BACK RIVER PROJECT
Environmental Management and Protection Plan

Type B Development Works Water Licence

August 2017

Version 2.0

BACK RIVER PROJECT
ENVIRONMENTAL MANAGEMENT and PROTECTION PLAN

Table of Contents

Table of Contents i
List of Figures i
List of Tables i
1. Introduction 1-1
2. Scope and Objectives 2-1
3. Monitoring 3-1
3.1 Design Support Monitoring 3-1
3.2 Performance Measurement and Monitoring 3-2
3.3 Water Quality Monitoring 3-2
3.4 Aquatic Effects Monitoring Program 3-7
3.5 General Monitoring 3-7
3.6 Inspections 3-7
3.6.1 Routine and Non-Routine Inspections 3-8
4. References 4-1

List of Figures

FIGURE **PAGE**

Figure 3-1. Continual Improvement Model 3-1
Figure 3.3-1. Proposed Monitoring Locations in Goose Property Area, Back River Project 3-5
Figure 3.3-2. Proposed Monitoring Locations in Marine Laydown Area, Back River Project 3-6

List of Tables

TABLE **PAGE**

Table 2-1. List of Activities 2-1
Table 3.3-1. Proposed Water Quality Monitoring at Goose and Marine Laydown Area 3-3
Table 3.3-2. List of Water Quality Constituents 3-4

1. Introduction

The Back River Project (the Project) is a proposed gold project owned by Sabina Gold & Silver Corp. (Sabina) within the West Kitikmeot region of southwestern Nunavut. It is situated approximately 400 km southwest of Cambridge Bay, 95 km southeast of the southern end of Bathurst Inlet, and 520 km northeast of Yellowknife, Northwest Territories. The Project is located predominantly within the Queen Maud Gulf Watershed (Nunavut Water Regulations, Schedule 4).

The Project is comprised of two main areas with interconnecting winter ice roads (WIR): Goose Property (Appendix A of the MASD, base Figure 2) and the Marine Laydown Area (MLA) (Appendix A of the MASD, base Figure 3) situated along the western shore of southern Bathurst Inlet. The majority of annual resupply will be completed using the MLA, and an approximately 160 km long WIR will interconnect these sites.

The Environmental Management and Protection Plan (EMPP or Plan) describes how Sabina intends to implement a range of environmental monitoring and management measures during early works activities. These measures demonstrate how Sabina will avoid, or minimize, mitigate and/or manage to an acceptable level, the potential adverse effects of the Project on the environment while systematically seeking to enhance positive effects. The EMMP is intended to support the Type B Water Licence Application for the Project.

Sabina's Environmental Management System (EMS) provides the framework through which the EMPP will be delivered. The EMS is the system through which Sabina will verify that the conditions set in the Project Certificate, permits, authorizations, and licences and the associated legislative requirements are met. In addition, Sabina will confirm that standard operating procedures reflect legal requirements pertaining to the Project.

The Plan was prepared following the requirements of:

- the Supplementary Information Guidelines (SIG) for Mining and Milling MM3 and Water Works M1, issued by Nunavut Water Board (NWB 2010 a, b);
- the Environmental Impact Statement Guidelines issued by the Nunavut Impact Review Board (NIRB) to Sabina (NIRB 2013); and
- in accordance with best management practices, and in conformance with current Federal and Territorial statutory requirements.

The information presented herein is current as of August, 2017.

2. Scope and Objectives

This EMPP has been written to meet requirements of a Type B Water Licence and summarizes the specific monitoring and inspections to be conducted by Sabina in relation to the site preparation and development work activities as described in Table 2-1. The Plan is supported by a suite of Project-specific mitigation, monitoring, and/or management plans that set out the Project's standards and requirements for particular areas of environmental management, including the:

- Comprehensive Spill Contingency Plan (August 2017);
- Fuel Management Plan (August 2017);
- Road Management Plan (August 2017);
- Quarry Management Plan (August 2017);
- Oil Pollution and Emergency Plan (August 2017);
- Environmental Management and Protection Plan (August 2017); and
- Interim Closure and Reclamation Plan and cost estimate (August 2017) specific to development works.

