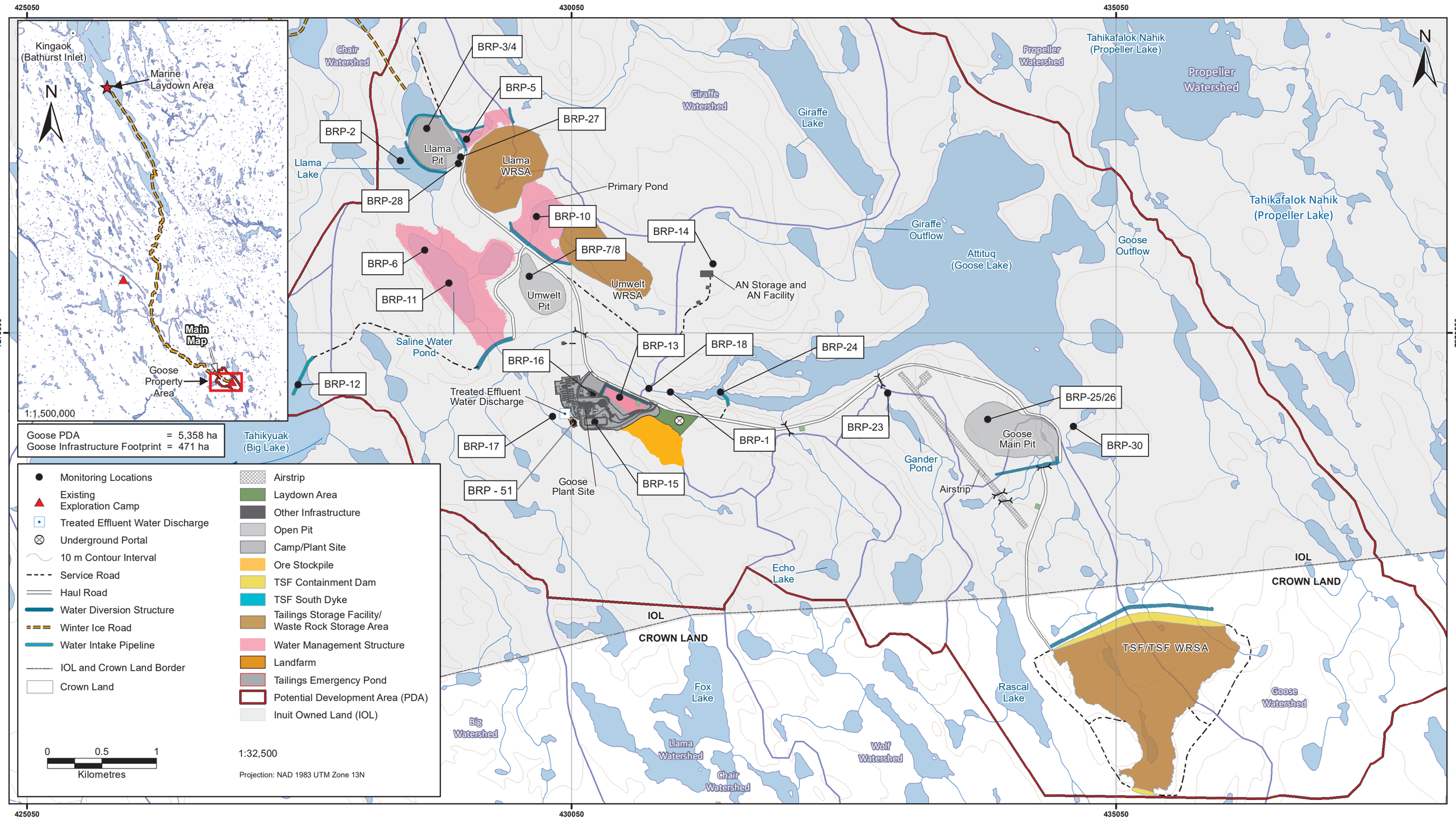
Water quality samples will be collected from specific sampling stations (coordinates still to be confirmed) using a grab sampler or directly into bottles provided by an accredited analytical laboratory. Water quality samples will be analyzed by an accredited laboratory at detection limits less than aquatic life guidelines or as appropriate for site contact water type samples. The specific limits will be provided once the analytical laboratory has been selected.

Quality Assurance and Quality Control

Samples will be collected following standard sampling protocol (e.g., see the Quality Assurance and Quality Control Plan [WL SD-24]) by qualified personnel using suitable sampling equipment. Water samples for laboratory analysis will be filtered and preserved (as required) and stored in a cool environment before shipping to the laboratory. Quality control samples (i.e., blanks and duplicates) will be collected at a quantity of 10% of all samples collected.

Reporting

Results collected in any given year will be included in the annual report. Descriptive summary statistics will be calculated, and results will be analyzed by comparison to Water Licence criteria and aquatic life guidelines (CCME 1999) or baseline conditions, as appropriate.



Sabina GOLD & SILVER CORP.

Proposed Surface Water Monitoring Locations
Goose Property Area, Back River Project

Figure B-02

GIS # BR_FEIS_NA_tab_MLASiteLayout_WL2020_B-02 V:\BackRiver\04_Exploration\BackRiverRegion\GIS_Products\ESRI_MXD\Water_Permitting\BR_FEIS_NA_tab_MLASiteLayout_WL2020_B-02.mxd May 25 2020

380500 381000 381500

7395500 7395000 7394500 7394000 7393500

N

BRP-42

Freight Storage Pad

MLA Shoreline Pad Extension

MLA Fuel Transfer Area

BRP-40

BRP-41

Shoreline Pad

Camp Area

Temporary Fuel Storage Area

Explosive Magazines

Airstrip

MLA Fuel Storage Area (1 Tank Constructed)

Construction Laydown Pad

MLA Airstrip Extension

Existing Quarry

BRP-43

Main Map

Marine Laydown Area

Kilogiktok (Bathurst Inlet, Southern Arm)

BIPR Winter Road Connector

Goose Property Area

Legend

- Monitoring Locations

1:6,000

NAD83 UTM Zone 13N

Kilogiktok (Bathurst Inlet, Southern Arm)

Marine Laydown Area

TO GOOSE PROPERTY

1:420,000

Figure B-02

Sabina GOLD & SILVER CORP.

Proposed Surface Water Monitoring Locations
Marine Laydown Area, Back River Project

Table B-01. Proposed Water Quality Monitoring for the Project during Construction, Operations, and Closure in Goose Property Area

Status	2020 Modification Package Revision	Monitoring Location Number	Monitoring Type	Description	Purpose	Mine Phase	Parameter Group Code[5]	Frequency
Active	No Change	BRP-G-01 to BRP-G-TBD	Regulated Monitoring[1]	General Site Runoff including Quarries - both Goose and MLA	Applies anywhere on the site; monitoring for erosion and sedimentation	Construction	C	Weekly if flow enters a waterbody
Active	Updated Location	BRP-01	Regulated Monitoring[2]	Discharge to Goose Lake (after treatment)	Test of dewatering discharge (i.e., effluent), at final point of control. If water does not meet TSS discharge criteria, water will be treated prior to release[2].	Construction	A, B, G	Weekly during dewatering
							D	Four times during dewatering, at the same time as the weekly samples
							H	Once per month during dewatering, at the same time as groups D and F
							I	One time during dewatering, at the same time as groups D and F
Active	No Change	BRP-02	General Monitoring	Llama Lake Dewatering (prior to treatment) if required	If treatment is required, this station will test pretreated water.	Construction	C (TSS only)	Weekly if treatment is required; no sample if treatment is not required
Active	No Change	BRP-03	Verification Monitoring	Llama Pit	Pit water quality prior to transfer to a tailings facility	Operations (Stage 1) to Operations (Stage 2)	A, G	See note [6]
Active	No Change	BRP-04	General Monitoring	Llama Pit Lake	During pit flooding and before overflow to the downstream environment	Closure to Post-closure	A, D	Twice per year
Active	No Change	BRP-05	Verification Monitoring	Llama WRSA Pond	Test quality of drainage water from Llama WRSA	Operations (Stage 1) to Closure	A, G	See note [6]
Active	No Change	BRP-06	General Monitoring	Umwelt Lake Dewatering (prior to treatment) if required	If treatment is required, this station will test pretreated water.	Construction	C (TSS only)	Weekly if treatment is required; no sample if treatment is not required
Active	No Change	BRP-07	Verification Monitoring	Umwelt Pit	Pit water quality prior to transfer to a tailings facility	Construction to Operations (Stage 2)	A, G	See note [6]

Status	2020 Modification Package Revision	Monitoring Location Number	Monitoring Type	Description	Purpose	Mine Phase	Parameter Group Code[5]	Frequency
Active	No Change	BRP-08	General Monitoring	Umwelt Pit Lake	During pit flooding and before overflow to the downstream environment	Closure to Post-closure	A, D	Twice per year
Inactive	Not Shown	BRP-09	Verification Monitoring	Umwelt WRSA Pond	Test quality of drainage water from Umwelt WRSA. A landfill is located in this WRSA. Appropriate landfill parameters will be tested for; see the LWMP (WL SD-10) for details.	Construction to Closure (early)	A, G	See note [6]
Active	Updated Purpose	BRP-10	Verification Monitoring	Primary Water Pond	Test quality of water in pond for industrial water use. Test quality of drainage water from Umwelt WRSA. A landfill is located in the Umwelt WRSA. Appropriate landfill parameters will be tested for; see the LWMP (WL SD-10) for details.	Construction to Closure (early)	A, D, G	See note [6]
Active	No Change	BRP-11	Verification Monitoring	Saline Water Pond	Test quality of water in pond; Formerly Umwelt Lake	Construction (late) to Closure (early)	A, D	See note [6]
Active	No Change	BRP-12	General Monitoring	Big Lake Intake;	Source intake water quality for potable and industrial use	Construction to Closure	A, D	Four times per year
							B	Weekly
Active	Updated Location & Description	BRP-13	Verification Monitoring	Plant Site Pond (formerly Ore Stockpile Pond)	Test quality of drainage water from Ore stockpile	Construction to Closure (early)	A, D	See note [6]
Active	No Change	BRP-14	Verification Monitoring	ANFO Plant	Test quality of runoff water in the ANFO plant containment area	Construction to closure	A, E	See note [6]
Active	Updated Location	BRP-15	Regulated Monitoring[3]	Goose Fuel Tank Farm	Test quality of runoff water in the Fuel Tank Farm containment area	Construction to closure	A, E	Prior to discharge or transfer of water
Active	Updated Location	BRP-16	Regulated Monitoring[3]	Goose Hazardous Waste Mgmt Area	Test quality of runoff water in the Hazardous Waste Management containment area	Construction to closure	A, E	Prior to discharge or transfer of water

Status	2020 Modification Package Revision	Monitoring Location Number	Monitoring Type	Description	Purpose	Mine Phase	Parameter Group Code[5]	Frequency
Active	Updated Location	BRP-17	Regulated Monitoring[4]	Treated sewage discharge to land	Test quality of sewage effluent discharge water quality	Construction to closure	A, E	Prior to discharge or transfer of water
Active	Updated Frequency	BRP-18	General Monitoring	Llama Watershed Outflow (PN04 from water and load balance)	Test quality of non-contact water runoff from the "Llama" watershed	Construction to closure	A, D	Once during freshet, and monthly during upstream construction while visible flow is present at the stations
Inactive	Not Shown	BRP-19	General Monitoring	Echo Outflow (PN09 from water and load balance)	Test quality of non-contact water runoff from the "Echo" watershed	Operations (Stage 1) to Closure	A, D	Once during freshet, and monthly during upstream construction while visible flow is present at the stations
Inactive	Not Shown	BRP-20	Verification Monitoring	Echo Pit	Pit water quality prior to transfer to a tailings facility; Echo underground water is always directed to the TSF	Operations (Stage 2)	A, G	See note [6]
Inactive	Not Shown	BRP-21	General Monitoring	Echo Pit Lake	During pit flooding and before overflow to the downstream environment	Closure to Post-closure	A, D	Twice per year
Inactive	Not Shown	BRP-22	Verification Monitoring	Echo WRSA Pond	Test quality of drainage water from Echo WRSA	Operations (Stage 2) to Closure (early)	A, G	See note [6]
Active	Updated Frequency	BRP-23	General Monitoring	Gander Pond Outflow (PN07 from water and load balance)	Test quality of non-contact water runoff from the "Gander" watershed	Operations (Stage 1) to Closure	A, D	Once during freshet, and monthly during upstream construction while visible flow is present at the stations
Active	Updated Location	BRP-24	General Monitoring	Goose Lake Intake	Source intake water quality; for operational use (mill water make-up)	Operations (Stage 2) to Closure (early)	B	Weekly
Active	Updated Purpose	BRP-25	Verification Monitoring	Goose Main Pit	Pit water quality prior to transfer to a tailings facility	Operations (Stage 1) to Operations (Stage 2)	A, G	See note [6]
Active	No Change	BRP-26	General Monitoring	Goose Main Pit Lake	During pit flooding and before overflow to the downstream environment	Closure to Post-closure	A, D	Twice per year

Status	2020 Modification Package Revision	Monitoring Location Number	Monitoring Type	Description	Purpose	Mine Phase	Parameter Group Code[5]	Frequency
Active	Updated Location, Description, & Mine Phase	BRP-27	Verification Monitoring	Llama TF Intake; collected at "inlet" to treatment facility	Pre-treatment quality	Operations (Stage 2) to Closure	A, G	See note [6]
Active	Updated Location, Description, & Mine Phase	BRP-28	Verification Monitoring	Llama TF Discharge into Llama TF (after treatment); collected at "outlet" of treatment facility; no discharge to the receiving environment	Post-treatment quality to confirm treatment efficiency	Operations (Stage 2) to Closure	A, G	See note [6]
Inactive	Not Shown	BRP-29	Verification Monitoring	TSF WRSA Pond	Test quality of drainage water from TSF; A landfill is located in this WRSA. Appropriate landfill parameters will be tested for; see the LWMP (WL SD-10) for details.	Operations (Stage 1) to Closure	A, G	See note [6]
Active	No Change	BRP-30	General Monitoring	Goose Southeast Inflow (PN06 from water and load balance)	Test quality of non-contact water runoff from the "TSF" watershed	Operations (Stage 1) to Closure	A, D	Once during freshet
Active	Updated Location	BRP-51	Regulated Monitoring[3]	Goose Landfarm	Test quality of runoff water in the Landfarm containment area	Construction to Closure	E	Prior to discharge or transfer of water

Notes BRP = Back River Project; MLA = Marine Laydown Area

1) See Table 7.5-2 (Dewatering Discharge Criteria) in the Water Management Plan

2) See Table 7.5-1 (Site Runoff Discharge Criteria) in the Water Management Plan

3) See Table 7.5-3 (Discharge to Land Criteria) in the Water Management Plan

4) See Table 7.5-4 (Treated Sewage Effluent Criteria) in the Water Management Plan

5) See Table B-03 for parameters in each monitoring group

6) Monitoring parameters and frequency at the discretion of Sabina as results from the verification stations are used for operational and management purposes

Table B-02. Proposed Water Quality Monitoring for the Project during Construction, Operations, and Closure in Marine Laydown Area

Status	2020 Modification Package Revision	Monitoring Location Number	Monitoring Type	Description	Purpose	Mine Phase	Parameter Group Code[4]	Frequency
Active	No Change	BRP-G-01 to BRP-G-TBD	Regulated Monitoring[1]	General Site Runoff including Quarries - both Goose and MLA	Applies anywhere on the site; monitoring for erosion and sedimentation	Construction	C	Weekly if flow enters a waterbody
Active	Updated Location	BRP-40	General Monitoring	Bathurst Inlet Intake (pre-treatment)	Source intake water quality for potable and industrial use	Construction to Closure	A, D	See note [5]
							B	See note [5]
Active	Updated Location	BRP-41	General Monitoring[1]	Bathurst Inlet Discharge (post treatment)	Test quality at final point of control	Construction to Closure	A, J	See note [5]
Active	Updated Location	BRP-42	Regulated Monitoring[2]	MLA Treated Effluent Discharge Location to land (greywater)	Confirm quality of greywater before release	Construction to Closure	A, F	Prior to discharge or transfer of water
Active	No Change	BRP-43	Regulated Monitoring[3]	MLA Fuel Tank Farm	Test quality of runoff water in the Fuel Tank Farm containment area	Construction to closure	A, E	Prior to discharge or transfer of water
Inactive	Not Shown	BRP-44	Regulated Monitoring[3]	MLA Landfarm	Test quality of runoff water in the Landfarm containment area	Construction to closure	A, E	Prior to discharge or transfer of water
Inactive	Not Shown	BRP-45	Regulated Monitoring[3]	MLA Hazardous Waste Mgmt Area	Test quality of runoff water in the Hazardous Waste Management containment area	Construction to closure	A, E	Prior to discharge or transfer of water

Notes BRP = Back River Project; MLA = Marine Laydown Area

1)Marine Discharge Criteria not required for the Water Licence

2) See Table 7.5-4 (Treated Sewage Effluent Criteria) in the Water Management Plan

3) See Table 7.5-3 (Discharge to Land Criteria) in the Water Management Plan

4) See Table B-03 for parameters in each monitoring group

5) Monitoring parameters and frequency at the discretion of Sabina as results from the verification stations are used for operational and management purposes

Table B-03. List of Constituents in Each Parameter Group

Parameter Group	Parameter Group Code	Specific parameters
Field Chemistry	A	pH, specific conductivity, and temperature.
Flow	B	Flow datalogger, calculated volume
General Surface runoff	C	Total Suspended Solids (TSS), Oil and Grease, pH
General Chemistry	D	Conventional: turbidity, hardness, alkalinity, calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, total dissolved solids, TSS, total cyanide, free cyanide, and weak acid dissociable (WAD) cyanide. Nutrients: ammonia, nitrate, nitrite, total phosphorus (TP), and dissolved organic carbon. Total and dissolved metals: aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, uranium, and zinc Other: radium-226, *Escherichia coli,* and Total coliforms, when required
Secondary Containment	E	TSS, pH, ammonia, total arsenic, total copper, total lead, total nickel, total zinc, benzene, toluene, ethylbenzene, xylene, Oil and Grease
Sewage	F	Biochemical Oxygen Demand (5-day), TSS, Fecal coliform, ammonia, phosphorus, Oil and Grease, pH, Acute toxicity (Rainbow Trout and Daphnia magna)
MDMER deleterious substances	G	TSS, total cyanide, total arsenic, total copper, total lead, total nickel, total zinc, and radium-226
MDMER toxicity	H	Acute toxicity (Rainbow Trout and Daphnia magna)
MDMER sublethal toxicity	I	Sublethal toxicity (Fathead Minnow or Rainbow Trout, Ceriodaphnia dubia, Lemna minor, Pseudokirchneriella subcapitata)
Discharge to Marine	J	Salinity, total metals (aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, uranium, and zinc), oil and grease

Note: Detection limits may vary for site monitoring and for downstream receiving environment monitoring

REFERENCES

1985. *Fisheries Act*. R.S.C. 1985, c. F-14.

1988. *Environmental Protection Act*. RSNWT (Nu) 1988, c E-7.

1993. *Nunavut Agreement Act*. S.C. 1993, c. 29.

CCME (Canadian Council of Ministers of the Environment). 1999 (with updates to 2017). Canadian Environmental Quality Guidelines for the Protection of Aquatic Life – Summary Table. Available at: http://st-ts.ccme.ca/.

Appendix C. Saline Water Management Plan

Water Management Plan

Appendix C: Saline Water Management Plan

June 2020

BACK RIVER PROJECT
SALINE WATER MANAGEMENT PLAN

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Revision Log

Version	Date	Section	Page	Revision
1	June 2018	All	All	Addition of Appendix C: Saline Water Management
2	June 2020	All	All	Updated to reflect the 2020 Modification Package changes, and as a Supporting Document for the Type A Water Licence Application; submitted to the Nunavut Water Board for review and approval.

Acronyms

CCME	Canadian Council of Ministers of the Environment
MDMER	Metal and Diamond Mining Effluent Regulations
MAD	Main Application Document, submitted October 2017 (2AM-BRP1831)
NWB	Nunavut Water Board
Project	Back River Project
Sabina	Sabina Gold & Silver Corp.
SD	Supporting Document
SWMP	Saline Water Management Plan
SWP	Saline Water Pond
TF	Tailing Facility
WMP	Water Management Plan

1. Introduction

The Saline Water Management Plan (SWMP or the Plan) is developed as an appendix to the Water Management Plan (WMP) to provide additional details related to the management of saline groundwater in compliance with the Type A Water Licence, 2AM-BRP1831. The WMP outlines the procedures required to manage the quantity and quality of water interacting with Project components throughout the Construction, Operations, Closure, and Post-Closure phases of the Project.

The SWMP outlines the procedures required to manage the quantity and quality of saline groundwater interacting with Project components throughout the mine life, and characterization of saline water inflows into the underground mine workings. The Plan also includes monitoring of thermal conditions, monitoring of saline water at the Goose Property, mitigation measures designed to address the potential for higher-than-predicted volumes of saline water inflows into the open pits and the underground mine, and potential water treatment and disposal methods.

2. Scope and Objectives

The SWMP is provided as an addendum to the WMP with the objective of further detailing the saline water management strategies and designs for the Project, including considerations about contingencies, monitoring, and potential adaptive management strategies. The SWMP applies to all phases of the Project during which saline water will be managed. The SWMP has been written to meet requirements of the Type A Water Licence (2AM-BRP1831) and NIRB Project Certificate (No. 007).

The purpose of the SWMP is to:

- outline procedures and processes specific to management of saline water through all phases of the Project, as proposed in the WMP;
- summarize designs of infrastructure dedicated to management of saline water;
- meet relevant laws and regulations;
- detail mitigation (adaptive management) strategies to manage potential adverse environmental effects; and
- define steps that will be taken to monitor potential mitigation measures for success.

The WMP incorporates strategies for saline water management that allow full containment of saline water within the Project site throughout the various phases of the Project. Additional details related to the closure and reclamation of saline water management structures can also be found in the Interim Closure and Reclamation Plan (WL SD-26).

The SWMP, as part of the WMP, will be updated as needed to reflect changes in operations and technology. Any updates will be filed with the Annual Report submitted under the Type A Water Licence, or as otherwise directed by the NWB.

The SWMP is divided into the following sections:

- Applicable Legislation and Guidelines (Section 3);
- Saline Water Management Strategy (Section 4);
- Monitoring and Reporting Program (Section 5);
- Quality Assurance/Quality Control Procedures (Section 6);
- Adaptive Management (Section 7); and
- Reclamation (Section 8).

2.1 RELATED DOCUMENTS

Documents within the Application for the Type A Water Licence supporting the SWMP include the following:

- Hydrogeological Characterization and Modelling Report (Sabina 2017, Appendix F-5);
- Environmental Management and Protection Plan (WL SD-20);
- Water Management Plan (Appendix B to the 2020 Modification Package);
- Aquatic Effects Management Plan (WL SD-21);
- Road Management Plan (WL SD-02);
- Interim Closure and Reclamation Plan (WL SD-26);
- Quality Assurance / Quality Control Plan (WL SD-24);
- Hydrology Report (Sabina 2015, Appendix V2-7B);
- Water and Load Balance Report (Appendix E of the WMP); and

3. Applicable Legislation and Guidelines

Specific legislation, regulations, and guidelines related to water management in Canada, and specifically within Nunavut, are summarized in the Table 3-1 of the WMP.

Sabina is bound by the terms and conditions of its land use permits issued by the Kitikmeot Inuit Association for Inuit Owned Land, Crown-Indigenous Relations and Northern Affairs Canada for Crown Land, and the Type A Water Licence (2AM-BRP1831).

4. Saline Water Management Strategy

As defined in the WMP, saline water for the Project is the groundwater that flows into Llama Open Pit (only pit not in permafrost) and the underground workings, refer to Figure A-11 and A-12 of the WMP for the location of Goose Property infrastructure and the Saline Water Pond. A small volume of brine water may be used for drilling in the underground mine workings. This brine water would be recirculated during drilling as much as feasible, with any excess managed synonymously with other saline water from the Project as described below.

This section provides a description of the saline water management strategy throughout the Construction, Operations, and Closure phases of the Project. In summary, the saline water management strategy consists of collecting saline water from Llama Open Pit and the underground mine workings, and temporarily storing this groundwater in a dedicated storage facility until it can be returned back into the mined-out underground workings and the exhausted Umwelt Open Pit.

4.1 PERMAFROST CHARACTERISTICS AND GROUNDWATER INFLOWS

The Back River Property is located in the continuous permafrost region of the Canadian Arctic. While permafrost may extend in excess of 400 metres below the ground surface (mbgs), it is expected that some of the underground development will extend below this depth into unfrozen rock and soil. In addition, Llama Open Pit will be located within a through talik underneath Llama Lake.

As part of the Project, a groundwater prediction model was completed to estimate potential groundwater inflows during mining at the Goose Property (Sabina 2017, Appendix F-5); this model was employed in both the FEIS (Sabina 2015) and the Type A Water Licence Application (Sabina 2017). Sabina subsequently scaled the quantity and quality of groundwater inflows predicted to match the new mine schedule. A summary of the estimated quarterly groundwater inflows at the Goose Property and corresponding Total Dissolved Solids (TDS) concentrations is provided in Table 4.1-1 and Table 4.1-2, for Llama Pit and Umwelt Underground, respectively.

Table 4.1-1. Llama Open Pit Quarterly Groundwater Inflows and TDS Concentrations

Mine Year	Inflow		Total Dissolved Solids	
	Volume (m^3)	Rate (m^3/day)	Mass (tonne)	Concentration (mg/L)
Y1Q3	82,200	900	700	8,500
Y1Q4	48,300	500	400	9,300
Y2Q1	21,500	200	200	9,800
Y2Q2	20,100	200	200	10,100
Y2Q3	49,100	500	500	9,900
Y2Q4	28,800	300	300	9,600
Y3Q1	38,400	400	400	9,300
Y3Q2	35,700	400	300	9,300
Y3Q3	46,800	500	400	7,800
Y3Q4	44,600	500	300	7,600

(continued)

Table 4.1-1. Llama Open Pit Quarterly Groundwater Inflows and TDS Concentrations (completed)

Mine Year	Inflow		Total Dissolved Solids	
	Volume (m^3)	Rate (m^3/day)	Mass (tonne)	Concentration (mg/L)
Y4Q1	32,900	400	200	7,300
Y4Q2	37,700	400	200	6,500
Y4Q3	35,300	400	200	5,900
Y4Q4	44,400	500	200	5,600
Y5Q1	48,800	500	300	5,800

Table 4.1-2. Umwelt Underground Quarterly Groundwater Inflows and TDS Concentrations

Mine Year	Inflow		Total Dissolved Solids	
	Volume (m3)	Rate (m3/day)	Mass (tonne)	Concentration (mg/L)
Y1Q1	11,000	100	300	29,000
Y1Q2	27,000	300	900	33,300
Y1Q3	38,200	400	1,400	37,500
Y1Q4	60,500	700	2,500	41,000
Y2Q1	71,200	800	3,100	43,400
Y2Q2	74,400	800	4,400	59,000
Y2Q3	74,400	800	4,400	59,000
Y2Q4	74,400	800	4,400	59,000
Y3Q1	74,400	800	4,400	59,000
Y3Q2	74,400	800	4,400	59,000
Y3Q3	62,000	700	3,000	48,900
Y3Q4	51,900	600	2,600	49,400
Y4Q1	45,700	500	2,300	49,500
Y4Q2	45,700	500	2,400	53,500
Y4Q3	63,500	700	3,800	60,500
Y4Q4	74,400	800	4,400	59,000
Y5Q1	72,900	800	4,100	56,900
Y5Q2	60,500	700	3,500	57,000
Y5Q3	54,500	600	3,100	57,200
Y5Q4	51,100	600	2,900	57,300
Y6Q1	48,100	500	2,800	57,500
Y6Q2	44,700	500	2,600	57,700
Y6Q3	43,300	500	2,500	57,900
Y6Q4	42,200	500	2,500	58,200
Y7Q1	40,700	400	2,400	58,400
Y7Q2	38,700	400	2,300	58,700
Y7Q3	38,000	400	2,200	58,900

(continued)

Table 4.1-2. Umwelt Underground Quarterly Groundwater Inflows and TDS Concentrations (completed)

Mine Year	Inflow		Total Dissolved Solids	
	Volume (m3)	Rate (m3/day)	Mass (tonne)	Concentration (mg/L)
Y7Q4	37,400	400	2,200	59,200
Y8Q1	36,500	400	2,200	59,500
Y8Q2	35,000	400	2,100	59,700
Y8Q3	34,600	400	2,100	60,000
Y8Q4	34,300	400	2,100	60,200
Y9Q1	33,700	400	2,000	60,500

At the Goose Property, groundwater modelling and analysis determined that inflows are expected from Llama Open Pit, and Umwelt Underground. Llama open pit mining will be developed below Llama Lake within a through talik that is connected to the groundwater system. It is also expected that Umwelt underground workings will intercept the groundwater system below the basal permafrost layer. The remaining developments (Umwelt Open Pit, and Goose Main Open Pit) are not expected to have notable groundwater inflows.

The inflows and concentrations in Table 4.1-1 and Table 4.1-2 were derived from hydrogeological parameters obtained from the field investigation program results, including installation of the Westbay Well to conduct groundwater quality sampling at the Goose Property. Multiple hypothetical scenarios were modelled to assess the sensitivity of groundwater model predictions to hydraulic conductivity (K) values, the potential presence of fault conduits, lake sediment K values, and permafrost distribution. The hypothetical scenarios were used to contextualize the overall groundwater model in terms of both quantity and quality of water estimated to report to the mine workings.

Groundwater inflows in Table 4.1-1 and Table 4.1-2 represent quarterly average flows, meaning they are estimated as the total annual inflow volumes equally distributed over three months. As such, these inflow volumes do not fully account for the actual schedule of mining completion in the last year of facility. If the facilities are completed in the first few weeks of the production quarter, the inflow rates for those months would be higher than the quarterly average inflow rates, as the total annual estimated inflow volume would be concentrated in a period of time shorter than three months. Linear interpolation was assumed for groundwater flow into Llama Open Pit during pit flooding; this is further described in Water and Load Balance Report, Appendix E of the WMP.

A detailed description of the groundwater prediction model and results through all mine phases can be found in the Hydrogeological Characterization and Modelling Report for the Project (Sabina 2017, Appendix F-5).

4.2 SALINE WATER MANAGEMENT STRATEGY AND ASSOCIATED CONTROL STRUCTURES

Sabina recognizes that there is a chance that groundwater flow in the mine workings may be dominated by specific fractures or features that are intercepted. This uncertainty exists for all mining projects and is never completely alleviated, which is the reason why structural geology and hydrogeology data are regularly collected from mining operations. The influx of groundwater into a mine is a normal and well understood phenomenon and is regularly managed by standard operating procedures in operating mines. Sabina is aware of the uncertainty related to fault zones and will take advanced actions where feasible to help safely and appropriately manage groundwater inflows reporting to the mine workings. These actions may include use of surface and underground exploration information to identify enhanced permeability that may be intercepted by the mine workings, advancing cover and probe drilling (i.e., exploration drainage holes), and interpretation of groundwater pressure and inflow data when high permeability formations are encountered.

A series of options to manage saline water as it reports to the mine workings was identified and assessed during the development of the WMP. These options included, but were not limited to, physical barriers to cut off inflow, temporary and/or permanent storage in dedicated storage facilities, and an array of pumps and sumps to collect and transfer saline water. Potential saline water management options are listed in order of preference (from most preferred or applicable to least preferred or applicable) in Table 4.2-1, along with a discussion of the applicability of each option given the current mine plan.

Table 4.2-1. Saline Water Management Options Considered

Management Option/Location	Discussion of Applicability
Exhausted open pits (Umwelt, Llama, Goose Main, or other open pits)	A possible option if the future pit lake could be managed to support meromictic conditions, resisting turnover due to pit lake geometry, and therefore unlikely to result in a discharge of saline water to local freshwater streams. Currently, Umwelt Pit is expected to be developed as meromictic, but depending on the developing mine plan, all pits could be considered for the possibility of temporary or permanent saline water storage. In-pit tailings disposal in all pits would be prioritized over disposal of saline water. The use of exhausted open pits, along with mined-out underground workings, provide the most suitable permanent saline water disposal locations; however, the timing of saline water discharges, relative to the availability of either as permanent storage, may not match.
Closed U/G workings (Umwelt or other underground workings)	A possible temporary or final disposal option. It is noted that underground workings are the main source of saline water and could not be used for disposal until mining is completed. The use of mined-out underground workings, along with exhausted open pits, provide the most suitable permanent disposal locations; however, the timing of saline water discharges, relative to the availability of either as permanent storage, may not match.
Modified natural containment area (Llama Lake or Umwelt Lake)	A modified natural containment area (for example, Llama or Umwelt lakes) could be suitable as a temporary saline water storage area and could be used for permanent saline water storage as long as any overflow meets appropriate discharge criteria. A modified natural containment area is technically feasible and economically viable. Impacts to fish and fish habitat for use of Umwelt Lake and dewatering of Llama Lake have already been assessed (refer to Fish Out Plan [Sabina 2015, Volume 10, Chapter 21] for details). No additional impacts to fish or fish habitat would be realized as a result of using Llama or Umwelt lakes as modified natural containment areas. Llama Lake is the only natural containment area currently identified that provides the estimated required storage volume (approximately 1.1 M-m^3). Current water management planning identifies Umwelt Lake as the Saline Water Pond; it is the preferred temporary saline water storage area and could be used if inflow volumes are greater than anticipated.

(continued)

Table 4.2-1. Saline Water Management Options Considered (completed)

Management Option/Location	Discussion of Applicability
Tailings Storage Facility / Tailings Facility	Supernatant pond water from the active Tailings Storage Facility (TSF) or Tailings Facility (TF) will be reclaimed for the Process Plant. The Process Plant cannot easily tolerate the expected high salinity levels in the saline water, and as such, storing saline water in the active TSF/TF is not the preferred option. However, saline water may be sufficiently diluted in the supernatant pond to temporarily provide storage for limited periods (i.e., months), if required, and not upset the process. In addition, if the groundwater is of better quality than currently predicted, or salinity tolerances in the Process Plant are higher, saline water could be permanently stored with the supernatant pond. Once a TF is no longer used for Process Plant reclaim (i.e., tailings deposition moved to the next TF), the facility could be used to store saline water as long as an appropriate freshwater cover was maintained over existing tailings, and discharge criteria are met for overflows.
Man-made surface containment ponds	Similar to the modified natural containment area, man-made surface containment ponds could be constructed (or a current water management pond could be utilized) to temporarily or permanently store saline groundwater; this would be at a higher (than other options) cost and could increase the footprint of the surface disturbance within the Property. The man-made surface containment ponds would be designed and constructed to avoid additional impacts to fish or fish habitat.
Local watercourses following treatment	Saline groundwater could be processed in a reverse osmosis (or similar) water treatment process for discharge to the environment. Saline water treated to meet effluent discharge criteria acceptable to the NWB could be released to a local watercourse. However, such treatment produces a small volume of high salt brine that would require management and disposal.
Transport and disposal to Bathurst Inlet	Should on-site storage volumes be insufficient, saline water, or high salt brine from reverse osmosis treatment, could be transported to Bathurst Inlet and discharged via a diffuser. Should this option be required it is noted that significant additional regulatory requirements (including MDMER) may be required.
Physical barriers to cut off groundwater inflow	Current data suggest that permafrost and tight ground conditions will limit the volume of inflows. Use of physical barriers to cut off groundwater inflows prior to it reporting to the mine workings is a high cost measure, especially if used on a large scale, and is therefore not the preferred option for the Project. However, this option will be considered as an adaptive management measure to mitigate local, higher than expected inflows, if encountered.

The availability and applicability of the above options depend upon a number of factors, including timing (when the saline water will be generated relative to when the appropriate storage location is available), actual Project development schedule, the need for prioritizing the disposal of tailings over saline water, and the fact that, unlike solid mine wastes such as tailings or waste rock, saline groundwater can be temporarily stored more easily as it can be moved (i.e., pumped) to its final disposal location with relative ease.

Selection of the available permanent storage location for saline water is a function of current Project timing. As the Umwelt Pit will become available for storage in Year 3, this is the basis for selecting this location as permanent storage for saline water. In addition, this location is close to the temporary saline water storage in the former Umwelt Lake (called the Saline Water Pond [SWP]). The underground workings at Umwelt become available in the later years of the mine life and can be used to store any remaining saline water at that time, if necessary.

