BACK RIVER PROJECT
Risk Management and Emergency Response Plan

October 2017

BACK RIVER PROJECT
RISK MANAGEMENT AND EMERGENCY RESPONSE PLAN

Table of Contents

List of Figures

List of Tables

Revision Log

Version	Date	Section	Page	Revision
1	October 2017	All	All	Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval

Acronyms

CCG	Canadian Coast Guard
ERC	Emergency Response Coordinator
ERT	Emergency Response Team
FEIS	Final Environmental Impact Statement
INAC	Indigenous and Northern Affairs Canada
KIA	Kitikmeot Inuit Association
MAD	Main Application Document
MLA	Marine Laydown Area
NWR	Nunavut Water Regulations
OPEP	Oil Pollution Emergency Plan
Project	Back River Project
RCMP	Royal Canadian Mounted Police
RMERP or Plan	Risk Management and Emergency Response Plan
Sabina	Sabina Gold & Silver Corp.
SCP	Spill Contingency Plan
SOPEP	Shipboard Oil Pollution Emergency Plan
TDGR	Transportation of Dangerous Goods Regulations
WHMIS	Workplace Hazardous Materials Information System
WIR	Winter Ice Road

1. Introduction

1.1 OVERVIEW

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 kilometres (km) southwest of Cambridge Bay, 95 km southeast of the southern end of Bathurst Inlet (Kingaok), 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) (Main Application Document [MAD] Appendix A, base Figure 2): Goose Property (MAD Appendix A, base Figure 3) and the Marine Laydown Area (MLA) (MAD Appendix A, base Figure 4) 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. Refer to the MAD Appendix A, base Figures 1 to 5 for general site layout and locations. A detailed project description is provided in the MAD.

This Risk Management and Emergency Response Plan (RMERP or Plan) outlines Sabina's approach to risk management and to ensure that an adequate level of emergency preparedness is available for the construction, operation and closure of 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) and the Environmental Impact Statement Guidelines issued by the Nunavut Impact Review Board to Sabina (NIRB 2013) and in accordance with best management practices and in conformance with current Federal and Territorial statutory requirements (see Applicable Legislation and Guidelines Section 3).

This plan is a living document to be updated upon changes in related regulatory requirements, management reviews, incident investigations, changes to facility operation or maintenance, and environmental monitoring results, best practice updates or other Project specific protocols once construction starts through to Project closure activities. Any updates will be filed with the Annual Report submitted under the Type A Water Licence.

The information presented herein is current as of September 2017. An update will be initiated prior to the start of construction. The Plan will be reviewed as needed for changes in operation and technology and as directed by the Nunavut Water Board in the Type A Water Licence or other regulatory authorization where appropriate. Completion of the updated Plan will be documented through signatures of the personnel responsible for reviewing, updating, and approving the Plan.

A record will document all significant changes that have been incorporated in the Plan subsequent to the latest review. The record will include the names of the persons who made and approved the change, as well as the date of the approval.

Sabina will maintain a distribution list providing contact details for all parties to receive the Plan including key personnel, contractors, organizations, and external agencies.

2. Scope and Objectives

The RMERP is one of the documents that forms part of Sabina's overall Emergency Response Program for the Project. This plan has been written to meet requirements of a Type A Water Licence and applies to all Sabina projects in the Kitikmeot region.

The RMERP is designed to provide an assessment of the potential risks associated with the Project and establish an organizational structure and procedures for effective response to emergencies. As a contractual condition with penalties, Contractors will be obliged to comply with Sabina's approvals and environmental management plans, including this RMERP. Sabina staff will monitor contractor performance and adherence to legislation and the commitments in the environmental management plans.

The Plan addresses potential risks from natural hazards, as well as accidents and malfunctions, which could result in emergency situations (e.g., medical, spills, fire).

This plan is divided into the following components:

- Applicable Legislation and Guidelines (Section 3);
- Planning and Implementation (Section 4);
- Roles and Responsibilities (Section 5);
- Emergency Contact Information (Section 6);
- Risk Assessment and Management (Section 7);
- Emergency Response (Section 8);
- Adaptive Management (Section 9);
- Record Keeping (Section 10); and
- Loss Prevention (Section 11).

2.1 COMPLEMENTARY PLANS AND DOCUMENTS

Documents within the Application for the Type A Water Licence, which support this plan include the following:

- Fuel Management Plan (Supporting Document [SD]-16);
- Spill Contingency Plan (SD-17);
- Oil Pollution Emergency Plan (SD-18);
- Landfill and Waste Management Plan (SD-10);
- Landfarm Management Plan (SD-12);
- Incineration Management Plan (SD-11);
- Hazardous Materials Management Plan (SD-13);
- Road Management Plan (SD-02);

- Explosives Management Plan (FEIS Volume 10, Chapter 13).
- Shipping Management Plan (FEIS Volume 10, Chapter 15);
- Occupational Health and Safety Plan (FEIS Volume 10, Chapter 25); and
- Shipboard Oil Pollution Emergency Plan (to be provided in the future by Shipping Company).

2.1.1 Linkage with Sabina Oil Pollution Emergency Plan

The *Response Organizations and Oil Handling Facilities Regulations* under the *Canada Shipping Act* stipulates that operators of designated Oil Handling Facilities must have an on-site Oil Pollution Emergency Plan (OPEP; SD-18) that has been approved by Transport Canada.

The OPEP (SD-18) prepared for the MLA Oil Handling Facility applies to marine spills that may occur during ship-to-shore fuel transfers. Ship-specific Shipboard Oil Pollution Emergency Plans (SOPEP) specifically address marine spill incidents that may be associated with spills from shipping vessels while at sea. The OPEP (SD-18) prepared for the MLA has been designed to complement this plan.

Sabina's Emergency Response Team (ERT) will be trained to adequately handle any emergencies that impact the ocean, land and freshwater, including implementation of this Spill Contingency Plan (SCP; SD-17) for land-based spills, and implementation of the OPEP (SD-18) for any spills that may occur during ship-to-shore fuel transfers.

3. Applicable Legislation

Both federal and territorial legislation exist to address risk management and emergency response. Operational policies and procedures that fulfill conditions in applicable legislation will be further developed as the Project proceeds.

Table 3-1 summarizes the primary Federal and Territorial legislation applicable to emergency response in Nunavut.

Table 3-1. Legislation Applicable to the Risk Management and Emergency Response Plan

Act	Regulations	Guidelines
Federal		
Canadian Labour Code (R.S.C., 1985, C. l-2)	Canadian Occupational Health and Safety Regulations (SOR/86-304)	-
Arctic Waters Pollution Prevention Act (R.S.C., 1985, c. A-12)	Arctic Shipping Pollution Prevention Regulations (C.R.C., c. 353)	-
Canadian Environmental Protection Act (R.S.C. 1999 c.33)	Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197) Environmental Emergency Regulations (SOR/2003-307) Interprovincial Movement of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2002-301) Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149)	Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (CCME 2003) Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (CCME 2008)
Fisheries Act (1985, c. F-14)	Metal Mining Effluent Regulations (SOR/2002-2222)	-
Explosives Act (1985, c. E-17)	Ammonium Nitrate and Fuel Oil Order (C.R.C., c.598) Explosives Regulations (C.R.C., c. 1516)	Guidelines for Bulk Explosives Facilities – Minimum Requirements (NRCan 2014) Quantity Distance Principles User's Manual (NRCan 2013) National Standard of Canada CAN/BNQ 2910-500/2015 – Explosives – Magazines for Industrial Explosives (BNQ 2015)
National Fire Code of Canada (2010)	-	-
Transportation of Dangerous Goods Act (1992, C. 34)	Transportation of Dangerous Goods Regulations (SOR/2015-100)	2016 Emergency Response Guidebook (Transport Canada and U.S. Department of Transportation 2016)
Territorial Lands Act (R.S. 1985, c. T-7)	Northwest Territories and Nunavut Mining Regulations (C.R.C., c. 1516) Territorial Land Use Regulations (C.R.C., c. 1524) Territorial Lands Regulations (C.R.C., c. 1525)	- -
Hazardous Products Act	*Controlled Products Regulations*	Workplace Hazardous Materials Information System (WHMIS)