Included within the plans are monitoring with adaptive management measures to confirm that the Project is executed as planned, that mitigation is successful, and potential adverse effects are minimized.

Table 2-1. List of Activities

GOOSE PROPERTY
Goose Exploration Camp Operation
Ice Airstrip Construction and Operation
Mobilize Fuel, Equipment, and Supplies
Winter Ice Road Construction and Operation
Operate Airstrip Quarry
Operate Umwelt Quarry
Locate Temporary Fuel Storage
Construct All-weather Service Roads and Water Crossings
Construct Goose Plant Site and Fuel Storage Area Pad
Airstrip Extension
Rascal Stream Re-alignment
Relocate Explosives Storage Area
Water Intake Installation
MARINE LAYDOWN AREA
Ice Airstrip Construction and Operation
Mobilize Fuel, Equipment, and Supplies (Air)
Upgrade Temporary Exploration Camp
Operate MLA Quarry
Construct All-weather Service Roads, Laydown Areas, and Fuel Storage Area
Mobilize Additional Fuel, Equipment, and Supplies (Vessels)
Install One Steel Bulk Fuel Tank
Water Intake/Discharge

3. Monitoring

Proactive and reactive key performance indicators will be developed by Sabina to monitor performance against EMS objectives and to promote continual improvement. The key performance indicators will be tracked and monitored by using environmental checklists. These will be developed for the Project as a whole to confirm that there is alignment and consistency in achieving performance goals. Performance statistics based on the checklists will be compiled and distributed to internal and external stakeholders, as appropriate. Environmental indicators and monitoring programs associated with the aspects or activities of the Project will be refined as the Project develops.

Figure 3-1. Continual Improvement Model

3.1 DESIGN SUPPORT MONITORING

Site-specific field monitoring will be required to support detailed engineering design and confirm modelling assumptions, in advance of full scale Construction Phase implementation pending receipt of a Type A Water Licence. This monitoring (e.g., additional aquatics sampling in lakes at the Goose site, additional water sampling in streams at the Goose site, additional water and sediment sampling at the MLA) will be undertaken in response to commitments previously made.

3.2 PERFORMANCE MEASUREMENT AND MONITORING

The requirements for monitoring effects on the biophysical environment will be an integral part of the Project. The objectives of the monitoring program are to:

- Track performance of mitigation measures implemented; and.
- Identify environmental changes in the receiving environment, if any.

Appropriately qualified personnel and resources will be allocated to conduct monitoring in a systematic and scientifically defensible manner. Monitoring initiatives will be periodically reviewed and modified to confirm continued suitability and value. The regular monitoring reviews will consider:

- Effectiveness of monitoring design to assess environmental performance requirements;
- Timing, frequency and relevance of the monitoring strategy; and
- Closing date for individual programs.

Reporting will be conducted in accordance with frequency requirements defined in permits and authorizations. Deviations from an expected outcome will be investigated and adjustments to the plans will be implemented, where necessary.

3.3 WATER QUALITY MONITORING

For the purposes of the Type B EMPP, water quality monitoring will provide data to support on-site management decisions.

Proposed water quality monitoring stations are illustrated in Figures 3.3-1 and 3.3-2. The station location, sampling frequency, and monitoring groups are provided in Table 3.3-1 with the specific monitoring parameters in Table 3.3-2.

Water quality monitoring provided in the tables applies to the current scope of development works. Additional monitoring currently undertaken on-site in accordance with 2BE-GEO1520 and 2BE-G001520 will be undertaken and reported as required under those specific water licenses.