Should contingency measures for saline water storage in open pits or other above-listed storage locations be identified (other than what is currently captured in the mine plan), Sabina intends to provide the NWB at least 60 days' notice prior to implementation with the following: water disposal volumes, disposal

timing, maximum pit/storage capacity, effects to pit closure, and appropriate mitigation and monitoring plans.

4.3 SALINE WATER POND DESIGN CRITERIA

The Saline Water Pond (SWP), in the former Umwelt Lake, was selected as the preferred alternative for the temporary storage of Project saline water before permanent storage capacity becomes available in Umwelt Pit. Details on the SWP design are provided in Section 6 of the WMP.

The SWP will have one containment dam located south end of the Umwelt Lake basin (WMP Figure A-11). The design event for the containment structures was defined based on a qualitative assessment of the risk level associated with overtopping or breaching of the structure. The SWP Containment Dam was assigned a "high risk" classification based on the consideration that discharge from these structures in the unlikely event of an overtop/breach would be directly into the environment; this consideration is consistent with overall Project design criteria.

In 2018, Sabina completed a geotechnical drill program at the Goose Property that included field characterization at the SWP location at that time (which has now been updated). In part based on this drilling, the decision was made to move the SWP Containment Dam slightly south of the previously proposed location, that appears more geomorphologically favourable (Figure A-26 of the WMP). Sabina will be conducting more field characterization studies in support of final design of the SWP, and further characterization, in the form of drilling and field percolation testing, will be carried out immediately prior to construction of the facility. The information from the field characterization will verify that the design meets the required intent of full containment of the saline water and will inform Sabina on the need for implementation of additional measures to provide containment of saline water. Information, including geological cross sections, collected in support of final designs of the infrastructure, will be provided to the NWB, and any additional information relevant to the design gathered during construction will be documented in the as-built drawings for the facility.

4.4 EXISTING GROUNDWATER MANAGEMENT CONTROL STRUCTURES

There are currently no existing groundwater management control structures in place at the Project.

4.5 SALINE WATER MANAGEMENT SCHEDULE

Table 4.5-1 outlines the timeline for key saline water management activities, including tasks and facilities. A detailed Mine schedule for overall Mine Water Management (e.g., building of culverts, berms, and containment dams) is presented in the WMP.

During Phase 1 (Construction), Umwelt Lake will be dewatered to construct the SWP. The SWP Containment Dam will be constructed before the pumped saline water level requires containment.

For Phase 2 (Operations), saline water from the Umwelt underground mine and the Llama Open Pit will be collected and pumped to the SWP. In Year 3, saline water from the SWP will be pumped at a rate of around 13,000 m^3/day to the bottom of Umwelt Reservoir (formerly Umwelt Open Pit). A freshwater cap will be generated from contact and non-contact runoff water, creating a meromictic (stratified) lake. In total, approximately 1.3 Mm^3 of saline water will be pumped into the Umwelt Reservoir. Saline water will also be pumped into the mined-out Umwelt Underground, after mining of Umwelt Underground is complete in Year 10.

Following the dewatering of the SWP, sediment in the basin will be tested, and removed, if required, to meet defined discharge water quality criteria; see Section 5.2 for additional details. The containment dam will be breached once water from the SWP area is deemed suitable for discharge.

Table 4.5-1. Overview of Saline Water Management Activities

Activity	Mine Year	Notes
Umwelt Lake is fished out in preparation for lake dewatering	-2	
Umwelt Lake is dewatered to Goose Lake to allow for construction of the Saline Water Pond.	-1	Portion of water is treated for TSS.
The Saline Water Pond is constructed.	-1	
Saline water from Umwelt Underground mine is pumped to the Saline Water Pond.	1	Approximately until end of Year 2, Q2
Saline water inflow from Llama Open Pit is pumped to the Saline Water Pond.	1	Approximately until end of Year 2, Q2
Saline water from the Saline Water Pond will be pumped to the bottom of Umwelt Reservoir to create a meromictic lake.	3	In total, approximately 1.3 Mm^3 of saline water will be pumped into the Umwelt Reservoir.
Saline water is pumped from the Umwelt Reservoir into the Umwelt Underground mine.	10+	Umwelt Reservoir volume currently conservatively assumes no saline water is pumped into the underground, which creates additional storage capacity of this facility.
Surficial soils in the footprint of former Umwelt Lake lakebed are excavated and placed in the Llama TF	4	Top 1-2m will be removed.
Decommissioning of Saline Water Pond Containment Dam	4	After dewatering of Saline Water Pond and removal of soils.

Source: Water Management Plan

5. Monitoring and Reporting Program

This section presents a summary of the saline water monitoring and reporting programs that will be carried out during Construction and Operations related to mine development water quantity and quality.

As part of effective mine water management, monitoring is important to verify the predicted water quality and quantity trends and conduct adaptive management should differing trends be observed. Monitoring will occur at three levels:

- Regulated discharge monitoring occurring at monitoring points specified in the approved Licence or regulations.
- Verification monitoring carried out for operational and water management purposes by Sabina. This monitoring data will not be reported to the Regulators in the Annual Water Licence Report but can be provided upon request by the Regulators.
- General monitoring included in the Licence requirements and subject to compliance assessment to confirm sampling was carried out using established protocols, including quality assurance/quality control provisions, and addressing identified issues. General monitoring is subject to change as directed by an Inspector, or by the Licensee, subject to approval by the NWB.

All three types of monitoring will be used at the Mine. Appendix B of the WMP presents the monitoring plan relating to water management during Construction, Operations, and Closure. More detailed information on the planned monitoring programs for the Project are provided in the Environment Management and Protection Plan (WL SD-20).

5.1 WATER QUANTITY

The volume of saline water being collected and transferred to and from the SWP will be measured using flow meters. This data will be supplemented by periodic seepage surveys which will record visually observed groundwater inflows in the open pits and underground mines. Measured groundwater inflow rates will be compared to model predictions on an annual basis. If significant variations from model predictions are observed, the assumptions behind the analysis will be reviewed and the analysis updated, if required. In addition, updates to the groundwater model may be required based on operational changes as the Project advances.

The prediction node PN04 will illustrate flows downstream of Umwelt Open Pit and the SWP.

5.2 WATER QUALITY

Saline water quality will be monitored in the SWP to assess the quality of groundwater flowing into Llama Open Pit and the underground workings. The Water Quality Monitoring for the Project (WMP Appendix B) provides information on proposed water quality sampling stations to be monitored. Saline water inflows from Llama Open Pit and underground mines will be monitored. The proposed BRP-11 monitoring station at the SWP will be used monitor the quality of water in this pond. Refer to WMP Appendix B, Table B-01, Figures B-01 and B-02 for exact location of monitoring stations.

To understand and plan for treatment requirements at surface, if deemed necessary, water accumulating in sumps underground will also be sampled on a monthly basis prior to recirculation for underground use or pumping to the SWP.

Water quality results will be compared to regulated water licence requirements, Metal and Diamond Mining Effluent Regulations (MDMER; Canada Gazette 2017), Canadian Council of Ministers of the Environment (CCME), and Site-Specific Water Quality Objectives guidelines.

Sabina notes the potential for chloride concentrations within sediments encountered at the bottom of the Saline Water Pond, once the saline water has been removed. Sabina has identified a number of mitigation measures to reduce chloride concentrations within the sediment, including removal of sediments for disposal within Llama TF. Sabina will track sediment and pore water chloride concentrations for the SWP in order to ensure appropriate water quality for the reconnection of Umwelt Lake to surface waters. A target chloride concentration of 120 mg/L (following the CCME guideline for the Protection of Aquatic Life) would be achieved at the receiving environment (defined as per the *Fisheries Act*).

Sabina also notes the potential exists for migration of saline water from the SWP to the surrounding environment. Sabina will therefore monitor the permafrost in the locations where seepage may occur as well as monitor the condition of vegetation in the vicinity of the SWP for effects due to the presence of saline groundwater.

5.3 THERMAL CONDITIONS MONITORING

The potential effect of the underground operations to the permafrost thermodynamics and hydrogeological system will consist of minor local modification of the thermal regime at the vicinity of the underground workings and a mobilization of frozen groundwater into the regional system.

During Operations, the underground workings will be backfilled progressively with waste rock and the groundwater encountered at depth will be pumped to the SWP (or Umwelt Reservoir) at surface. Once mining and backfilling are complete, the saline water stored in the SWP will be pumped into the remaining underground void space. As water saturates the mined-out areas, the heat will transfer to the surrounding permafrost and generate local thawing of the frozen ground surrounding the workings. The underground areas will be expected to freeze back where the minimum ground temperature is less than -2°C (above ~350 mbgs depth). However, it is possible that parts of the underground areas will not completely freeze back due to the large latent heat requirements combined with relatively warm permafrost temperatures at depth.

The underground mines are in competent rock and the structural stability of this bedrock does not rely on permafrost. The Project mine design parameters for the permafrost and talik zones are identical demonstrating that the structural integrity of the mines does not rely on presence of permafrost. There are therefore no concerns that permafrost thawing would lead to subsidence at surface. Pending final engineering designs and additional field characterization, Sabina will review and assess the requirements associated with thermal conditions monitoring. Sabina will undertake verification monitoring if needed.

6. Quality Assurance/Quality Control Procedures

Quality Assurance refers to plans or programs that encompass a wide range of internal and external management and technical practices designed to ensure the collection of data of known quality that matches the intended use of the data. Quality Control is a specific aspect of Quality Assurance that refers to the internal techniques used to measure and assess data quality.

Quality Assurance and Quality Control specific guidelines for the Project are provided in the Quality Assurance / Quality Control Plan (WL SD-24). These guidelines will equally apply to the saline water management structures and the saline water monitoring program.

7. Adaptive Management

The mine design, including the management of saline water, has been carefully prepared taking into consideration the vast database of site characterization data gathered for the Project, coupled with rigorous engineering analysis. Where data were limited, conservative assumptions were consistently applied. While there is a high level of confidence that the plans are viable and realistic, it is understood that mining activities are by nature inherently uncertain. Therefore, additional mitigation or adaptive management may be required as an outcome of monitoring activities described in Section 5. This may include changes to saline water management as a result of operational, engineering, and/or environmental monitoring. Any additional mitigation or adaptive management that is found to be required will be implemented in a timely manner.

Possible upset scenarios, and contingency strategies to address, are outlined Table 7-1.

Table 7-1: Saline Water Contingency Strategies

Possible Scenario	Contingency Strategy
Saline inflow volumes into the mine workings are greater than expected.	Modification and/or adjustment of the mine plan to avoid areas of concern, or to use mined-out underground stopes to provide surge capacity. Additional sump capacity to handle higher than predicted inflows. Pre-grouting of highly conductive structures prior to intersection with the mine workings. Isolation of mining sections with bulkheads to control or minimize mine inflows. If the average long-term groundwater inflows are higher despite these measures, the meromictic lake in the Umwelt Reservoir has extra capacity for saline water storage. Additional storage locations could be identified, blending of saline water with other contact water may be investigated, or treatment to desalinate the water may be required.
Water quality in the Saline Water Pond does not meet wildlife guidelines and wildlife (such as migratory waterfowl or caribou) are found to be using the pond or drinking from the pond.	Wildlife will be excluded from the ponds following an adaptive management approach.
Underground mining operations cease prior to the underground deposition of the required volume of saline water from the Saline Water Pond.	Additional storage locations will need to be identified, or treatment to desalinate the water may be required. If necessary, the meromictic lake in the Umwelt Reservoir has extra capacity for saline water storage.
Chloride sediments are encountered at the bottom of the Saline Water Pond once the saline water has been removed.	Sediments will be excavated and deposited in Llama Tailings Facility (TF). Alternatively, the base of the dewatered SWP could be washed down with freshwater and the rinse water will be pumped out. If necessary, this rinsing method would be repeated until the salinity of the rinse water is acceptably low (i.e., chloride concentration of 120 mg/L or less).
Water quality within the re-watered Umwelt Lake does not meet the requirements (Section 5.2) at the time of release.	Additional water treatment may be necessary.

The SWMP is part of a continually evolving process that relies not only on the efficacy of data collection and analytical results, but is also dependent on feedback from the communities, government, Indigenous groups, and the public. Having an adaptive and flexible program allows for appropriate and necessary changes to the design of monitoring studies, and the mitigation and monitoring plans. Some changes may come about through the observation of unanticipated effects or inadequacies in the sampling methods to detect measurable effects. Other changes may result from ecological knowledge acquired through working with Indigenous community members and discussions with Elders, both in the field and through workshops.

The SWMP will be reviewed on a regular basis to incorporate lessons learned, major changes to facility operation or maintenance, and environmental monitoring results relating to the management of saline water at the Project. Any updates will be filed with the Annual Report submitted under the Type A Water Licence (2AM-BRP1831), unless otherwise directed by the NWB.

8. Reclamation

The majority of the SWP closure activities will occur as progressive reclamation with the remainder occurring in the Closure Phase. The SWP will be dewatered to the Umwelt Reservoir using separate pumping and pipeline infrastructure during Operations. In addition, a portion of saline water stored in Umwelt Reservoir will be pumped back into the Umwelt Underground as part of closure of this facility.

Once the SWP has been dewatered, sediments will be tested and if the chloride content would be considered to be too high to achieve Site-specific Water Quality Objectives and/or CCME guidelines for the Protection of Freshwater Aquatic Life when the facility was re-watered, these sediment would be removed and placed in the Llama TF. Based on average hydraulic conditions, the Llama TF will take approximately six years to fill with water (i.e., the facility is expected to overflow in Year 11). Therefore, SWP sediments placed in the Llama TF will have six years to settle prior to overflows from the facility are anticipated. This is considered a sufficient length of time for the sediments to settle; however, the water will be tested prior to overflow, and treatment for suspended sediment will be implemented if necessary.

Once the water in the re-watered SWP meets Site-specific Water Quality Objective and/or CCME guidelines for the Protection of Freshwater Aquatic Life, the SWP Containment Dam will then be breached allowing Umwelt Lake to re-establish.

Additional details pertaining to reclamation and closure are provided in the Interim Closure and Reclamation Plan (WL SD-26).

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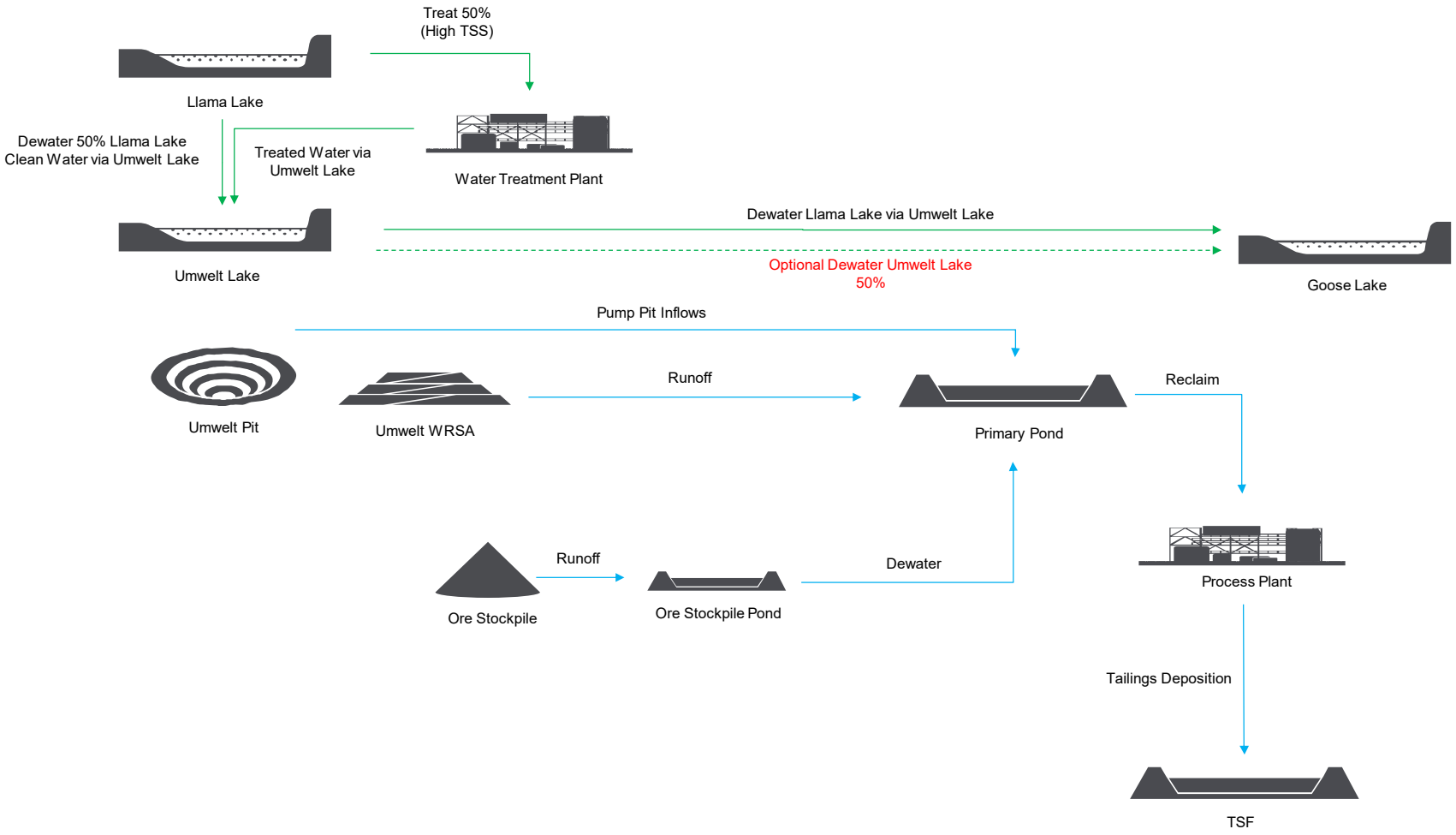
Appendix D. Water Management Flowsheets



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Job No: 1CS020.016
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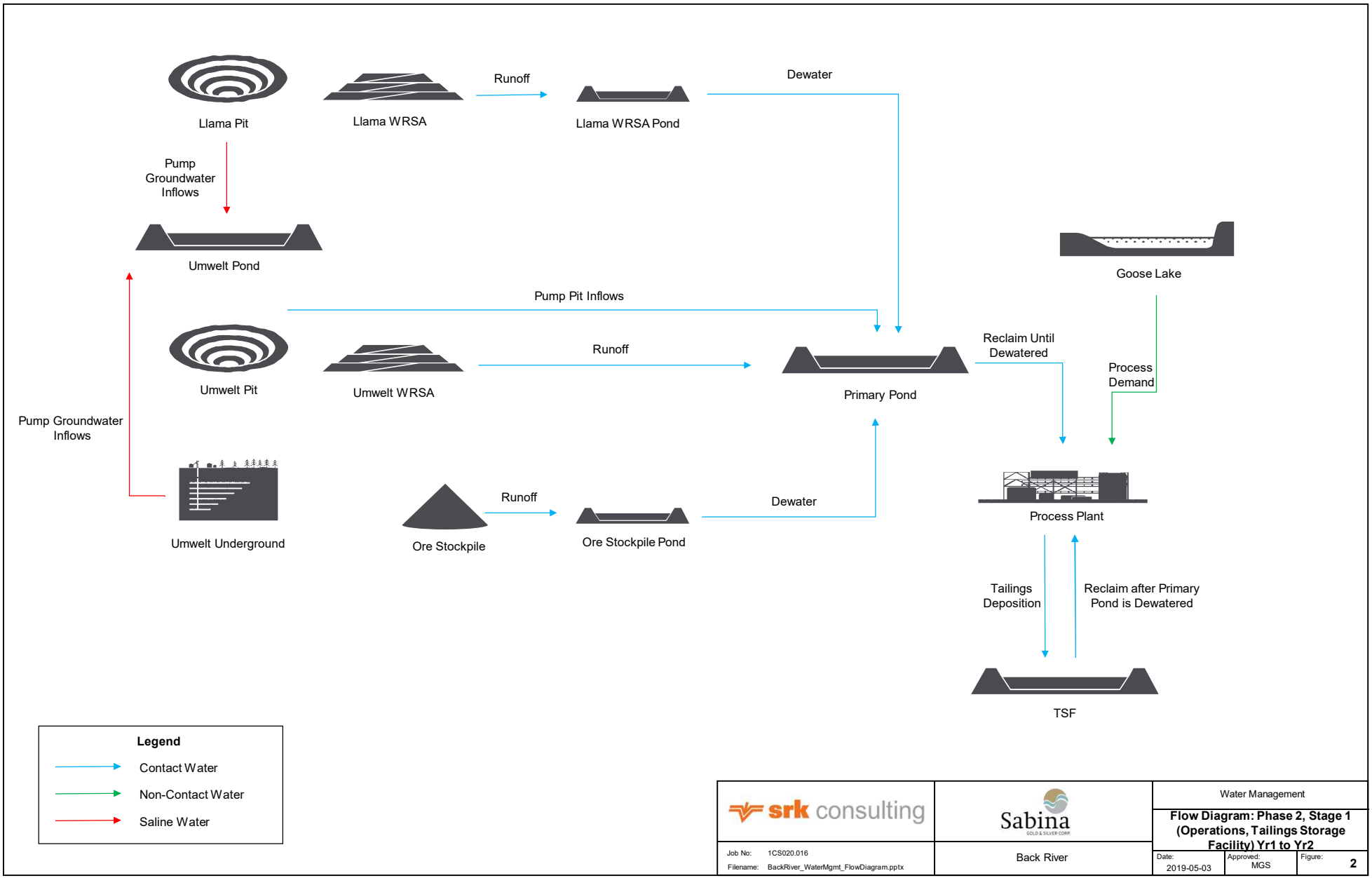
Sabina GOLD & SILVER CORP.

Back River

Water Management

Flow Diagram: Phase 1 (Construction) Yr-1

Date:	Approved:	Figure:
2019-05-03	MGS	1



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Water Management

Flow Diagram: Phase 2, Stage 1 (Operations, Tailings Storage Facility) Yr1 to Yr2

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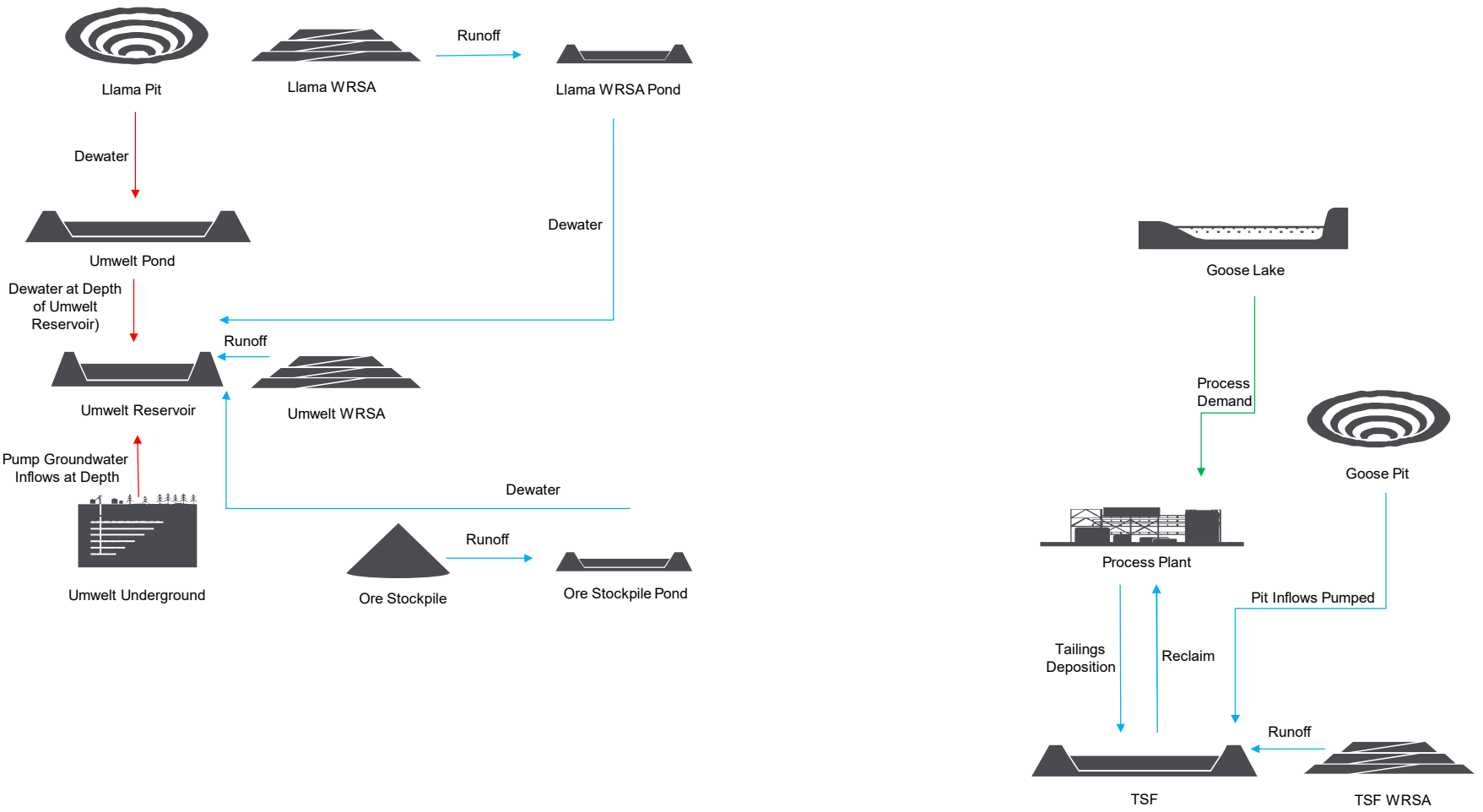

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Back River

Water Management

Flow Diagram: Phase 2, Stage 1 (Operations, Tailings Storage Facility) Yr2 to Yr4

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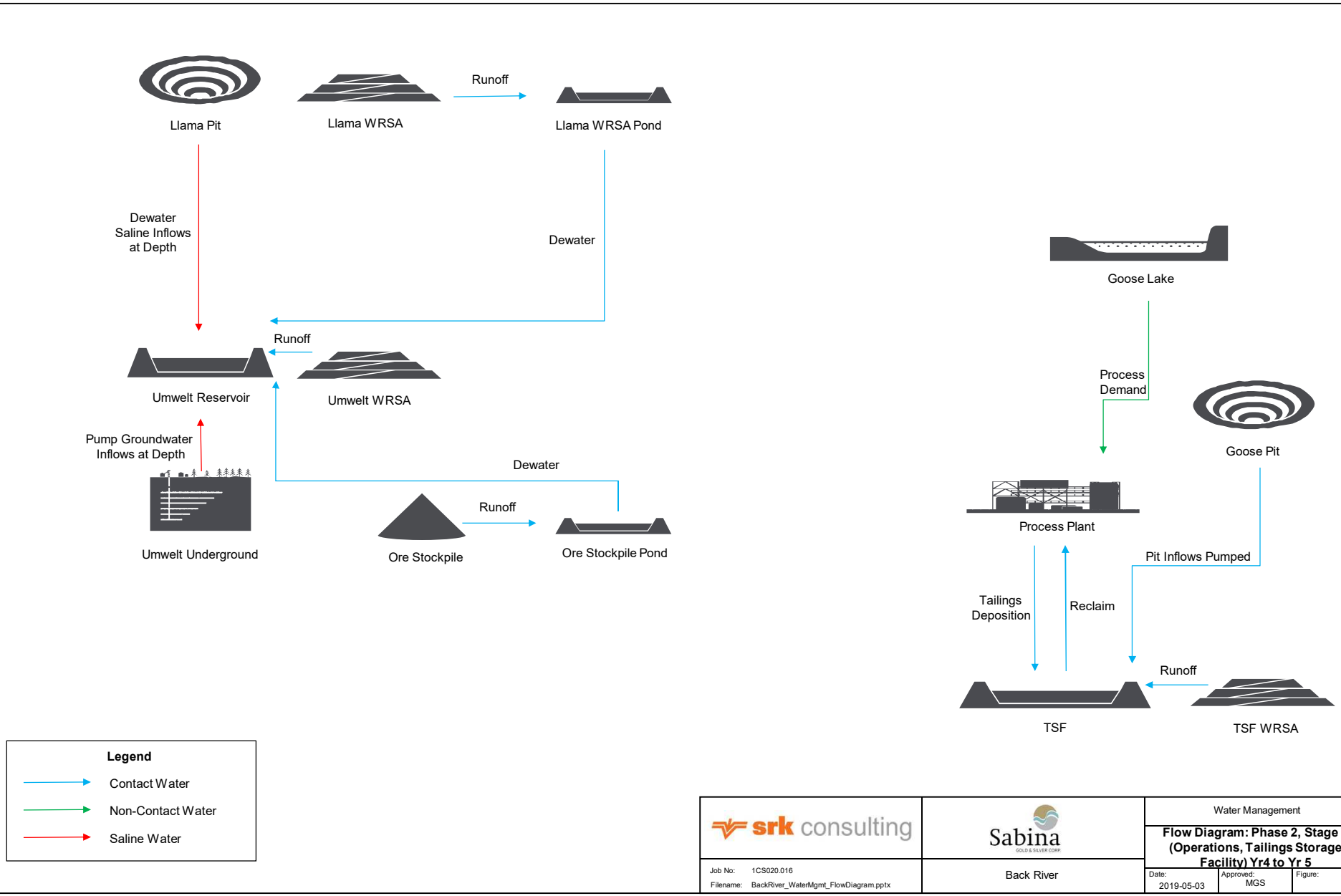

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Back River

Water Management

Flow Diagram: Phase 2, Stage 1 (Operations, Tailings Storage Facility) Yr4 to Yr 5

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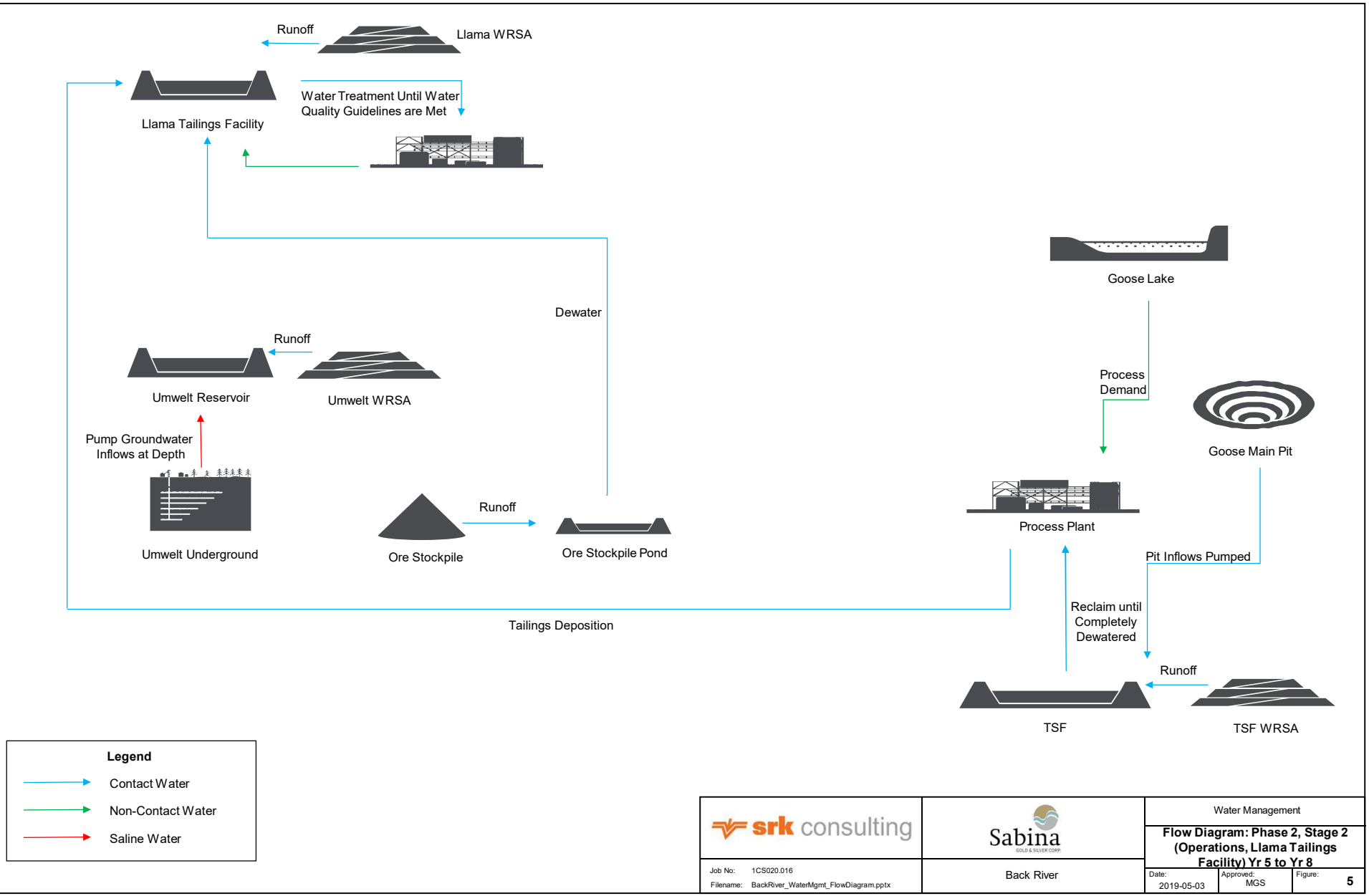

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Back River

Water Management

Flow Diagram: Phase 2, Stage 2 (Operations, Llama Tailings Facility) Yr 5 to Yr 8

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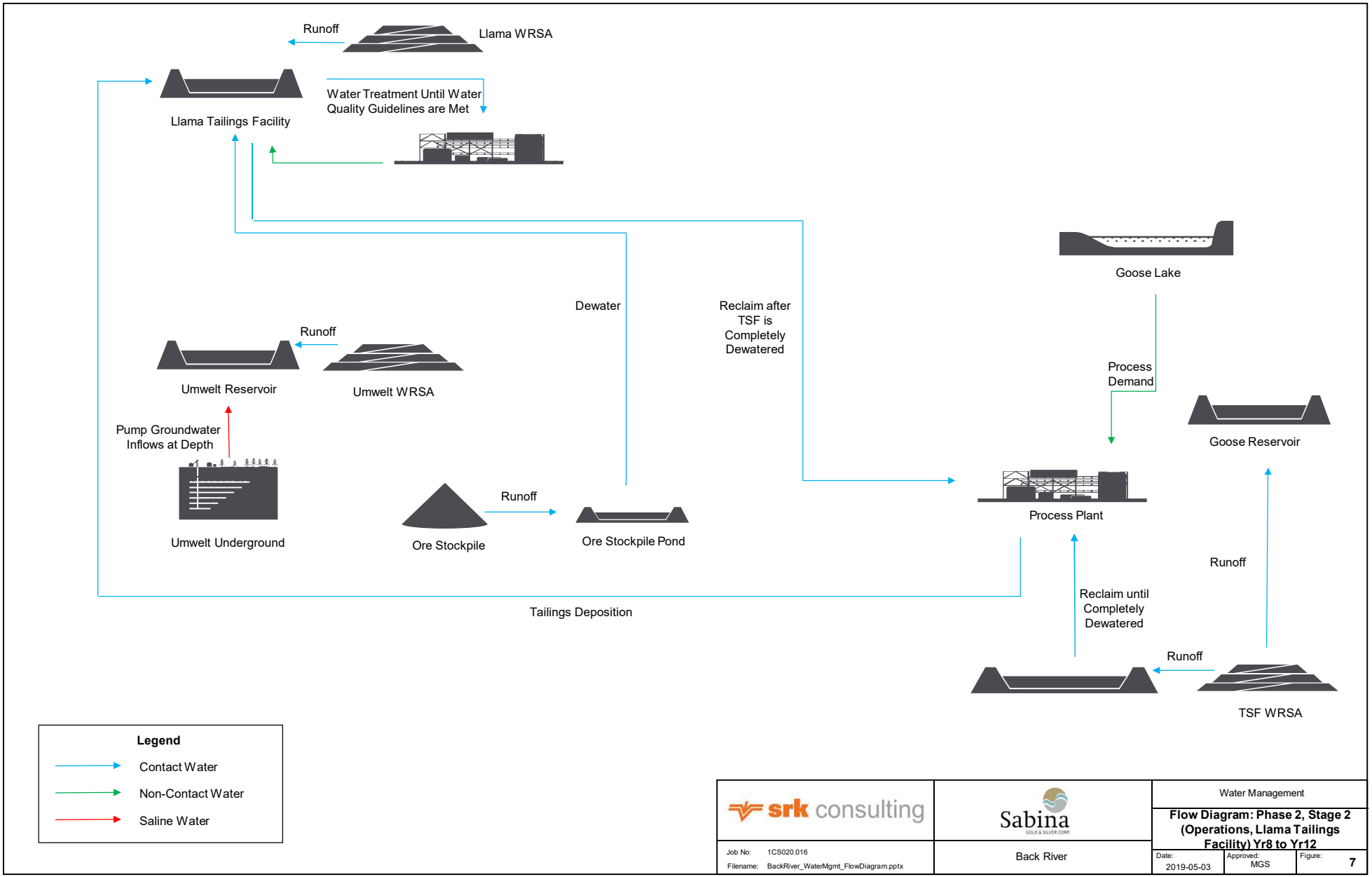
2019-05-03	MGS	5