(continued)

Table 3-1. Legislation Applicable to the Risk Management and Emergency Response Plan (completed)

Act	Regulations	Guidelines
Territorial – Nunavut		
Environmental Protection Act (RSNWT (Nu) 1988, c E-7)	Spill Contingency Planning and Reporting Regulations (NWT Reg (Nu) 068-93) Used Oil and Waste Fuel Management Regulations (NWT Reg 064-2003) The removal of hazardous materials will require the registration with the Government of Nunavut, Department of Environment (DOE) as a waste generator as well as carrier (if applicable) prior to transport	Government of Nunavut (GN) Environmental Guidelines for the Management of: • General Management of Hazardous Waste in Nunavut (GN 2010a) • Waste Paint (GN 2010b) • Mercury-Containing Products and Waste Mercury (GN 2010c) • Industrial Waste Discharges into Municipal Solid Waste and Sewage Disposal Facilities (GN 2011a) • Waste Batteries (GN 2011b) • Waste Solvent (GN 2011c) • Waste Antifreeze (GN 2011d) • Used Oil and Waste Fuel (GN 2012) • Biomedical and Pharmaceutical Waste (GN 2014)
Mine Health and Safety Act (SNWT (Nu) 1994, c. 25)	Mine Health and Safety Regulations (NWT Reg (Nu) 125-95)	-
Workers' Compensation Act (RSNWT, 1998, c. W-6)	Workers' Compensation General Regulations (Nu Reg 017-2010)	-
Explosives Use Act (RSNWT (Nu) 1988, c. E-10)	Explosives Regulations (RRNWT (Nu) 1990, c. E-27)	-
Fire Prevention Act (RSNWT (Nu) 1988, c. F-6)	Fire Prevention Regulations (RRNWT (Nu) 1990, c. F-12)	-
Motor Vehicles Act (RSNWT (Nu) 1988, c. M-16)	Large Vehicle Control Regulations (RRNWT (Nu) 1990, c. M-30)	-
Public Health Act (RSNWT (Nu) 1988, c. P12)	Camp Sanitation Regulations (RRNWT (Nu) 1990, c. P-12)	-
	General Sanitation Regulations (RRNWT (Nu) 1990, c. P-16)	-
Safety Act (RSNWT 1988, c. S-1)	General Safety Regulations (RRNWT (Nu) 1990, c. P-16)	-
	Work Site Hazardous Materials Information System Regulations (RSNWT 1988, c. 81 (Supp))	-
Transportation of Dangerous Goods Act (1990, RSNWT (Nu) 1988, c. 81 (Supp))	Transportation of Dangerous Goods Regulations (1991, NWT Reg (Nu) 095-91)	-

Sabina notes that the Canadian Coast Guard (CCG) is the lead federal agency for all ship-source spills or pollution incidents in water under Canadian jurisdiction. Sabina recognizes our responsibility to manage the risks effectively and to be prepared to respond in the event of a spill. Response to spills that occur

during the act of shipping will be covered under the vessel's SOPEP. The SOPEP is a required document that must be reviewed and approved by Transport Canada.

The *Canada Shipping Act,* 2001, stipulates that operators of designated oil handling facilities must have an OPEP. An OPEP must be reviewed and approved by Transport Canada.

Transport Canada and the CCG have the expertise, jurisdiction and mandate to advise on shipping and marine spill response, in accordance with the *Canada Shipping Act* and its regulations, which include numerous specific requirements relating to shipping in the Canadian Arctic and marine spill prevention and response. Other federal agencies and departments, such as Fisheries and Oceans Canada, the CCG and Environment and Climate Change Canada, have distinct but interrelated responsibilities for the management of marine transportation safety and environmental protection in the Arctic (FEIS Volume 10, Chapter 15, Appendix A) (FEIS Addendum Section 9.3, Accidents and Malfunctions [Addenda]).

4. Planning and Implementation

Planning for the RMERP started with the development impact review stage, which identified existing (baseline) conditions, assessed potential impacts of the Project, and developed conceptual mitigation strategies and specific mitigation measures to execute these strategies. The Plan has been updated to reflect comments identified throughout the environment assessment process.

Risk management and emergency preparedness and response will be tracked, reviewed, and updated through ongoing maintenance of the Plan. The Plan strategies and procedures will be refined over time. These updates will incorporate relevant feedback from the public, obtained during public consultation.

4.1 SUSTAINABLE DEVELOPMENT POLICY

Sabina is committed to fostering sustainable development throughout all stages of our activities. We constantly strive to conduct our operations in a manner that balances the social, economic, cultural, and environmental needs of the communities in which we operate. To build on this commitment Sabina will:

- Meet or strive to exceed all relevant legislated sustainable development requirements in the regions where we work.
- Ensure appropriate personnel, resources and training is made available to implement our sustainable development objectives.
- Establish clear lines of responsibility and accountability throughout the Company to meet these objectives.
- Implement proven management systems and procedures to facilitate our sustainable development objectives. A priority will be placed on developing and implementing management structures related to the environment, health and safety, emergency response and stakeholder engagement.
- Act as responsible stewards of the environment for both current and future generations. We will make use of appropriate assessment methodologies, technologies and controls to minimize environmental risks throughout all stages of mineral development.
- Work closely with local communities and project stakeholders to understand their needs, address their concerns and provide project-related benefits to create win-win relationships. Our goal is to earn and maintain a social licence to operate at all our operations while building partnerships.
- Pursue economically feasible projects in order to generate shareholder profitability and support long-term positive socio-economic development in the regions where we work.
- Utilize a precautionary approach as it applies to potential effects from our activities. Work with employees, contractors and stakeholders to promote a culture of open and meaningful dialogue to ensure that any known or suspected departures from established protocols are reported to management in a timely manner.
- Regularly review this policy to ensure it is consistent with Sabina's current activities and the most recent legislation.
- Continually improve our performance and contributions to sustainable development including pollution prevention, waste minimization and resource consumption.

- Implement programs at each of our operations to monitor and report compliance and proactively address potential deficiencies in our policies and procedures.

The objectives of our sustainable development policy cannot be accomplished without the active involvement and commitment of many dedicated individuals. As such, we will regularly communicate this policy and its outcomes to our employees, contractors and relevant stakeholders. Together, we can foster a culture of sustainable development at Sabina.

5. Roles and Responsibilities

The initial stage of any emergency incident and resultant response is critical. An effective and timely response is essential to prevent an emergency situation from escalating to a higher level. Therefore, all relevant personnel must be fully aware of their individual roles and responsibilities as presented in this plan.

Safety training and awareness of emergency response measures and risk management is key to the implementation of an effective RMERP (see Section 5.11).

Figure 5-1 summarizes Sabina's generalized emergency response organization chart. This structure will be refined in future iterations of this plan. The same organization chart applies to spill response, and therefore updates to this organization chart are to be incorporated into an update of the SCP (SD-17).

Duties of the ERT during an emergency are:

- Report to the scene of the incident.
- Work closely with the Incident Commander to determine appropriate response strategy for their respective work area.
- Contact departmental resources via radio as required during the emergency response.
- Direct ERT members in their respective tasks as required.
- Participate in a post-emergency debriefing session.

Specific responsibilities and duties inherent to personnel involved in emergency response are outlined below.