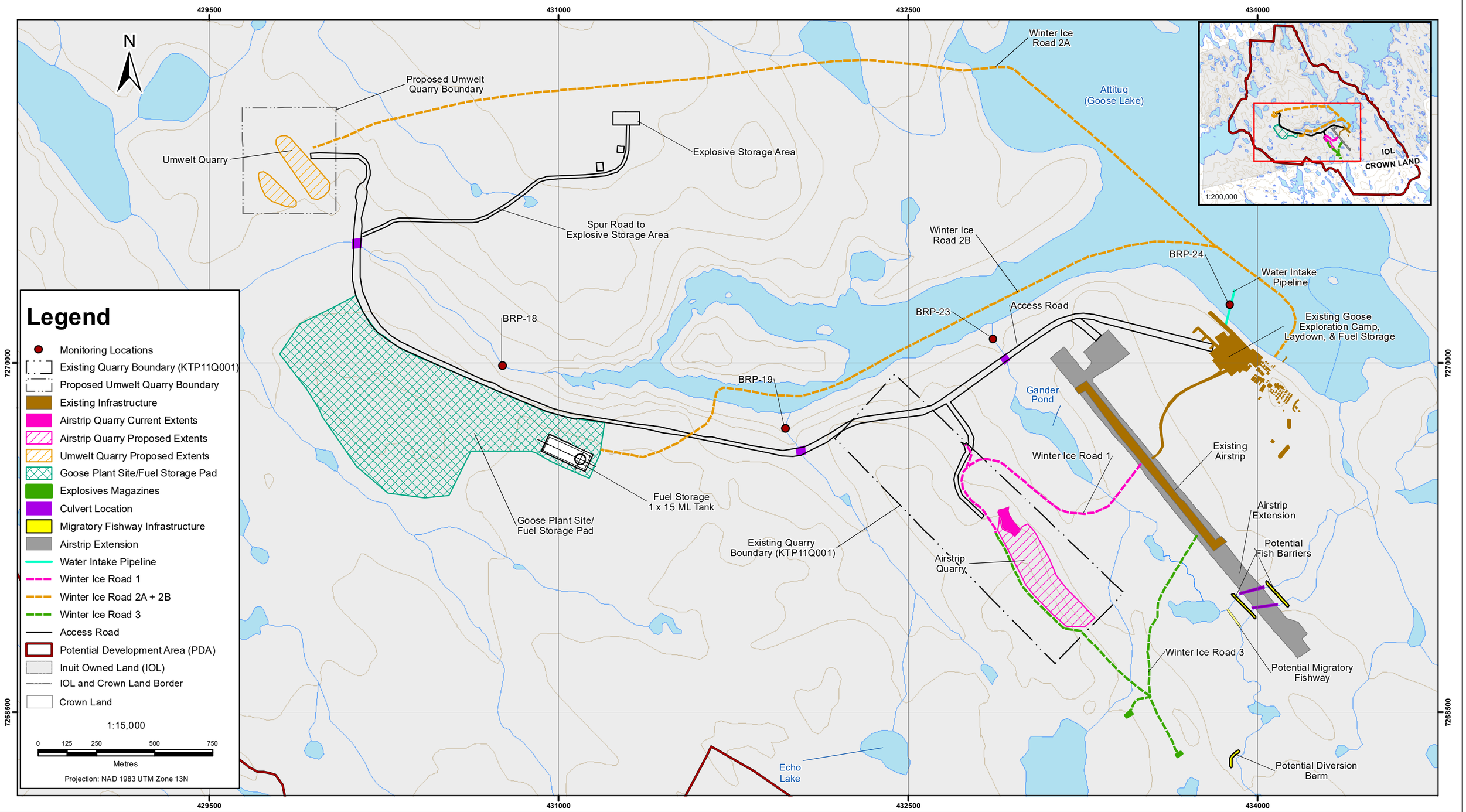
Table 3.3-1. Proposed Water Quality Monitoring at Goose and Marine Laydown Area