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Back River

Water Management

Flow Diagram: Phase 2, Stage 2 (Operations, Llama Tailings Facility) Yr8 to Yr12

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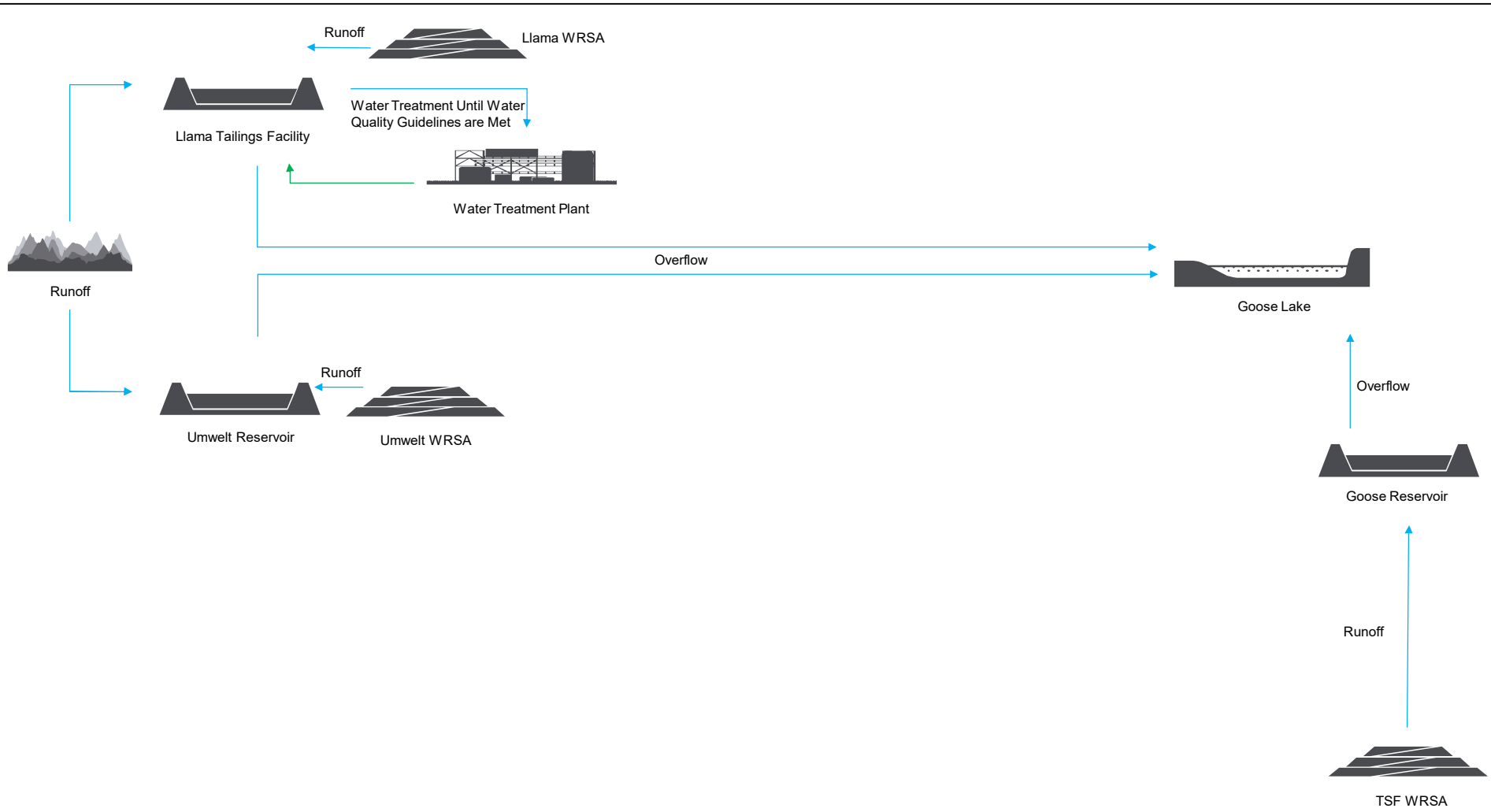

srk consulting	Sabina GOLD & SILVER CORP.	Water Management
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Job No: 1CS020.016 Filename: BackRiver_WaterMgmt_FlowDiagram.pptx	Back River	Date: 2019-05-03 / Approved: MGS / Figure: 8

Appendix E. Water and Load Balance Report

(Pending – to be provided)

Appendix C. Goose Property Water Availability Memo

TECHNICAL MEMORANDUM

DATE 13 March 2020 **Project No.** 18114181-057-TM-Rev0

TO Merle Keefe, EIT
Sabina Gold & Silver Corp.

CC Catherine Paul, Matthew Pickard (Sabina) and Dionne Filiatrault (Golder)

FROM Johannes Kloeckes and Curtis VanWerkhoven **EMAIL Curtis_VanWerkhoven@Golder.com**

HYDROLOGICAL ASSESSMENT OF EFFECTS FROM INCREASED GOOSE LAKE AND BIG LAKE WITHDRAWALS

1.0 INTRODUCTION

Sabina Gold & Silver Corp. (Sabina) requested Nuqsana Golder Engineering and Environment Inc. (Nuqsana Golder) review the potential for additional water withdrawal availability at the Back River Project (the Project). The nature of this request was to complete hydrologic modeling for Goose Lake and Big Lake to consider increased total water withdrawals above those proposed in the FEIS (Final Environmental Impact Statement). To assess the effects from increased Goose Lake and Big Lake water withdrawals, the following assessment tasks were completed and are presented in the subsequent sections:

- Review and summary of relevant sections of the FEIS and received information
- Description of methods used to update the daily time-step hydrologic model received from ERM
- Presentation of hydrologic indices results from the daily time-step model at the assessment nodes
- Summary and conclusions for the Project Modifications

This assessment determined that 1500 m³/day of year-round water withdrawal with an additional 400 m³/day during the months of June to October from Goose Lake and 750 m³/day of year-round water withdrawal from Big Lake would not change the resulting surface water hydrology Valued Ecosystem Component (VEC) magnitude category for effects to hydrological indicators (streamflows and lake volumes) at assessed waterbodies from the FEIS (Sabina 2015). Furthermore, all hydrological indicators had a low magnitude category for effects and predicted changes remained within acceptable environmental guidelines at the Local Study Area (LSA) boundaries.

2.0 SUMMARY OF FEIS AND RECEIVED INFORMATION

The FEIS was prepared to determine the environmental and social effects of the Project (Sabina 2015). The data from the FEIS hydrology baseline programs were the main inputs into the modeling analysis of the Project components (e.g., water withdrawal, water diversion, water storage, drainage modifications, and dewatering). It is through this modeling that the Project effects on surface water hydrology were established. The FEIS provides an assessment of predicted effects to streamflows, water levels, and lake volumes for planned Project activities but does not include a determination of a maximum allowable withdrawal from the Project waterbodies.

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Details on the Hydrology Baseline Program, including all information collected at the monitoring stations, are found in the FEIS (Volume 6 Appendices 6-1A through 6-1D) (Sabina 2015). The modeling of effects on surface hydrology is described in Volume 6, Section 1.5 and Volume 6 Appendices 6-1E and 6-1F, using the following methods:

- Water Balance Model – The model was developed using monthly streamflow data in GoldSim and was used to determine the effects of the Project components on streamflows.
- Spreadsheet Model (Daily Time-Step Model) – This model, originally completed by Environmental Resources Management (ERM) during the FEIS, was used to refine the effects that the Project components had on lake volumes and outflows. Daily Time-Step data were inserted into the spreadsheet to improve the effects assessment of the water withdrawal. This spreadsheet accounted for sub-monthly characteristics such as lake outlet opening in May that could not be modeled with a monthly timestep.

The water withdrawal schedule from Goose Lake and Big Lake, as reported in the FEIS, is summarized in Table 1.

Table 1: FEIS Water Withdrawal from Goose Lake and Big Lake (Volume 6, Section 1.4.2.1)

Assessed Lake	Location	Annual Withdrawal (m^3/day)	Additional June to October Withdrawal (m^3/day)
Goose Lake	Within LSA	900 (For Mill Operation and Other Industrial Uses)	400 (For Dust Suppression)
Big Lake	Within LSA	350 (For Domestic Uses)	N/A

Surface water hydrology VEC in the FEIS analysis that affect fish/aquatic habitat include streamflows and lake volumes. The magnitude of the effects on VECs surface water hydrology are ranked on a four-point scale (Negligible, Low, Moderate, and High) in the FEIS as shown in Table 2.

Table 2: FEIS Surface Water Hydrology VEC Indicators and Magnitude Categories (Volume 6, Section 1.5.1)

VEC	Indicator	Magnitude	Description
Surface Water Hydrology	Streamflow	Negligible	The change in streamflow is not detectable (i.e., less than 1% of baseline flow)
		Low	The change in streamflow is less than 10% of baseline flow
		Moderate	The change in streamflow is between 10% and 50% of baseline flow
		High	The change in streamflow is greater than 50% of baseline flow
	Lake Volumes	Negligible	The change in lake volume is not detectable (i.e., less than 1% of baseline volume)
		Low	The change in lake volume is less than 10% of baseline volume
		Moderate	The change in lake volume is between 10% and 50% of baseline volume
		High	The change in lake volume is greater than 50% of baseline volume

According to the FEIS analysis (Volume 6, Section 1.5.1), lake and streamflow reduction magnitudes are determined from an environmental standpoint and the Department of Fisheries and Oceans Canada (DFO) fish habitat guidelines and protocols. In agreement with the DFO (2013) guidelines, a variation of 10% from baseline streamflow conditions was assumed to be within the natural variability of the riverine system, and therefore have low magnitude effects. For winter conditions, the DFO (2010) protocol provides guidance that the reduction in the volume of waterbodies should not exceed 10% of the available water volume after adjusting for the maximum predicted ice thickness. These DFO protocols and guidelines are in place to provide guidance on minimizing the effects to fish and fish habitat through oxygen depletion, loss of overwintering habitat and/or reductions in littoral habitat from changes in water levels or streamflows. In the FEIS Addendum Appendix V6-6G (Sabina 2017a), predicted changes in water levels were assigned a level of risk for spawning habitat loss as shown in Table 3. For the FEIS analysis, the winter months are defined as the months of October to May.

Table 3: Under-Ice Water Withdrawal Risk Level Framework for Spawning Shoal Habitat for Fall-Spawning Fish[(a)]

Risk of Spawning Habitat Loss	Change in Water Elevation Under Ice (m)	Rationale
Nil or negligible	Less than 0.22	The reduction in water level lies within the average change in ice thickness (i.e., within normal variation)
Low	0.22 to less than 0.42	The reduction in water level remains within 1 SD of the average
Medium	0.42 to 0.80	The reduction in water level remains between 1 and 2 SD of the average
High	Greater than 0.80	The reduction in water level is beyond 2 SD of average and there is less than a 5% chance for this occurring naturally

a) includes coregonid species, such as Lake Whitefish (*Coregonus clupeaformis*), and Lake Trout (*Salvelinus namaycush*); SD = standard deviation

In addition to the FEIS and the FEIS Addendum, the 2017 Back River Project Water Management Plan that was submitted as part of the Type A Water Licence Application (Sabina 2017b) was also reviewed to check assumptions made in the Daily Time-Step Model that was completed for the FEIS. The reported average annual runoff and the 1-in-20-year dry annual runoff in the 2017 Back River Project Water Management Plan were consistent with the values used in the FEIS assessment.

3.0 HYDROLOGICAL ASSESSMENT FOR PROJECT MODIFICATIONS

Golder reviewed the ERM Daily Time-Step Model, which calculated the predicted effects on lake volumes and streamflows at locations affected by water withdrawal from Goose Lake and Big Lake. The ERM Daily Time Step Model was described in Volume 6: Appendices 6-1E and 6-1F of the FEIS (Sabina 2015).

Golder updated the ERM Daily Time-Step Model results using an iterative approach at the lake outflow nodes (river and lake nodes), and the river nodes. The iterative method involved revising the water withdrawals for Big Lake and Goose Lake, and compiling the predicted effects to streamflows and lake volumes. Withdrawals were limited based on the following criteria: (1) to avoid a volume reduction of greater than 10% of the available water volume under the maximum predicted ice thickness (DFO 2010); (2) to remain within nil or negligible reduction in water levels (<0.22 m) (Sabina 2017a); and (3) to have low or moderate changes to streamflows (reductions not greater than 10% to 50%) at outflows of lakes directly affected by withdrawals (DFO 2013; Sabina 2015) and to have low changes to streamflows (reductions less than 10%) at and downstream of the LSA boundary. The predicted changes in hydrologic indices (i.e., streamflows, water levels, and volumes) due to the withdrawals at Goose Lake and Big

Lake were then evaluated against the magnitude categories for the effects to fish and fish habitat presented in the FEIS.

The selected increased withdrawals assessed in this study include:

- 1500 m³/day of year-round water withdrawal for mill operation and other industrial uses, with an additional 400 m³/day for dust suppression during the months of June to October (5 months total) from Goose Lake.
- 750 m³/day of year-round water withdrawal for domestic or mill operation and other industrial uses from Big Lake.

Overall, Golder used the same methods and approach as in the FEIS to assess the hydrologic effects at, and downstream of, Goose Lake and Big Lake due to the Project withdrawals. The hydrological regime for baseline and Project cases were analyzed for the following nodes:

- Goose Lake Outflow (PN03)
- Propeller Lake Outflow (PN02)
- Ellice River (PN01)
- Big Lake Outflow (PN14)
- LSA Boundary (PN05)

The modified Daily Time-Step Model applied the following assumptions to calculate the predicted effects from the Project:

- All disturbed Project areas are not assumed to contribute runoff to Goose Lake or Big Lake, therefore resulting in a decrease to the natural watershed area contributing to Goose Lake and Big Lake.
- According to the 2011 bathymetry survey (Rescan 2012), the volume of Goose Lake is 10.7 Mm^3 when full and the volume is 5.4 Mm^3 below 2.0 m of ice.
- According to the 2012 bathymetry survey (Rescan 2012), the volume of Big Lake is 12.1 Mm^3 when full and the volume is 5.0 Mm^3 below 2.0 m of ice.
- The Goose Property Airstrip Extension modification was included in the disturbed catchment area and reduced the natural watershed area by 0.18 km^2. Minor potential changes in drainage area associated with the other 2020 Project modifications were not considered in the assessment. The airstrip extension did not measurably reduce the total Goose Lake natural watershed area; therefore, 11% natural catchment area disturbance (same as in FEIS) was used in Golder's analysis.
- Lake outflow channels were assumed to be frozen to bottom in winter; therefore, no streamflow from the lakes was modeled as occurring in the winter.
- If the outflows from the lakes were below the flow threshold of 30% of the mean annual baseline discharge, then the flow was considered negligible in calculations of number of days flowing.

3.1 Goose and Propeller Lake Results

3.1.1 Goose Lake Outflow

The natural catchment area of Goose Lake Outflow node (PN03) is 95 km^2 and the effects of the planned withdrawals for average and dry conditions are shown in Table 4. The assessment considers that 11% of the natural catchment is disturbed and that contact water from disturbed catchment areas does not contribute to runoff into Goose Lake.

Table 4: Predicted Hydrologic Indices at Goose Lake Outflow (PN03) for Baseline and Modified Project Conditions

Lake	Parameter		Average Condition	1-in-20 Year Dry Condition
Goose Lake	Mean annual lake outflow	Baseline (m^3/s)	0.45	0.23
		Modified Project Affected (m^3/s)	0.38	0.18
		Flow Reduction (m^3/s)	0.07	0.05
		Flow Reduction (% of Baseline Flow)	15.6%	21.7%
	Date at onset of lake outflow	Baseline	24-May	25-May
		Modified Project Affected	30-May	3-Jun
		Delayed Onset (days)	6	9
	Date at flow ceasing	Baseline	27-Oct	19-Oct
		Modified Project Affected	24-Oct	13-Oct
		Accelerated Ceasing (days)	3	6
	Total number of flow days	Baseline	156	147
		Modified Project Affected	147	132
		Reduction of Flow Days (days)	9	15
	Decrease of minimum lake level in winter	Reduction from Baseline (m)	0.10	0.10
	Maximum winter withdrawal	(% of under ice volume)	6.1%	6.5%

Goose Lake Outflow (PN03) is predicted to have a reduction in mean annual flow of 15.6% during average conditions and 21.7% during dry conditions, due to the 11% reduction in catchment area and updated water withdrawals from Goose Lake, resulting in moderate changes in streamflows. Withdrawal during the winter months will result in a water level that is below the elevation necessary for lake outflow. During average conditions, the onset of flow above the flow threshold of 30% of the baseline mean annual discharge (consistent with approach used in the FEIS [Sabina 2015]) is predicted to be delayed by 6 days and cease 3 days earlier, therefore, the extent of the open-water season is expected to be decreased by 9 days from baseline conditions. During 1-in-20-year dry conditions, the onset of flow is predicted be delayed by 9 days and the flow is estimated to cease 6 days earlier, therefore, the extent of the open-water season is expected to be decreased by 15 days from baseline conditions. The decrease in lake elevation in the winter, compared to the baseline condition, is 0.10 m and the maximum winter withdrawal (% of under ice volume) is 6.1% during average conditions and 6.5% during dry conditions, which are within DFO (2010) protocol. All results above are compared to baseline conditions.

The baseline and the Project affected flows at Goose Lake Outflow (PN03) are shown in Figure 1 (adapted from Sabina [2015]), based on an average hydrograph distribution presented in the FEIS.

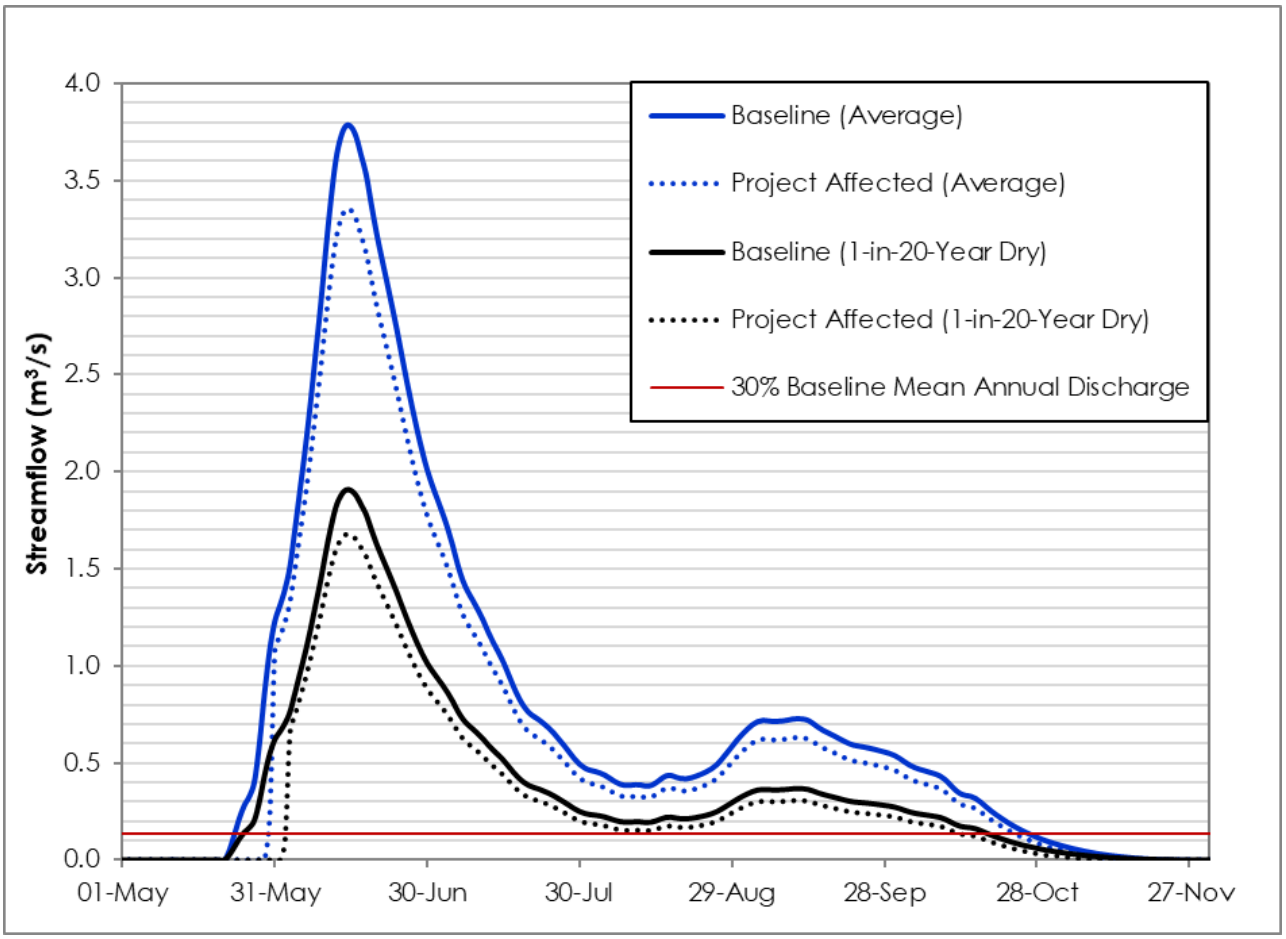

Figure 1: Baseline and The Project Affected Flows at Goose Lake Outflow (PN03)

3.1.2 Propeller Lake Outflow

The catchment area of Propeller Lake Outflow node (PN02) is 205 km^2, which is approximately twice that of the Goose Lake Outflow. Therefore, effects of the Project on Propeller Lake Outflow flows and water levels are reduced compared to the effects at Goose Lake Outflow. The effects of the planned withdrawals for average and dry conditions are shown in Table 5.

Table 5: Predicted Hydrologic Indices at Propeller Lake Outflow (PN02) for Baseline and Modified Project Conditions

Lake	Parameter		Average Condition	1-in-20 Year Dry Condition
Propeller Lake	Mean annual lake outflow	Baseline (m^3/s)	0.97	0.49
		Modified Project Affected (m^3/s)	0.90	0.44
		Flow Reduction (m^3/s)	0.07	0.05
		Flow Reduction (% of Baseline Flow)	7.2%	10.2%
	Date at onset of lake outflow	Baseline	24-May	25-May
		Modified Project Affected	25-May	28-May
		Delayed Onset (days)	1	3
	Date at flow ceasing	Baseline	27-Oct	19-Oct
		Modified Project Affected	26-Oct	17-Oct
		Accelerated Ceasing (days)	1	2
	Total number of flow days	Baseline	156	147
		Modified Project Affected	154	142
		Reduction of Flow Days (days)	2	5
	Decrease of minimum lake level in winter	Reduction from Baseline (m)	0.00	0.00
	Maximum winter withdrawal	(% of under ice volume)	N/A	N/A

Propeller Lake Outflow (PN02) is predicted to have a reduction in mean annual flow of 7.2% during average conditions and 10.2% during dry conditions, due to the upstream Project effects, resulting in low magnitude changes to streamflows at the LSA boundary and within guidelines for changes to streamflows (DFO 2013). The reduced streamflows from the upstream Goose Lake Outflow are expected to delay the onset of flow and cease the flow earlier at Propeller Lake Outflow. During average conditions, the delay is predicted to be 1 day and the flow is estimated to cease 1 day earlier, therefore, the extent of the open-water season is expected to be decreased by 2 days from baseline conditions. During 1-in-20-year dry conditions, the onset of flow is predicted to be delayed 3 days and the flow is estimated to cease 2 days earlier, therefore, the extent of the open water season is expected to be decreased by 5 days from baseline conditions. Due to no water withdrawal in Propeller Lake and no lake outflow during winter, the decrease in Propeller Lake elevation due to withdrawals in upstream Goose Lake is expected to be negligible. All results above are compared to baseline conditions.

The baseline and the Project affected flows at Propeller Lake Outflow (PN02) are shown in Figure 2 (adapted from Sabina [2015]), based on an average hydrograph distribution presented in the FEIS.

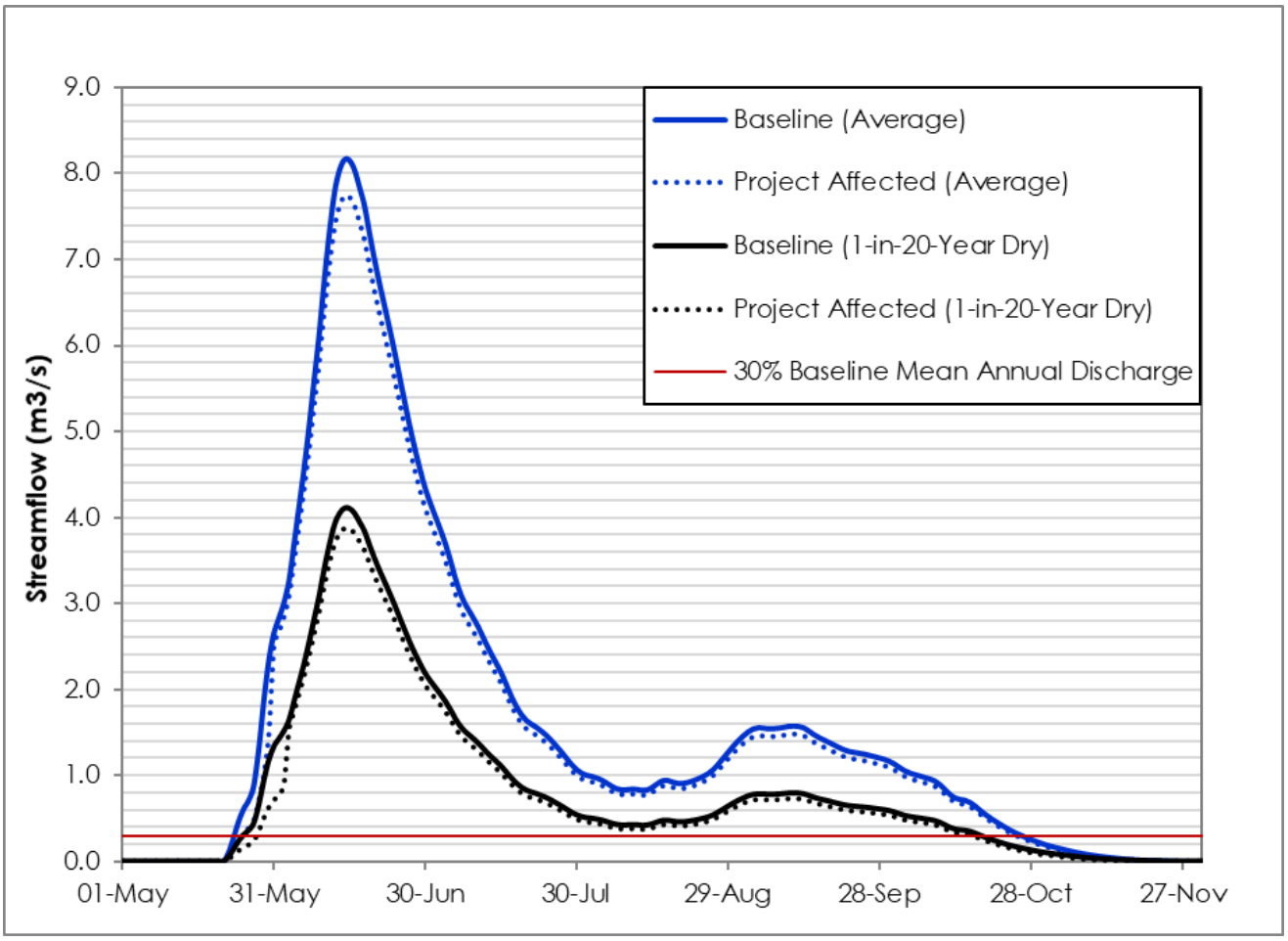

Figure 2: Baseline and The Project Affected Flows at Propeller Lake Outflow (PN02)

3.1.3 Ellice River and Regional Study Area Boundary

The catchment area of Ellice River node (PN01) is 6,655 km^2, which is approximately 70 times larger than the Goose Lake Outflow catchment area. The effects of the planned withdrawals for average and dry conditions are shown in Table 6.

Table 6: Predicted Hydrologic Indices at Ellice River (PN01) for Baseline and Modified Project Conditions

Lake	Parameter		Average Condition	1-in-20 Year Dry Condition
Ellice River	Mean annual flow	Baseline (m^3/s)	31.44	15.83
		Modified Project Affected (m^3/s)	31.38	15.78
		Flow Reduction (m^3/s)	0.07	0.05
		Flow Reduction (% of Baseline Flow)	0.2%	0.3%
	Date at onset of flow	Baseline	24-May	25-May
		Modified Project Affected	24-May	25-May
		Delayed Onset (days)	0	0
	Date at flow ceasing	Baseline	27-Oct	19-Oct
		Modified Project Affected	27-Oct	19-Oct
		Accelerated Ceasing (days)	0	0
	Total number of flow days	Baseline	156	147
		Modified Project Affected	156	147
		Reduction of Flow Days (days)	0	0

No water is withdrawn from Ellice River and the catchment area is substantially larger than Goose Lake Outflow, therefore, the predicted effect of the Project on Ellice River mean annual flow is negligible (0.2%). The effects of the withdrawals and the reduction of the natural watershed area within the overall Ellice River (PN01) watershed are negligible; therefore, flows are expected to be within 1% of baseline flows. The onset and cease of flow are predicted to be similar to baseline conditions. All results above are compared to baseline conditions. As the predicted changes to hydrologic indices from baseline values are negligible, the Ellice River hydrograph is not shown.

3.2 Big Lake Results

3.2.1 Big Lake Outflow

The catchment area of Big Lake Outflow node (PN14) is 37 km^2 and the results of the planned withdrawals for average and dry conditions are shown in Table 7. No large-scale disturbance to the natural drainage conditions is expected in the Big Lake watershed.

Table 7: Predicted Hydrologic Indices at Big Lake Outflow (PN14) for Baseline and Modified Project Conditions

Lake	Parameter		Average Condition	1-in-20 Year Dry Conditions
Big Lake	Mean annual lake outflow	Baseline (m^3/s)	0.175	0.088
		Modified Project Affected (m^3/s)	0.166	0.079
		Flow Reduction (m^3/s)	0.009	0.009
		Flow Reduction (% of Baseline Flow)	5.1%	10.2%
	Date at onset of lake outflow	Baseline	24-May	25-May
		Modified Project Affected	31-May	3-Jun
		Delayed Onset (days)	7	9
	Date at flow ceasing	Baseline	27-Oct	19-Oct
		Modified Project Affected	25-Oct	17-Oct
		Accelerated Ceasing (days)	2	2
	Total number of flows days	Baseline	156	147
		Modified Project Affected	147	136
		Reduction of Flow Days (days)	9	11
	Decrease of minimum lake level in winter	Reduction from Baseline (m)	0.04	0.04
	Maximum winter withdrawal	(% of under ice volume)	3.3%	3.4%

Big Lake Outflow (PN14) is predicted to have a reduction in mean annual flow of 5.1% during average conditions and 10.2% during dry conditions, due to the water withdrawal from Big Lake compared to baseline conditions. During average conditions, the onset of flow, above the flow threshold of 30% of the baseline mean annual discharge, is expected to be delayed by 7 days and cease 2 days earlier, therefore, the extent of the open water season is estimated to be decreased by 9 days from baseline conditions. During 1-in-20-year dry conditions, the onset of flow is predicted to be delayed by 9 days and cease 2 days earlier, therefore, the extent of the open water season is expected to be decreased by 11 days from baseline conditions. The decrease in lake elevation in the winter, compared to the baseline condition, is 0.04 m and the maximum winter withdrawal (% of under ice volume) is 3.3% during average conditions and 3.4% during dry conditions, therefore, complying with the DFO (2010) protocol. All results above are compared to baseline conditions.

The baseline and the Project affected flows at Big Lake Outflow (PN14) are shown in Figure 3 (adapted from Sabina [2015]), based on an average hydrograph distribution presented in the FEIS.

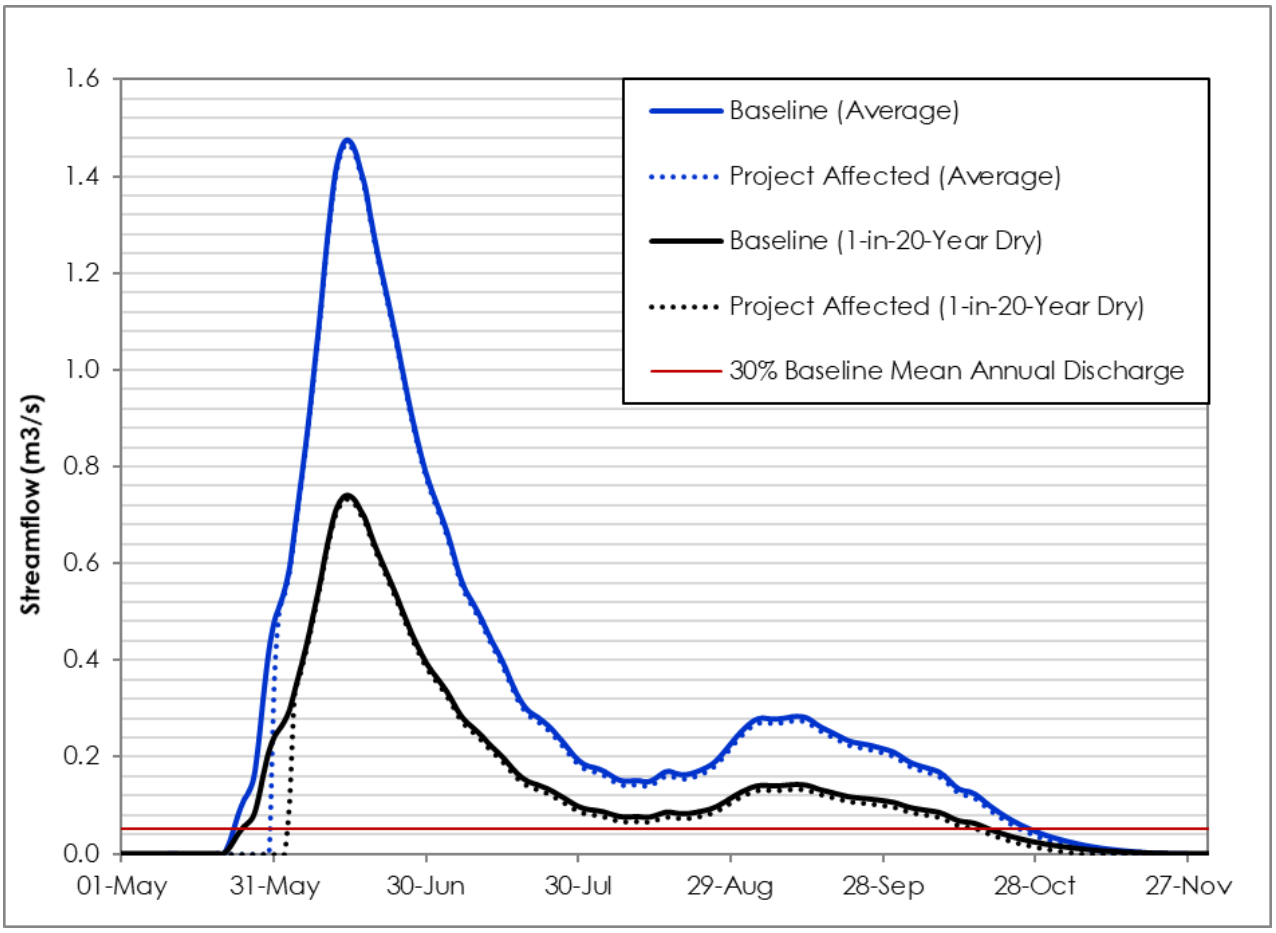

Figure 3: Baseline and The Project Affected Flows at Big Lake Outflow (PN14)

3.2.2 PN05 and LSA Boundary

The catchment area of the LSA Outflow node (PN05) downstream of Big Lake is 158.5 km^2 which is approximately four times larger than the catchment area of Big Lake Outflow. The results of the proposed withdrawals are shown in Table 8.