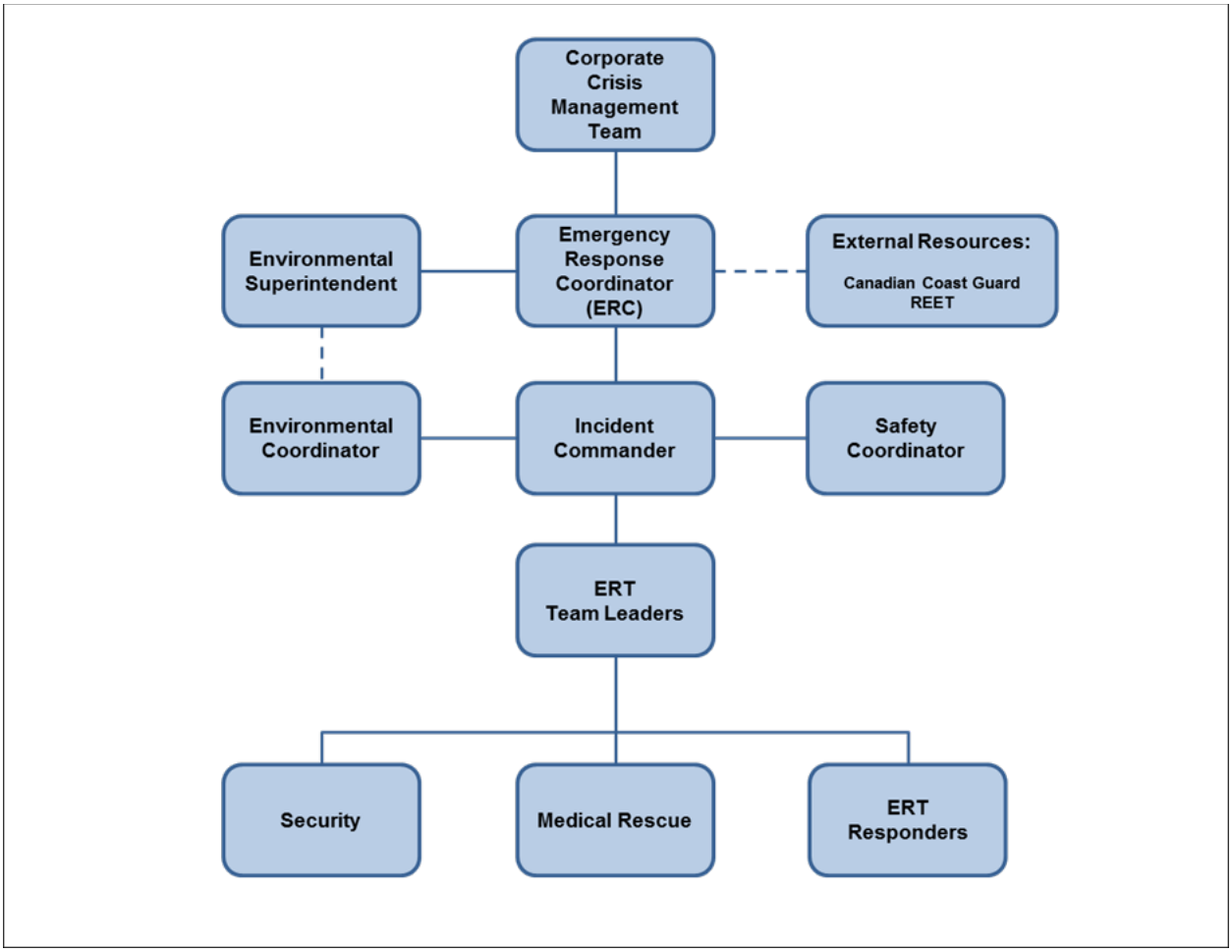


Figure 5-1. Sabina Emergency Response Organization Chart

5.1 EMERGENCY RESPONSE COORDINATOR

The Emergency Response Coordinator (ERC) is the General Manager or his designate. The ERC's duties during an emergency are:

- To ensure coordination of ERT leaders and responders.
- Upon being notified of an emergency, initiate response activities and assess the situation based on current information from the Incident Commander (see Section 5.3).
- Activate the emergency response process and escalate according to severity of the incident.
- The ERC will coordinate all activities. In the event the ERC leaves his post, the ERC will designate an individual to coordinate in his absence.
- Ensure that the appropriate area manager/s has been notified.
- Provide internal notification as applicable based on the level of emergency.
- Provide instruction to ensure that appropriate external resources are notified.

- Receive information from the Incident Commander and ensure appropriate resources are made available.
- Provide support for the acquirement of additional supplies and resources as requested by the Incident Commander.
- Contact departmental resources via radio as required during the emergency response.
- Provide internal notification of the “all clear”.
- Ensure the coordination and establishment of an emergency debriefing session.
- Review incident log and post response incident report.
- Post incident debrief with Incident Commander.
- Provide necessary information to the Communications Officer for a media statement release if required (see Section 5.5).
- Complete a report on the events surrounding the incident.
- Coordinate collection of all incident notes, reports, statements, and log of events.
- End the event in a project tracking system.

5.2 ENVIRONMENTAL SUPERINTENDENT

The duties of the Environment Superintendent during an emergency are:

- For major spills contact the ERC and report to the command center.
- Assist the ERC in evaluating the initial situation and assessing the magnitude of the spill.
- Report the spill to NWT-NU 24-hour Spill Report Line depending on whether threshold volume is triggered.
- Assist in developing an overall plan of action.
- Document all actions and decisions.
- Complete Government Agency notification processes.
- Act as the spokesperson with government agencies as appropriate.
- Collect photographic records of the spill event and cleanup efforts.
- Report to the ERC and provide recommendations on resource requirements (additional manpower, equipment, material) to complete the cleanup effort.
- Provide liaison with management to keep them informed of cleanup activities.
- Ensure that the spill is cleaned up and follow-up communication and reports are filed with the Indigenous and Northern Affairs Canada (INAC) and Kitikmeot Inuit Association (KIA).
- Assist in the accident/incident investigation process.
- Participate in post-emergency debriefing.
- Ensure that all involved departments complete reporting process.
- Ensure that spill reports submitted to INAC and KIA include photographic records and an updated map showing Universal Transverse Mercator (UTM) coordinates, date, and amount and nature of the spill.

- Implement a sampling procedure for the collection and analysis of samples to identify and monitor possible contaminant levels resulting from the spill.
- Document the cause of the spill and effectiveness of the cleanup effort, and recommend the appropriate measures to prevent a recurrence of the spill.
- Prepare and submit follow-up documentation required by appropriate regulators.

5.3 INCIDENT COMMANDER

The Incident Commander is the site lead administrator for the ERT, responsible for ensuring the necessary emergency response equipment and adequate level of training for ERT members. The Incident Commander directs the ERT at the scene as ERT Leader. In the absence of the Incident Commander, a senior team member will be designated in his place.

The duties of the Incident Commander during an emergency are:

- Muster accordingly and brief team members.
- Report to the scene of the emergency.
- Take charge of the scene.
- Evaluate the details of the emergency as presented by those on scene.
- Assess the immediate situation, confirm the level of emergency and notify the ERC.
- Maintain contact with the ERC and provide support in coordination of the response.
- Direct ERT members in their respective tasks as required.
- Contact departmental resources via radio as required during the emergency response.
- Request internal/external resources as required.
- Advise ERT on aspects of internal/external support as they are received.
- Develop a written log of events indicating instructions given, action taken and outcomes achieved.
- Announce the ‘all clear’ to the ERC when the emergency has ended.
- Lead the post-emergency debriefing session.
- Ensure that all ERT equipment is returned to original order and/or replaced to ensure future rapid response.
- Provide assistance with ongoing investigation.
- Prepare a written report on response activities.

5.4 EMERGENCY MEDICAL PERSONNEL

Duties of Emergency Response Personnel during an emergency are:

- Respond when required as directed by the Incident Commander.
- Responsible for all decisions of medical-related situations on-site.
- Responsible for assessing, administering, and delegating emergency medical care.
- Advise the Incident Commander of the number and condition of any ill/injured personnel.

- Advise the ERC of off-site resources required.
- Maintain a log of events, actions, and outcomes.
- Participate in a post-emergency debriefing session.

5.5 COMMUNICATIONS OFFICER

The Communications Officer manages the collection and dissemination of all information relating to an emergency, including:

- Government agencies, including those that may be involved in responding to any emergency;
- Communities (Hamlets, community groups and individuals); and
- Media.

The Communications Officer will be part of the Corporate Crisis Management Team identified on Figure 5-1, and most likely will be a corporate executive such as the Vice President, Environment & Sustainability, or a designate.