Monitoring Location Identification[a]	Description	Purpose	Mine Phase	Parameter Group Code[b]	Frequency
BRP-G-01 to TBD	General Site Runoff during Construction	Applies anywhere on the site (Goose and MLA); monitoring for erosion and sedimentation	Development Works	B	Once daily during activities
BRP-S-01 to TBD	Seeps or runoff (to be determined); Temporary storage areas (non-hazardous material)	Applies anywhere on the site (Goose and MLA); monitoring for potential seepage or runoff from excavated and/or stockpiled material Applies to any runoff from temporary storage areas	Development Works	A, C	Monthly, or as found
BRP-18	Llama Watershed Outflow (PN04 from water and load balance)	Monitoring water quality during road construction and culvert installation	Development Works	B	Once during freshet; additional as required during construction
BRP-19	Echo Outflow (PN09 from water and load balance)	Monitoring water quality during road construction and culvert installation	Development Works	B	Once during freshet; additional as required during construction
BRP-23	Gander Pond Outflow (PN07 from water and load balance)	Monitoring water quality during road construction and culvert installation	Development Works	B	Once during freshet; additional as required during construction
BRP-24	Goose Lake Intake	Source intake water quality for development works use	Development Works	E	Weekly during intake period
BRP-40	MLA Intake (pre-treatment)	Source intake water quality for development works use	Development Works	E	Weekly during intake period
				A, F	Once per month during intake period
BRP-41	MLA Discharge (post treatment)	Test quality at final point of control	Development Works	A, F	Prior to discharge
BRP-43	MLA Fuel Tank Farm	Test quality of runoff water in the Fuel Tank Farm containment area	Development Works	A, D	As required
BRP-46	MLA mid-shore by the water discharge pipeline	Monitor marine area near the treated water discharge	Development Works	A, C	Twice per year during discharge period
BRP-47	MLA near-shore by the barge	Monitor marine area in the barge area, near-shore environment	Development Works	A, C	Twice per year when there is barge activity
BRP-48	MLA mid-shore by the barge	Monitor marine area in the barge area, mid-shore environment	Development Works	A, C	Twice per year when there is barge activity

Notes BRP = Back River Project; MLA = Marine Laydown Area
a Location numbering extends from the numbering system proposed for the Type A Water Licence
b See Table 3.3-2- for parameters in each monitoring group

Table 3.3-2. List of Water Quality Constituents

Parameter Group	Parameter Group Code	Specific Parameters
Field Chemistry	A	pH, specific conductivity, and temperature.
Surface runoff	B	Total Suspended Solids (TSS) and turbidity
General Chemistry on site	C	Conventional: turbidity, hardness, alkalinity, calcium, chloride, fluoride, magnesium, potassium, sodium, sulphate, total dissolved solids (TDS), turbidity, and TSS. Nutrients: ammonia, nitrate, nitrite, total phosphorus (TP), and total dissolved phosphorus (TDP). Total metals: aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, and zinc
Secondary Containment	D	TSS, ammonia, total arsenic, total copper, total lead, total nickel, total zinc, benzene, toluene, ethylbenzene, xylene, and total petroleum hydrocarbons (TPH), plus nitrate and ammonia when necessary
Flow	E	Flow datalogger, calculated volume
Marine	F	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



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Proposed Monitoring Locations
Goose Property Area
Type B Water License

Figure 3.3-1

September 13 2017

GIS # MLA_NA-tab_EMPP_MonitoringLocations_WL_TypeB_Fig3.3-2 W:\BackRiver\04_Exploration\BackRiverRegion\GIS_Products\ESRI_MXD\Water_Permitting\MLA_NA-tab_EMPP_MonitoringLocations_WL_TypeB_Fig3.3-2.mxd

381000 381750

7395000 7394000 7393000

N

FUEL SHIP
FLOATING HOSE
TEMPORARY LAYDOWN AREA
FREIGHT STORAGE AREA
FRESH/FIRE WATER STORAGE TANK
INCINERATOR
TEMPORARY FUEL STORAGE 7 x 90,000 L TANKS
HELIPAD
CAMP AREA
MLA QUARRY
BRP-48
BRP-47
BRP-43
FUEL STORAGE AREA 1 x 15,000,000 L TANKS

Main Map
Marine Laydown Area
Kilogiktok (Bathurst Inlet, Southern Arm)
George Camp
Goose Property Area
1:1,810,000