Table 8: Predicted Hydrologic Indices at LSA Outflow (PN05) for Baseline and Modified Project Conditions

Lake	Parameter		Average Condition	1-in-20 Year Dry Conditions
BL-H2	Mean annual flow	Baseline (m^3/s)	0.749	0.377
		Project Affected (m^3/s)	0.740	0.368
		Flow Reduction (m^3/s)	0.009	0.009
		Flow Reduction (% of Baseline Flow)	1.2%	2.4%
	Date at onset of flow	Baseline	24-May	25-May
		Project Affected	24-May	27-May
		Delayed Onset (days)	0	2
	Date at flow ceasing	Baseline	27-Oct	19-Oct
		Project Affected	27-Oct	19-Oct
		Accelerated Ceasing (days)	0	0
	Total number of flow days	Baseline	156	147
		Project Affected	156	145
		Reduction of Flow Days (days)	0	2

No water is withdrawn downstream of Big Lake, and the LSA Outflow catchment area is substantially larger than Big Lake Outflow; therefore, the effects of the upstream withdrawals on the LSA Outflow flows and water levels are reduced compared to the effects at Big Lake Outflow. The reduction in mean annual flow at the LSA boundary, compared to baseline conditions, is 1.2% during average conditions and 2.4% during dry conditions. Due to the water withdrawal from Big Lake, during average conditions, the onset of flow is not estimated to be delayed and the flow is not predicted to cease earlier, therefore, the extent of the open-water season is not expected to change from baseline conditions. During 1-in-20-year dry conditions, the onset of flow is expected to be delayed by 2 days and the flow is not expected to cease earlier, therefore, the extent of the open-water season is predicted to decrease by 2 days from baseline conditions. All results above are compared to baseline conditions. As the predicted changes to hydrologic indices from baseline value are negligible, the LSA Boundary (PN05) hydrograph is not shown.

4.0 SUMMARY OF INCREASED WITHDRAWALS AT GOOSE AND BIG LAKES

Golder used methods consistent with the FEIS to model and predict the hydrological effects at, and downstream of, Goose Lake and Big Lake due to increased lake water withdrawals required for the 2020 Project modifications. The Daily Time-Step Models were used iteratively to increase withdrawals above the FEIS values, while predicted changes to hydrological indices (i.e., streamflows, lake levels, and lake volumes) remained within acceptable environmental guidelines at the LSA boundaries.

At Goose Lake, 1500 m³/day of year-round water withdrawal for mill operation and other industrial uses, with an additional 400 m³/day for dust suppression during the months of June to October, from Goose Lake (PN03) was assessed. The results of the study for Goose Lake (PN03) and the downstream nodes are the following:

- The mean annual discharge will be reduced below baseline conditions by 15.6% during average conditions, and by 21.7% during dry conditions, at Goose Lake Outflow (PN03). Downstream of Goose Lake at the LSA boundary (Propeller Lake Outflow, PN02), the mean annual discharges are predicted to be reduced below baseline conditions by 7.2% for average and 10.2% for dry conditions. Negligible changes to streamflows are predicted downstream at the RSA boundary (Ellice River, PN01).
- The decrease in the under-ice Goose Lake water level, compared to the baseline condition, is predicted to be 0.10 m, and the Goose Lake winter withdrawal (% of under ice volume) is predicted to be less than 6.5% for both average and dry conditions.
- Winter withdrawal protocols (DFO 2010) and guidelines (Sabina 2017a) related to lake water levels and withdrawal volumes are met at Goose Lake and all downstream waterbodies.
- The predicted changes in streamflows at Goose Lake Outflow (reductions of 15.6% for average conditions and 21.7% for dry conditions from baseline values) exceed guidelines of a 10% reduction in streamflows (DFO 2013). These predicted changes result in a moderate reduction in streamflows at Goose Lake Outflow and a low reduction in streamflows at the LSA boundary. These results are consistent with the magnitude of changes predicted in the FEIS and represent small incremental changes, as the reduction in average streamflows from baseline conditions at Goose Lake Outflow were 13.3% for average conditions and 17.4% for dry conditions from baseline values in the FEIS.
- The surface water hydrology VEC magnitude of effects to indicators (streamflows and lake volumes) did not change from the FEIS. The VEC magnitude category for Goose Lake is moderate for streamflows and low for lake volumes. At assessment nodes downstream of Goose Lake, all indicators have a low magnitude of effects.

At Big Lake, 750 m³/day of year-round water withdrawal for domestic or mill operation use and other industrial uses from Big Lake (PN14) was assessed. The results of the study for Big Lake (PN14) and the downstream nodes are the following:

- The mean annual discharge reductions below baseline conditions are within 10% for both average and dry conditions at Big Lake Outflow (PN14). Downstream of Big Lake at the LSA boundary (PN05), the mean annual discharge is within 3% of baseline conditions for both average and dry conditions.
- The decrease in the under-ice Big Lake water level, compared to the baseline condition, is 0.04 m and the Big Lake winter withdrawal (% of under ice volume) is less than 3.4% for both average and dry conditions.
- Winter withdrawal protocols (DFO 2010) and guidelines (Sabina 2017a) related to lake water levels, and guidelines for reduction in streamflows (DFO 2013), are met at, and downstream of, Big Lake.

- The surface water hydrology VEC magnitude of effects to indicators (streamflows and lake volumes) did not change from the FEIS. The VEC magnitude category for Big Lake and downstream assessment nodes is low for streamflows and lake volumes.

CLOSURE

We trust that this report provides the information required by Sabina Gold & Silver Corp. at this time. If there are any questions or require further detail, please contact the undersigned.

Yours truly,

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PERMIT TO PRACTICE
GOLDER ASSOCIATES LTD.
Signature
Date 13 MARCH 2020
PERMIT NUMBER: P 049
NT/NU Association of Professional Engineers and Geoscientists

REFERENCES

DFO (Fisheries and Oceans Canada). 2010. DFO Protocol for Winter Water Withdrawal from Ice-Covered Waterbodies in the Northwest Territories and Nunavut. Prepared June 20, 2010. 3 pp.

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Sabina. 2017b. Back River Project: Water Management Plan. October 2017.

Appendix D. MLA Shoreline Pad Extension Memo

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Memo

To:	Merle Keefe, Catherine Paul	**Client:**	Sabina Gold & Silver Corp
From:	Cameron Hore, CPEng, PEng John Kurylo, MSc, PEng	**Project No:**	1CS020.016
Reviewed By:	*Review of previous 2018 revision from the late* Maritz Rykaart, PhD, PEng	**Date:**	June 5, 2020 *2020 update by John Kurylo*
Subject:	Back River Project: MLA Shoreline Pad Extension – Preliminary Design – *Rev01 - June 2020*		

1 Introduction

1.1 General

The Marine Laydown Area (MLA) is the primary offloading facility for annual resupply of Sabina Gold and Silver's Back River Project in Nunavut. The MLA is located on Bathurst Inlet and is seasonally connected to the Goose site, 130 kilometers to the south where the mining activity will take place.

The Shoreline Pad is the landing facility for lightering barges during the summer sealift. The initial construction for the Shoreline Pad was constructed in the spring of 2018, based on Sabina's modified designs, and commissioned during the later summer 2018 sealift. Shallow bathymetry necessitates grounding of the lightering barges to ensure safe offloading.

1.2 Objective

This memo provides a preliminary design for extending the Shoreline Pad (i.e. Shoreline Pad Extension) a nominal distance into the ocean. The original version of this memo was produced in December 2018 and then updated in June 2020 based on the latest feedback and development plans that were provided by Sabina. This scope and focus of this memorandum is the Shoreline Pad Extension only, and not any of the existing or other infrastructure Sabina plans to construct at the MLA.

2 Design Concept

2.1 Approach

The design concept for the Shoreline Pad Extension is to build out the Shoreline Pad into the ocean through in-water construction, nominally extending its footprint onto the seabed. The in-water portion of the Shoreline Pad Extension will be constructed on geogrid to minimize differential settlement and improve overall safety of the facility.

2.2 Topographic Data

Design of the Shoreline Pad Extension is based on the following topographical and survey data:

- Off-shore: 1.0 m vertical resolution bathymetry data collected by ERM (formally Rescan) in 2012. In the summer of 2018 Sabina site staff completed field bathymetry checks, depth measurements, to correct this original bathymetry data.
- On-shore: Approximately 0.3 m vertical resolution 2018 as-built pad and original ground topography. This information was collected by Nuna Logistics site survey crews using Global Navigation Satellite System (GNSS) equipment.

Additional information on the data sources are presented in the Issue for Permit drawings (Attachment 1).

2.3 Foundation Conditions

SRK previously undertook a geotechnical assessment for the MLA (SRK, 2018b). Around the Shoreline Pad location, the general foundation conditions indicate weak ground conditions in the active layer (non frozen) soils that could be prone to excess pore pressure buildup if loadings rates are not controlled throughout construction and operation. As outlined n this assessment the foundation soils around the Shoreline Pad area was logged as a sand, but based on lab testing, should be classified as silty to clayey sand. From the available data (SRK 2015, Golder 2017) permafrost is expected to extend over the Shoreline Pad area with an estimated active layer depth in the range of 2m (below original ground). SRK has assumed that the shallow sub-sea foundation conditions beneath the Shoreline Pad Extension will be consistent to those onshore in the area of the Shoreline Pad.

No offshore geotechnical investigation has been completed and is not considered necessary due to the small extent of the proposed Shoreline Pad Extension. Typically, in this region submarine permafrost can be present in areas with an average water depth of 1 m or less.

3 Design

3.1 Design Criteria

The design criteria for the Shoreline Pad Extension, based on the operational requirements stipulated by Sabina, are as follows:

- The total marine environmental footprint should not exceed 500 m^2; and
- The pad should have a minimum 35-m width for stability purposes, and in consideration of the foundation conditions.
- Construction must be done at a slow rate and loadings controlled (including barge offloading) to ensure that foundation pore pressures in the unfrozen active layer foundation soils do not generate excess pore pressures and exhibit a loss of strength.

3.2 Design

The Shoreline Pad Extension will have a variable fill height which will be configured to allow a smooth transition from the existing Shoreline Pad. This means the final crest elevation at the perimeter will range from approximately 1 m to 3 m. The Shoreline Pad Extension will be constructed with run-of-quarry (ROQ) material as the bulk fill. Prior to placing the ROQ, two layers of bi-axial geogrid will be placed to mitigate against excessive differential settlement on the weak foundation soils. The pad side slopes will be 1.5H:1V for fill areas less than 2 m in height, and at 2H:1V for fill slopes equal to or greater than 2 m. The final slopes may be armoured with riprap as protection against wave erosion and ice plucking. The pad driving surface will be covered with 0.15 m of surfacing material, if required for tire protection. Preliminary design drawings are included as Attachment 1.

4 Construction

Construction fill materials will be obtained from local geochemically suitable permitted quarries or run-of-mine waste rock brought in from the Goose site. Surfacing (32 mm minus) material will be produced at an on-site crusher at either the MLA or Goose site. About 400 m^3 of ROQ, 50 m^3 of surfacing material, and 1200 m^2 of geogrid are estimated to be required (rounded neat-line quantities with overlap included / considered for the geogrid).

The construction fleet will consist of mobile equipment already staged at the MLA and is expected to include rock trucks (30 and 40T), dozers (D8 or smaller), excavators, compactor, and a crusher plant (not currently on site).

Prior to placement of ROQ, two layers of biaxial geogrid will be placed on seabed, extending approximately 3 m beyond the design footprint. ROQ is then placed from land, working from the existing Shoreline Pad, onto the geogrid. Construction rate and sequencing will be adjusted to ensure appropriate time is allowed for pore pressure dissipation of the marine sediments to ensure safe working conditions. Removal of the marine sediments is not required prior to construction and therefore no dredging of marine sediments will be carried out. Surfacing material and rip rap will not be placed until the ROQ material layer is at design grade and level. All construction will be performed in accordance with approved Technical Specifications (SRK 2018a).

Construction may occur in winter or summer, i.e. frozen or open water conditions. For open water conditions, prior to construction, the entire perimeter of the Shoreline Pad will be encircled by a silt curtain deployed approximately 20 m from the footprint of the Shoreline Pad Extension and will remain in place throughout construction. Summer construction will require careful screening of the shoreline for nesting birds, and modifications to the construction schedule may be required to avoid disturbing nesting populations. If construction during fisheries restricted activity timing windows cannot be avoided, additional mitigation measures will be discussed with Fisheries and Oceans Canada.

For frozen conditions, sediment control will not be required as all construction will occur within the ground-fast sea ice extent. Any sea ice in the footprint of the Shoreline Pad Extension will be excavated and placed adjacent to the excavation on top of the sea ice. Rockfill placement will follow ice excavation and geogrid placement. The work will progress along the length of the

existing Shoreline Pad in an ordered method by slowly working from one end of the pad to the other, and then restarting at the original end to best spread out the working face and allow the most time between subsequent foundation loading. Temporary construction routes should aim to not repeatedly drive over the same area but be continually moving around the pad with placement. The rate of barge offloading should be considered and carefully monitored; e.g. are multiple barges going to be offloaded back to back which could potentially impact foundation pore pressure build up. Safe work plans should be developed by Sabina for this construction, which should consider the inspection recommendations below.

4.1 Inspection Recommendations

Due to the close proximity to, and minimal in-water works, at least daily inspections should be completed during construction, and every day the Shoreline Pad (including extension) is used for offloading.

Note that work area should be cleared of snow, ice and any other debris prior to being inspected. For these inspections, the crests of the areas that are being worked on, the areas immediately adjacent to these areas, and the ground immediately in front (downslope) of the advancing rock placement should be examined for signs of cracking, settling, slope movement, changes in material type or moisture contact of the material being placed, and surface deflection from equipment.

Any areas which experience consistent/frequent or identifiable erosion or tension cracking, any bulging by the toe or release of pore water from the foundation, should be recorded and work should be temporarily paused in this area to allow it to stabilize.

4.2 Monitoring Recommendations

- During construction ongoing surveys should be completed over any original ground before material placement and after each lift placed. A full as-built will also be completed once the Shoreline Pad Extension has been constructed.

5 Closure

Due to the nominal extent of the Shoreline Pad Extension, Sabina intends to leave the structure in place at closure, similar to the other roads, pads and existing Shoreline Pad. This will result in minimal environmental disturbance, and the structure is not a navigation hazard.

6 References

Golder Associates. 2017. Back River Project – Marine Laydown Area (MLA) – Geotechnical Factual report. Report prepared for Sabina Gold and Silver Corp. November 2017. Sabina reference number SBR5GAL-7000-G-RPT-0001. Golder reference number 17774320-036-RPT-Rev0.

SRK Consulting (Canada) Inc. 2015. Marine Laydown Area – 2015 Overburden geotechnical Investigation Program. Report prepared for Sabina Gold & Silver Corp. December 2015. Project No. 1CS020.009.

SRK Consulting (Canada) Inc. 2018a. Technical Specifications – Earthworks and geotechnical Engineering – Back River Gold Project, Nunavut Canada – Revision 0 - Issued for Construction. Prepared for Sabina. SRK job number 1CS020.016. April 2018.

SRK Consulting (Canada) Inc. 2018b. Back River Project: MLA Shoreline Pad Geotechnical Assessment. Memorandum prepared for Sabina. SRK job number 1CS020.016. June 2018.

Attachment 1: Permitting Drawings for the Shoreline Pad Extension

LEGEND

- Shoreline Pad Extension
- 2018 MLA As-Built (by others / Sabina)

NOTES

1. Contours shown at 1.0m intervals.
2. All dimensions in meters unless otherwise stated.
3. It is the Contractor's responsibility to ensure that the geogrid is installed in advance of the construction fill
4. being placed.
5. Significant settlement of placed ROQ into the sea bed is expected during placement, even with geogrid installation.
6. The Contractor is responsible for silt and sediment control during construction (specifically if construction done during the open water season).
7. Notes listed on each drawing apply to all drawings in the package.
8. Existing Shoreline Pad by other - designed and constructed by Sabina.

REFERENCE

- NAD83 UTM Zone 13.
- Existing topographic contours generated from data provided by Sabina Gold and Silver Corp. File: 'bathurst_inlet_1m_dem_tile26 to tile39.xyz', dated 2012-20-13.
- Available bathymetric data (blue contours) provided by Sabina on 2018/04/19 (CAD file 'BathymetryBathurst.dwg'). This data set was collected by ERM (formerly Rescan).
- As-Built Shoreline Pad survey provided by Sabina August 18, 2018. File name: Site 180818MLA Jetty.dwg
- Consideration of risk, such as rapid construction not allowing foundation pore pressures to dissipate, outlines in more detail in SRK June 2018 memo "Back River Project: MLA Shoreline Pad Geotechnical Assessment", project number 1CS020.016.

MATERIAL QUANTITIES AND AREAS

Shoreline Pad In-water Extension: 420m²
Bulk Pad Fill: 365m³

All volumes reported are calculated to neat lines. No bulking / shrinking factors have been utilized in volume determination.

0m 3 6 9 12

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
- -	- -	- -	- -	- -

NO.	DESCRIPTION	CHK'D	APP'D	DATE
A	Issued for Permit	JBK	CP	20/06/03

REVISIONS

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
CH/JBK	TH	EMR
CHECKED:	APPROVED:	DATE:
JBK	CP	June 2020

FILE NAME: 1CS020.018 - Shoreline Pad - opt 2.dwg

Sabina GOLD & SILVER CORP

Back River Project

SRK JOB NO.: 1CS020.018

Marine Laydown Area

DRAWING TITLE:

Shoreline Pad Extension

DRAWING NO.	SHEET	REVISION NO.
01	1 OF 2	A

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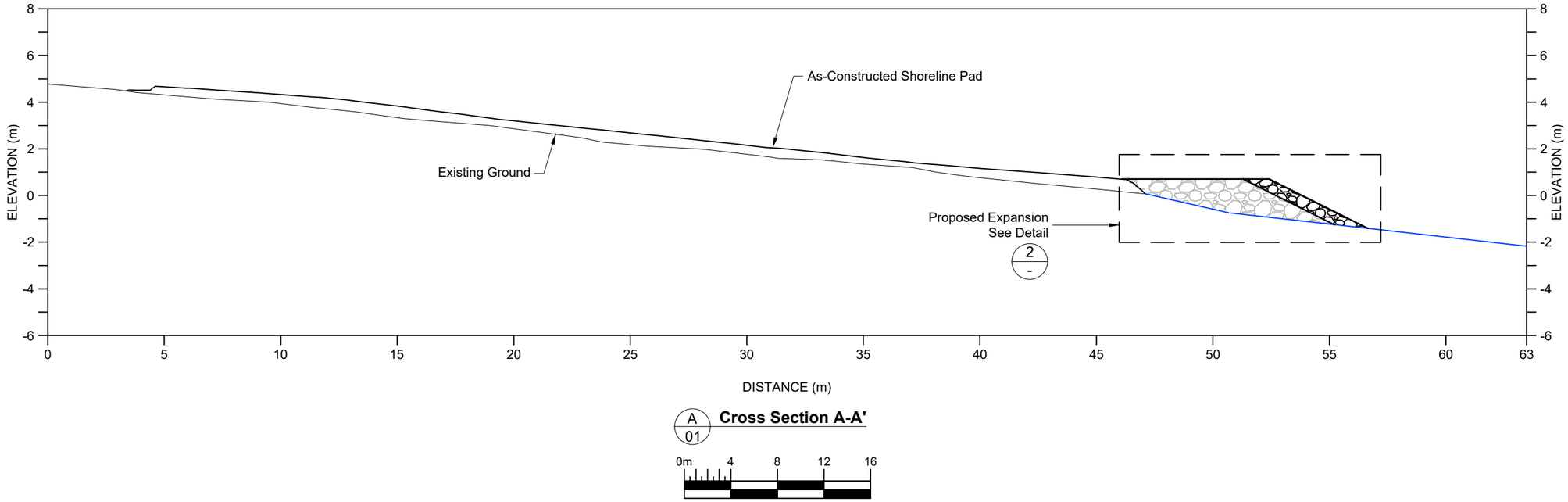


A/01 **Cross Section A-A'**

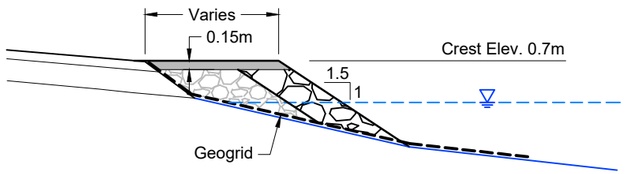
0m 4 8 12 16

LEGEND

- Bathymetric Surface
- Approximate Water Line
- Geogrid
- Rip rap
- Run of Quarry (ROQ) Material
- Surfacing Material

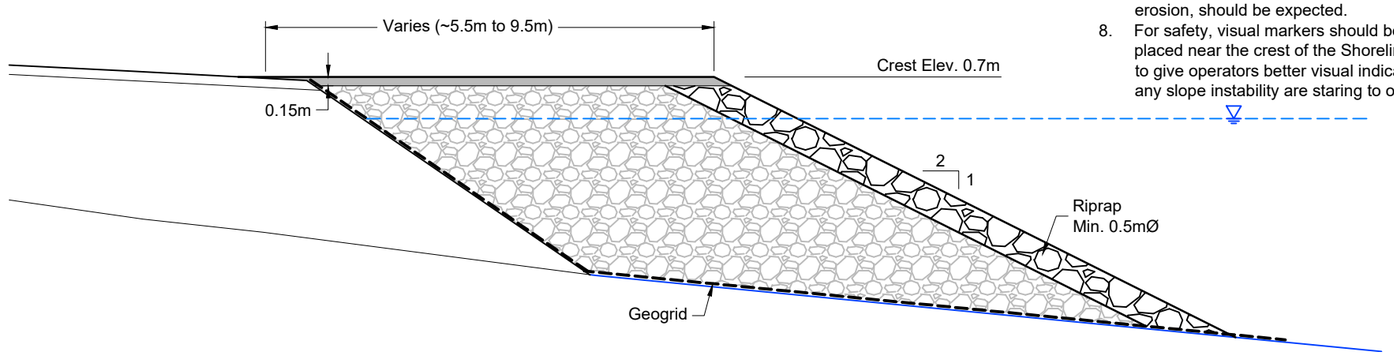
NOTES

1. All dimensions in meters unless otherwise stated.
2. For the geogrid the minimum longitudinal overlap must be 0.5m and minimum transverse overlap must be 5m.
3. All geogrid joints will be permanently secured using heavy duty zip ties at a minimum spacing 1.0m. Heavy duty zip ties will have a minimum tensile strength of 175lbs.
4. The Contractor is responsible for silt and sediment control during the construction (specifically if done during the open water season).
5. ROQ material must be coarse with limited sand and fines content. See "Technical Specifications Earthworks and Geotechnical Engineering, Back River Gold Project, Nunavut Canada. Revision 0", dated April 2018.
6. Approximate water line shown is based solely on the provided bathymetric information. No data was provided to estimate the average, high or low water levels and no assessment was done on publicly available data sets to estimate these ranges.
7. Loading within 5m of the crest should be kept to a minimum, and/or avoided wherever possible. Slope relaxation of the outside slope is expected and ongoing maintenance, due to wave and ice erosion, should be expected.
8. For safety, visual markers should be placed near the crest of the Shoreline Pad to give operators better visual indication if any slope instability are staring to occur.



1/- **Typical Section for Sections of Extension less than 2.0m in height**

0m 1 2 3 4



2/- **Typical Section for Sections of Extension greater than 2.0m in height**

0m 1 2 3 4

DRAWING NO.	DRAWING TITLE	NO.	DESCRIPTION	CHK'D	APP'D	DATE	NO.	DESCRIPTION	CHK'D	APP'D	DATE
		--	--	--	--	--	A	Issued for Permit	JBK	CP	20/06/03
REFERENCE DRAWINGS		REVISIONS									

PROFESSIONAL ENGINEERS STAMP

srk consulting

DESIGN:	DRAWN:	REVIEWED:
CH/JBK	TH	EMR
CHECKED:	APPROVED:	DATE:
JBK	CP	June 2020

FILE NAME: 1CS020.018 - Shoreline Pad - opt 2.dwg

Sabina GOLD & SILVER CORP.

Back River Project

SRK JOB NO.: 1CS020.018

Marine Laydown Area

DRAWING TITLE:
Shoreline Pad Extension
Cross Sections

DRAWING NO.	SHEET	REVISION NO.
02	2 OF 2	A

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Appendix E. WIR Water Increase Memo

NUQSANA GOLDER
ENGINEERING AND ENVIRONMENTAL INC.

TECHNICAL MEMORANDUM

DATE 11 March 2020 **Project No.** 18114181-054b-TM-Rev1

TO Merle Keefe, EIT
Sabina Gold & Silver Corp.

CC Catherine Paul (Sabina) and Dionne Filiatrault (Golder)

FROM Johannes Kloeckes and Curtis VanWerkhoven **EMAIL Curtis_VanWerkhoven@golder.com**

RE: WINTER ICE ROAD MODIFICATIONS – TOTAL WATER AVAILABILITY ASSESSMENT

1.0 INTRODUCTION

Sabina Gold & Silver Corp. (Sabina) requested Nuqsana Golder Engineering and Environment Inc. (Nuqsana Golder) review the potential for additional water withdrawal availability along the winter ice road (WIR) for the Back River Project (the Project). This technical memorandum summarizes this review to confirm if the increase in annual WIR water withdrawal volume from 108,000 m³ to 324,000 m³ remains within volumes anticipated to avoid measurable residual effects to fish and fish habitat.

2.0 PREVIOUS 2018 WINTER ICE ROAD WATER WITHDRAWAL EVALUATION

Provided as Appendix A, Nuqsana Golder evaluated potential water sources for the approximately 160 km-long winter ice road from Goose Property at Goose Lake to the Marine Laydown Area at Bathurst Inlet (Golder 2018). Available winter water withdrawal for winter ice road construction was assessed using bathymetry data for 118 waterbodies derived from satellite imagery analysis. Of potential sources, 55 waterbodies were identified as being deep enough for under ice withdrawal without expected measurable residual effects to fish and fish habitat based on the Fisheries and Oceans Canada (DFO) protocol for mitigating water withdrawal effects on fish in ice-covered waterbodies in the North (DFO 2010). The lakes that did not meet the depth criteria (maximum depths less than 3.5 m) were screened out and were not included in the analysis of lakes available for winter water withdrawal. The DFO (2010) protocol is the basis for the analysis of available winter water withdrawal and screening of lakes that do not meet the following criteria from DFO 2010:

- In one ice-covered season, total water withdrawal from a single waterbody is not to exceed 10% of the available water volume calculated using a maximum expected ice thickness of 2.0 m for lakes above the tree line in the North.
- Only waterbodies with maximum depths that are 1.5 m greater than their corresponding maximum expected ice thickness of 2.0 m for lakes above the tree line in the North should be considered for water withdrawal.
- Any waterbody with a maximum expected ice thickness that is greater than, or equal to, its maximum depth (as determined from a bathymetric survey) is exempt from the 10% maximum withdrawal limit. These waterbodies are expected to freeze to bottom and are therefore assumed to be non-fish bearing.

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16820 107 Avenue, Edmonton, Alberta, T5P 4C3, Canada T: +1 780 483 3499 F: +1 780 483 1574

Furthermore, the 55 lakes screened as having maximum depths greater than 3.5 m were also assessed for water level changes from water withdrawals. As it was assumed that all waterbodies deeper than 3.5 m support large-bodied fish, predicted changes in water levels were assigned a level of risk for spawning habitat loss as per FEIS Addendum Appendix V6-6G (Sabina 2017). At all 55 lakes with maximum depths greater than 3.5 m, if a 10% water withdrawal resulted in changes in water levels greater than those associated with a risk of spawning habitat loss of nil or negligible (changes in water levels greater than 0.22 m), the allowable water withdrawal (less than 10%) was calculated for drawdowns of 0.22 m. Table 2 of Appendix A provides the calculated recommended maximum withdrawal volume for the 55 lakes identified as being deep enough for under-ice withdrawals based on the initial screening.

3.0 WATER AVAILABILITY FOR INCREASED WITHDRAWALS AT LAKES PREVIOUSLY INDENTIFIED

Sabina requested Nuqsana Golder confirm if increasing annual water withdrawal from 108,000 m³ to 324,000 m³ along the WIR is possible while avoiding measurable residual effects to fish and fish habitat. Based on the previous study (Golder 2018), a total of over 57 million m^3 of under-ice water is available in the 55 lakes, and the 108,000 m^3/year equates to approximately 0.2% of the available under-ice water identified while adhering to the DFO protocol (2010) and resulting in expected nil or negligible risk of spawning habitat loss (See Appendix A, Table 2). Based on total water withdrawals along the WIR, it is not expected that increasing the annual WIR water withdrawal volume from 108,000 m^3 to 324,000 m³ will have measurable residual effects to fish and fish habitat, providing that total annual withdrawals from individual lakes do not exceed values previously calculated for nil or negligible risk of spawning habitat loss (See Appendix A, Table 2).

CLOSURE

We trust that this report provides the information required by Sabina Gold & Silver Corp. at this time. If there are any questions or require further detail, please contact the undersigned.

Yours truly,

GOLDER ASSOCIATES LTD.

Johannes Kloeckes
Water Resources Specialist

Curtis VanWerkhoven, MASc
Water Resources Specialist

Nathan Schmidt, PhD, PEng (NWT/NU)
Principal, Senior Water Resources Engineer

JK/CV/NS

https://golderassociates.sharepoint.com/sites/101666/technical work/6000_modification_packages/06-wir/water availability tm/rev1/18114181-054b-tm_wir_modification_rev1_total water.docx

REFERENCES

DFO (Fisheries and Oceans Canada). 2010. DFO Protocol for Winter Water Withdrawal from Ice-Covered Waterbodies in the Northwest Territories and Nunavut. Prepared June 20, 2010. 3 pp

Golder. 2018. Winter Ice Road Water Withdrawal Evaluation – Back River Project. Prepared for Sabina Gold & Silver Corp. November 2018. Reference No. 1776921_021_MEM_Rev0

Sabina (Sabina Gold & Silver Corp.). 2017. Final Environmental Impact Statement Addendum. Submitted to Nunavut Impact Review Board. February 2017.

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder can not be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

APPENDIX A

2018 WINTER ICE ROAD WATER WITHDRAWAL EVALUATION – BACK RIVER PROJECT

TECHNICAL MEMORANDUM

DATE November 8, 2018 **REFERENCE No.** 1776921_021_MEM_Rev0

TO Merle Keefe
Sabina Gold & Silver Corp.

CC Matthew Pickard, Dionne Filiatrault

FROM Cam Stevens **EMAIL** cameron_stevens@golder.com

WINTER ICE ROAD WATER WITHDRAWAL EVALUATION – BACK RIVER PROJECT

Golder Associates Ltd. (Golder) was retained by Sabina Gold & Silver Corp. (Sabina) to provide an evaluation of potential water sources for winter ice road construction along the proposed 160 km-long winter road corridor from the Goose Property at Goose Lake to the Marine Laydown Area at Bathurst Inlet. Potential water sources are waterbodies deeper than 3.5 m (i.e., lakes) and available water volumes in those waterbodies are no more than 10% of the under ice volume, as per the Fisheries and Oceans Canada (DFO) protocol for mitigating water withdrawal effects on fish in ice-covered waterbodies in the North (DFO 2010).

The information provided in this technical memorandum (memo) fulfills commitments made during the environmental review of the Back River Project (the Project) (see Addendum Appendix V6-6G in Sabina [2017]), and provides Sabina with the necessary information to minimize, if not eliminate, any potential effects to overwintering fish and fish habitat, including spawning shoal habitat, during the construction of the winter ice road. The current plan for the winter ice road requires 108,000 m^3 of water per season (675 m^3 per km) to maintain ice thickness as per the Project Description (Volume 2 in Sabina [2017]).

The following sections of the memo provide methods and results for the available under-ice water volumes, the volumes representing 10% of available under-ice water, and the reduction in water depth associated with withdrawals of 10% of the available under-ice water per each lake in the winter road corridor. The memo also evaluates changes in water depths in terms of risk to spawning shoal habitat loss in lakes as per methods outlined in Addendum Appendix V6-6G in Sabina (2017). Based on that evaluation, recommended volumes for water withdrawal that present negligible risk of habitat loss are provided.

1.0 METHODS

Bathymetric digital elevation models were generated by Aeroquest Mapcon (Aeroquest) for 118 waterbodies within the winter road corridor using stereo-photogrammetric interpretation methods of stereo, 8 band, 50 cm satellite imagery; imagery was collected in August 2017 by DigitalGlobe's Worldview-2 satellite (Legleiter et al. 2014; Dörnhöfer and Oppelt 2016). For each waterbody, surrounding terrain characteristics were used to interpret slopes entering the waterbody at the shorelines, where the slopes were then extrapolated into the waterbody to connect with the lake bottom topography visualized through 'coastal blue', 'blue' and 'green' (spectral) bands in the imagery in a Geographic Information System (GIS). These spectral bands allow the identification of detailed lakebed topography to a depth of 30 m.

Bathymetric models of each waterbody were provided to Golder in raster format for analyses of volume and area per depth in a GIS platform for each waterbody deeper than 3.5 m. Tables produced from the raster analysis (see Appendix A) were used to estimate available under-ice water volumes for ice road construction for each source lake (i.e., 10% of under ice volume); where it was assumed that the maximum ice thickness is 2 m (DFO 2010). Changes in water levels from water withdrawals were also estimated. As it was assumed that all waterbodies deeper than 3.5 m support large-bodied fish, predicted changes in water levels were assigned a level of risk for spawning habitat loss as per Addendum Appendix V6-6G in Sabina (2017) (Table 1). Waterbodies with a potential risk of spawning habitat loss from a 10% under-ice volume reduction were identified as sources where water withdrawals should be reduced, particularly during below-average precipitation years. Recommended volumes for water withdrawal that present negligible risk of habitat loss were then calculated for these waterbodies.

Table 1: Water Withdrawal Risk Level Framework for Spawning Shoal Habitat for Fall-Spawning Fish[(a)]

Risk of Spawning Habitat Loss	Change in Water Elevation Under Ice (m)	Rationale
Nil or negligible	Less than 0.22	The reduction in water level lies within the average change in ice thickness (i.e., within normal variation)
Low	0.22 to less than 0.42	The reduction in water level remains within 1 SD of the average
Medium	0.42 to 0.8	The reduction in water level remains between 1 and 2 SD of the average
High	Greater than 0.8	The reduction in water level is beyond 2 SD of average and there is less than a 5% chance for this occurring naturally

a) includes coregonid species, such as Lake Whitefish (*Coregonus clupeaformis*), and Lake Trout (*Salvelinus namaycush*); SD = standard deviation

A characterization of whether bathymetric data are representative of below-average, average, or above-average water level conditions was provided using precipitation statistics for the region. Statistics were derived for both 2017 and 30-year (1981-2010) 'normal' data, obtained from a representative monitoring station in west-central Nunavut (station name: Kugluktuk A; see Government of Canada 2017).

The evaluation of satellite imagery results (volumes) also included a comparison with results generated by bathymetric (sonar) surveys previously performed in the field for a subset of seven lakes (Appendix V6-3A in Sabina [2017]; Rescan 2014). The lakes with existing bathymetric data included five lakes surveyed in early July 2014 (Fold Lake, Winter Road Lake 01, Winter Road Lake 02, Winter Road Lake 05, and Winter Road Lake 06) and two lakes surveyed in August 2010 (Llama Lake and Chair Lake). All lakes were less than 30 m depth, the extent to which accurate detection of the spectral bands in the satellite imagery is known to be effective. It was assumed that the previously conducted surveys of each lake were performed consistent with methods described by DFO (2010), and included one longitudinal transect (connecting the two farthest shorelines) and a minimum of two perpendicular transects evenly spaced on the longitudinal transect at maximum intervals of 500 m. Project lakes with existing bathymetric data that were excluded from the comparison were either outside the boundary of the winter road corridor, or had insufficient data to provide a reliable volume estimate.