The Communications Officer or designate will control radio use and restrict it to emergency response only. The Communications Officer will also direct the collection and management of all written information, photographs, drawings and video recordings generated during the emergency. This includes the following records:

- A record of the chronology of events.
- Log of telephone calls.
- Log of written statements regarding the emergency (emails, press releases, etc.).
- A list of personnel on-site at the time of the emergency along with emergency contact information, in case it is needed.

All other communications of an emergency by other Project personnel will be prohibited, to limit possible uncontrolled dissemination of misinformation.

5.6 SECURITY

Security personnel or designates are key in an emergency response in that they will receive an initial notification of an emergency and provide first communications to essential personnel and secure the area.

Their duties in an emergency are:

- Report muster and evacuation status to the Incident Commander and await further instruction.
- Provide traffic and personnel control at scene as directed by the Incident Commander.
- Assist in controlling access to the emergency area.
- Maintain open radio communication (via radio or telephone intercom system).
- Keep a written record of events throughout incident.
- Relay notification of ‘all clear” order when directed by Incident Commander.
- Maintain Security of the scene as directed by the ERC or Incident Commander.

- Direct all off-site inquiries regarding the emergency to the ERC or designate.
- Participate in a debriefing session for the emergency response.

5.7 ENVIRONMENTAL COORDINATOR

The Environmental Coordinator will liaise with the Incident Commander to advise on the direction of environmental response efforts once the scene has been assessed by the Incident Commander and all medical and/or fire emergencies are under control.

In an emergency, the Environmental Coordinator will:

- Directly proceed to the scene of the incident.
- Make recommendations for response methods and resources based on area sensitivities and incident severity through the Incident Commander as necessary.
- Make recommendations for additional resources through the Incident Commander as necessary.
- Participate in post-emergency debriefing.
- Maintain a log of events, actions, and outcomes.

5.8 SAFETY COORDINATOR

The duties of the Safety Coordinator during an emergency are:

- Contact the ERC.
- Respond to the scene and make direct contact with the Incident Commander.
- Establish perimeters around the area of the emergency and direct appropriate resource personnel responsible for traffic flow.
- Assist with identifying and assessment of potential hazards of the ERT response and notify the Incident Commander.
- Ensure appropriate personal protective equipment for involved responders.
- Note pertinent information that may be relative to the investigation.
- Secure the area in coordination with site security.
- Participate in post-emergency debriefing.
- Assist in the accident/incident investigation and complete report.

5.9 TEAM LEADERS – (EMERGENCY RESPONSE TEAM)

The duties of the Team Leaders during an emergency are detailed as follows:

- Report to the scene of the incident.
- Work closely with the Incident Commander to determine appropriate response strategy for their respective work area.
- Contact departmental resources via radio as required during the emergency response.
- Direct ERT members in their respective tasks as required.
- Participate in a post-emergency debriefing session.

5.10 EXTERNAL RESOURCES

The CCG is responsible for spill response in the Arctic. In 2007, the CCG undertook an evaluation of risk and requirements for additional Arctic pollution response equipment, in consultation with key partners and clients, purchased and placed Arctic Response Packs in 19 communities throughout the Arctic. These Arctic Response Packs provide communities with on-site equipment to use in the event of a small-scale pollution incident in their waters. Arctic Response Packs are located in Cambridge Bay, Kugluktuk, and Gjoa Haven. Each of the Arctic Response Packs deployed to the communities contains surface booms and accessories, shoreline cleanup kits, small vessels and outboard motors and trailers, and in select communities, beach flushing kits.

Along with the deployment of the Arctic Response Packs, the CCG was to provide training where the Arctic Response Packs are located (Transport Canada 2014). Community residents can therefore play a role in helping the lead response agency, the Canadian Coast Guard, should a marine spill occur.

Additionally, local communities can provide valuable local knowledge on what sensitivities are important to the local community they represent and what resources are available to assist in a response. This type of information was collected as part of the Inuit knowledge study work undertaken or reviewed by the Project.

Additional discussion on CCG and community marine spill response is provided in the Shipping Management Plan and the OPEP (SD-18).

5.11 TRAINING

Sabina will ensure that personnel involved in emergency response have received prior training and the requisite skills to safely minimize risks and respond to emergencies.

The personnel directly linked to emergency response operations will receive training to familiarize themselves with the RMERP, SCP (SD-17), OPEP (SD-18), Hazardous Materials Management Plan (SD-13), Explosives Management Plan (FEIS Volume 10, Chapter 13), on a regular basis according to their duties and responsibilities. All completed training will be recorded in the training register and kept up to date by the ERT.

In addition to orientation programs required by all persons visiting site, the personnel directly linked to emergency response operations, contract employees and the other responders identified in this plan will take part in the yearly training program. Training will be conducted to ensure adequate numbers of responders are available for all levels, times, and work shifts. As a contractual condition with penalties, Contractors will be obliged to comply with Sabina's approvals and environmental management plans, including this plan.

5.11.1 Site Orientation

On-site orientation will be provided to all personnel to ensure employees are aware of:

- The RMERP, SCP (SD-17), OPEP (SD-18), Explosives Management Plan (FEIS Volume 10, Chapter 13).
- Applicable legislation.
- Environmental receptors (i.e., surface water and sensitive areas).
- First Responders' duties in case of an emergency.

- Location of muster Points and First Aid Stations.
- The location of emergency response equipment, such as:
  - Fire extinguishers and firefighting equipment.
  - Safety data sheets and Spill Report Forms.
  - Spill Response Kits.

5.11.2 Role Specific

Specific training will be provided to all employees whose job function may have a higher probability of experiencing an emergency, to ensure understanding of:

- WHMIS and TDGR.
- Specialized handling and emergency/spill response procedures related to specific chemicals (e.g., explosives, cyanide, fuel) to minimize the risk of spills.
- Risk management - identifying and avoiding conditions which may lead to an emergency situation.
- Hazards associated with sources of ignition (smoking, electrical sparks) near a fuel source.
- How to use emergency response equipment.

For employees involved in fuel handling, additional training would be provided regarding appropriate refuelling techniques and drum handling procedures. Personnel not trained to handle chemical spills will not attempt to clean up spill; they are to contact the ERT for clean-up assistance.

Information on measures to avoid spills can be found in the SCP (SD-17).

5.11.3 Emergency Response Team

Members of the ERT will be provided a higher level of training to allow for safe and adequate response. The ERT members will receive 8 hours of training during each two-month period, or as prescribed by the *Mines Act*. ERT training includes:

- Information provided as part of the Role-Specific Training.
- First Aid training.
- Fire extinguishers and water pump locations and use.
- Details of the SCP (SD-17) and the Fire Action Plan.
- How to identify, evaluate and mitigate hazards by using appropriate personal protective equipment.

5.11.4 Emergency Response Exercises

Emergency response exercises will be conducted on occasion to validate on-site capabilities, practice the internal and external notification processes and evaluate the management of the response through the decisions and actions of the ERT participating in the exercise(s).

The exercises will involve the application of realistic hands-on scenarios where the ERT will deploy the appropriate equipment to respond to the specific scenario developed for the exercise. The exercise may be broken down into two or more sessions to ensure adequate coverage.

Records of all emergency response exercises will be kept on file and posted to provide access for those who were unable to attend.

6. Emergency Contact Information

Contact information for all Sabina staff members involved in emergency response is presented in Table 6-1 and will be updated in future iterations of this plan. External contacts that may provide additional assistance as necessary are presented in Table 6-2 and Table 6-3. Key government contacts are provided in Table 6-4. These contacts are reviewed and updated with every review of the RMERP.