Kilogiktok (Bathurst Inlet, Southern Arm)
Marine Laydown Area
1:120,000

Monitoring Locations
Existing Exploration Camp
Temporary Laydown
Proposed Camp Facilities
Proposed Storage Facilities
Potential Development Area (PDA)
MLA Quarry Proposed Extents
Contours 5 m
Inuit Owned Land (IOL)
Crown Land

1:7,500
0 200 400
Metres

Projection: NAD 1983 UTM Zone 13N

NOTE: All roads at the MLA are service roads

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Proposed Monitoring Locations
Marine Laydown Area
Type B Water License

Figure 3.3-2

3.4 AQUATIC EFFECTS MONITORING PROGRAM

A baseline sampling program will be executed in 2017 following the draft Aquatic Effects Monitoring Program design plan (submitted as Chapter 19, Volume 10 in the FEIS Addendum). Further sampling may also be conducted in 2018 following this plan.

3.5 GENERAL MONITORING

Other monitoring will also be conducted as part of the following plans:

- Comprehensive Spill Contingency Plan (August 2017);
- Fuel Management Plan (August 2017);
- Road Management Plan (August 2017);
- Quarry Management Plan (August 2017);
- Oil Pollution Emergency Plan (August 2017);
- Environmental Management and Protection Plan (August 2017); and
- Interim Closure and Reclamation Plan and cost estimate (August 2017) specific to development works.

Details specific to monitoring are included in those plans.

Monitoring results collected under the various programs will undergo appropriate quality assurance and quality control checks, and will be included in the annual report.

Environmental coordinators/technicians will carry out day-to-day environmental monitoring and reporting as required.

3.6 INSPECTIONS

Sabina has responsibility for inspection and maintenance of all Project components, including the inspection and monitoring of development work activities.

A good inspection program will lead to the early identification of areas where improvements are needed. The early resolution of any deficiencies will result in less ongoing maintenance and repair of mine components, and a reduction in the risk of adverse environmental effects.

If the Project enters temporary closure, Sabina will notify the NWB, NIRB, KIA, Indigenous and Northern Affairs Canada, Government of Nunavut, and other relevant parties. Upon notification, Sabina will confirm that internal inspections are maintained. Reporting requirements also will be maintained. In conjunction with the change of operations, Sabina will review and update, if needed, all management plans to reflect the change in operational status.

The objective of inspections is to confirm that the Project remains safe, stable, and fully compliant with all authorizations. Inspections will confirm that pre-work activities are carried out and managed in an environmentally sound, safe, and efficient manner.

3.6.1 Routine and Non-Routine Inspections

Routine inspections are planned and scheduled on a repetitive basis, and are those required under authorizations. Non-routine, event, or unplanned inspections include accidents, malfunctions, and spills, or after major rain events.

Inspection priorities are based on analyzing all development activities and their respective risks to health and safety or to the environment, and on outcomes of previous inspections

Personnel having knowledge and experience with the components and activities will carry out the inspections. Training will be provided by Sabina to effectively and efficiently complete inspections. Inspections will allow action to be taken to address any deficiencies in components or activities, and reports will be retained on site by the respective inspecting departments.

Sabina has developed and implemented an incident management and investigation procedure. The intention of this procedure is to confirm that all incidents, including "near misses," no matter how minor, are recorded, investigated and reported, where applicable. All incidents, investigations, and corrective and preventive actions will be input to an incident reporting database and tracked until Closure.

4. References

NIRB (Nunavut Impact Review Board). 2013. *Guidelines for the Preparation of an Environmental Impact Statement for Sabina Gold & Silver Corp.'s Back River Project*. NIRB File No. 12MN036).

NWB (Nunavut Water Board). 2010a. Mining and Milling Supplemental Information Guideline (SIG) for Mine Development (MM3). February 2010.

NWB. 2010b. Miscellaneous Supplemental Information Guideline (SIG) for General Water Works (including crossings, flood control, diversions, and flow alterations) (M1). February 2010.