2.0 RESULTS AND DISCUSSION

Of the 118 waterbodies examined for use for winter ice road construction, 55 lakes were identified as being deep enough (greater than 3.5 m) for under-ice water withdrawal (Table 2; Figure 1; Appendix B). Overall, source lakes were determined to provide a median capacity of 39,637 m^3 of water per lake for winter ice road construction, where available 10% under-ice volumes may range from 683 m^3 for Lake 996 to 301,075,442 m^3 for Lake 34-0 (i.e., lower Bathurst Inlet). The provided volume statistics for lakes in the winter road corridor are expected to represent average lake level conditions, given that cumulative precipitation levels in August 2017 totalled 208.4 mm, just 1 mm below normal totals for that time of the year when the imagery was acquired (Figure 2). It is expected that available water volumes for winter ice road construction is lower during below-average precipitation years and higher during above-average precipitation years.

Table 2: Water Sources, Bathymetry Statistics, and Available Volumes for Winter-Ice Road Construction for the Back River Project

Waterbody ID	North. UTM	East. UTM	Surface Area (SA) (m^2)	Volume (V) (m^3)	V:SA ratio (m)	Under Ice Volume Below 2 m Depth (m^3)	10% Volume Below 2 m Depth (m^3)	Predicted Water Level Change (m)	Risk of Habitat Loss For 10% Guideline	Calculated Volume for Nil Risk (m^3)
Lake 1-0	7272263	428691	348,021	951,009	2.7	396,025	39,603	0.19	Nil	39,603
Lake 2-0	7273318	427649	598,077	1,487,839	2.5	535,068	53,507	0.17	Nil	53,507
Lake 3-0	7273459	425284	557,865	1,738,708	3.1	793,748	79,375	0.21	Nil	79,375
Lake 4-0	7275521	422778	349,596	705,486	2.0	193,786	19,379	0.13	Nil	19,379
Lake 8-0	7276631	418218	765,711	2,427,790	3.2	1,137,977	113,798	0.20	Nil	113,798
Lake 7-0	7277136	419314	2,211,876	8,325,456	3.8	4,336,453	433,645	0.22	Low	424,972
Lake 6-0	7277346	421197	224,514	614,579	2.7	253,622	25,362	0.19	Nil	25,362
Lake 9-0	7277741	416761	620,172	1,581,371	2.5	537,030	53,703	0.14	Nil	53,703
Lake 11-0	7280643	411983	885,771	2,406,329	2.7	981,876	98,188	0.19	Nil	98,188
Lake 13-0a	7284074	407857	290,376	597,123	2.1	151,117	15,112	0.12	Nil	15,112
Lake 14-0a	7287885	404204	3,942,630	10,415,812	2.6	3,597,800	359,780	0.16	Nil	359,780
Lake 14-1	7293431	401036	2,221,497	4,779,159	2.2	881,912	88,191	0.08	Nil	88,191
Lake 15-0	7298909	399919	1,441,269	5,027,754	3.5	2,373,270	237,327	0.19	Nil	237,327
Lake 16-0	7303281	399696	2,068,272	12,016,309	5.8	8,139,725	813,973	0.40	Low	447,685
Lake 17-0	7305916	402441	5,913,261	61,932,318	10.5	50,372,624	5,037,262	0.90	High	1,239,167
Lake 16-1	7306279	398021	319,815	812,512	2.5	260,311	26,031	0.14	Nil	26,031
Lake LA17-0	7308172	395986	3,193,056	18,907,975	5.9	12,865,851	1,286,585	0.43	Med.	643,293
Lake 18-0	7308843	401524	635,085	2,886,128	4.5	1,690,494	169,049	0.28	Low	128,478
Lake 984	7309759	402495	153,108	296,424	1.9	71,739	7,174	0.17	Nil	7,174
Lake 18-1	7310007	401912	161,253	426,414	2.6	150,589	15,059	0.15	Nil	15,059
Lake LA18-0a	7311590	396960	714,708	4,368,027	6.1	3,006,955	300,695	0.36	Low	128,478
Lake 19-0	7311911	401691	160,065	360,221	2.3	98,274	9,827	0.12	Nil	9,827
Lake 985	7312109	395983	40,914	106,234	2.6	35,130	3,513	0.13	Nil	3,513
Lake 986	7312574	392342	16,299	37,926	2.3	12,753	1,275	0.14	Nil	1,275
Lake 989	7313114	391719	29,322	62,690	2.1	17,580	1,758	0.13	Nil	1,758
Lake 987	7313141	398133	206,199	760,584	3.7	393,753	39,375	0.21	Nil	39,375
Lake 991	7313599	391191	36,702	76,595	2.1	21,030	2,103	0.13	Nil	2,103

Waterbody ID	North. UTM	East. UTM	Surface Area (SA) (m^2)	Volume (V) (m^3)	V:SA ratio (m)	Under Ice Volume Below 2 m Depth (m^3)	10% Volume Below 2 m Depth (m^3)	Predicted Water Level Change (m)	Risk of Habitat Loss For 10% Guideline	Calculated Volume for Nil Risk (m^3)
Lake LA20-0	7313887	399363	324,144	940,089	2.9	389,431	38,943	0.18	Nil	38,943
Lake 990	7314076	388751	761,706	3,456,788	4.5	2,130,011	213,001	0.41	Low	115,021
Lake 20-0	7314226	404075	5,757,903	24,053,493	4.2	14,139,389	1,413,939	0.29	Low	1,060,454
Lake 992	7314853	389975	893,646	3,525,249	3.9	1,938,558	193,856	0.24	Low	178,347
Lake LA21-0	7315592	399777	256,878	761,896	3.0	309,761	30,976	0.18	Nil	30,976
Lake LA23-0	7315882	401330	265,968	1,013,844	3.8	524,720	52,472	0.23	Low	51,947
Lake LA21-1	7316914	399454	204,606	406,055	2.0	129,313	12,931	0.16	Nil	12,931
Lake LA22-0	7317386	399995	2,393,802	5,635,137	2.4	1,697,105	169,711	0.16	Nil	169,711
Lake 23-0	7318800	403392	498,888	1,218,007	2.4	396,365	39,637	0.14	Nil	39,637
Lake 24-0	7321054	402094	876,762	2,011,377	2.3	599,951	59,995	0.13	Nil	59,995
Lake 994	7323246	400275	136,197	276,346	2.0	61,034	6,103	0.11	Nil	6,103
Lake 995	7325353	400617	103,959	233,491	2.2	75,975	7,597	0.17	Nil	7,597
Lake 25-0	7326281	400452	483,390	1,713,886	3.5	868,241	86,824	0.23	Low	80,746
Lake 996	7327338	401382	26,253	43,840	1.7	6,832	683	0.09	Nil	683
Lake 26-0	7328257	401915	59,454	181,351	3.1	97,110	9,711	0.30	Low	6,992
Lake 997	7329276	401911	17,280	41,763	2.4	15,122	1,512	0.17	Nil	1,512
Lake 28-0	7332392	403397	265,680	653,963	2.5	239,515	23,951	0.18	Nil	23,951
Lake 29-0	7334245	403433	1,174,887	5,393,491	4.6	3,246,825	324,682	0.34	Low	211,044
Lake 998	7336793	403071	46,809	125,763	2.7	53,343	5,334	0.20	Nil	5,334
Lake 30-0	7340003	404631	927,360	1,683,771	1.8	566,741	56,674	0.21	Nil	56,674
Lake 30-4	7343073	403851	48,825	101,926	2.1	28,590	2,859	0.15	Nil	2,859
Lake 31-0	7351852	400718	82,758,231	2,779,474,304	33.6	2,616,978,541	261,697,854	3.39	High	17,010,361
Lake 999	7364930	391663	1,645,029	13,130,162	8.0	10,124,845	1,012,485	0.76	Med.	293,621
Lake 31-1	7367584	391134	34,803	70,470	2.0	16,035	1,604	0.12	Nil	1,604
Lake 31-2	7367973	390840	55,377	137,368	2.5	52,909	5,291	0.22	Low	5,185
Lake 32-0	7373635	387860	3,747,375	21,976,529	5.9	14,966,675	1,496,668	0.37	Low	868,067
Lake 33-0	7378706	385690	124,371	270,935	2.2	86,426	8,643	0.17	Nil	8,643
Lake 34-0	7380542	390639	157,216,248	3,320,662,011	21.1	3,010,754,419	301,075,442	2.03	High	32,516,148

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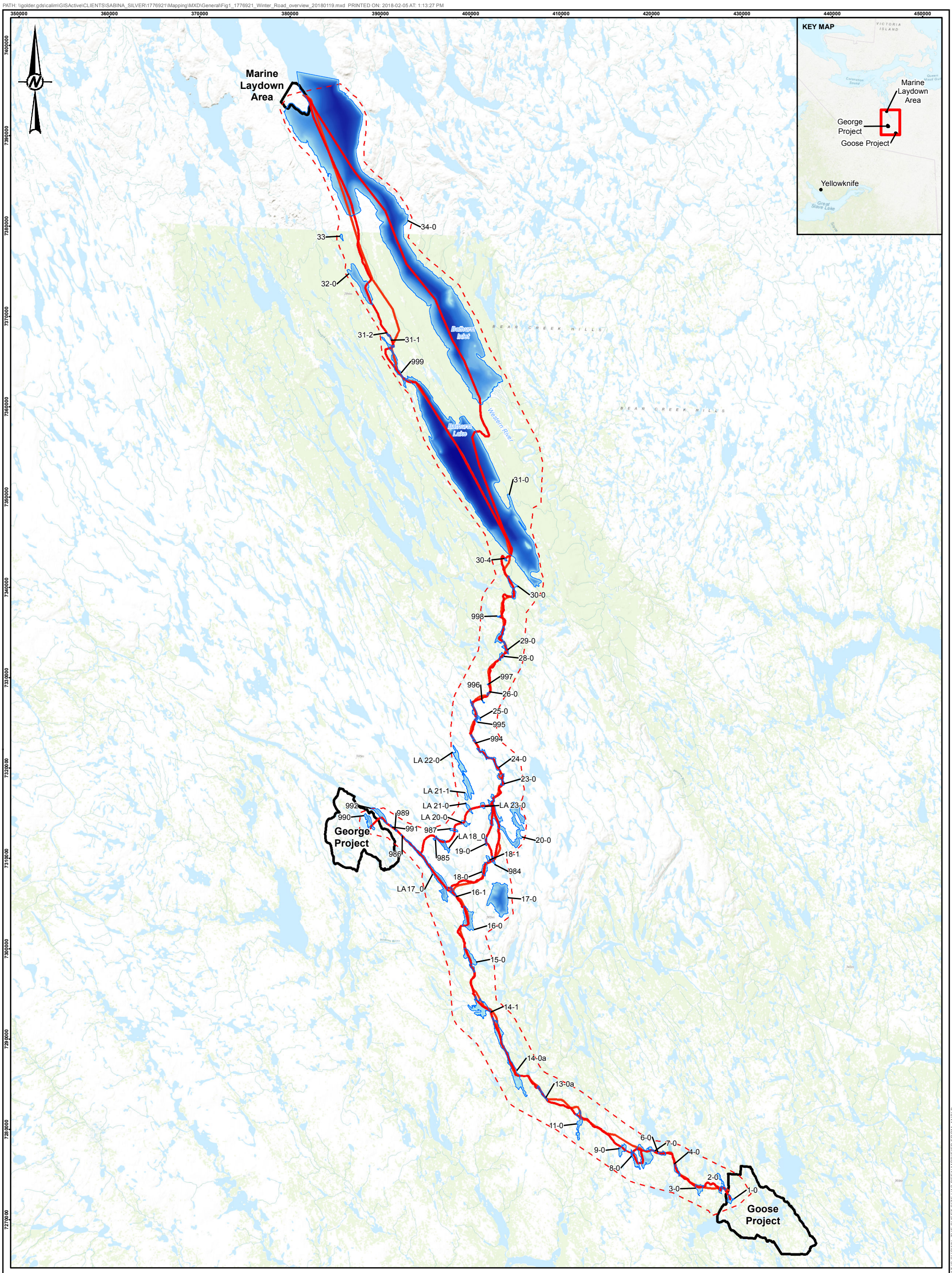

LEGEND

- WINTER ROAD
- PROJECT AREA
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY

BATHYMETRY (1 M INTERVAL)

0
-13
-26
-39
-52
-65

0 10 20

1:400,000 KILOMETRES

REFERENCE(S)

SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
PROJECTION: UTM ZONE 13 DATUM: NAD 83

CLIENT
SABINA GOLD & SILVER CORP.

PROJECT
BACK RIVER PROJECT

TITLE
OVERVIEW OF WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

CONSULTANT
Golder Associates

YYYY-MM-DD	2018-02-05
DESIGNED	BW
PREPARED	JG
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
1776921	1300/1320	A	1

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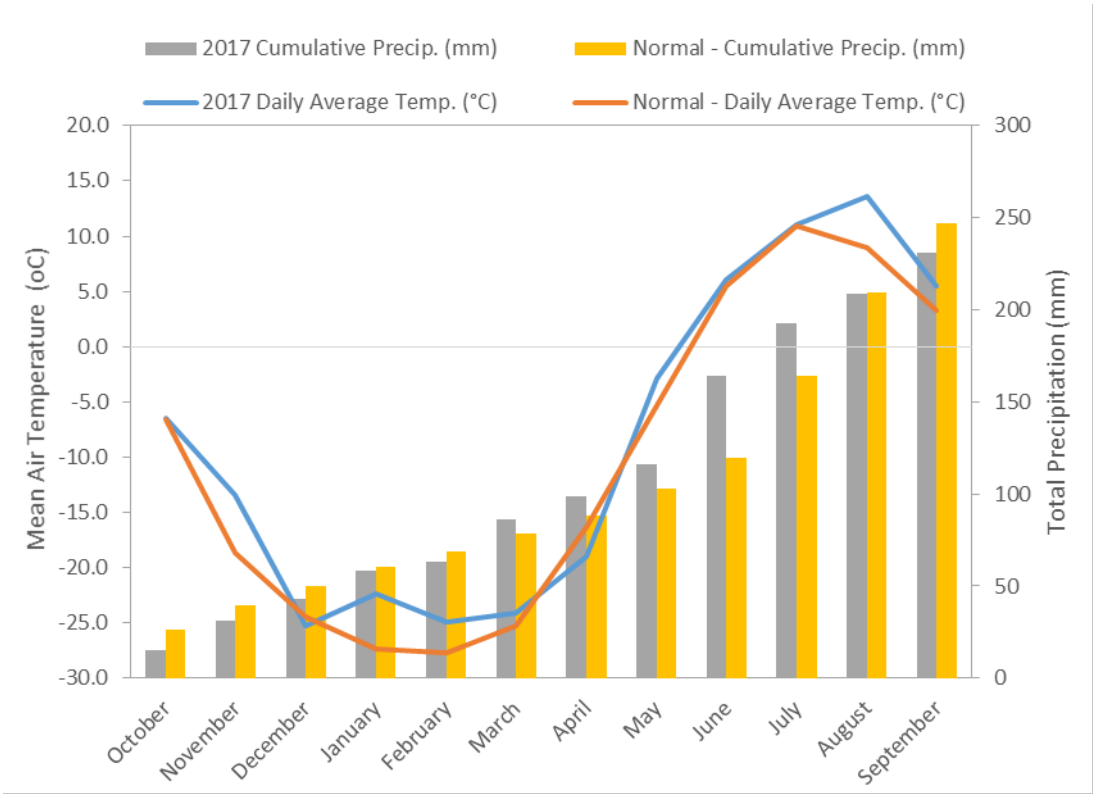

Figure 2: A Comparison of Monthly Total Precipitation and Mean Air Temperature for 2017 versus 'Normals' (1981-2010)

No measurable effects are predicted for fish and fish habitat for most of the identified source lakes if using the 10% under-ice volume guideline for water withdrawal (Table 2). However, potential effects to fish and fish habitat may result for some lakes with large volumes of water relative to the surface area of the lake (i.e., lakebeds profiled as a deep 'bathtub' or 'bowl' shape). For example, minor effects to fish habitat may result in Lake LA17-0 and Lake 999 where predicted water levels may be reduced by 0.43 m, and 0.76 m, respectively, during water withdrawal. To avoid effects to fish and fish habitat (e.g., exposing incubating eggs on shoals) in these two lakes, it is recommended that volumes less than the 10% under ice volume be withdrawn (e.g., approximately 5% for Lake LA17-0, and 3% for Lake 999). A similar recommendation is made for Lake 31-0 (Bathurst Lake) where moderate to major effects to fish habitat may result from water withdrawals unless reduced below the DFO guideline. Given that predicted water levels may drop by 3.39 m if extracted volumes are 10% the under-ice volume, it is recommended that approximately 1% of the under ice volume be withdrawn from Lake 31-0 for road construction. Although the available under ice volume for Lake 34-0 (i.e., lower Bathurst Inlet) for winter ice road construction may be larger than that reported in Table 2 because of receiving under-ice flows from the Western River, the reported under ice volume is recommended without additional hydrological study as a protective measure for fish and fish habitat.

The lake volume statistics generated by the satellite imagery interpretation method were similar to those generated from a field-based sonar survey of lakes. Lake volumes generated by the satellite imagery interpretation method were only marginally higher (by 9.2%) than the previously estimated volumes (Table 3). Differences may be a result of annual or seasonal changes in lake conditions, and also a result of differences underlying the two methods. Although a field-based sonar survey can collect accurate elevation details using a depth sounder, coverage is often limited in spatial extent due to time or logistical constraints. Furthermore, DFO's protocol

recommends only one longitudinal transect (connecting the two farthest shorelines) and a minimum of two perpendicular transects evenly spaced on the longitudinal transect at maximum intervals of 500 m (DFO 2010). The spatial extent of topographic detail collected in the field can clearly be much less than what can be provided by satellite imagery, and recent studies suggest that accurate elevation data (within 0.2 m) can be achieved using high-quality imagery and stereo-photogrammetry interpretation methods (Ehses and Rooney 2015; Mohamed et al. 2016).

Table 3: Comparison of Volume Estimates for Field Survey-Derived Bathymetry versus Satellite Imagery-Derived Bathymetry

Analysis ID	Existing ID	Maximum Depth (m)	Field-Derived Volume (m^3)	Satellite-Derived Volume (m^3)	Volume % Difference
Lake 990	Fold Lake	15.4	2,970,486[(a)]	3,456,788	16.4
Lake 4-0	Winter Road Lake 01	8.5	664,318[(a)]	705,486	6.2
Lake 13-0a	Winter Road Lake 02	5.4	435,046[(a)]	597,123	37.3
Lake 25-0	Winter Road Lake 05	11.3	1,482,102[(a)]	1,713,886	15.6
Lake 26-0	Winter Road Lake 06	10.5	190,557[(a)]	181,351	-4.8
Lake 1-0	Llama Lake	13.6	1,130,613[(b)]	951,009	-15.9
Lake 2-0	Chair Lake	10.3	1,355,660[(b)]	1,487,839	9.8
				Mean Difference	9.2

a) Rescan (2014)
b) Appendix V6-3A in Sabina (2017)

In summary, the recommended (negligible risk to fish habitat) under-ice water volumes to be withdrawn for the construction of the winter ice road (in Table 2) are expected to be more protective of fish and fish habitat than the DFO 10% under-ice volume guideline. Furthermore, actual volumes of water to be withdrawn from each lake during construction are expected to be much less than the recommended volumes. The current plan for the winter ice road requires only 108,000 m^3 of water in total, which is lower than the recommend volume for some of the individual source lakes and is considerably lower than the combined recommended volumes in Table 2-1. However, water withdrawal targets should be re-evaluated annually for lakes if and when climate-related changes influence lake conditions beyond the baseline characterization described in this memo.

3.0 CLOSURE

We trust the above meets your needs, if you have any questions or concerns, please do not hesitate to contact the undersigned.

Sincerely,

Cam Stevens
Associate, Fisheries Biologist

Nathan Schmidt
Principal, Senior Water Resources Engineer

CS/NS/jr

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APPENDIX A

Bathymetry Results for Source Lakes for Winter Ice Road Construction

APPENDIX A

LIST OF TABLES

Table 1: Lake 1-0 (Llama Lake)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	951,009	348,021
-0.5	786,774	311,913
-1	638,670	270,801
-1.5	510,448	242,370
-2	396,025	214,992
-2.5	295,643	186,885
-3	208,840	155,556
-3.5	138,458	126,351
-4	82,119	96,138
-4.5	39,609	74,187
-5	7,540	11,493
-5.5	2,876	7,317

Table 2: Lake 2-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	1,487,839	598,077
-0.5	1,206,147	536,076
-1	950,662	482,616
-1.5	726,548	414,567
-2	535,068	343,089
-2.5	378,487	284,283
-3	250,032	213,183
-3.5	156,529	162,261
-4	86,311	83,394
-4.5	49,066	65,880
-5	20,279	29,286
-5.5	8,028	20,043

Table 3: Lake 3-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	1,738,708	557,865
-0.5	1,471,400	515,466
-1	1,222,799	476,883
-1.5	996,480	428,517
-2	793,748	372,249
-2.5	618,754	328,077
-3	465,410	282,915
-3.5	334,237	242,181
-4	222,877	186,147
-4.5	139,473	148,266
-5	73,867	108,693
-5.5	28,801	72,639

Table 4: Lake 4-0 (Winter Road Lake 01)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	705,486	349,596
-0.5	543,299	302,454
-1	402,231	248,976
-1.5	288,067	208,080
-2	193,786	155,061
-2.5	123,756	125,640
-3	67,658	90,612
-3.5	28,424	66,951

Table 5: Lake 8-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	2,427,790	765,711
-0.5	2,062,180	704,376
-1	1,722,511	639,504
-1.5	1,416,714	584,028
-2	1,137,977	505,422
-2.5	896,624	460,161
-3	677,996	390,681
-3.5	498,982	325,350
-4	352,629	232,290
-4.5	247,406	188,874
-5	163,374	136,503
-5.5	102,089	109,107
-6	53,617	70,497
-6.5	22,787	53,226

Table 6: Lake 7-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	8,325,456	2,211,876
-0.5	7,247,255	2,110,995
-1	6,213,087	2,021,373
-1.5	5,238,844	1,876,698
-2	4,336,453	1,730,376
-2.5	3,503,990	1,599,210
-3	2,737,090	1,432,809
-3.5	2,067,760	1,242,540
-4	1,496,684	974,259
-4.5	1,053,454	800,208
-5	694,516	599,229
-5.5	427,598	469,224
-6	224,290	284,922
-6.5	101,840	206,397
-7	15,882	24,579
-7.5	5,966	15,507

Table 7: Lake 6-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	614,579	224,514
-0.5	508,726	201,150
-1	413,116	181,332
-1.5	327,974	159,327
-2	253,622	137,583
-2.5	189,913	117,333
-3	136,266	94,599
-3.5	93,626	76,032
-4	60,191	56,196
-4.5	35,098	44,199
-5	15,937	25,083
-5.5	5,842	15,588

Table 8: Lake 9-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	1,581,371	620,172
-0.5	1,283,776	574,164
-1	1,006,749	525,564
-1.5	757,986	469,674
-2	537,030	405,927
-2.5	348,525	348,795
-3	187,488	260,631
-3.5	77,135	184,167

Table 9: Lake 11-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	2,406,329	885,771
-0.5	1,986,081	803,664
-1	1,602,079	709,965
-1.5	1,270,068	619,065
-2	981,876	521,703
-2.5	738,637	452,313
-3	528,555	382,608
-3.5	353,075	319,824
-4	208,294	199,395
-4.5	120,846	151,551
-5	55,599	80,262
-5.5	22,085	54,639

Table 10: Lake 13-0a (Winter Road Lake 02)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	597,123	290,376
-0.5	462,061	254,862
-1	342,054	215,253
-1.5	240,406	191,115
-2	151,117	156,141
-2.5	81,631	122,094
-3	28,802	37,107
-3.5	13,126	26,073
-4	2,450	3,024
-4.5	1,081	2,412

Table 11: Lake 14-0a

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	10,415,812	3,942,630
-0.5	8,508,701	3,706,839
-1	6,707,236	3,413,583
-1.5	5,076,385	3,109,680
-2	3,597,800	2,447,298
-2.5	2,465,903	2,080,647
-3	1,517,173	1,296,630
-3.5	925,510	1,073,889
-4	439,353	581,913
-4.5	186,010	435,573

Table 12: Lake 14-1 (Winter Road Lake 03)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	4,779,159	2,221,497
-0.5	3,696,902	2,121,723
-1	2,656,345	1,995,939
-1.5	1,713,762	1,775,016
-2	881,912	1,167,093
-2.5	391,958	793,134
-3	87,827	148,545
-3.5	30,358	84,393

Table 13: Lake 15-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	5,027,754	1,441,269
-0.5	4,320,561	1,395,918
-1	3,631,480	1,355,472
-1.5	2,978,026	1,258,470
-2	2,373,270	1,149,336
-2.5	1,834,521	1,003,284
-3	1,372,339	795,123
-3.5	1,001,136	690,291
-4	681,553	501,993
-4.5	452,038	416,331
-5	265,208	302,211
-5.5	132,056	231,246
-6	33,062	53,973
-6.5	11,835	32,049

Table 14: Lake 16-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	12,016,309	2,068,272
-0.5	10,997,464	2,014,488
-1	10,001,007	1,967,616
-1.5	9,044,365	1,860,210
-2	8,139,725	1,742,535
-2.5	7,289,399	1,658,664
-3	6,480,762	1,575,414
-3.5	5,717,933	1,476,243
-4	5,004,215	1,375,101
-4.5	4,341,201	1,277,172
-5	3,726,880	1,167,093
-5.5	3,169,045	1,065,015
-6	2,661,580	959,958
-6.5	2,202,731	875,907
-7	1,785,082	786,681
-7.5	1,413,523	700,362
-8	1,084,083	605,790
-8.5	799,103	534,645
-9	548,721	457,002
-9.5	345,505	357,075
-10	190,492	247,329
-10.5	81,526	189,459

Table 15: Lake 17-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	61,932,318	5,913,261
-0.5	58,988,355	5,863,014
-1	56,069,074	5,813,217
-1.5	53,191,478	5,696,244
-2	50,372,624	5,540,463
-2.5	47,635,707	5,406,192
-3	44,967,408	5,241,510
-3.5	42,391,708	5,060,475
-4	39,906,981	4,851,423
-4.5	37,526,172	4,672,242
-5	35,233,773	4,421,880
-5.5	33,077,330	4,204,242
-6	31,029,091	3,975,948
-6.5	29,091,298	3,775,158
-7	27,253,008	3,540,456
-7.5	25,520,934	3,388,428
-8	23,863,695	3,223,233
-8.5	22,287,815	3,080,664
-9	20,782,317	2,938,743
-9.5	19,345,963	2,806,947
-10	17,974,529	2,677,734
-10.5	16,665,221	2,559,897
-11	15,413,919	2,444,607
-11.5	14,219,600	2,332,719
-12	13,080,745	2,222,280
-12.5	11,997,651	2,110,113
-13	10,970,236	1,999,755
-13.5	9,998,631	1,886,976
-14	9,082,514	1,775,952
-14.5	8,221,505	1,668,375
-15	7,413,747	1,562,508
-15.5	6,656,587	1,466,451
-16	5,946,799	1,372,005
-16.5	5,284,027	1,279,431
-17	4,666,741	1,189,449
-17.5	4,093,761	1,102,932
-18	3,563,254	1,017,972
-18.5	3,075,495	933,507
-19	2,629,259	848,709
-19.5	2,225,377	767,574
-20	1,861,215	682,425

Table 15: Lake 17-0 (continued)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
-20.5	1,538,744	607,680
-21	1,252,962	524,637
-21.5	1,005,985	463,815
-22	788,650	398,403
-22.5	603,012	344,385
-23	443,520	277,704
-23.5	316,488	231,093
-24	211,662	181,017
-24.5	131,801	138,987
-25	71,788	97,299
-25.5	29,713	71,325

Table 16: Lake 16-1

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	812,512	319,815
-0.5	656,628	303,615
-1	508,692	286,110
-1.5	375,239	248,013
-2	260,311	207,252
-2.5	165,049	174,015
-3	86,367	90,900
-3.5	46,432	69,156
-4	16,902	25,299
-4.5	6,517	16,578

Table 17: Lake LA17-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	18,907,975	3,193,056
-0.5	17,331,869	3,111,678
-1	15,795,680	3,029,634
-1.5	14,305,839	2,929,986
-2	12,865,851	2,812,185
-2.5	11,491,012	2,686,905
-3	10,179,056	2,553,057
-3.5	8,937,258	2,414,124
-4	7,764,886	2,272,824
-4.5	6,660,229	2,145,879
-5	5,618,749	2,013,453
-5.5	4,657,451	1,832,022
-6	3,786,398	1,600,722
-6.5	3,030,687	1,422,720
-7	2,363,514	1,175,598
-7.5	1,816,893	1,011,708
-8	1,351,204	752,112
-8.5	1,004,902	634,284
-9	715,587	488,862
-9.5	494,721	395,442
-10	319,267	258,894
-10.5	204,715	200,232
-11	118,230	119,160
-11.5	67,019	86,382
-12	31,037	44,217
-12.5	12,445	30,618

Table 18: Lake 18-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	2,886,128	635,085
-0.5	2,571,908	622,143
-1	2,263,916	608,175
-1.5	1,968,603	573,255
-2	1,690,494	537,786
-2.5	1,432,519	494,226
-3	1,196,240	445,176
-3.5	983,789	404,523
-4	792,166	352,332
-4.5	627,040	308,979
-5	482,366	266,328
-5.5	357,855	232,326
-6	249,488	196,920
-6.5	160,328	160,461
-7	88,190	123,966
-7.5	35,648	87,174

Table 19: Lake 984

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	296,424	153,108
-0.5	222,837	141,282
-1	154,983	116,604
-1.5	105,469	82,350
-2	71,739	46,314
-2.5	50,654	38,205
-3	33,417	29,034
-3.5	20,565	22,446
-4	10,796	15,111
-4.5	4,391	10,665

Table 20: Lake 18-1

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	426,414	161,253
-0.5	347,889	152,856
-1	273,423	144,927
-1.5	206,642	122,508
-2	150,589	101,844
-2.5	103,121	88,371
-3	62,127	74,511
-3.5	28,085	61,884

Table 21: Lake LA18-0a

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	4,368,027	714,708
-0.5	4,014,611	699,075
-1	3,668,821	682,677
-1.5	3,332,711	661,842
-2	3,006,955	640,116
-2.5	2,693,523	613,575
-3	2,393,308	579,033
-3.5	2,112,672	543,897
-4	1,849,433	507,033
-4.5	1,606,085	466,578
-5	1,382,725	425,655
-5.5	1,179,964	385,632
-6	996,976	336,573
-6.5	835,437	309,663
-7	687,154	277,686
-7.5	556,205	246,411
-8	440,264	209,835
-8.5	341,992	183,456
-9	256,581	156,249
-9.5	184,461	132,399
-10	123,961	107,064
-10.5	75,973	85,185
-11	38,628	51,327
-11.5	16,249	38,412

Table 22: Lake 19-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	360,221	160,065
-0.5	283,395	147,330
-1	212,794	133,866
-1.5	150,823	114,210
-2	98,274	94,680
-2.5	55,599	76,140
-3	21,703	31,635
-3.5	8,554	21,276

Table 23: Lake 985

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	106,234	40,914
-0.5	86,360	38,592
-1	67,644	36,297
-1.5	50,480	32,436
-2	35,130	28,764
-2.5	22,038	23,598
-3	11,445	17,559
-3.5	4,342	11,160

Table 24: Lake 986

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	37,926	16,299
-0.5	30,295	14,220
-1	23,650	12,348
-1.5	17,841	10,917
-2	12,753	9,513
-2.5	8,385	8,046
-3	4,704	6,048
-3.5	2,032	4,653

Table 25: Lake 989

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	62,690	29,322
-0.5	48,842	26,073
-1	36,561	22,338
-1.5	26,256	18,891
-2	17,580	14,976
-2.5	10,895	11,817
-3	5,699	8,595
-3.5	2,181	5,616

Table 26: Lake 987

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	760,584	206,199
-0.5	660,430	194,562
-1	565,753	183,537
-1.5	476,918	171,882
-2	393,753	160,596
-2.5	318,065	142,254
-3	251,463	116,433
-3.5	197,446	100,071
-4	150,792	83,763
-4.5	112,205	70,776
-5	79,776	58,113
-5.5	53,942	45,423
-6	34,115	32,454
-6.5	20,002	24,156
-7	9,785	14,814
-7.5	3,695	9,630

Table 27: Lake 991

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	76,595	36,702
-0.5	59,409	32,085
-1	44,450	27,594
-1.5	31,736	23,274
-2	21,030	19,152
-2.5	12,573	14,697
-3	6,223	9,414
-3.5	2,372	6,093

Table 28: Lake LA20-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	940,089	324,144
-0.5	783,490	302,679
-1	637,283	271,242
-1.5	507,698	247,482
-2	389,431	222,093
-2.5	284,596	197,334
-3	192,027	157,527
-3.5	120,826	127,575
-4	64,244	90,423
-4.5	25,810	63,693

Table 29: Lake 990 (Fold Lake)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	3,456,788	761,706
-0.5	3,087,385	716,427
-1	2,739,717	656,919
-1.5	2,423,106	609,525
-2	2,130,011	545,661
-2.5	1,870,827	491,571
-3	1,638,121	400,167
-3.5	1,453,581	339,399
-4	1,297,348	285,903
-4.5	1,158,719	268,677
-5	1,028,661	251,361
-5.5	907,323	233,991
-6	794,532	216,981
-6.5	689,551	202,869
-7	591,575	188,604
-7.5	500,912	173,979
-8	417,561	159,345
-8.5	341,565	144,666
-9	272,818	129,204
-9.5	213,107	109,845
-10	162,911	87,579
-10.5	122,816	72,927
-11	89,990	56,997
-11.5	64,197	46,296
-12	43,700	33,516
-12.5	28,675	26,550
-13	17,063	17,811
-13.5	9,378	13,059
-14	3,909	6,435
-14.5	1,383	3,843

Table 30: Lake 20-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	24,053,493	5,757,903
-0.5	21,274,098	5,359,257
-1	18,694,202	4,914,081
-1.5	16,327,151	4,554,369
-2	14,139,389	4,160,286
-2.5	12,143,103	3,824,901
-3	10,313,817	3,444,399
-3.5	8,671,863	3,124,656
-4	7,188,577	2,734,920
-4.5	5,892,489	2,450,403
-5	4,736,646	2,011,113
-5.5	3,800,296	1,737,054
-6	2,996,722	1,430,307
-6.5	2,332,005	1,230,615
-7	1,764,101	958,626
-7.5	1,324,398	802,566
-8	958,983	612,387
-8.5	682,383	495,297
-9	462,115	355,122
-9.5	303,961	279,081
-10	181,373	194,058
-10.5	96,468	146,736
-11	33,608	44,649
-11.5	14,164	33,363

Table 31: Lake 992 (Lower Long Lake)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	3,525,249	893,646
-0.5	3,090,884	843,894
-1	2,681,132	794,889
-1.5	2,296,727	742,455
-2	1,938,558	684,441
-2.5	1,609,868	630,351
-3	1,308,061	570,294
-3.5	1,037,696	511,290
-4	796,388	428,427
-4.5	600,504	355,113
-5	441,327	242,514
-5.5	331,443	197,631
-6	243,202	131,913
-6.5	183,033	109,143
-7	133,905	84,798
-7.5	95,742	68,004
-8	65,674	49,887
-8.5	43,530	38,835
-9	26,637	26,559
-9.5	14,968	20,178
-10	6,340	9,612
-10.5	2,417	6,255

Note: results represent approximately half of the lake

Table 32: Lake LA21-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	761,896	256,878
-0.5	636,798	243,540
-1	518,164	230,571
-1.5	408,466	208,323
-2	309,761	184,896
-2.5	223,571	160,011
-3	149,502	131,949
-3.5	90,275	105,246
-4	43,945	61,821
-4.5	17,741	43,488

Table 33: Lake LA23-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	1,013,844	265,968
-0.5	883,593	255,177
-1	758,619	244,926
-1.5	638,981	233,838
-2	524,720	223,182
-2.5	417,547	205,551
-3	319,059	188,469
-3.5	231,584	161,847
-4	156,958	135,342
-4.5	97,169	104,409
-5	51,964	72,063
-5.5	21,204	51,399