Table 6-1. Emergency Response Team Contact Information

Title	Name	Telephone No.
Emergency Response Coordinator	TBD	TBD
Environmental Superintendent	TBD	TBD
Incident Commander	TBD	TBD
Environmental Coordinator	TBD	TBD
Safety Coordinator	TBD	TBD
Operations Superintendent	TBD	TBD
Emergency Medical Personnel	TBD	TBD
Team Leaders	TBD	TBD
Communications Officer	TBD	TBD

Table 6-2. External Emergency Response Contacts

Emergency Situation	Agency Contact	Telephone No.
Medical emergency / medivac	Kitikmeot Regional Health Centre	867-983-4500
	Cambridge Bay Heath Centre	867-983-4500
	Stanton General Hospital	1-800-661-0867
	Air Tindi	867-669-8200
Poisonous substance ingestion	Poison Control Centre	1-800-268-9017
Search and Rescue	Cambridge Bay RCMP	867-983-0123
	Kitikmeot Search and Rescue	867-983-5100
Fatality	Cambridge Bay RCMP	867-983-0123
Workers' Safety and Compensation Commission	Incident and Injury Reporting	1-800-661-0792
Hazardous material spill	Emergency/ Spill Report Line	867-920-8130
Crime	Cambridge Bay RCMP	867-983-0123
Wildlife management	Department of Environment – Cambridge Bay	867-983-4164

Table 6-3. External Emergency/Spill Response Contractors

Expediting Company	Contact Name	Telephone No.
Shell Canada, Mobile Environmental Response	TBD	867-874-2562
Explosives Supplier (TBD)	TBD	TBD
Kitnuna	TBD	867-983-2331
Nuna Logistics Ltd.	TBD	867-682-4667
DuPont (Fuel Dye)	TBD	905-821-5660
Frontier Mining (Sorbents)	TBD	867-920-7617
Mackenzie Delta Spill Response Corporation	TBD	403-457-3661
Acklands (Sorbents)	TBD	867-873-4100

Table 6-4. Key Government Contacts

Agency/Organization	Contact	Telephone No.
Indigenous and Northern Affairs Canada	Water Resources Officer	867-222-6490
	Resource Mgmt. Officer	867-975-4296
	Manager of Field Ops	867-975-4548
Canadian Coast Guard	TBD	1-800-265-0237
Department of Fisheries and Oceans	Fisheries Biologist	1(855) 852-8320
Environment and Climate Change Canada	Manager of Enforcement	867-669-4730
	NWT/NU 24-hour Spill Report Line	867-920-8130
Government of Nunavut Environmental Protection	Director Environment	867-979-7800
Kitikmeot Inuit Association (KIA)	Director Environment and Lands	867-982-3310
Nunavut Water Board	Executive Director	867-360-6338
	Manager of Licensing	
RCMP (Cambridge Bay)	On Duty Officer	867-983-0123
RCMP (Yellowknife)	On Duty Officer	867-669-1111
WSCC (Yellowknife)	Chief Inspector of Mines	867-669-4430

7. Risk Assessment and Management

7.1 RISK ASSESSMENT METHODOLOGY

A comprehensive evaluation of the potential risks from natural hazards and accidents and malfunctions is essential in order to meet legislated regulations, as well as Sabina's health, safety, and environmental objectives. The process of identifying and managing risk, as well as the appropriate mitigation measures in the event of accident or malfunction, is ongoing and involves:

- Identification of hazards;
- Assessment of the risk;
- Evaluation of existing controls;
- Implementation of additional risk controls, if required; and
- Monitoring and review.

Management of risks and contingency planning are integral to Sabina's approach to the Project. While there exists the possibility of natural hazards and accidents and malfunctions, Sabina's goal is to minimize risks and consequences that might affect people and the environment. Management systems, including adaptive management practices, will be designed to mitigate most risks and limit consequences. Personnel training, education, regular inspections, monitoring and maintenance of equipment are all utilized to further reduce risk. Engineering Hazard Assessment Tables 7.1-1, 7.1-2, and 7.1-3 following within this section provide hazard assessments prior to mitigations being applied. Appropriate mitigation measures are also presented within these tables.

Sabina's risk assessment methodology consists of a four-step process:

1. Identify hazards – itemize all possible natural and human-made hazards that could impact the site of operations;
2. Evaluate likelihood or frequency (probability) - the degree of risk posed by each hazard (Table 7.1-1);
3. Evaluate consequences (severity) - select the category which best describes the effects of a credible mishap on personnel, environment, and facilities, assuming that emergency planning and management controls are in place (Table 7.1-2); and
4. Evaluate risk – for each hazard, select its risk category based on probability and consequences (Table 7.1-3).

Table 7.1-1. Likelihood

Likelihood	Description in Context of Full Operating Life of the Facility	Frequency
Almost Certain	Consequence expected to occur in most circumstances	High frequency of occurrence - occurs more than once per year
Likely	Consequence will probably occur in most circumstances	Event does occur, has a history, occurs once every 1 to 10 years
Possible	Consequence could occur at some time	Occurs once every 10 to 100 years
Unlikely	Consequence may occur at some time	Occurs once every 100 to 1,000 years
Rare	Consequence may occur at some time	Occurs once every 1,000 or more years

Table 7.1-2. Consequence Severity

Consequence	Definition
Critical	*Major uncontrolled event or inefficiency with uncertain and perhaps prohibitively costly remediation*. Health and Safety: Fatality. Production: More than six-month production loss or expenditure. Cost: >$500,000,000 damage or additional costs. Environmental Impact/Compliance: Very serious environmental impacts with impairment on landscape/ marine ecology. Long-term, widespread effects on significant environment. Corporate Image: Corporate image tarnished internationally. Community Affairs: Noncompliance with existing community agreement. Extreme and widespread community concerns with international exposure/influence.
Major	*Significant event or inefficiency that can be addressed but with great effort.* Health and Safety: Lost-time injury(s) potentially resulting in permanent disability. Production: Three to six months' production loss or expenditure. Cost: $100,000,000 to $500,000,000. Environmental Impact/Compliance: Serious environmental impacts with impairment on ecosystems. Relatively widespread long-term effects. Regulatory approval withdrawn for a few months. Corporate Image: Corporate image tarnished in North America. Community Affairs: High local community concerns with national exposure/influence.
Moderate	*Moderate event or inefficiency that might need physical attention and certainly engineering review.* Health and Safety: Lost-time injury (no permanent disability). Production: One to three months' production loss or expenditure. Cost: $1,000,000 to $100,000,000 damage or additional costs. Environmental Impact/Compliance: Some impairment on ecosystem function. Displacement of species. Moderate short-term widespread effects. Regulatory orders with significant cost implications. Corporate Image: Corporate image tarnished in Nunavut. Community Affairs: Moderate local community concern with potential permanent damage to relations.

(continued)

Table 7.1-2. Consequence Severity (completed)

Consequence	Definition
Minor	*Minor incident or inefficiency that might require engineering review and is easily and predictably remediated.* Health and Safety: Injury (no lost time). Production: Less than one-month production loss or expenditure. Cost: $100,000 to $1,000,000 damage or additional costs. Environmental Impact/Compliance: Minor effects on biological or physical environment. Minor short-term damage to small areas. Corporate Image: Corporate image not affected, written complaint or concern dealt with internally. Community Affairs: Minimal local community concern with no lasting damage to relations.
Insignificant	*Minor incident or inefficiency of little or no consequence.* Health and Safety: No injury or lost time. Production: One to two weeks' production loss or expenditure. Cost: <$100,000 damage or additional costs. Environmental Impact/Compliance: No lasting impacts. Low-level effects on biological or physical environment. Limited damage to minimal area of low significance. Corporate Image: Corporate image not affected or verbal complaint dealt with internally. Community Affairs: No community concern

Risk was derived from the average of probability and consequences. Risks in the highest category are considered non-routine and would receive additional planning, employee training, and management scrutiny as appropriate.

Table 7.1-3. Risk Matrix

	Likelihood				
Consequence	**Rare**	**Unlikely**	**Possible**	**Likely**	**Almost Certain**
Critical	Moderate	Moderate	High	Extreme	Extreme
Major	Low	Moderate	Moderate	High	Extreme
Moderate	Low	Moderate	Moderate	Moderate	High
Minor	Very Low	Low	Moderate	Moderate	Moderate
Insignificant	Very Low	Very Low	Low	Low	Moderate

7.1.1 Risk Mitigation Strategies

Mitigation strategies to reduce the probability and consequences of any accidents and malfunctions include:

- Reducing probability of occurrence of the event (e.g. reinforcement of structures);
- Reducing consequences of the event (e.g., increased setbacks from sensitive sites); and
- Developing system redundancies (e.g., backup systems).