Table 34: Lake LA21-1

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	406,055	204,606
-0.5	313,083	167,463
-1	238,330	125,316
-1.5	179,826	108,810
-2	129,313	92,871
-2.5	87,933	72,837
-3	56,168	50,058
-3.5	33,938	39,006
-4	17,084	25,722
-4.5	6,464	16,857

Table 35: Lake LA22-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	5,635,137	2,393,802
-0.5	4,482,867	2,216,070
-1	3,417,646	2,004,201
-1.5	2,486,972	1,719,324
-2	1,697,105	1,305,063
-2.5	1,119,971	1,006,281
-3	687,345	499,131
-3.5	461,891	403,263
-4	283,219	234,945
-4.5	178,423	184,986
-5	97,282	137,520
-5.5	38,910	96,624

Table 36: Lake 23-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	1,218,007	498,888
-0.5	978,980	457,965
-1	759,688	413,127
-1.5	565,653	363,042
-2	396,365	304,857
-2.5	255,928	256,743
-3	139,356	190,107
-3.5	57,778	137,799

Table 37: Lake 24-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	2,011,377	876,762
-0.5	1,593,705	794,241
-1	1,216,306	707,499
-1.5	885,350	616,248
-2	599,951	502,839
-2.5	370,232	417,114
-3	182,194	251,559
-3.5	74,529	180,648

Table 38: Lake 994

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	276,346	136,197
-0.5	211,157	124,704
-1	151,661	108,810
-1.5	101,855	90,432
-2	61,034	64,206
-2.5	33,180	47,628
-3	13,069	19,656
-3.5	4,999	12,825

Table 39: Lake 995

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	233,491	103,959
-0.5	184,607	91,971
-1	141,616	80,118
-1.5	105,172	65,538
-2	75,975	49,248
-2.5	53,340	41,301
-3	34,509	32,976
-3.5	19,729	26,199
-4	8,207	12,276
-4.5	3,137	8,127

Table 40: Lake 25-0 (Winter Road Lake 05)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	1,713,886	483,390
-0.5	1,479,292	454,887
-1	1,258,717	423,630
-1.5	1,055,229	390,429
-2	868,241	330,912
-2.5	712,176	293,499
-3	574,202	257,418
-3.5	451,816	232,380
-4	341,796	204,354
-4.5	246,870	175,221
-5	166,488	126,810
-5.5	109,103	103,149
-6	63,042	61,848
-6.5	36,204	45,756
-7	16,933	11,070
-7.5	12,052	8,469
-8	8,414	6,066
-8.5	5,663	4,896
-9	3,483	3,753
-9.5	1,874	2,709
-10	757	1,224
-10.5	278	765

Table 41: Lake 996

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	43,840	26,253
-0.5	31,678	22,446
-1	21,286	18,900
-1.5	12,971	14,409
-2	6,832	8,010
-2.5	3,481	5,508
-3	1,240	2,079
-3.5	436	1,233

Table 42: Lake 26-0 (Winter Road Lake 06)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	181,351	59,454
-0.5	154,336	48,852
-1	132,265	39,654
-1.5	113,597	35,064
-2	97,110	30,897
-2.5	82,370	28,089
-3	69,005	25,425
-3.5	57,094	22,320
-4	46,686	19,287
-4.5	37,659	16,812
-5	29,834	14,472
-5.5	23,043	12,771
-6	17,092	10,998
-6.5	12,014	9,297
-7	7,753	5,436
-7.5	5,320	4,320
-8	3,393	3,141
-8.5	2,024	2,358
-9	1,010	1,593
-9.5	372	1,017

Table 43: Lake 997

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	41,763	17,280
-0.5	33,611	15,246
-1	26,461	13,284
-1.5	20,335	11,277
-2	15,122	9,513
-2.5	10,772	7,875
-3	7,193	6,390
-3.5	4,381	4,842
-4	2,264	3,240
-4.5	911	2,214

Table 44: Lake 28-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	653,963	265,680
-0.5	528,349	236,736
-1	417,104	207,198
-1.5	321,078	177,165
-2	239,515	140,265
-2.5	174,734	119,358
-3	119,751	93,681
-3.5	77,451	75,375
-4	44,548	49,707
-4.5	23,042	36,387
-5	8,010	11,835
-5.5	3,093	7,965

Table 45: Lake 29-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	5,393,491	1,174,887
-0.5	4,817,050	1,131,201
-1	4,262,173	1,080,720
-1.5	3,737,917	1,015,686
-2	3,246,825	921,393
-2.5	2,804,519	847,629
-3	2,399,386	757,305
-3.5	2,039,176	683,649
-4	1,715,040	594,387
-4.5	1,432,061	537,903
-5	1,176,592	472,086
-5.5	955,205	414,081
-6	761,770	348,588
-6.5	600,293	298,143
-7	462,858	233,271
-7.5	355,325	197,280
-8	264,767	151,047
-8.5	195,440	126,801
-9	137,826	102,753
-9.5	92,119	80,523
-10	56,906	52,065
-10.5	34,308	38,700
-11	17,925	26,217
-11.5	7,001	17,721

Table 46: Lake 998

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	125,763	46,809
-0.5	103,848	40,851
-1	84,747	35,496
-1.5	68,045	31,401
-2	53,343	27,126
-2.5	40,766	23,247
-3	30,037	19,116
-3.5	21,351	15,615
-4	14,376	12,312
-4.5	8,942	9,630
-5	4,748	6,426
-5.5	1,948	4,725

Table 47: Lake 30-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	1,683,771	927,360
-0.5	1,258,362	778,509
-1	900,580	370,440
-1.5	724,696	333,720
-2	566,741	294,957
-2.5	429,027	256,815
-3	309,111	201,456
-3.5	216,433	169,920
-4	138,546	127,656
-4.5	81,453	101,151
-5	36,825	50,634
-5.5	15,061	36,639

Table 48: Lake 30-4

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	101,926	48,825
-0.5	79,011	42,921
-1	58,908	37,179
-1.5	42,092	30,240
-2	28,590	23,796
-2.5	18,087	18,225
-3	10,211	10,035
-3.5	5,873	7,398
-4	2,787	4,374
-4.5	1,021	2,718

Table 49: Lake 31-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	2,779,474,304	82,758,231
-0.5	2,738,286,322	81,993,276
-1	2,697,479,161	81,173,871
-1.5	2,657,060,478	80,500,122
-2	2,616,978,541	79,766,712
-2.5	2,577,275,942	79,043,760
-3	2,537,934,427	78,270,867
-3.5	2,498,976,729	77,559,606
-4	2,460,374,524	76,781,853
-4.5	2,422,167,580	76,045,545
-5	2,384,328,503	75,273,336
-5.5	2,346,852,319	74,632,995
-6	2,309,694,851	73,976,832
-6.5	2,272,843,941	73,428,219
-7	2,236,266,110	72,845,262
-7.5	2,199,978,270	72,306,963
-8	2,163,957,904	71,748,549
-8.5	2,128,208,323	71,249,652
-9	2,092,707,373	70,744,662
-9.5	2,057,462,312	70,235,793
-10	2,022,471,385	69,723,927
-10.5	1,987,739,440	69,204,159
-11	1,953,266,573	68,684,013
-11.5	1,919,046,272	68,198,400
-12	1,885,068,199	67,705,983
-12.5	1,851,334,569	67,228,920

Table 49: Lake 31-0 (continued)

Lake Volume and Surface Area Per Depth		
-13	1,817,838,881	66,697,659
-13.5	1,784,611,758	66,210,417
-14	1,751,627,867	65,717,829
-14.5	1,718,882,776	65,263,140
-15	1,686,364,164	64,808,766
-15.5	1,654,084,897	64,309,302
-16	1,622,054,442	63,761,085
-16.5	1,590,297,568	63,265,374
-17	1,558,788,025	62,746,614
-17.5	1,527,535,319	62,264,043
-18	1,496,522,874	61,762,707
-18.5	1,465,765,321	61,268,445
-19	1,435,253,763	60,769,143
-19.5	1,404,995,684	60,263,793
-20	1,374,989,744	59,751,288
-20.5	1,345,249,489	59,210,694
-21	1,315,778,729	58,660,461
-21.5	1,286,584,459	58,117,185
-22	1,257,661,383	57,566,655
-22.5	1,229,012,381	57,030,012
-23	1,200,631,288	56,477,808
-23.5	1,172,533,740	55,912,635
-24	1,144,717,715	55,346,733
-24.5	1,117,200,617	54,721,701
-25	1,089,995,211	54,093,960
-25.5	1,063,111,477	53,442,306
-26	1,036,552,135	52,792,983
-26.5	1,010,316,014	52,152,156
-27	984,399,486	51,509,538
-27.5	958,815,565	50,828,094
-28	933,570,502	50,145,750
-28.5	908,670,006	49,457,457
-29	884,111,981	48,772,368
-29.5	859,900,511	48,074,625
-30	836,036,328	47,279,367
-30.5	812,565,571	46,607,166
-31	789,426,176	45,925,938
-31.5	766,625,128	45,280,584
-32	744,143,346	44,571,042
-32.5	722,006,980	43,975,332
-33	700,167,379	43,382,241
-33.5	678,627,297	42,778,629

Table 49: Lake 31-0 (continued)

Lake Volume and Surface Area Per Depth		
-34	657,388,064	42,176,700
-34.5	636,455,412	41,554,566
-35	615,832,872	40,931,937
-35.5	595,521,309	40,315,581
-36	575,516,794	39,702,060
-36.5	555,810,028	39,125,016
-37	536,390,699	38,547,693
-37.5	517,270,174	37,934,649
-38	498,455,270	37,322,379
-38.5	479,949,509	36,701,775
-39	461,752,823	36,082,944
-39.5	443,862,015	35,480,250
-40	426,271,732	34,876,053
-40.5	408,991,697	34,243,875
-41	392,027,236	33,613,353
-41.5	375,357,554	33,065,784
-42	358,961,388	32,516,379
-42.5	342,841,389	31,964,148
-43	326,996,676	31,414,347
-43.5	311,425,290	30,871,422
-44	296,124,835	30,327,417
-44.5	281,090,826	29,809,215
-45	266,315,475	29,291,625
-45.5	251,799,364	28,772,748
-46	237,542,200	28,252,341
-46.5	223,568,690	27,641,682
-47	209,899,524	27,030,564
-47.5	196,562,608	26,317,629
-48	183,580,647	25,575,021
-48.5	171,007,519	24,720,444
-49	158,858,197	23,844,411
-49.5	147,142,961	23,019,183
-50	135,836,868	22,053,330
-50.5	125,044,753	21,117,474
-51	114,717,209	20,171,889
-51.5	104,882,606	19,168,425
-52	95,546,830	18,123,930
-52.5	86,725,970	17,161,929
-53	78,382,597	16,124,526
-53.5	70,550,222	15,209,154
-54	63,168,664	14,290,947
-54.5	56,242,766	13,416,732

Table 49: Lake 31-0 (continued)

Lake Volume and Surface Area Per Depth		
-55	49,748,780	12,454,083
-55.5	43,766,641	11,480,868
-56	38,262,036	9,984,519
-56.5	33,494,892	9,088,650
-57	29,168,416	8,002,602
-57.5	25,342,406	7,304,724
-58	21,860,302	6,573,060
-58.5	18,694,822	6,091,542
-59	15,766,101	5,604,417
-59.5	13,077,313	5,153,346
-60	10,610,749	4,659,732
-60.5	8,406,393	4,161,825
-61	6,444,473	3,645,792
-61.5	4,756,378	3,111,633
-62	3,327,705	2,489,598
-62.5	2,211,484	1,981,539
-63	1,340,252	1,264,635
-63.5	787,502	952,182
-64	382,210	551,313
-64.5	151,366	377,046

Table 50: Lake 999

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	13,130,162	1,645,029
-0.5	12,324,390	1,578,249
-1	11,551,678	1,504,566
-1.5	10,819,036	1,426,212
-2	10,124,845	1,342,953
-2.5	9,471,923	1,269,396
-3	8,855,337	1,192,131
-3.5	8,273,597	1,134,972
-4	7,720,226	1,074,447
-4.5	7,196,013	1,022,535
-5	6,697,821	965,898
-5.5	6,227,583	914,967
-6	5,782,681	855,180
-6.5	5,366,913	807,948
-7	4,974,531	749,808
-7.5	4,608,981	712,206
-8	4,261,919	667,332
-8.5	3,936,614	633,996
-9	3,627,776	599,787
-9.5	3,336,031	567,324
-10	3,060,269	515,619
-10.5	2,809,077	489,231
-11	2,571,030	460,863
-11.5	2,346,590	437,148
-12	2,133,688	397,755
-12.5	1,939,590	378,657
-13	1,754,894	358,821
-13.5	1,580,047	340,425
-14	1,414,333	322,128
-14.5	1,257,609	304,803
-15	1,109,556	287,262
-15.5	969,988	271,035
-16	838,528	254,754
-16.5	715,437	237,744
-17	600,816	219,321
-17.5	494,990	203,760
-18	396,851	188,118
-18.5	306,567	173,007
-19	223,659	112,086
-19.5	170,397	100,881
-20	122,628	81,927

Table 50: Lake 999 (continued)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
-20.5	84,113	72,216
-21	50,359	62,487
-21.5	22,284	50,175

Table 51: Lake 31-1

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	70,470	34,803
-0.5	53,923	31,437
-1	39,034	28,197
-1.5	26,274	22,941
-2	16,035	14,895
-2.5	9,540	11,124
-3	4,806	6,885
-3.5	1,913	4,752

Table 52: Lake 31-2

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	137,368	55,377
-0.5	111,092	49,734
-1	87,524	43,290
-1.5	68,169	34,299
-2	52,909	22,995
-2.5	42,007	20,646
-3	32,218	18,522
-3.5	23,705	15,561
-4	16,557	12,969
-4.5	10,708	10,467
-5	6,040	8,172
-5.5	2,505	5,985

Table 53: Lake 32-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	21,976,529	3,747,375
-0.5	20,130,753	3,636,045
-1	18,339,977	3,518,766
-1.5	16,617,299	3,372,615
-2	14,966,675	3,218,004
-2.5	13,385,314	3,107,889
-3	11,858,153	2,995,722
-3.5	10,405,325	2,816,910
-4	9,039,923	2,641,860
-4.5	7,770,292	2,437,587
-5	6,601,351	2,226,348
-5.5	5,542,465	2,010,033
-6	4,590,286	1,790,037
-6.5	3,742,287	1,602,801
-7	2,986,697	1,408,995
-7.5	2,329,723	1,219,779
-8	1,766,071	1,032,291
-8.5	1,282,680	901,386
-9	864,349	742,716
-9.5	533,637	582,318
-10	280,019	383,598
-10.5	114,906	278,631

Table 54: Lake 33-0

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	270,935	124,371
-0.5	212,600	108,945
-1	161,855	87,570
-1.5	121,111	75,402
-2	86,426	58,716
-2.5	59,865	47,709
-3	38,572	36,459
-3.5	22,604	27,396
-4	11,012	15,255
-4.5	4,521	10,881

Table 55: Lake 34-0 (Lower Bathurst Inlet)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
0	3,320,662,011	157,216,248
-0.5	3,242,285,412	156,296,529
-1	3,164,357,277	155,139,363
-1.5	3,087,175,952	153,595,260
-2	3,010,754,419	152,013,132
-2.5	2,935,337,834	149,661,963
-3	2,861,083,384	147,317,517
-3.5	2,787,866,353	145,558,773
-4	2,715,516,461	143,831,412
-4.5	2,644,168,880	141,559,281
-5	2,573,955,889	138,770,010
-5.5	2,505,117,971	136,589,616
-6	2,437,357,360	134,425,800
-6.5	2,370,739,815	132,051,222
-7	2,305,297,954	129,707,748
-7.5	2,241,084,611	127,158,525
-8	2,178,127,683	124,601,346
-8.5	2,116,626,591	121,407,669
-9	2,056,715,484	117,836,145
-9.5	1,998,611,273	114,569,469
-10	1,942,156,521	111,006,765
-10.5	1,887,443,003	107,868,915
-11	1,834,265,954	104,774,184
-11.5	1,782,515,939	102,239,658
-12	1,732,011,025	99,746,091
-12.5	1,682,747,632	97,322,355
-13	1,634,673,468	94,934,628
-13.5	1,587,841,099	92,418,390
-14	1,542,232,067	89,901,333
-14.5	1,497,855,760	87,615,594
-15	1,454,603,280	85,344,021
-15.5	1,412,437,213	83,337,822
-16	1,371,248,955	81,401,391
-16.5	1,330,951,001	79,797,096
-17	1,291,444,162	78,208,425
-17.5	1,252,743,067	76,603,950
-18	1,214,832,755	75,027,555
-18.5	1,177,719,168	73,436,157
-19	1,141,389,022	71,869,878
-19.5	1,105,835,767	70,359,318
-20	1,071,012,696	68,925,483

Table 55: Lake 34-0 (Lower Bathurst Inlet) (continued)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
-20.5	1,036,903,801	67,520,178
-21	1,003,484,304	66,104,001
-21.5	970,767,886	64,767,087
-22	938,711,950	63,413,928
-22.5	907,299,980	62,239,320
-23	876,467,854	61,008,156
-23.5	846,253,173	59,857,542
-24	816,602,873	58,743,063
-24.5	787,524,687	57,575,763
-25	759,021,754	56,434,914
-25.5	731,092,489	55,285,002
-26	703,733,181	54,154,953
-26.5	676,913,254	53,126,199
-27	650,604,821	52,108,326
-27.5	624,783,781	51,175,593
-28	599,428,816	50,244,048
-28.5	574,533,210	49,339,089
-29	550,088,651	48,440,565
-29.5	526,087,209	47,566,152
-30	502,521,118	46,698,912
-30.5	479,422,657	45,698,769
-31	456,818,707	44,721,144
-31.5	434,722,343	43,668,513
-32	413,149,392	42,626,592
-32.5	392,102,798	41,562,108
-33	371,585,866	40,507,344
-33.5	351,609,916	39,399,894
-34	332,180,732	38,242,395
-34.5	313,348,528	37,089,666
-35	295,088,704	35,925,381
-35.5	277,429,392	34,716,213
-36	260,368,854	33,488,091
-36.5	243,935,626	32,248,809
-37	228,116,039	31,007,007
-37.5	212,876,735	29,953,134
-38	198,160,274	28,905,912
-38.5	183,963,137	27,884,169
-39	170,275,692	26,857,386
-39.5	157,100,529	25,846,137
-40	144,428,510	24,823,413
-40.5	132,289,859	23,734,530

Table 55: Lake 34-0 (Lower Bathurst Inlet) (continued)

Lake Volume and Surface Area Per Depth

Elevation (m)	Cumulative Volume (m^3)	Cumulative Area (m^2)
-41	120,690,883	22,664,268
-41.5	109,614,224	21,645,522
-42	99,042,791	20,349,549
-42.5	89,120,186	19,343,151
-43	79,696,709	18,260,478
-43.5	70,870,760	17,047,413
-44	62,645,297	15,560,451
-44.5	55,193,891	14,252,175
-45	48,387,157	12,141,720
-45.5	42,569,731	11,134,899
-46	37,245,670	9,563,436
-46.5	32,665,660	8,762,805
-47	28,476,533	7,786,719
-47.5	24,748,249	7,133,058
-48	21,336,650	6,211,449
-48.5	18,354,386	5,719,374
-49	15,616,131	5,217,471
-49.5	13,113,823	4,793,148
-50	10,821,496	4,370,733
-50.5	8,744,070	3,940,920
-51	6,878,964	3,476,700
-51.5	5,234,537	3,103,515
-52	3,772,989	2,650,050
-52.5	2,559,532	2,208,681
-53	1,559,990	1,605,843
-53.5	840,334	1,277,856
-54	276,818	410,859
-54.5	107,940	270,522

APPENDIX B

Map of Water Sources for Ice Road Construction

Marine
Laydown
Area

34-0

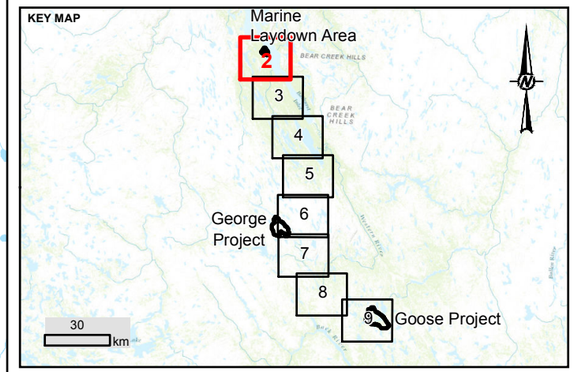
LEGEND

- MARINE LAYDOWN AREA
- WINTER ROAD
- WATERCOURSE
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY
- WATERBODY
- WETLAND

BATHYMETRY (1 M INTERVAL)

0
-13
-26
-39
-52
-65

KEY MAP



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1:75,000 KILOMETRES

NOTE(S)

1. TSF WRSA POND BREACHED TO GOOSE MAIN TF.

REFERENCE(S)

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PROJECTION: UTM ZONE 13N DATUM: NAD 83

YYYY-MM-DD	2018-02-05
DESIGNED	BDW
PREPARED	JG/RC
REVIEWED	
APPROVED	

CLIENT
SABINA GOLD & SILVER CORP.

CONSULTANT
Golder Associates

PROJECT
BACK RIVER PROJECT

TITLE
WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

PROJECT NO.	FIGURE	REV.
1776921/1300/1320	B2	A

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

0 25mm

PATH: \\golder.gds\calm\GIS\Active\CLIENTS\SABINA_SILVER\1776921\Mapping\MXD\General\Fig2-9_1776921_Winter_Road_Mapbook_20180119.mxd PRINTED ON: 2018-02-05 AT: 1:13:24 PM

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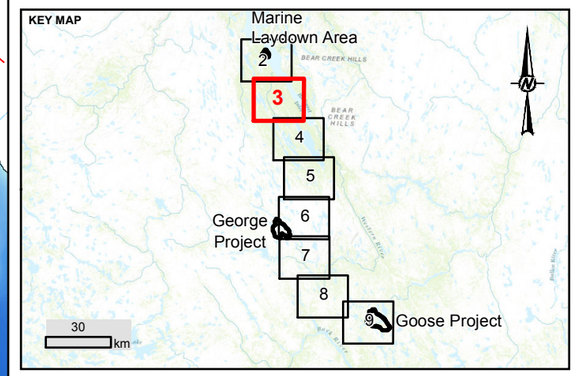
LEGEND

- WINTER ROAD
- WATERCOURSE
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY
- WATERBODY
- WETLAND

BATHYMETRY (1 M INTERVAL)

0
-13
-26
-39
-52
-65

KEY MAP



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NOTE(S)

1. TSF WRSA POND BREACHED TO GOOSE MAIN TF.

REFERENCE(S)

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PROJECTION: UTM ZONE 13N DATUM: NAD 83

YYYY-MM-DD	2018-02-05
DESIGNED	BDW
PREPARED	JG/RC
REVIEWED	
APPROVED	

CLIENT
SABINA GOLD & SILVER CORP.

CONSULTANT
Golder Associates

PROJECT
BACK RIVER PROJECT

TITLE
WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

PROJECT NO.	FIGURE	REV.
1776921/1300/1320	B3	A

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

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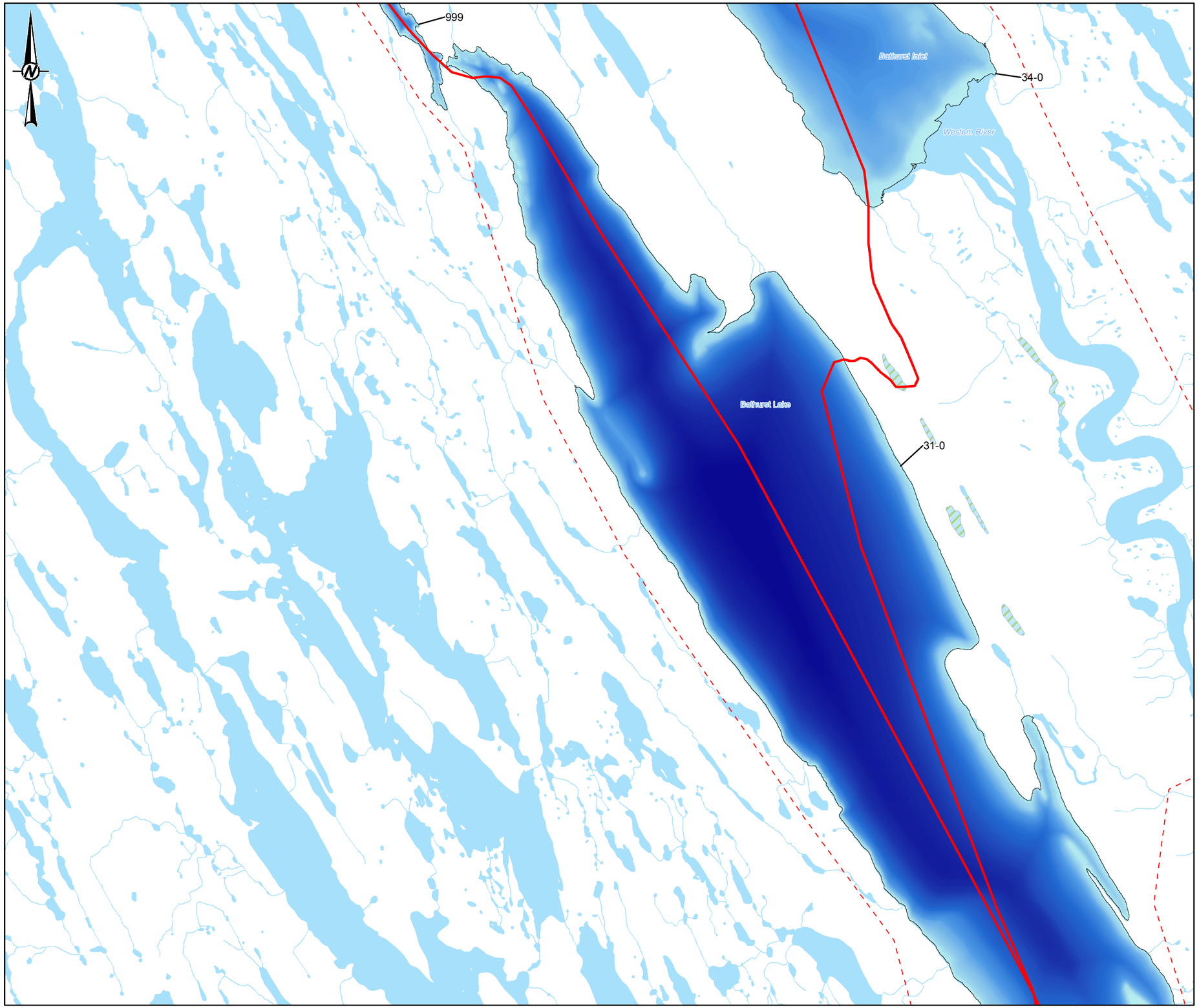


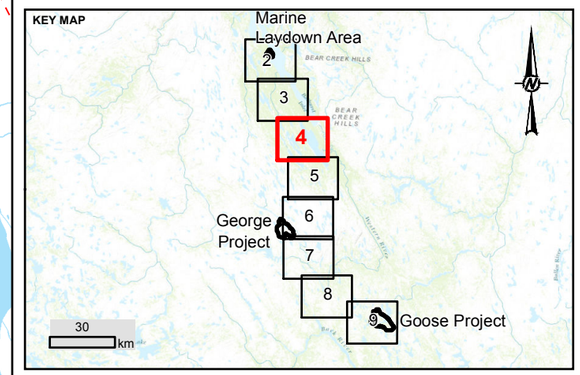
LEGEND

- WINTER ROAD
- WATERCOURSE
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY
- WATERBODY
- WETLAND

BATHYMETRY (1 M INTERVAL)

0
-13
-26
-39
-52
-65

KEY MAP



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NOTE(S)

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PROJECTION: UTM ZONE 13N DATUM: NAD 83

YYYY-MM-DD	2018-02-05
DESIGNED	BDW
PREPARED	JG/RC
REVIEWED	
APPROVED	

CLIENT
SABINA GOLD & SILVER CORP.

CONSULTANT
Golder Associates

PROJECT
BACK RIVER PROJECT

TITLE
WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

PROJECT NO.	FIGURE	REV.
1776921/1300/1320	B4	A

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

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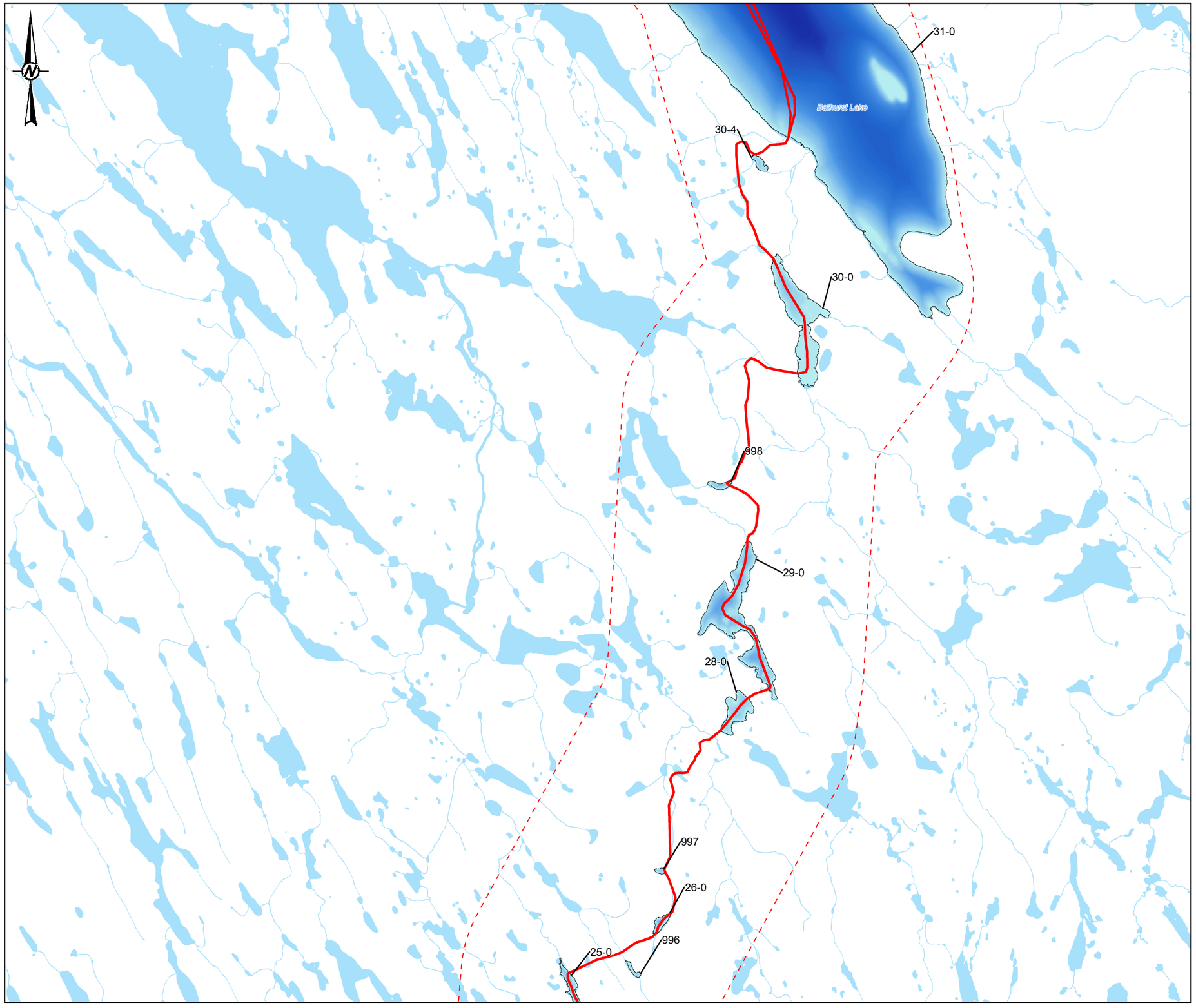


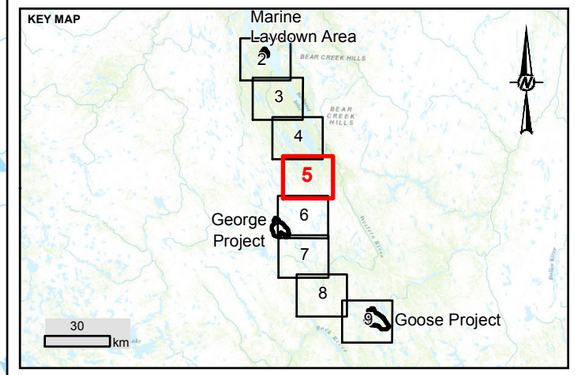
LEGEND

- WINTER ROAD
- WATERCOURSE
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY
- WATERBODY
- WETLAND

BATHYMETRY (1 M INTERVAL)

0
-13
-26
-39
-52
-65

KEY MAP



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1:75,000 KILOMETRES

NOTE(S)

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YYYY-MM-DD	2018-02-05
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PREPARED	JG/RC
REVIEWED	
APPROVED	

CLIENT
SABINA GOLD & SILVER CORP.

CONSULTANT
Golder Associates

PROJECT
BACK RIVER PROJECT

TITLE
WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

PROJECT NO.	FIGURE	REV.
1776921/1300/1320	B5	A

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

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996
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995
994
24-0
LA 22-0
23-0
LA 21-1
LA 23-0
LA 21-0
20-0
990
992
LA 20-0
991
989
987
986
George
Project
985
LA 18_0
19-0
LA 17_0
18-1
984
18-0

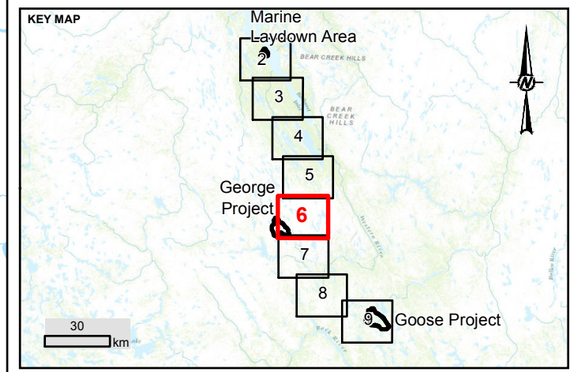
LEGEND

- GEORGE PROPERTY AREA
- WINTER ROAD
- WATERCOURSE
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY
- WATERBODY
- WETLAND

BATHYMETRY (1 M INTERVAL)

0
-13
-26
-39
-52
-65

KEY MAP



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NOTE(S)

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REFERENCE(S)

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PROJECTION: UTM ZONE 13N DATUM: NAD 83

YYYY-MM-DD	2018-02-05
DESIGNED	BDW
PREPARED	JG/RC
REVIEWED	
APPROVED	

CLIENT
SABINA GOLD & SILVER CORP.

CONSULTANT
Golder Associates

PROJECT
BACK RIVER PROJECT

TITLE
WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

PROJECT NO.	FIGURE	REV.
1776921/1300/1320	B6	A

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George Project

George Project

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LA17_0

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14-0a

LEGEND

- GEORGE PROPERTY AREA
- WINTER ROAD
- WATERCOURSE
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY
- WATERBODY
- WETLAND

BATHYMETRY (1 M INTERVAL)

0
-13
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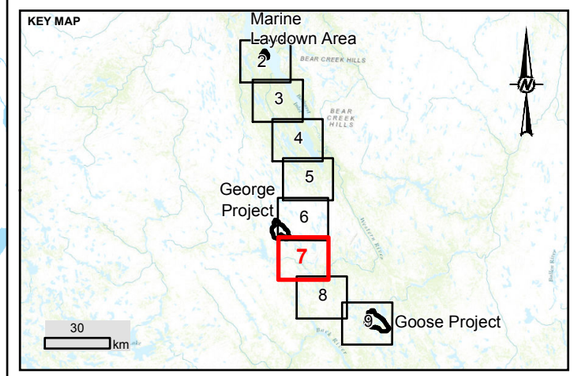
-52
-65

KEY MAP



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NOTE(S)

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PROJECTION: UTM ZONE 13N DATUM: NAD 83

YYYY-MM-DD	2018-02-05
DESIGNED	BDW
PREPARED	JG/RC
REVIEWED	
APPROVED	

CLIENT
SABINA GOLD & SILVER CORP.