Sabina will implement the following mitigation actions to prevent accidents and malfunctions from occurring and to minimize impacts when such events occur:

- Systematic Risk Assessment Approach
  - The results of hazard identification and risk assessment are the basis for establishing and documenting:
    - Environmental, health, and safety objectives;
    - Environmental, health, and safety performance targets; and
    - Actions to achieve the established objectives and targets.
  - Each hazard classified as representing a priority risk requires an action plan with recommendations to control the risk. Recommendations include consideration for:
    - Operational controls;
    - Training and awareness; and
    - Performance measurement and monitoring.
  - The action plan and recommendations are forwarded to the area management responsible for the follow-up. In all cases, the action plan and recommendations are communicated to the interested and affected employees (and others as required). Typically, the recommendations are implemented in consultation with interested and affected employees (and others as required).
- Employee training programs:
  - Sabina will develop a training program for those involved in handling specific hazardous materials. Training will include safe-work practices, tail-gate meetings, job and task hazard assessments, weekly departmental safety meetings, non-routine task identification and evaluation, handling procedures, spill prevention, and clean-up.
- Inspection and Maintenance Program
  - Sabina will implement routine inspection and maintenance program for its equipment, facilities, and hazardous material storage facilities. Equipment containing hazardous materials will be kept in good repair. Worn or damaged transfer equipment (e.g., valves and hoses) will be replaced or repaired promptly.
- Emergency Response
  - The Plan and SCP (SD-17) will take into account the possible scenarios for major accidents and malfunctions.
  - Suitable spill kits will be maintained at transfer points for hazardous materials.
  - An on-site ERT will be established. The ERT will be trained to respond to likely spill scenarios. Field exercises and classroom training will be undertaken on an annual basis.
  - Detailed procedures for handling and disposal of spill contaminated materials will be developed.
  - Location maps identifying emergency response resources (including spill response kits) will be provided in appropriate future regulatory applications.
- Environmental Monitoring
  - Sabina will develop an Environmental Protection Plan for the Construction Phase;

  - Employees and contractors will receive a site induction program during which they will be made aware of the site environmental sensitivities and reporting requirements for unsafe or hazardous situations.
  - Sabina will employ site-based environmental personnel during Construction to monitor contractor performance to ensure that suitable environmental precautions and standards are being followed.

- Adaptive Management
  - All incidents and accidents will be investigated and reported. Lessons learned from these investigations will inform revisions to work procedures and response techniques.

7.2 NATURAL HAZARDS

The environment has the potential to affect the design, Construction, Operations, and Closure of the Project. Extreme weather (storms, extreme rainfall or snowfall, extreme low temperatures) and geo-hazards (seismicity, ground, and slope instabilities) have the potential to affect Project infrastructure and in turn represent concerns for human safety and the environment. An assessment of risk and identification of mitigation measures associated with effects of the environment on the Project is presented in FEIS Volume 9, Chapter 2, and is summarized below.

The following natural hazards were identified:

- Geotechnical hazards, including:
  - Slope stability;
  - Underground stability;
  - Frost heave;
  - Ice scour;
  - Coastal erosion and sea level trends; and
  - Seismic activity.
- Unfavourable geological conditions;
- Permafrost (thaw settlement and subsidence);
- Hydrological conditions;
- Severe weather events, including:
  - Extreme precipitation events;
  - Extreme temperature; and
  - Snow drifting/banking.
- Sea ice conditions;
- Ice ride-up and pile-up;
- Isostatic rebound; and
- Climate change effects, including:
  - Permafrost changes;

- Hydrological changes;
- Sensitive ecosystem and land features

An engineering hazard analysis was undertaken for each main project component, including the Goose Property, all-weather roads and airstrip, WIRs, and the MLA. Tables 7.2-1, 7.2-2, and 7.2-3 present the results of the engineering hazard for these project components, including a description of the hazard, potential consequences, the likelihood and consequence of an event occurring, and the mitigation measures including engineering design features planned to reduce the likelihood and/or the consequence of the identified natural hazards.

The high consequence natural hazards include thaw-susceptible soils; seismicity; culvert crossing stability; and the stability of pit walls, stockpiles, underground workings and the tailings embankment. The primary mitigation measures for these features have included advancement of geotechnical investigations to date to understand ground conditions and the incorporation of appropriate factors of safety. The proposed design of engineered structures is consistent with appropriately conservative factors of safety applied to other mining projects in the Arctic. Monitoring programs have been identified in other management plans to verify that engineered structures perform as expected.

The potential impacts of climate change on the Project were also considered. This includes an increase in the active layer over time which is relevant to post-closure performance of covers over Waste Rock Storage Areas and the Tailings Storage Facility, as well as increased precipitation. By the year 2100, active layer thickness is estimated to increase 65 cm for natural overburden sand at the Property, and this has been accounted for in the design of engineered covers over potential acid generating and metal leaching materials. The impacts of climate change on the hydrological regime, including freshwater and groundwater regimes, can be considered in the amount of precipitation the area receives. Climate change analysis confirmed that the rate of change of rainfall depth over baseline conditions is expected to be less than 10% by the year 2040, and as such, water management structures were designed with a 10% increased rainfall depth.

Table 7.2-1. Engineering Hazard Assessment – Goose Property

Engineering Hazard	Hazard Description	Potential Consequences	Likelihood	Consequence Factor	Mitigation Measures
Permafrost / Thaw Susceptible Soils	• Construction over ice-rich or thaw sensitive permafrost ground causing technical issues with Project infrastructure foundations. • Problems potentially leading to environmental impacts.	• Heavy structures experiencing creep settlement over ice-rich permafrost. • Thaw weakening of surficial soils causing failure or movement of foundations. • Melting of massive deposits below or adjacent to structures causing settlement or movement.	Moderate	High	• Geotechnical investigations have been progressed. • Where possible, found significant structures on bedrock and locate structures to avoid problem areas. • Excavations in overburden materials and disturbance of natural ground will be avoided where feasible. • If excavation is required, natural materials will be over excavated and backfilled with an insulating cover of thaw stable granular fill materials of a minimum thickness to protect against thaw and instability in the underlying ice-rich overburden soils. • Embankments or granular fill pads will be constructed with side slopes sufficient to protect underlying permafrost. • Design and construct with insulation to control and limit effects of heat and restricted cooling.
Seismicity	• Significant earthquake event subjecting structures to dynamic loading. • Low seismicity of region.	• Pit slope failure. • Failure of WRSA, stockpile or tailings slopes. • Failure of infrastructure.	Low	Moderate to high	• Geotechnical investigations have been progressed. • Concerns mitigated through seismic hazard assessment and understanding load potential. • Side slopes and foundations built to meet seismic design parameters. • Monitoring during operations for indicators of potential problems. • Impact of seismicity on structures in permafrost is low.
Flooding / Hydrology	• Although not expected to have significant impact, runoff and water pooling could impact thermal regime. • Significant runoff event exceeds capacity of service road culverts. • Icing of culverts reduces capacity for normal flows. • Debris build-up causes reduced capacity for flows.	• Surface water induced thermal degradation leading to thaw settlement or weakening of soils/foundations. • Overtopping of roads causing failure and potential downstream sediment issues.	Moderate	Low	• Hydrology baseline studies have progressed. • Where surface water collection or diversion is required, the thermal impact of runoff will be considered. Interception ditches or berms will be employed to redirect surface water flows. Ditches may have to be built by over-excavation and replacement with thaw stable processed rock fill material. • Maintain grading and drainage of all areas near infrastructure. • All culverts designed for 1-in-100-year flood event. • Regular monitoring of culverts to identify icing or other debris blockages.
Open Pit Stability	• Overall slope stability. • Rock fall potential. • Freeze/thaw cycles within the active zone will cause or accelerate the deterioration of the bench faces and increasing the chances of rock falls. • Ground water inflow could have an impact on slope stability. • Open pits could extend close to, or into, talik zones.	• Rock falls, groundwater inflows or an overall slope stability issue resulting in material impacting personnel or equipment working at lower elevations within the pit. • Injury or fatality. • Temporary shutdown of open pit operations.	Moderate	Moderate to high	• Geotechnical investigations have been progressed. • Bench face angles selected to reduce instabilities. • Catch benches incorporated into design to reduce impact of small scale instabilities. • Inter-ramp and overall slope angles selected to achieve target factor of safety against multi-bench or overall slope failures. • Bench maintenance program will include monitoring, scaling, and the cleaning of accumulated debris from the catch benches. • Groundwater inflows have been accounted for in the design when open pits intersect a talik zone. In other areas, inflows are expected to be negligible as a result of permafrost conditions. • Waterbodies that could cause a potential stability impact will be managed early, either through partial dewatering or diversion via temporary berm.
Open Pit Overburden Slope Stability	• Failure of natural overburden slope above open pit. • Piping and undercutting of toe due to groundwater seepage.	• Slope failure could impact personnel or equipment working at lower elevations within the pit. • Thermal degradation could lead to increased sediment reporting to open pit.	Moderate	Moderate	• Geotechnical investigations have been progressed. • Cut slopes designed to address stability issues. • Ice-rich slopes will be protected with thermal or erosion barriers (e.g., rock cover). • Diversion berms may be utilized to control surface run-off where seasonal flows can affect the slope.