CONSULTANT
Golder Associates

PROJECT
BACK RIVER PROJECT

TITLE
WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

PROJECT NO.	FIGURE	REV.
1776921/1300/1320	B7	A

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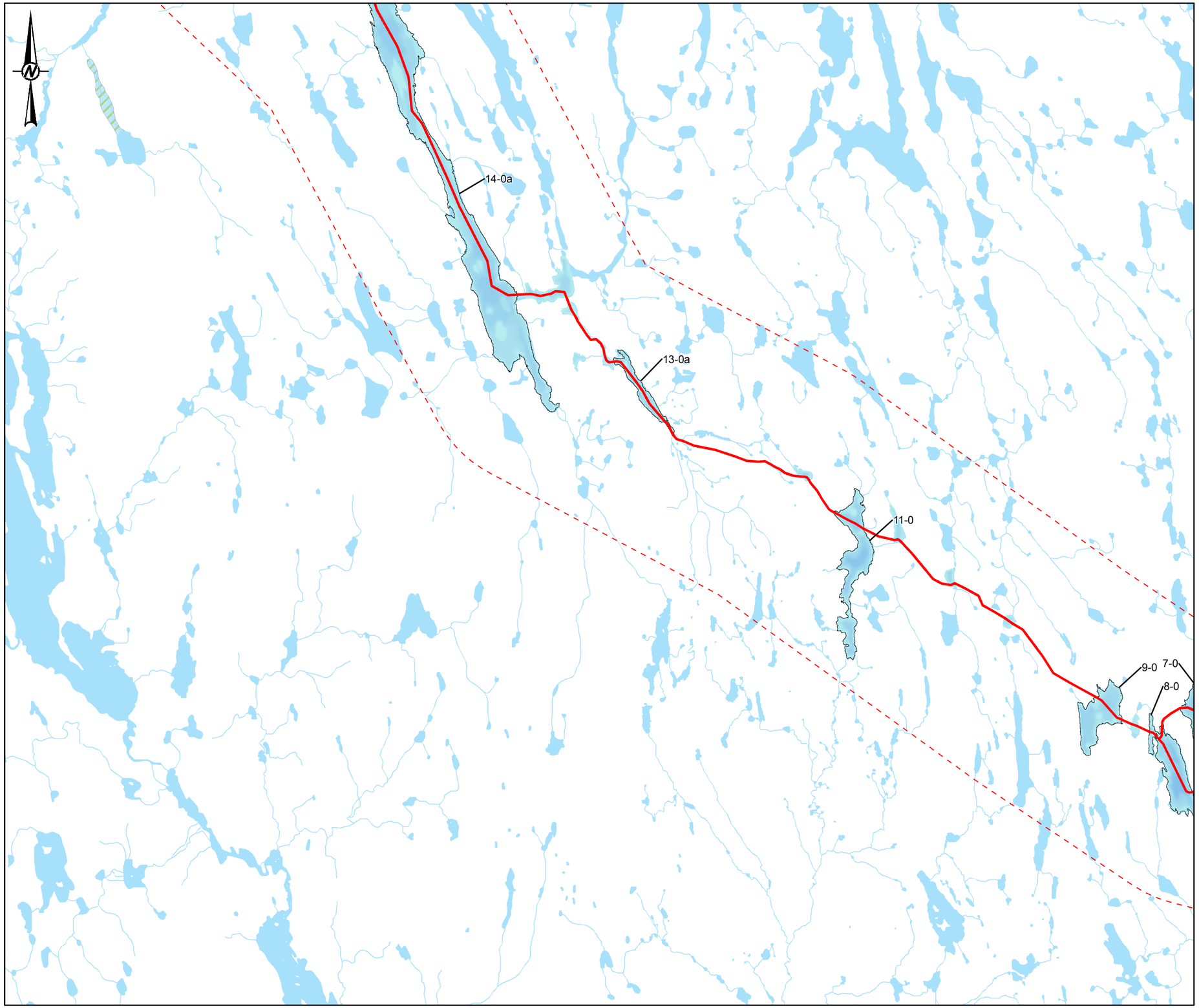


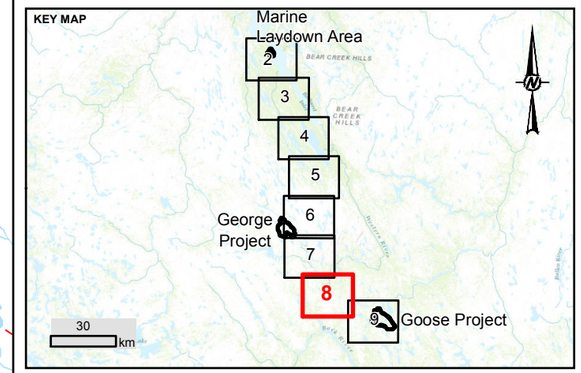
LEGEND

- WINTER ROAD
- WATERCOURSE
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY
- WATERBODY
- WETLAND

BATHYMETRY (1 M INTERVAL)

0
-13
-26
-39
-52
-65

KEY MAP



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NOTE(S)

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YYYY-MM-DD	2018-02-05
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PREPARED	JG/RC
REVIEWED	
APPROVED	

CLIENT
SABINA GOLD & SILVER CORP.

CONSULTANT
Golder Associates

PROJECT
BACK RIVER PROJECT

TITLE
WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

PROJECT NO.	FIGURE	REV.
1776921/1300/1320	B8	A

9-0
8-0
7-0
6-0
4-0
3-0
2-0
1-0
Goose Project
Goose Lake
Gander Pond
Gosling Pond 2
Gosling Pond 1
Little Rascal Pond
Pond 4
Rascal Lake
Wolf Lake
WLA5
WLA4
RLA2
WLA3
RLA1
WLA1
WLA2
WLD4
WLD3
WLD1
WLD2
WLC5
WLC4
WLC1
WLC3
WLC2
RLB1
RLB3
RLB2
RLB4
RLB5
RLB7
RLB6
WLB1
WLB2

LEGEND

- GOOD PROPERTY AREA
- WINTER ROAD
- WATERCOURSE
- LAKE EXTENT (DEPTH > 3.5M)
- PROJECT BOUNDARY
- WATERBODY
- WETLAND

BATHYMETRY (1 M INTERVAL)

0
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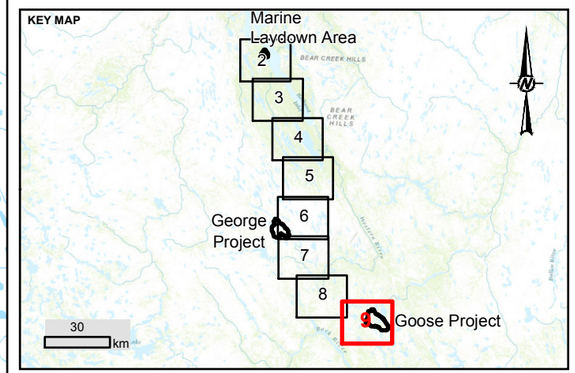
KEY MAP



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NOTE(S)

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YYYY-MM-DD	2018-02-05
DESIGNED	BDW
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REVIEWED	
APPROVED	

CLIENT
SABINA GOLD & SILVER CORP.

CONSULTANT
Golder Associates

PROJECT
BACK RIVER PROJECT

TITLE
WATER SOURCES FOR WINTER ICE ROAD CONSTRUCTION FOR THE BACK RIVER PROJECT

PROJECT NO.	FIGURE	REV.
1776921/1300/1320	B9	A

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0 25mm

Appendix F. Type A Water Licence Amendment Application

Application for Water Licence Amendment

Document Date: April 2013

Application Submission Date: 06/05/2020
Month/Day/Year

P.O. BOX 119
GJOA HAVEN, NUNAVUT
XOB 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369

kNK5 wmoEp5 vtmpq
NUNAVUT IMALIRIYIN KATIMAYIT
NUNAVUT WATER BOARD
OFFICE DES EAUX DU NUNAVUT

P.O. BOX 119
GJOA HAVEN, NU X0B 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369

kNK5 wmoEp5 vtmp5
NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYIT
OFFICE DES EAUX DU NUNAVUT

APPLICATION FOR WATER LICENCE AMENDMENT

The applicant is referred to the NWB's Guide 7: *Licensee Requirements Following the Issuance of a Water Licence* for more information about this application form.

Where possible, provide background information regarding the original licence application or attach previously submitted information.

EXISTING LICENCE NO: ___2AM-BRP1831_____

1. LICENSEE CONTACT INFORMATION

Is the licensee the same as that referred to on the existing licence?

X Yes ☐ No

If No, a licence assignment must be completed and approved by the NWB. **An amendment will only be issued in the name of the current licensee in the absence of assignment of the licence.**

If the licensee is the same, but the name of the licensee has changed, attach a certificate of name change.

Name: **Sabina Gold & Silver Corp. (Corporate Head Office)**

Address: **# 1800 - 555 Burrard Street, Box 220, Vancouver, BC Canada, V7X 1M7**

Phone: **(604) 998-4175 and Toll Free: (888) 648-4218**
Fax: **(604) 998-4175**
e-mail: **n/a**

2. LICENSEE REPRESENTATIVE CONTACT INFORMATION – If different from Block 1.

Name: **Mathew Pickard, Vice President, Environment & Sustainability, Sabina Gold & Silver Corp.**

Address: **Same as Block 1**

Phone: **(604) 484-8967/ (416) 848-1184 and Cell: (416) 605-7881**
Fax: **(604) 998-1051**
e-mail: mpickard@sabinagoldsilver.com

3. NAME OF PROJECT

Has the name of the project changed?

☐ Yes **X** No

If Yes, indicate the name of the project including the name of the location:

4. LOCATION OF UNDERTAKING

Does the proposed amendment change the location of the amended undertaking?

☐ Yes **X** No

Provide the project extents and camp locations. Identify proposed changes.

Project Extents/Camp Location(s): Remains unchanged from the current approved water licence.

Project Extents	Latitude	Longitude
Back River Project Area	66° 42' N	107° 50' W
	66° 42' N	106° 11' W
	65° 29' N	106° 12' W
	65° 29' N	107° 50' W
Goose Main Camp Site	66° 38' 47.8'' N	107° 41' 19.4'' W
Marine Laydown Area Camp Site	65° 32' 27.4'' N	106° 30' 28.3'' W

5. MAP

Does the proposed amendment change the locations of any of the main components of the undertaking?

☐ Yes **X** No

Attach a topographical map, indicating the main components of the undertaking. Identify proposed changes.

NTS Map Sheet No.: **See below** Map Name: **See below** Map Scale: **See below**

NTS Map Sheet No: **76G (Beechey Lake) and 76J (Tinney Hills)**
Scale **1:250,000**

Refer to 2020 Modification Package Appendix A

6. NATURE OF INTEREST IN THE LAND

Does the proposed amendment change the nature of the interest in the land?

☐ Yes **X** No

If Yes, indicate changes.

_____

Check any of the following that are applicable to the proposed undertaking (at least one box under the 'Surface' header must be checked).

Sabina has not identified any necessary changes to existing Project Certificate (NIRB PC No. 007) Terms and Conditions or to the KIA Framework Agreement/Commercial Leases related to this Modification Package.

Sub-surface

☐ Mineral Lease from Nunavut Tunngavik Incorporated (NTI)
Date (expected date) of issuance: _____ Date of expiry: _____

X Mineral Lease from Indian and Northern Affairs Canada (INAC)
Date (expected date) of issuance: _____ Date of expiry: _____

Surface

X Crown Land Use Authorization from Indian and Northern Affairs Canada (INAC)
Date (expected date) of issuance: **June 2015** Date of expiry: **June 2039**

X Inuit Owned Land (IOL) Authorization from Kitikmeot Inuit Association (KIA)
Date (expected date) of issuance: **June 2015** Date of expiry: **June 2039**

☐ IOL Authorization from Kivalliq Inuit Association (KivIA)
Date (expected date) of issuance: _____ Date of expiry: _____

☐ IOL Authorization from Qikiqtani Inuit Association (QIA)
Date (expected date) of issuance: _____ Date of expiry: _____

☐ Commissioner's Land Use Authorization
Date (expected date) of issuance: _____ Date of expiry: _____

☐ Other
_____

Date (expected date) of issuance: _____ Date of expiry: _____

Is the name of the entity(s) holding authorizations the same as that considered in the existing water licence?

X Yes ☐ No

If No, a licence assignment must be completed and approved by the NWB.

Name of entity(s) holding authorizations: **Sabina Gold & Silver Corp.**

7. NUNAVUT PLANNING COMMISSION (NPC) DETERMINATION

Indicate the land use planning area in which the existing project is located.

☐ North Baffin	☐ Keewatin
☐ South Baffin	☐ Sanikiluaq
☐ Akunniq	**X** West Kitikmeot

Does the proposed amendment change the land use planning area?

☐ Yes **X** No

If yes, indicate the land use planning area in which the amended undertaking is located.

☐ North Baffin	☐ Keewatin
☐ South Baffin	☐ Sanikiluaq
☐ Akunniq	**X** West Kitikmeot

Was a land use plan conformity determination required from NPC prior to the issuance of the existing water licence?

X Yes ☐ No

If Yes, indicate date issued and attach copy. _____

Does the proposed amendment change the original NPC conformity determination or the need to obtain one?

☐ Yes **X** No

If Yes, indicate date issued (or expected) and attach a copy.
If No, provide written confirmation from NPC confirming that a land use plan conformity review is not required.

In accordance with NuPPAA application for modification will be filed with NPC for determination/confirmation timelines consistent with NuPPAA within 30 days of receipt of project proposal

8. NUNAVUT IMPACT REVIEW BOARD (NIRB) DETERMINATION

Was a screening determination required from NIRB prior to the issuance of the existing water licence?

X Yes ☐ No

If Yes, indicate date issued and attach copy.
Minister AANDC (now CIRNAC) Decision on screening received NIRB December 17, 2012, File 12MN036 available upon request - Copy is on file with NIRB public registry for the Project
NIRB Final Hearing Report (July 18, 2017). Project Certificate No. 007 issued: December 19, 2017.

Does the proposed amendment change the original NIRB screening determination or the need to obtain one?

X Yes ☐ No

If Yes, indicate date issued (or expected) and attach a copy. **Expected 45 days following submission from NPC to NIRB consistent with NuPPAA.**

Note: Sabina assessed each proposed Project modification with respect to the criteria outlined by the NIRB in their guidance for self-assessment for proposed modifications to projects that have been previously assessed and approved to proceed under NuPPAA issued in 2018. For summary of Modification Package NIRB Self Assessment refer to Table 1.7-1 of the Modification Package.

Self Assessment conclusion: Non-significant Modification/Amendments - NIRB assessment not required.

If No, provide written confirmation from NIRB confirming that a screening determination is not required.

9. DESCRIPTION OF UNDERTAKING

Does the proposed amendment change the description of the undertaking?

X Yes ☐ No

List and attach plans and drawings or project proposal. Identify proposed changes.

Refer to Modification Package Section 1.1
Scope of Activities List:

- **Goose Property Airstrip Extension**
- **Umwelt Underground Extension**
- **Goose Property Total Water Use Increase**
- **Waste and Water Management Infrastructure**
- **Marine Laydown Area (MLA) Fuel Transfer**
- **MLA Airstrip Extension**
- **MLA Shoreline Pad Extension**
- **Winter Ice Road (WIR) Subbase Upgrade**
- **WIR Service/Emergency Camps**
- **WIR Total Water Use Increase**

10. OPTIONS

Does the proposed amendment change any of the alternative methods and locations that were considered to carry out the project?

☐ Yes **X** No

Provide a brief explanation of the alternative methods or locations that were considered to carry out the project. Identify proposed changes.

11. CLASSIFICATION OF PRIMARY UNDERTAKING

Indicate the primary classification of undertaking for the existing licence by checking one of the following boxes:

- ☐ Industrial
- ☐ Agricultural
- **X** Mining and Milling (includes exploration/drilling/exploration camps)
- ☐ Conservation
- ☐ Municipal (includes camps/lodges)
- ☐ Recreational
- ☐ Power
- ☐ Miscellaneous (describe below):

Does the proposed amendment change the classification of primary undertaking?

☐ Yes **X** No

If Yes, indicate the primary undertaking of the amendment: _____

Information in accordance with applicable Supplemental Information Guidelines (SIG) must be updated and submitted with an Application for Amendment. Indicate which SIG(s) are applicable to your application.

- ☐ Hydrostatic Testing
- ☐ Tannery
- ☐ Tourist / Remote Camp
- ☐ Landfarm & On-Site Storage of Hydrocarbon Contaminated Soil
- ☐ Onshore Oil and Gas Exploration Drilling
- ☐ Mineral Exploration / Remote Camp
- ☐ Advanced Exploration
- ☐ Mine Development
- ☐ Municipal
- ☐ General Water Works
- ☐ Power

As per email from S. Kuflevskiy to M. Keefe dated May 19, 2020, the scope of changes is limited and in line with the previous SIG and therefore there is no need to provide a new SIG.

12. WATER USE

Indicate, using the boxes below, the types of water use(s) approved in the existing licence.

- **X** To obtain water for camp/ municipal purposes
- **X** To obtain water for industrial purposes
- **X** To divert a watercourse
- **X** To cross a watercourse
- **X** To modify the bed or bank of a watercourse
- **X** To alter the flow of, or store water
- **X** Flood control
- **X** Other: **quarry operations, dewatering**

Does the proposed amendment change the type(s) of water use(s)?

☐ Yes **X** No

If Yes, indicate using the boxes below, the proposed change(s) to the type(s) of water use(s) noting any water use(s) that are to be added, continued, or removed.

☐ To obtain water for camp/ municipal purposes
☐ To obtain water for industrial purposes
☐ To divert a watercourse
☐ To cross a watercourse
☐ To modify the bed or bank of a watercourse
☐ To alter the flow of, or store water
☐ Flood control
☐ Other: _____

13. QUANTITY OF WATER INVOLVED

Does the proposed amendment change the source of water? ☐ Yes **X** No

Indicate the water source(s). Identify proposed changes:

Refer to Table insert below in response to all in this box. Refer to Table 2.3-1 in the Modification Package.

Water Source	FEIS [m^3/yr]	Type A Water Licence Approved Quantities [m^3/yr]	Additional Amount Requested [m^3/yr]	Total Water Use as per Modification Package Type A Water Licence Amendment [m^3/yr]
Total Water Use: Goose Property and MLA		**578,000[a]**	**414,450**	**992,450**
Total Water Use: Goose Property	**518,000**	**468,000**	**414,450**	**882,450**
Goose Lake	390,000	390,000[b]	218,700	608,700
Big Lake	128,000	78,000[c]	195,750	273,750
Total Water Use: MLA		**110,000[d]**	**No change**	**110,000**
Total Water Use: Dewatering		**1,400,000[e]**	**No change**	**1,400,000**
Total Water Use: Winter Ice Road		**675 m^3/km[f]**	**1,350 m^3/km**	**2025 m^3/km**

a Total Use for domestic, construction operation and associated use including mining and milling as per Type A Water Licence 2AM-BRP1831, Part E, Item 3.
b As per Type A Water Licence 2AM-BRP1831, Part E, Item 3a.
c As per Type A Water Licence 2AM-BRP1831, Part E, Item 3b.
d As per Type A Water Licence 2AM-BRP1831, Part E, Item 3c.
e As per Type A Water Licence 2AM-BRP1831, Part E, Item 4.
f As per Type A Water Licence 2AM-BRP1831, Part E, Item 5.

(show location(s) on map) **Refer to Appendix A of the Modification Package**

Does the proposed amendment change the quality of the water source and/or its available capacity?

☐ Yes **X** No

Describe the quality of the water source(s) and the available capacity(s). Identify any changes:_____

Does the proposed amendment change the overall quantity of water to be used?

X Yes ☐ No

Provide the overall estimated quantity to be used. Identify proposed changes:
Refer to Table above

Does the proposed amendment change the quantity of water to be used from each source?

X Yes ☐ No

Provide the estimated quantity(s) of water to be used from each source. Identify proposed changes: **Refer to Table above**

Does the proposed amendment change the quantity of water to be used for each purpose?

X Yes ☐ No

Provide the estimated quantities to be used for each purpose (camp, drilling, etc.). Identify proposed changes: **Refer to Table above**

Does the proposed amendment change the method(s) of extraction?

☐ Yes **X** No

Describe the method(s) of extraction. Identify proposed changes:

Does the proposed amendment change the quantity(s) of water returned to source(s)?

☐ Yes **X** No

Estimated quantity(s) of water returned to source(s). Identify proposed changes: m^3/day

Does the proposed amendment change the quality(s) of water returned to source(s)?

☐ Yes **X** No

Describe the quality(s) of water(s) returned to source(s). Identify any changes:

14. WASTE

Check the appropriate box(s) to indicate the types of waste(s) approved in the existing licence.

X Sewage
X Solid Waste
X Hazardous
X Bulky Items/Scrap Metal
☐ Animal Waste
X Waste oil
X Greywater
X Sludges
X Contaminated soil and/or water
X Other (describe):_**mine waste (i.e., overburden, waste rock, tailings)**

Does the proposed amendment change the type(s) of waste(s) to be generated or deposited?

☐ Yes **X** No

If Yes, indicate using the boxes below, the proposed change(s) to the type(s) of waste(s) to be generated and/or deposited noting the addition, removal or continued generation and/or disposal of waste(s).

☐ Sewage
☐ Solid Waste
☐ Hazardous
☐ Bulky Items/Scrap Metal
☐ Animal Waste
☐ Other (describe):_____

☐ Waste oil
☐ Greywater
☐ Sludges
☐ Contaminated soil and/or water

15. QUANTITY AND QUALITY OF WASTE INVOLVED

Does the proposed amendment change the quantity(s) of the types of wastes involved?

X Yes ☐ No

Does the proposed amendment change the composition(s) of the types of wastes involved?

☐ Yes **X** No

Does the proposed amendment change the method(s) of treatment for the types of waste involved?

☐ Yes **X** No

Does the proposed amendment change the method(s) of disposal for the types of waste involved?

☐ Yes **X** No

If Yes to any of the above, describe the proposed changes: **Refer to Table below for change in quantities.**

For each type of waste indicated in Block 14, describe its composition, quantity in cubic meters/day, method of treatment and method of disposal. **Note: the only values to change as a result of the amendment request (comparative to the original application are shown below):**

Type of Waste	Composition	Approved Type A Water Licence Values	Quantity Generated	Treatment Method	Disposal Method
Tailings	Non-Acid Generating (NAP) and low potential for metal leaching in the long term (Refer to SD-09)	19.8 Mt	12.4 Mt	None	Tailings Storage Facility (TSF) and Tailings Facility (TF)
Waste Rock	No potential acid generating (NPAG) and low potential for metal leaching (Refer to SD-08)	59 Mt	93.1 Mt	None	Waste Rock Storage Areas (WRSAs)
Overburden	NPAG, Low potential for metal leaching and will meet MDMER monthly mean limits (Refer to SD-08)	5.3	6.5 Mt	None	Temporary storage in overburden stockpile; closure and site reclamation; co-disposed within WRSAs

Note: Original application for current Type A Licence can be found at: ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-BRP1831%20Sabina/1%20APPLICATION/2017/171005%202AM-BRP----CoverLtr_ApplicationForm-IMLE.pdf

16. OTHER AUTHORIZATIONS

Does the proposed amendment change the need for other authorizations in addition to the sub-surface and surface land use authorizations provided in Block 6?

☐ Yes **X** No

If Yes, indicate any additional authorizations required, which authorizations are no longer required, and which authorizations continue to be required.

For each provide the following: **Refer to summary below**

Authorization: _____

Administering Agency: _____

Project Activity: _____

Date (expected date) of issuance: _____ Date of expiry: _____

Sabina has not identified any necessary changes to existing Project Certificate (NIRB PC No. 007) Terms and Conditions or to the KIA Framework Agreement/Commercial Leases related to this Modification Package.

Amendments to Type A Water Licence (2AM-BRP1831) are anticipated as being necessary to increase water use allowance and in consideration of potential changes associated with the Project Interim Closure and Reclamation Plan are appropriately addressed. Sabina will follow all appropriate NWB processes associated with this amendment, and will work cooperatively with KIA, CIRNAC, and NWB on any related Project security revisions.

Sabina anticipates, and has confirmed with the DFO, that an update is necessary to the existing DFO Letter of Advice (18-HCAA-00971) to reflect planned in-water works related to the MLA Shoreline Pad Extension. Sabina will also prepare an application addressed to TC to ensure any in-water works will not substantially interfere with navigation, as is required under the *Navigation Protection Act*.

Sabina will review the Back River Project Marine Environment Land Lease (CIRNAC #76J/12-7-2), and the Winter Ice Road Land Use Licence (CIRNAC #N2018F0017), for possible revisions as a result of the Modification Package and adhere to any applicable processes.

Where additional regulatory processes may be required for individual Project modifications, Sabina will work cooperatively with all interested parties to ensure appropriate compliance.

17. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES

Does the proposed amendment change the predicted environmental impacts of the undertaking or the mitigation measures?

☐ Yes **X** No

Describe direct, indirect, and cumulative impacts related to water and waste. Identify any changes.

For detailed assessment of environmental impacts refer to Modification Package summary tables:

- **Table 1.5-1 2020 Modification Package Effects Assessment**
- **Table 1.6-1 Summary of Cumulative Project-related Residual Effects and Significance**

Results from the Modification Package effects assessment identified minimal change to the FEIS residual effects, and no change to the overall significance ratings for the FEIS residual effects. As a result, Sabina confirms that the overall effect of the Project on the atmospheric, terrestrial, freshwater, marine, and human environments remains the same as the FEIS effects assessment: Not Significant.

18. WATER RIGHTS OF EXISTING AND OTHER WATER USERS

Was compensation paid and/or an agreement(s) for compensation been entered into with any existing or other users of water during consideration of the existing licence?

☐ Yes **X** No

If Yes, provide the names, addresses and the nature of water use by those persons or properties.

Does the proposed amendment adversely affect any known persons or property including those that hold licences for water use in precedence to the application, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders, and holders of other rights of a similar nature?

☐ Yes **X** No

If Yes, provide the names, addresses and the nature of water use of those persons or properties.

Advise the Board if compensation has been paid and/or an agreement(s) for compensation has been reached with any existing or other water users with respect to the proposed amendment.

19. INUIT WATER RIGHTS

Was compensation paid/ or an agreement(s) for compensation been entered into with any Designated Inuit Organization (DIO) during consideration of the existing licence?

X Yes ☐ No

If Yes, which DIO(s) **Kitikmeot Inuit Association**

Does the proposed amendment substantially affect the quality, quantity or flow of waters flowing through Inuit Owned Land (IOL)?

☐ Yes **X** No

If Yes, advise the Board if negotiations have commenced or an agreement to pay compensation for any loss or damage has been reached with one or more DIO(s) with respect to the proposed amendment.

Sabina has not identified any necessary changes to the KIA Framework Agreement/Commercial Leases related to this Modification Package.

20. CONSULTATION - Provide a summary of any consultation meetings including when the meetings were held, where and with whom. Include a list of concerns expressed and measures to address concerns.

Refer to Modification Package Section 1.4 for additional detail.

Sabina has engaged communities specifically regarding the Modification Package Application. Details of the proposed modifications in the Modification Package were presented during public meetings (September 2019) in Cambridge Bay and Kugluktuk, and at the KIA Annual Board Meeting in Kugaaruk. In addition, Sabina discussed its need to complete detailed engineering and further refinement of the Project's execution plan during public meetings held in each Kitikmeot Region community in May 2019: Cambridge Bay, Gjoa Haven, Kugaaruk, Kugluktuk, and Taloyoak.

Community engagement summaries for each proposed modification are included within each specific section of the Modification Package. These summaries include information from both of Sabina's Community Engagement Databases: FEIS (2012-2017) and post-FEIS (2018+); in addition, these summaries include details from community concerns, comments, and recommendations documented in Appendix III of KIA (2014).

21. SECURITY INFORMATION

Does the proposed amendment change the financial security assessment?

X Yes ☐ No

Does the proposed amendment change the estimate of the total financial security for final reclamation?

X Yes ☐ No

Provide an estimate of the total financial security for final reclamation equal to the total outstanding reclamation liability for land and water combined sufficient to cover the highest liability over the life of the undertaking. Estimates of reclamation costs must be based on the cost of having the necessary reclamation work done by a third party contractor if the operator defaults. The estimate must also include contingency factors appropriate to the particular work to be undertaken. Identify any changes in the financial security assessment resulting from the proposed amendment.

Where applicable, the financial security assessment should be prepared in a manner consistent with the principals respecting mine site reclamation and implementation found in the *Mine Site Reclamation Policy for Nunavut,* Indian and Northern Affairs Canada, 2002.

Sabina anticipates that an amendment to the Type A Water Licence (2AM-BRP1831) may be required to update the approved Interim Closure and Reclamation Plan and cost estimate (ICRP; WL SD-26) to reflect changes associated with the 2020 Modification Package, as well as potential advancements in operation and technology. Sabina recognizes that additional consultation and discussion with KIA, and CIRNAC, in conjunction with oversight from NWB, will be required to address any monetary and/or staging changes associated with this application. Sabina will follow all appropriate NWB processes associated with this amendment, and will work in a timely, collaborative manner with KIA, CIRNAC, and NWB on any related Project security revisions in consideration of the 2020 Modification Package. The current monetary amount, staging, and regulatory divisions between KIA and CIRNAC, required in Part C or the Type A Water Licence (2AM-BRP1831), remains valid until a new version can be agreed upon by all parties.

22. FINANCIAL INFORMATION

Is the statement of financial security the same as that considered in the existing water licence?

X Yes ☐ No

Provide an updated statement of financial security.

The Project is 100% owned by Sabina. All rights, title, interests, liabilities, and obligations for the Project rest with Sabina. Taking into account Sabina's past performance, Sabina confirms in this Application:

- **they have the financial responsibility adequate to satisfy section 57 of the NWNSRTA, to complete the undertaking from Construction to Closure;**
- **measures are in place and will be put in place to mitigate any adverse impacts; and**
- **they are committed to ongoing maintenance and restoration of the Project in the event of future closing or abandonment of the undertaking. Sabina is confident in assuming its position, taking into account their current, ongoing, and past performance in the Kitikmeot region, Nunavut, and Canada.**

A copy of Sabina's audited financial statements can be found at the following link: Financial Statements.

If the applicant is a business entity please answer the questions below:

Is the list of the officers of the company the same as those considered in the existing water licence?

X Yes ☐ No

Provide a list of the officers of the company.

Bruce McLeod, Director, President and Chief Executive Officer

Email: bmcleod@sabinagoldsilver.com

Matthew Pickard, Vice-President, Environment &Sustainability
Email: mpickard@sabinagoldsilver.com

Elaine Bennet, Chief Financial Officer and Vice-President, Finance
Email: ebennett@sabinagoldsilver.com

Angus Campbell, Vice-President, Exploration
Email: acampbell@sabinagoldsilver.com

Nicole Hoeller, Vice-President, Communications
Email: nhoeller@sabinagoldsilver.com

Is the Certificate of Incorporation or evidence of registration of the company name the same?

X Yes ☐ No

Attach a copy of the Certificate of Incorporation or evidence of registration of the company name.

To minimize duplication the information is posted to the NWB Public Registry Appendix C-1 at the following link:

ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-BRP1831%20Sabina/1%20APPLICATION/2017/Main%20Application%20Document%20and%20all%20Appendices%20of%20MAD/

23. STUDIES UNDERTAKEN TO DATE

List and attach updated studies, reports, research etc.

To support the scope of modification requested Sabina has updated and included in the modification Package:

- **Updated Water Management Plan (Appendix B)**

To confirm consistency minor changes may be required to other management plans as such Sabina will submit revisions to the plans required by changes in operation and/or technology in the form of Addendum to be included with the Annual Report, consistent with the current Type A Water Licence Part B, Item 17 or as otherwise directed by the Board on approval of the amendment.

Sabina's comprehensive management program and associated management plans for the Project, consistent with the approved Type A Water Licence, includes:

Infrastructure and Access Management Program

- **Road Management Plan**
- **Borrow Pits and Quarry Management Plan**

Water Management Program

- **Water Management Plan**

Waste Management Program

- **Ore Storage Management Plan**
- **Mine Waste Rock Management Plan**
- **Tailings Management Plan**
- **Landfill and Waste Management Plan**
- **Incineration Management Plan**
- **Landfarm Management Plan**
- **Hazardous Materials Management Plan**

Emergency Response Program

- **Risk Management and Emergency Response Plan**
- **Fuel Management Plan**
- **Spill Contingency Plan**
- **Oil Pollution Emergency Plan***

General and Aquatic Effects Monitoring Program

- **Environmental Management and Protection Plan**
- **Aquatic Effects Management Plan**
- **Conceptual Fish Offsetting Plan***
- **Marine Monitoring Plan***
- **Quality Assurance / Quality Control Plan**

Interim Closure and Reclamation Program

- **Interim Closure and Reclamation Plan (including cost estimate and vegetation monitoring plan)**

*** plan outside the mandate of the NWB but available on NIRB public registry if needed.**

Provide a compliance assessment and status report including a response to any inspector's reports. The licensee must contact the NWB for licence specific direction in completing the assessment and report.

A compliance assessment and status report to Type A Water Licence 2AM-BRP1831 is attached to this application form for amendment.

Sabina currently holds one water licences for the Project: Type A Water Licence 2AM-BRP1831. Note: Type B – 2BC-BRP1819 for initial development works expired on issuance of the Type A Water Licence.

A summary of agency inspections and site visits for the 2018 calendar year were reported to include:

1. July 31 – August 2: CIRNAC Water Licence Inspection
2. August 2: KIA Site Visit
3. August 14 – August 16: NIRB Project Officer Inspection (NIRB PRI:320874;322442;322441)
4. October 14 – October 15: CIRNAC Land Use Inspection

Inspection results were conveyed during close-out meetings and are documented in Inspection Reports
subsequently distributed to Sabina and relevant stakeholders. Sabina responded to any requests in the inspections to provide additional information and/or address the identified concerns.

If in non-compliance, a licence may not be issued until compliance is achieved. If in non-compliance, attach plans/reports for consideration. Application will not be processed if significant issues of non-compliance exist.

24. PROPOSED TIME SCHEDULE

When are proposed amendments scheduled to be undertaken: _____

Does the proposed amendment change the time schedule considered in the existing licence for any phase of development?

X Yes ☐ No

Indicate the start and completion dates for each applicable phase of development (construction, operation, closure, and post closure). Identify proposed changes.

Construction
Proposed Start Date:__**Q2/2021**_____ Proposed Completion Date:__**Q4/2023**_____

Operation
Proposed Start Date:__**Q1/2024**_____ Proposed Completion Date:__**Q4/2035**_____

Closure
Proposed Start Date:__**Q1/2036**_____ Proposed Completion Date:__**Q4/2043**_____

Post - Closure
Proposed Start Date:__**Q1/2044**_____ Proposed Completion Date:__**Q4/2048**_____

For each applicable phase of development indicate which season(s) activities occur.

Construction
☐ Winter **X** Spring ☐ Summer ☐ Fall ☐ All season

Operation

X Winter ☐ Spring ☐ Summer ☐ Fall ☐ All season

Closure

X Winter ☐ Spring ☐ Summer ☐ Fall ☐ All season

Post - Closure

X Winter ☐ Spring ☐ Summer ☐ Fall ☐ All season

25. PROPOSED TERM OF LICENCE

On what date does the existing licence expire? **December 31, 2031**

Is the Licensee applying for a combined renewal and amendment of the existing licence?

☐ Yes **X** No

If Yes, indicate the proposed term of the renewal (maximum of 25 years): _____

Requested date of renewal issuance: _____ (month/year) Requested Expiry Date: _____ (month/year)

(The requested date of renewal issuance must be at least three (3) months from the date of application for a type B water licence and at least one (1) year from the date of application for a type A water licence, to allow for processing of the water licence application. These timeframes are approximate and do not account for the time to complete any pre-licensing land use planning or development impact requirements, time for the applicant to prepare and submit a water licence application in accordance with any project specific guidelines issued by the NWB, or the time for the applicant to respond to requests for additional information. See the NWB's *Guide 5: Processing Water Licence Applications* for more information)

26. ANNUAL REPORTING

Will the proposed amendment change the content of annual reports or the annual report template?

☐ Yes **X** No

If Yes, provide details regarding the content of annual reports and a proposed outline or template of the annual report.

27. CHECKLIST

The following must be included with the application for Amendment for the water licensing process to begin.