(continued)

Table 7.2-1. Engineering Hazard Assessment – Goose Property (completed)

Engineering Hazard	Hazard Description	Potential Consequences	Likelihood	Consequence Factor	Mitigation Measures
Waste Rock Storage Area Stability	• Stability problems associated with waste rock storage and waste overburden material facilities.	• Weakening of thaw sensitive soils during summer dumping. • Weakening of thaw sensitive soils due to surface water flows impacting thermal regime outer-slope failure. • Presence of ice-rich foundations leading to the development of cracks or unstable slopes. • Acid rock drainage.	High	High	• Current design is maximum 2.4:1 side slopes. • PAG waste rock will be placed in a manner to prevent surface permafrost degradation and promote aggregation of the permafrost into the waste rock. • Ground disturbance will be minimized prior to placement of the thermal barrier. Only surface ice and snow to be removed from the footprint during the winter prior to placement of waste rock. • In order to enhance thermal protection, management of WRSA surface runoff will be facilitated through the construction of ditches and/or toe berms. • Ongoing monitoring of slopes. Any cracks that develop will be monitored and repaired as required to minimize inflow of surface water and subsequent ice wedge formation within the WRSAs. • Encapsulate PAG waste materials in NPAG waste rock to maintain frozen state to protect the PAG waste rock from seasonal thawing (i.e. contain the active layer). • Ongoing monitoring of any seepage. • Encapsulate ice-rich materials in waste rock to maintain frozen state and prevent release of sediment. • Annual geotechnical inspections.
Tailings Storage Facility Stability	• Stability problems associated with tailings deposition and storage.	• Slope failure could impact personnel or equipment in the area. • Presence of ice-rich foundations leading to the development of cracks within the rockfill embankments. • Slope failure could lead to uncontrolled release of water and tailings.	Moderate	High	• Geotechnical investigations of foundation ground conditions have been progressed. • Design selected to achieve target factor of safety against partial or overall slope failures during construction and TSF operations. • Maintenance program will include a monitoring and inspection program for settlement or thermal degradation. • TSF current design: 1-in-2,475 year seismic event and 1-in-1,000 flood, 24-hour storm event. • Annual geotechnical inspections.
Underground Stability	• Failure of roof and walls. • Rock falls. • Groundwater inflows.	• Wall failure, rock falls or groundwater inflow could impact personnel or equipment working at depth. • Injury or fatality. • Temporary shutdown of underground operations.	Moderate	High	• Geotechnical investigations have been progressed. • Underground workings have been engineered to address stability. • Ground support will be installed as needed. • Hydrological investigations have been progressed and accounted for in mine design. • Water management systems designed to manage maximum potential inflow rates. • Underground maintenance program will include a monitoring program, scaling, and inflow inspection.
Surface Water Availability	• Insufficient Project surface water available from proposed sources due to reduced precipitation, or increased evapotranspiration or sublimation. • Run-off different than modelled.	• Process chemistry changes causing losses in mineral recovery. • Changes to water management and treatment plan.	Low	Low	• Meteorological and hydrological investigations have been progressed. • Current water management plan accounts for a range of expected precipitation and runoff conditions; changes outside of expected range will be managed by amending water management plan and balancing water supply and demand. • Other sources of surface water can be explored if needed.

Table 7.2-2. Engineering Hazard Assessment – All-weather Roads and Airstrip

Engineering Hazard	Hazard Description	Potential Consequences	Likelihood	Consequence Factor	Mitigation Measures
Permafrost / Thaw Susceptible Soils	• Massive ice or ice-rich soils at depth below higher embankments or in areas of cut. • Thaw sensitive soils near ground surface below low embankments.	• High embankments may experience creep settlement over time. • Settlement or heave of road surface due to thawing and freezing of ice-rich soils; higher risk in cut areas. • Construction disturbance or new ponding of water could impact thermal regime causing settlement, thermokarst development, and potentially impact stability of road. • Poor aesthetics.	Moderate	Low	• Geotechnical investigations have been progressed. • Design embankments with minimum fill thickness for thermal protection and implement flatter slopes in problem areas. • Embankment construction will be employed (i.e. no cuts into permafrost) where road alignment crosses overburden soils to avoid disturbing sensitive soils and surface vegetation. • Maintain grading and drainage from borrow areas and roads. • Runoff and sediment control measures. • On-going inspections and maintenance. • Annual geotechnical inspections.
Seismicity	• Significant earthquake event subjecting structures to dynamic loading. • Low seismicity of region.	• Failure of culvert crossings along road alignment. • Sudden failure of road embankment. • Landslide, overburden/bedrock cut slope instability impacting road. • Liquefaction of clay-rich soils.	Low	Moderate	• Side slopes and surfaces built to meet seismic design parameters. • Use stable fill materials, modern construction practices, and QA/QC procedures. • Monitoring during operations for indicators of potential problems. • Impact of seismicity on structures in permafrost is low.
Flooding / Hydrology	• Significant runoff event exceeds capacity of culverts or other water crossings. • Icing of culverts reduces capacity or normal flows. • Debris build-up causes reduced capacity for flows.	• Overtopping of road leading to operational shutdown, repairs or environmental impacts due to high downstream sediment loading. • Ponded water impacting thermal regime and overall stability of structures.	High	Low to moderate	• Hydrology baseline studies have progressed. • All culverts current design 1-in-100-year storm event. • Regular monitoring of culverts to identify and mitigate risk of icing or other debris blockages.
Road Embankment Stability	• Sudden failure of road embankment due to physical failure of embankment fill or underlying foundations.	• Failure causing operational shutdown. • Costs of repairs. • Environmental impacts due to downstream sediment loading.	Low	Moderate	• All side slopes will be constructed at 2H:1V; safety berms required for embankments higher than 3 m. • Use stable fill materials, modern construction practices, and QA/QC procedures. • Monitoring during construction and operations for indicators of potential problems.
Landform Stability	• Large scale landslide or slope instability outside footprint of road. • Medium or large-scale landslide through embankment footprint leading to subsidence in road bed.	• Sudden failure of road embankment. • Blockage of culverts. • Impact to thermal regime effecting longer term integrity of embankment permafrost foundations. • Temporary shutdown of road operations.	Low	Moderate	• Avoiding areas of major concern. • Monitoring of potential problem areas. • Overall topography is low relief which reduces overall risk.
Culvert Crossing Stability	• Failure of culvert crossing structures. • Abutment failure due to thawed areas or impacts of flows on thermal regime. • Erosion of abutment or foundations by water flows causing failure.	• Failure of culvert crossing causing operational shutdown. • Costs of repairs. • Injury or fatality. • Environmental impacts.	Low	High	• Geotechnical investigations have been progressed. • Design for thermal projection and abutment stability; maximize use of bedrock. • All culverts designed to 1-in-100-year storm event. • Scour protection around abutments. • Monitoring for advanced notification in event of potential failure.