Completed Application for Water Licence Amendment form.

X Yes ☐ No If no, date expected _____

Information addressing Supplement Information Guideline (SIG), where applicable (see Block 11)

☐ Yes **X** No If no, date expected **Not Required refer to Block 11**

Compliance Assessment / Status Report (see Block 23).

X Yes ☐ No If no, date expected _____

Indication of Renewal Requirement (see Block 26)

☐ Yes **X** No If no, date expected _____

English Summary of Amendment Application.

X Yes ☐ No If no, date expected _____

Inuktitut and/or Inuinnaqtun Summary of Amendment Application.

X Yes ☐ No If no, date expected _____

Application fee of $30.00 CDN (Payee Receiver General for Canada).

X Yes ☐ No If no, date expected _____

Water Use Fee Deposit of $30.00 CDN (Payee Receiver General for Canada). The actual water use fee will be calculated by the NWB based upon the amount of water authorized for use in accordance with the Regulations at the time of issuance of the licence.

X Yes ☐ No If no, date expected _____

Crown – paid annually in accordance with approved Type A Water Licence.

KIA – provided with Water Compensation Agreement

28. SIGNATURE

Merle Keefe	Manager, Environmental Permitting		5 June 2020
Name (Print)	**Title (Print)**	**Signature**	**Date**

COMPLIANCE ASSESSMENT/STATUS REPORT
(Amendment Application Form Box 23)
FOR MODIFICATION PACKAGE

SABINA REGULATORY COMPLIANCE ASSESSMENT/STATUS REPORT
WATER LICENCE: 2AM-BRP1831 NWB Water Licence Public Registry Link

PART / ITEM	REQUIREMENT SUMMARY (REFER TO LICENCE FOR SPECIFIC DETAIL)	DUE	NWB ACKNOWLEDGE RECEIPT (YYMMDD)	NWB APPROVAL	COMPLIANCE ASSESSMENT	COMPLIANCE DETERMINATION	REFERENCE SECTION
Part A	**Scope, Definitions and Enforcement**						
A1	Scope	NA	NA	NA	No changes in scope filed by Sabina other than the proposed Modification Package. No changes in Regulations or Statutes imposing more stringent conditions. Compliance to all applicable legislation, guidelines and directives assessed under NIRB Project Certificate Annual Report filed by Sabina.	Compliance	
A2	Definitions	NA	NA	NA	Not Applicable	Compliance	
A3	Enforcement		190313	NA	Inspection carried out with respect to the Licence at the MLA on January 30, 2019. Sabina responded to any requests during close out meetings and no concerns noted.	Compliance	NWB Public Registry
			190718	NA	Inspection carried out with respect to the Licence of the IWIR on May 9, 2019. No Concerns noted.		
Part B	**General Conditions**						
B1	Water Use Fee (Due year in advance and prior to September)	On application	120711	NA	Water Use Fee Deposit provided on application	Compliance	NWB Public Registry
		01-Sep-19		NA	Fees paid with Application for Amendment Modification Package submission June 2020.	Compliance	Water Use Fee Calculator
B2	Annual Report (No later than March 31 in the year following the calendar year being reported)	31-Mar-19	190401	NA	Water Licence Approved by Minister on 06 November 2018. 2019 Annual Report filed under 8BC-BRP1819	Compliance	NWB Public Registry 8BC-BRP1819
		31-Mar-20	200403	NA	2019 2AM-BRP1831 Annual Report dated April 2020 filed with NWB	Compliance	NWB Public Registry
B3	Copy of Licence at site of Operations	No due date - operational	NA	NA	Copy of Licence maintained in the main offices at the Marine Laydown Area and main Goose Site in December 2018. Confirmed by Inspector on 190313 at MLA.	Compliance	
B4	Communication with respect to Licence to Manager of Licensing	NA	NA	NA	Sabina endeavours to address all communication to Manager of Licensing	Compliance	
B5	Notification to an Inspector	NA	NA	NA	Sabina endeavours to address notification to an Inspector to Water Resources Officer	Compliance	
B6	Electronic copy of reports with executive summary in English, Inuktitut, Inuinnaqtun	NA	NA	NA	Sabina provided at least one electronic copy of all reports/studies and includes executive summary in English, Inuktitut, and Inuinnaqtun	Compliance	
B7	Assignment of Licence Filed		NA	NA	No Assignment of Licence to date.	Compliance	
B8	Confirm receipt of documents or correspondence received and confirmed by Manager of Licensing	NA	NA	NA	Sabina endeavours to confirm receipt of all documentation to Manager of Licensing	Compliance	
B9	Notice of Operating Change	60 days prior to operating change	181212 190314	NA	Notice of resumption of pre-development operations on site	Compliance	NWB Public Registry
			200403	NA	Sabina confirmed in the Annual Report key Pre-Development Activities occurring on site. (Refer to Section 1 of Annual Report)	Compliance	NWB Public Registry
B10	Post signs in English, Inuktitut and Inuinnaqtun for Water Supply and Waste Disposal Facilities				Signs posted in 3 languages at where applicable, at the MLA and Goose Main site. Ongoing as facilities constructed. Additional signage posted. Posting inspected and in good condition. (Refer to Part A, Item 3)	Compliance	
B11	Plans submitted include timetable for implementation. Plans cannot be implemented without written approval of the Board. Notice to consolidate Plans.	No due date - operational	NA	Part B, Item 14	No intention and therefor no notice provided to the Board in writing to rename or consolidate Plans. Ongoing notice of resumption of operations filed on NWB registry. Plans approved by the Board on Approval of Licence by the Minister.	Compliance	
B12	If plans unacceptable, revision of plans	Within 30 days of notification by the Board	NA	NA	No plans deemed unacceptable by the Board.	Compliance	
B13	Implement Plans as approved by the Board. Any changes must be approved.	No due date - operational	NA	NA	Plans approved by the Board on Approval of Licence by the Minister.	Compliance	
B14	List of Plans approved by the Board to be implemented	No due date - operational	NA	Part B, Item 14		Compliance	
B15	Board accepted QA/QC plan	No due date - operational	NA	Part B, Item 15	Plan accepted by the Board on Approval of Licence by the Minister.	Compliance	
B16	Additional terms imposed upon approval of a Plan become part of the Licence	No due date - operational	NA	NA	No additional conditions imposed by the Board on approval of the Plans	Compliance	
B17	Updated Addenda of Plan due to change in changes in operation and/or technology	No due date - operational	190808	190919	Addenda provide for Water Management Plan (June 2019) with requested revision list detailing significant changes in content submitted as attachment to request for revision to Schedule I (Refer to Part B, item 19)	Compliance	NWB Public Registry
			190401	Pending	Addenda to Incinerator Management plan provided in 2019 Annual Report		
B18	Expiry or Cancellation does not relieve obligation imposed or any other regulatory requirement	No due date - operational	NA	NA	Licence in effect until 2031.	Compliance	
B19	Board provided Notice of revisions to Licence "Schedules"	No due date - operational	190808	190919	Notice of revisions to Schedule I provided by NWB on August 8, 2019 and approved by the NWB on September 19, 2019	Compliance	NWB Public Registry
B20	Changes in legislation, policy, guideline or other requirement necessitates update to Plan required under the licence	No due date - operational	NA	NA	No changes in legislation, policy or guidelines or other requirement necessitates update of any plan under the current licence	Compliance	
		Board requested updated Water Management Plan			Refer to Part B, Item 17 decision of the Board re: revision to Schedule i		
Part C	**Conditions Apply to Security**						
C1/C3	Security held with Minister	Within 30 days of cancellation of Licence 2BC-BRP1819			Confirmation on April 1, 2018 that bonding transferred from 2BC-BRP1819 to 2AM-BRP1831	Compliance	NWB Public Registry
		60 days prior to construction of Initial Infrastructure			Notification provided to the Minister on Dec.20,2018 that security was filed (Letter to Ida Porter, Licence Administrator)	Compliance	
		60 days prior to construction of Umwelt Open Pit	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Tailings Storage Facility	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Llama Open Pit	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Llama Underground (U/G)	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Umwelt Underground	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Goose Main Pit	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Goose Main U/G	NA	NA	Construction not initiated	Compliance	

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		60 days prior to construction of Echo Pit and U/G	NA	NA	Construction not initiated	Compliance	
C2/C4	Confirmation in writing security held with KIA	Within 30 days of cancellation of Licence 2BC-BRP1819			Confirmation on April 1, 2018 that bonding transferred from 2BC-BRP1819 to 2AM-BRP1831	Compliance	NWB Public Registry
		60 days prior to construction of Initial Infrastructure			Notification provided to the Minister on Dec.20,2018 that security was filed (Letter to Ida Porter, Licence Administrator)	Compliance	
		60 days prior to construction of Umwelt Open Pit	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Tailings Storage Facility	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Llama Open Pit	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Llama Underground (U/G)	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Umwelt Underground	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Goose Main Pit	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Goose Main U/G	NA	NA	Construction not initiated	Compliance	
		60 days prior to construction of Echo Pit and U/G	NA	NA	Construction not initiated	Compliance	
C5	Once all construction commenced of all stage; security furnished and maintained	Not less than $43,189,352.00	NA	NA	Construction not initiated	Compliance	
C6	Within 10 days after furnishing security to Minister provide evidence to NWB and KIA confirming security received indicate amount, form, nature and conditions	10 days of filing security re: cancellation of licence			Posted to Registry on December 21, 218	Compliance	NWB Public Registry
		10 days of filing security re: initial Infrastructure			Notification provided to the Minister on Dec.20,2018 that security was filed (Letter to Ida Porter, Licence Administrator)	Compliance	
		10 days of filing security re: Umwelt Open Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Tailings Storage Facility	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Llama Open Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Llama Underground (U/G)	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Umwelt Underground	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Goose Main Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Goose Main U/G	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Echo Pit and U/G	NA	NA	Construction not initiated	Compliance	
C7	Within 10 days after furnishing security with KIA provide evidence to NWB and Minister confirming security received indicate amount, form, nature and conditions	10 days of filing security re: cancellation of licence			Posted to Registry on December 21, 218	Compliance	NWB Public Registry
		10 days of filing security re: initial Infrastructure			Notification provided to the Minister on Dec.20,2018 that security was filed (Letter to Ida Porter, Licence Administrator)	Compliance	
		10 days of filing security re: Umwelt Open Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Tailings Storage Facility	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Llama Open Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Llama Underground (U/G)	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Umwelt Underground	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Goose Main Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Goose Main U/G	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Echo Pit and U/G	NA	NA	Construction not initiated	Compliance	
C8	Failure to provide notice of security to KIA under Part B	Within 30 days provide KIA security to Minister re: cancellation			Not Applicable	Compliance	NWB Public Registry
		10 days of filing security re: initial Infrastructure			Notice provide on Dec. 20, 2019 hat security was filed (Letter to Ida Porter, Licence Administrator)	Compliance	
		10 days of filing security re: Umwelt Open Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Tailings Storage Facility	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Llama Open Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Llama Underground (U/G)	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Umwelt Underground	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Goose Main Pit	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Goose Main U/G	NA	NA	Construction not initiated	Compliance	
		10 days of filing security re: Echo Pit and U/G	NA	NA	Construction not initiated	Compliance	
C9	Written notification of material change (i.e. modification, change activities or stages of infrastructure)	notification 90 days prior to any material change			Notification included as statement in Modification Package Refer to Section 1.3.	Compliance	
C10	Updated Cost Estimate	As per Part J, Item 1, 12 months following commencement of Operations phase with updated Interim Closure and Reclamation Plan	NA	NA	Project still in Pre-Development Phase	Compliance	
C11	Updated Cost Estimate	As per Part J, Item 2, with Final Closure and Reclamation Plan, 12 months prior to the expected end of planned mining; or	NA	NA	Project still in Pre-Development Phase	Compliance	
		Within 12 months of entering Care and Maintenance Phase and every 3 years thereafter	NA	NA	Project still in Pre-Development Phase	Compliance	
C12	Periodic Review by Board, Application amendment of Licensee, KIA or Minister	As per Part C, Item 10 and 11.	NA	NA	Project still in Pre-Development Phase. No application made by the Board, KIA or Minister	Compliance	
C13	Application by Licensee, Minister, KIA to amend Security		NA	NA	No application made by the Licensee, KIA or Minister	Compliance	
C14	Security maintained until Minister satisfied all provision of Final Closure Reclamation Plan implemented		NA	NA	Project still in Pre-Development Phase.	Compliance	
C15	Notification of intent to initiate new stage infrastructure	at least 60 days prior to construction of Tailings Storage Facility	NA	NA	Project still in Pre-Development Phase.	Compliance	
		at least 60 days prior to construction of Llama Open Pit	NA	NA	Project still in Pre-Development Phase.	Compliance	
		at least 60 days prior to construction of Llama Underground (U/G)	NA	NA	Project still in Pre-Development Phase.	Compliance	
		at least 60 days prior to construction of Umwelt Underground	NA	NA	Project still in Pre-Development Phase.	Compliance	
		at least 60 days prior to construction of Umwelt Open Pit	NA	NA	Project still in Pre-Development Phase.	Compliance	

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		at least 60 days prior to construction of Goose Main Pit	NA	NA	Project still in Pre-Development Phase.	Compliance	
		at least 60 days prior to construction of Goose Main U/G	NA	NA	Project still in Pre-Development Phase.	Compliance	
		at least 60 days prior to construction of Echo Pit and U/G	NA	NA	Project still in Pre-Development Phase.	Compliance	
Part D	**Conditions Applying to Construction and Operation**						
D1	Implement Road Management Plan and Borrow Pits and Quarry Management Plan	No due date - operational		Part B, Item 14	Plans approved upon approval of Licence. No updated plans submitted.	Compliance	NWB Public Registry
D2/D3	Final Design and Construction Drawings for a. water works; b.waste disposal/ management facilities; and c. bulk fuel storage facilities	At least 60 days prior to Construction	190529 190530 190614 190617	NA	Bulk Fuel storage design reports, drawings submitted for Board review approval not required	Compliance	NWB Public Registry
D4	Final Design and Construction Drawings for Tailings Storage Facility Dam including results of Infill Geotechnical Characterization Program and monitoring	At least 60 days prior to Construction	NA	NA	Construction not initiated	Compliance	
D5	Waste Rock and fill for construction only from approved sources	No due date - operational	NA	NA	Construction not initiated. Pre-development works refer to Annual report	Compliance	NWB Public Registry
D6	Identify and demark potentially PAG as per Borrow Pits and Quarry Management Plan	No due date - operational	NA	NA	Construction not initiated. Pre-development works refer to Annual report	Compliance	
D7	Implement Sediment and erosion control measures	No due date - operational	NA	NA	Sabina implemented measure where appropriate.	Compliance	
D8	Conduct Construction monitoring and daily inspections during construction activities	No due date - operational	NA	NA	Construction not initiated. Pre-development works refer to Annual report	Compliance	
D9	Conduct visual inspection for runoff/seepage and sample during spring freshet and after remarkable rainfall events	No due date - operational	NA	NA	Runoff/seepage observed requiring sampling noted in Annual report.	Compliance	
D10	During Construction, provide required supervision and field check with records available upon request of Board and/or Inspector	No due date - operational	NA	NA	Field check and supervision supplied during construction of fuel tank farm (refer to Part D, Item 2). Records available upon request.	Compliance	
D11	Construction Summary Report for Water and Waste Facilities	Within 90 days of completion of facility	NA	NA	Construction of Water and Waste Facilities not initiated.	Compliance	
D12	Prevent chemicals, fuels or waste from entering any waterbody	No due date - operational	NA	NA	Sabina implemented measure where appropriate.	Compliance	
D13	Not remove any material below ordinally HWM unless authorized by the Board	No due date - operational	NA	NA	No material removed from below HWM	Compliance	
D14	Minimize disturbance to terrain, permafrost and drainage during construction	No due date - operational	NA	NA	Sabina implemented measure where appropriate.	Compliance	
D15	Not store material on surface of frozen streams or lakes except for immediate use	No due date - operational	NA	NA	No material stored on frozen streams or lakes except for immediate use	Compliance	
D16	Locate equipment storage at least 31 m above HWM unless authorized by the Board	No due date - operational	NA	NA	Equipment was not stored below the HWM	Compliance	
D17	Undertake corrective measures to mitigate impacts on surface drainage	No due date - operational	NA	NA	Corrective measures not required	Compliance	
D18	Limit in stream activity to low water periods and prohibited during fish migrations	No due date - operational	NA	NA	In stream activity limited and did not occur during fish migration	Compliance	
D19	Bridge construction occur outside HWM and no restrictions to natural channel process	No due date - operational	NA	NA	No bridge construction undertaken	Compliance	
D20	Operate Bulk Fuel Storage Facility in accordance with applicable legislation and standards	No due date - operational	NA	NA	Operating in accordance with legislation	Compliance	
D21	Surface/runoff and/or discharge	Weekly Sampling of Effluent with limits set in Licence	NA	NA	No discharges undertaken and runoff refer to Annual report for locations and monitoring results	Compliance	
D22	Effluent Quality limits apply during construction for General site runoff (reference Part D, Item 21)	Weekly during Construction Effluent limits set in Licence	NA	NA	Refer to Annual report for locations and monitoring results	Compliance	
D23	Effluent Quality limits apply during road construction and culvert installation or maintenance	Weekly during road construction and operation/maintenance	NA	NA	Runoff or drainage not observed. Construction not initiated.	Compliance	
D24	Implement quarry seepage and runoff management in accordance with Water Management Plan	No due date - operational		Part B, Item 14	Plans approved upon approval of Licence. No updated plans submitted.	Compliance	
D25	Consider principles of adaptive management in construction and operations	No due date - operational	NA	NA	Construction not initiated. Adaptive management consider in Sabina management plans	Compliance	
D26	Effluent from dewatering of Llama Lake and Umwelt Lake to the Water Treatment Plant or environments. Effluent limits set in Licence if discharge made into Goose Lake	No due date - operational	NA	NA	Dewatering not initiated	Compliance	
D27	Operate Sewage Treatment Plant in accordance with Part F, Item 4 (Effluent criteria)	No due date - operational	NA	NA	Construction not initiated	Compliance	
Part E	**Conditions Applying to Water Use and Management**						
E1	Implement Water Management Plan	No due date - operational	NA	Part B, Item 14	Plans approved upon approval of Licence (SD-05). Updated Water Management Plan submitted with the Modification Package	Compliance	NWB Public Registry
E2	Revised Water Management Plan including update saline Water Management Plan and additional treatment options related to effluent from flooded pits and downstream environment	60 days following approval of Licence (i.e. January 6, 2019)	190111	NA	Licence approved on November 6, 2018. Sabina requested deferral of requirement pending determination to go into Construction. Refer to email from Sabina dated January 11, 2019. Updated Water Management Plan submitted with the Modification Package including Saline Water Management Plan	Compliance	NWB Public Registry
E3	Obtain Water from Goose Lake, Big Lake and MLA Ponds/Lake at quantity specified in Licence	No due date - operational	NA	NA	Quantities of water confirmed in monthly and annual report	Compliance	NWB Public Registry
E4	Obtain Water from Llama and Umwelt Lakes for dewatering at quantity specified in Licence	No due date - operational	NA	NA	Dewatering not initiated	Compliance	
E5	Obtain Water for WIR from proximal water sources	No due date - operational	NA	NA	Quantities of water confirmed in annual report. Refer to Part E, Item 13.	Compliance	NWB Public Registry

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E6	Shall not use streams as a Water sources unless approved	No due date - operational	NA	NA	No streams used as water source unless otherwise approved	Compliance	
E7	Intake hose equipped with mesh to minimize fish entrainedment and impingement	No due date - operational	NA	NA	Intake hoses equipped with appropriate mesh size	Compliance	
E8	Not remove any material below ordinally HWM unless authorized by the Board	No due date - operational	NA	NA	No material removed from below HWM	Compliance	
E9	Appropriate corrective measures to prevent/mitigate impacts to surface Water	No due date - operational	NA	NA	Appropriate corrective measures implemented where applicable	Compliance	
E10	Implement Sediment and erosion control measures	No due date - operational	NA	NA	Measure implemented where applicable	Compliance	
E11	Implement measures to minimize generation and deposition of dust and sediment to Water from road use	No due date - operational	NA	NA	Measure implemented where applicable	Compliance	
E12	Regular inspections of all Water management Structures during periods of flow and available upon request of an Inspector. May included in Annual report	No due date - operational	NA	NA	Construction not initiated. Pre-development works refer to Annual report	Compliance	NWB Public Registry
E13	Submit Technical Memorandum for Interconnection of Winter Ice Road	at least 60 days prior to annual interconnection of WIR or as appendix to Water Management Plan	181204	181218	2019 WIR Tech Memo submitted.	Compliance	NWB Public Registry
E14	Submit a Dewatering Plan	At least 60 days prior to dewatering or as appendix to WMP	NA	NA	Dewatering not initiated	Compliance	
E15	As Appendix to WMP, baseline data collection report and updated hydrodynamic model	With 2018 Annual Report	190111	NA	Licence approved on November 6, 2018. Sabina requested deferral of requirement pending determination to go into Construction. Refer to email from Sabina dated January 11, 2019. Updated Water Management Plan submitted with the Modification Package.	Compliance	NWB Public Registry
E16	Water and Load Balance reviewed periodically to reflect changes in operation and submit with Annual Report (Part B, Item 20 as appendix to Water Management Plan	Changes in Operation in Annual Report	NA	NA	No changes in operation requiring updated WLB. However updated WLB submitted as part of Modification Package resulting from Engineering Design refinements.	Compliance	
Part F	**Conditions Applying to Waste Disposal and Management**						
F1	Implement Ore Storage Management Plan, Mine Waste Rock Management Plan, Tailings Management Plan, Landfill and Waste Management Plan, Incineration Management Plan, Landfarm Management Plan, and Hazardous Materials Management Plan	No due date - operational	NA	Part B, Item 14	Plans approved upon approval of Licence. No updated plans submitted.	Compliance	NWB Public Registry
F2	Notification of any Discharge	at least 10 days notice to the Inspector	NA	NA	No discharges undertaken	Compliance	
F3	Perform all land applied discharges in manner to prevent erosion at point discharge and downstream	No due date - operational	NA	NA	No discharges undertaken	Compliance	
F4	Direct all Sewage at Goose to Sewage Treatment Plant with discharges to land not to exceed effluent limits in the Licence	No due date - operational	NA	NA	Sewage Treatment Plant yet to be constructed	Compliance	
F5	Direct all sludge from STP to incinerator, landfarms or as otherwise approved by the Board	No due date - operational	NA	NA	Sludges not produced. Sewage Treatment Plan yet to be constructed	Compliance	
F6	Direct all Greywater at MLA to oil and grease separator prior to discharge. Discharge to land not to exceed effluent limits in the Licence	No due date - operational	NA	NA	Oil and Grease separator installed during Pre-development activities. No discharges since revision to Schedule I as per Part B, Item 19.	Compliance	
F7	Site specific OM Manual for Water Treatment Plant and Sewage Treatment Plant in accordance with Guidelines	at least 90 days prior to Construction/installation of facilities	NA	NA	Facilities yet to be constructed	Compliance	
F8	Backhaul or dispose in Landfill or as otherwise approved by the Board non-hazardous solid waste	No due date - operational	NA	NA	Project still in pre-development. Construction yet to be initiated. Shipped offsite, refer to Annual report for records.	Compliance	
F9	Maintain records of all Waste backhauled with tracking and registration with GN	No due date - operational	NA	NA	Records maintained on site and refer to Annual report	Compliance	
F10	Backhaul of all Hazardous waste, waste oil and non-combustible waste at licensed facility	No due date - operational	NA	NA	Bulk Fuel storage design reports, drawings submitted for Board review approval not required	Compliance	
F11	Contain and remediate hydrocarbon contaminated soils at Goose or MLA Landfarms or as otherwise approved	No due date - operational	NA	NA	Project still in pre-development. Construction yet to be initiated. Backhauled refer to Annual report.	Compliance	
F12	Effluent shall not exceed discharge standards for Hazardous Waste Management Area, Landfarms, tank farm and temporary fuel storage facility as provided in the Licence	No due date - operational	NA	NA	Refer to monthly and annual report for effluent monitoring summary	Compliance	
F13	Effluent that does not meet Part F, Item 12 directed to TSF/TF	No due date - operational	NA	NA	No Effluent directed to the TSF/TF	Compliance	
F14	Licensee shall not open burn material specified in Licence.	No due date - operational	NA	NA	No open burning undertaken. Any open burning excludes material listed in Licence.	Compliance	
F15	Dispose of all tailings and operate TSF/TF in accordance with Tailings Management Plan. Not discharge effluent from TSF/TF unless approved	No due date - operational	NA	NA	TSF/TF yet to be constructed.		
F16	Submit for approval Temporary Tailings Effluent Discharge Plan	at least 120 days prior to discharge of effluent from TSF/TF	NA	NA	TSF/TF construction still pending	Compliance	
F17	Effluent from Waste Rock Storage areas, all Ore Stockpiles, and the ANFO Plant to the Primary Water Pond, Tailings Storage Facility, or Tailings Facility, unless otherwise approved	No due date - operational	NA	NA	Project still in pre-development. Construction yet to be initiated. No effluent generated.	Compliance	
F18	Direct all Effluent from the Primary Water Pond to the Tailings Storage Facility, Tailings Facility, or the Mill for re-use unless otherwise approved	No due date - operational	NA	NA	Project still in pre-development. Construction yet to be initiated. No effluent generated.	Compliance	

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F19	Direct all Effluent from the MLA Desalinization Plant to the marine environment	No due date - operational	NA	NA	All effluent directed from MLOA Desalinization plant directed to marine environment	Compliance	
F20	Direct all Saline Water (groundwater) from underground mines, open pit mines, or storage facilities to the Saline Water Pond or to Llama Underground, Llama Reservoir, Goose Main Underground, or Umwelt Underground	No due date - operational	NA	NA	Project still in pre-development. Construction yet to be initiated. No effluent generated.	Compliance	
Part G	**Conditions Applying to Modifications**						
G1	Notification of Modification	60 days prior to modification	190808	190919	Notice of revisions to Schedule I provided by NWB on August 8, 2019 and approved by the NWB on September 19, 2019	Compliance	NWB Public Registry
G2	If Part G, Item 1 not met, written approval of Board required	Prior to carrying out modification	NA	NA		Compliance	
G3	Application for modification to contain information specified in the Licence	No due date - operational	NA	NA		Compliance	
G4	Submission of As builds stamped by Engineer	90 days of completion of Modification - Fuel Storage Design As build's	pending	pending	Bulk Fuel Storage facilities still under construction.	Compliance	
Part H	**Conditions Applying to Emergency Response and Contingency Planning**						
H1	Implement the Risk Management and Emergency Response Plan, Fuel Management Plan, and Spill Contingency Plan	No due date - operational	NA	Part B, Item 14	Plans approved upon approval of Licence. No updated plans submitted.	Compliance	NWB Public Registry
H2	Prevent chemicals, petroleum products or unauthorized Waste from entering any waterbody	No due date - operational	NA	NA	Sabina endeavours to prevent unauthorized waste from entering waterbodies.	Compliance	
H 3	Provide Secondary containment for fuel and chemical storage to industry standards and practice	No due date - operational	190529 190530 190614 190617	NA	Bulk Fuel storage design reports, drawings submitted for Board review approval not required	Compliance	NWB Public Registry
H4	Perform regular inspection in accordance with Environmental Protection Plan and Fuel Management Plan. More frequent inspection at request of Inspector	As per Plans	NA	NA	Sabina has undertaken regular inspection in accordance with the Plan(s). Inspector did not request more frequent inspections	Compliance	
H5	If Sabina provides notification of care and maintenance (i.e. as per Part J, Item 3 - 60 days prior or to CM); Submit addendum to plans detailing changes	60 days prior to Care and Maintenance or as soon as practically possible.	NA	NA	No notification of Care and Maintenance submitted. Project remains in pre-development	Compliance	
H6	Maintain copy of Risk Management and Emergency Response Plan, and Spill Contingency Plan at each site	No due date - operational	NA	NA	Copies of plans on site at Goose and MLA properties.	Compliance	
H7	Conduct emergency maintenance and servicing in designated areas and implement collection, prevention and containment for spills	No due date - operational	NA	NA	Maintenance conducted in designated area and measures implemented where applicable	Compliance	
H8	Report unauthorized deposits of Waste or Effluent; Employ Spill plan,	Notify Inspector and Spill Report line immediately	NA	NA	Spills reported immediately upon notification. Refer to Annual Report	Compliance	
H9		Provide detailed report to Inspector and NWB 30 days after initially reporting event	NA	NA	Specific reports not provided. However summary provided in Annual Report for minor events. Sabina will endeavour to supply detailed report going forward.	Partially Compliance	
Part I	**Conditions Applying to General and Aquatic Effects Monitoring**						
I1	Implement the Environmental Management and Protection Plan, Aquatic Effects Management Plan and the Quality Assurance / Quality Control Plan	No due date - operational	NA	Part B, Item 14	Plans approved upon approval of Licence. No updated plans submitted.	Compliance	NWB Public Registry
I2	Submit updated Aquatic Effects Management Plan	prior to March 31, 2019	Pending	pending	Sabina remains in pre-development and assumes AEMP updated linked to deferred WMP as per Part E, Item 15	Compliance	
I3	Install and maintain flow meters for measuring water use and effluent discharges	No due date - operational	NA	NA	Where applicable to pre-development operations meters installed.	Compliance	
I4	Undertake monitoring Program in Schedule I	No due date - operational	NA	NA	Where applicable to pre-development, monitoring program implemented.	Compliance	
I5	Written notification separately or with monthly report as per Part I, Item 18	at least 60 days prior to Project Phase change to Construction	NA	NA	Project still in Pre-development	Compliance	
		At least 60 days prior to phase change to Operations Stage 1	NA	NA		Compliance	
		At least 60 days prior to phase change to Operations Stage 2	NA	NA		Compliance	
		At least 60 days prior to phase change to Operation Stage 3	NA	NA		Compliance	
I6	Establish locations and GPS coordinates for all monitoring program stations in consultation with an Inspector	No due date - operational			Where applicable to pre-development operations locations and GPS established	Compliance	
	Additional or replacement stations added in consultation with Inspector	No due date - operational			No additional or replacement stations added	Compliance	
I7	Install and signs identifying monitoring stations in English, Inuktitut and Inuinnaqtun	No due date - operational	NA	NA	Where applicable to pre-development signs established and maintained	Compliance	
I8	Measure and record in cubic metres (water use, volumes of effluents, and estimated of contact water)	Monthly	NA	NA	Where applicable to pre-development volumes measures and recorded in cubic metres	Compliance	
I9	Measure and record in tonnes quantity of wastes and stockpiled material	Monthly	NA	NA	Where applicable to pre-development volumes measures and recorded in tonnes	Compliance	
I10	Conduct Geotechnical Inspection of all major earthworks as per Licence list	Annually (between July and September) 2019	NA	NA	Project still in pre-development. Construction of major earthworks yet to be initiated.	Compliance	
I11	Geotechnical Inspection report with cover letter to address Geotechnical Engineers recommendations	90 days following completion of inspection 2019	NA	NA	Project still in pre-development. Construction of major earthworks yet to be initiated.	Compliance	
I12	Visually monitor and record observations in accordance with Environmental Management and Protection Plan during periods of discharge with results available at request of Inspector (stations defined in the Licence)	No due date - operational	NA	NA	Project still in pre-development. Construction yet to be initiated. No effluent generated.	Compliance	

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I13	Digital photographic record of all project watercourse crossings before, during and after Construction	No due date - operational	NA	NA	Project still in pre-development. No crossings constructed except as approved under pre-development.	Compliance	
I14	Maintain and implement accepted QA/QC Plan	No due date - operational	NA	Part B, Item 15	Plan accepted by the Board on Approval of Licence by the Minister.	Compliance	
I15	Annual review of QA/QC Plan with changes submitted to accredited Lab for approval	Annually	NA	NA	Plan review and no changes required at this time.	Compliance	
I16	All Analysis conducted by approved standards	No due date - operational	NA	NA	All Analysis undertaken by LAB NAME	Compliance	
I17	All Analysis performed in accredited lab to ISO/IEC Standard 17025	No due date - operational	NA	NA	All Analysis undertaken by LAB NAME		
I18	Submit Monthly Monitoring Report	Within 30 days following the month being reported	(see registry link)	NA	Refer to monthly reports on NWB public registry. Also refer to annual summary of monthly monitoring reports provided in the Annual report	Compliance	NWB Public Registry
I19	As per Part B, Item 19 Board approve changes to Schedule I	No due date - operational	190808	190919	Notice of revisions to Schedule I provided by NWB on August 8, 2019 and approved by the NWB on September 19, 2019. BRP-42 amended.	Compliance	NWB Public Registry
I20	Additional monitoring imposed by Inspector	No due date - operational	NA	NA	No additional monitoring imposed by an Inspector	Compliance	
Part J	**Conditions Applying to Abandonment, Reclamation and Closure**						
J1	Implement the approved Interim Closure and Reclamation Plan	No due date - operational	NA	Part B, Item 15	Plan accepted by the Board on Approval of Licence by the Minister.	Compliance	
	Updated Interim Closure and Reclamation Plan	within 12 months following commencement of Operations Phase	NA	NA	Project in pre-development.	Compliance	
J2	Submit Final Closure and Reclamation Plan for Approval	at least 12 months prior to expected end of planned mining	NA	NA	Project in pre-development.	Compliance	
J3	Submit Notification of intent to enter Care and Maintenance	at least 60 days prior to, or as soon as practically possible	NA	NA	Project in pre-development	Compliance	
J4	Submit Care and Maintenance Plan	Within 30 days of providing notice of intent under J3	NA	NA	Project in pre-development	Compliance	
J5	If project remains in Care and maintenance submit updated cost estimate of liability	within 12 months of entering Care and Maintenance	NA	NA		Compliance	
J6	ICRP and FCP shall be reviewed and modified to reflect changes in operation/technology and actual site conditions and monitoring results over life of project	No due date - operational	NA	NA	Project in pre-development	Compliance	
J7	Updated Cost estimate in accordance with Standards, policy and model	as per J1 with updated ICRP 12 months following commencement of Operations Phase	NA	NA	Project in pre-development	Compliance	
		as per J2 with FCRP at least 12 month prior to expected end of planned mining	NA	NA	Project in pre-development	Compliance	
		as per J5 with Care and Maintenance Plan(s)	NA	NA		Compliance	
J8	Complete all reclamation work in accordance with plan or as otherwise approved by the Board	No due date - operational	NA	NA	Project in pre-development	Compliance	
J9	Implement progressive reclamation	No due date - operational	NA	NA	Refer to annual report summary if applicable	Compliance	NWB Public Registry
J10	Remove culverts and restore as practicable natural drainage	No due date - operational	NA	NA	No culverts removed.		
J11	All Roads and airstrip re-graded as practicable	No due date - operational	NA	NA	Project in pre-development no remediation of roads or airstrip	Compliance	
J12	Hydrocarbon contaminated areas reclaimed to GN Guideline	No due date - operational	NA	NA	Project in pre-development	Compliance	
J13	Contour and Stabilize disturbed areas to predistrubed state	No due date - operational	NA	NA	Project in pre-development	Compliance	
J14	Notification of intent to achieve Recognized Closed Mine Status	at least 60 days prior to intent to seek	NA	NA	Project in pre-development	Compliance	
Schedules:							
Schedule A:	**Scope, Definitions and Enforcement**				No changes		
Schedule B:	**General Conditions**		200403	NA	2019 2AM-BRP1831 Annual Report dated April 2020 filed with NWB	Compliance	NWB Public Registry
Schedule C:	**No Schedule in Licence**		NA	NA	No Schedule in Licence	NA	
Schedule D:	**Conditions Applying to Construction**	Within 90 days of completion of facility	NA	NA	Construction of Water and Waste Facilities not initiated.	Compliance	
Schedule E:	**No Schedule in Licence**		NA	NA	No Schedule in Licence	NA	
Schedule F:	**No Schedule in Licence**		NA	NA	No Schedule in Licence	NA	
Schedule G:	**No Schedule in Licence**		NA	NA	No Schedule in Licence	NA	
Schedule H:	**No Schedule in Licence**		NA	NA	No Schedule in Licence	NA	
Schedule I:	**Conditions Applying to General and Aquatic Effects Monitoring**				Applicable monitoring completed. Refer to Monthly and Annual Reports	Compliance	NWB Public Registry
Schedule J:	**No Schedule in Licence**		NA	NA	No Schedule in Licence	NA	