Table 7.2-3. Engineering Hazard Assessment – Marine Laydown Area

Engineering Hazard	Hazard Description	Potential Consequences	Likelihood	Consequence Factor	Mitigation Measures
Permafrost / Thaw Susceptible Soils	• Construction over ice-rich or thaw sensitive permafrost ground causing technical issues with Project infrastructure foundation. • Problems potentially leading to environmental impacts.	• Heavy structures experiencing creep settlement over ice-rich permafrost. • Thaw weakening of surficial soils causing failure or movement of foundations. • Melting of massive deposits below or adjacent to structures causing settlement or movement.	Moderate	Moderate	• Geotechnical investigations have been progressed to understand ground conditions. • Where possible, found most significant structures on bedrock and locate structures to avoid problem areas. • Excavations in overburden materials and disturbance of natural ground will be avoided where feasible. • If excavation is required, natural materials will be over excavated and backfilled with an insulating cover of thaw stable granular fill materials of a minimum thickness to protect against thaw and instability in the underlying ice-rich overburden soils. • Embankments or granular fill pads will be constructed with a side slopes sufficient to protect underlying permafrost. • Monitoring during construction and operations for indicators of potential problems.
Seismicity	• Significant earthquake event subjecting structures to dynamic loading. • Low seismicity of the MLA region.	• Failure of infrastructure or foundations.	Low	High	• Concerns mitigated through seismic hazard assessment and understanding loading potential. • Use stable fill materials, modern construction practices, and QA/QC procedures. • Monitoring during operations for indicators of potential problems. • Impact of seismicity on structures in permafrost is low.
Flooding / Hydrology	• Although not expected to have significant impact, runoff and water pooling could impact thermal regime. • Significant runoff event exceeds capacity of service road culverts (i.e., icing of culverts or debris reduces capacity).	• Surface water induced thermal degradation leading to thaw settlement or weakening of soils/foundations. • Overtopping of roads causing failure and potential downstream sediment issues.	Low	Moderate	• Where surface water collection or diversion is required, the thermal impact of runoff will be considered. • Maintain grading and drainage of all areas near infrastructure. • All culverts designed for 1-in-100-year event. • Regular monitoring of culverts to identify icing or other debris blockages.

Extreme meteorological events that have the potential to affect the Project include:

- Extreme temperature and precipitation events;
- White-out conditions;
- Extreme cold; and
- Shortened winter season.

Extreme temperature and precipitation events were identified in the engineering hazard assessment presented above, and have been incorporated into the engineering design of the Project, as described above and in more detail in Volume 9 of the FEIS.

Despite accounting for extreme meteorological events in the engineering design, high runoff events could potentially lead to elevated flows beyond the capacity of certain hydraulic structures established along road alignments and those within Project areas. There are some minor hydrological risks associated with surface runoff and water pooling that could impact the thermal regime. These risks are further increased by the combination of spring freshet and the potential ice blockage of culverts, which could reduce flow capacity and lead to overtopping and washouts of road sections. This condition may also contribute to high sediment loading to the downstream environment and increased erosion.

The Project will be designed for the cold temperatures experienced in the region. However, persistent extreme cold conditions can present difficult operating conditions in which equipment can be damaged or stop operating, potentially presenting a health and safety risk to workers.

Whiteout conditions offer operational challenges and scheduling impacts. These conditions occur in Polar Regions when illumination from snow on the ground and heavily falling or blowing snow obscures the landscape and reduces visibility. This has a potential to impede all aspects of outdoor operations. In case of whiteout conditions, site safety protocols will be activated to ensure the risks to personnel and operations are mitigated.

The potential changes associated with the timing of ice formation could affect operational components and ongoing field investigations. Although considered manageable, delayed ice formation could potentially impact operational components such as ice-based airstrips and WIRs. A shortened seasonal use of such components could lead to logistical and operational delays associated with transportation of freight and fuel between the Goose Property and the MLA. These risks can be mitigated by construction criteria that address the potential increased temperatures due to climate change. In addition, logistics, planning, and potential equipment fleet adjustments will be implemented to address changes in operational ice road seasons.

Several emergencies resulting from natural hazards such as weather have been assessed as accidents and malfunctions in the following section. This includes weather-related stranding, power outage, and weather-related failures of mine infrastructure.

7.3 ACCIDENTS AND MALFUNCTIONS

Accidents and malfunctions may occur during any phase of the Project. Thus, contingency planning and mitigation measures will be activated in any case where these have the potential to affect human health and the environment during Construction, Operations, or Closure.

The primary environmental concern resulting from accidents and malfunctions is the possibility for spills, release of chemicals, reagents, petroleum products, or process materials onto the land or water. For

example, damage to or malfunction of the wastewater system might result in the release of effluent. Fire presents another risk; this may result from vehicle accidents, damage to electrical systems or accidental explosions.

Shipping presents further risk potential. Ship damage through collision with other vessels or grounding may result in harm to marine life and the coastal environment through possible diesel spills along the shipping route.

7.3.1 Emergency Preparedness and Spill Response Capability - Shipping

The CCG is the lead federal agency for all ship-source spills or pollution incidents in water under Canadian jurisdiction. During the FEIS Final Hearing, the CCG confirmed their ability to implement a consistent approach for responding to marine pollution incidents in all regions of Canada:

> *"…the Canadian Coast Guard is the lead federal agency for all ship-source spills or pollution incidents in waters under Canadian jurisdiction…The Canadian Coast Guard's environmental response program's mission is to ensure an appropriate level of preparedness and response capability for all ship-source and mystery-source pollution incidents in waters under Canadian jurisdiction. To that end, the Canadian Coast Guard implements a consistent approach for responding to marine pollution incidents in all regions of Canada."*[1]

Sabina recognizes our responsibility to manage the risks effectively and to be prepared to respond in the event of a spill. Response to spills that occur during the act of shipping will be covered under the vessel's SOPEP. The SOPEP is a required document that must be reviewed and approved by Transport Canada.

A tremendous amount of attention is paid to emergency preparedness and response to shipping in Canada and particularly in the Arctic waters. Transport Canada has put in place a significant legislative and regulatory framework that apply to all vessels within Canadian waters. Shipping companies bringing goods and fuel to the MLA must remain in compliance with all regulatory requirements at all times.

7.3.2 Emergency Preparedness and Spill Response Capability - Fuel Transfer to Land

The *Canada Shipping Act,* 2001, stipulates that operators of designated oil handling facilities must have an OPEP. An OPEP must be reviewed and approved by Transport Canada.

Spills that occur during the transfer of fuel from a ship in Bathurst Inlet to the Project, MLA Oil Handling Facility will be responded to in accordance with the Transport Canada approved OPEP (FEIS Addendum Volume 10, Chapter 6). An OPEP outlines potential spill scenarios, and provides specific procedures for responding to spills while minimizing potential health and safety hazards and environmental damage. It provides instructions to guide all personnel in emergency spill response situations, defines the roles and responsibilities of management and responders and outlines the measures taken to prevent spills, the related exercise and evaluation programme, and the mechanism for regular updates to the plan.

Several preventive measures are in place to minimize risk of spills during bulk fuel transfer including:

- The bulk fuel storage facility, pipeline and all related equipment and infrastructures are inspected prior to the bulk cargo transfer and the inspection methods are documented as a Standard Operating Procedure.

---

1 Ms. Williston, DFO, on behalf of the CCG, NIRB Final Hearing File No. 12MN036 Transcript, Pg. 1163, Lines 15 to 26; Pg. 1164, Lines 1 to 10

- Complete bulk cargo transfer procedures have been established, a copy of which is found in Annex 5 of the OPEP (SD-18).
- As required by the applicable legislation the ship has a comprehensive SOPEP and a copy of this plan has been reviewed by Sabina.
- In addition to the legislative requirements, the charterer has implemented a shipboard spill response training program and performs routine exercises in spill response operations.
- The ship carries a compliment of spill response equipment as listed in Annex 6 of the OPEP (SD-18) and this equipment is ready at the ship's rail at all times for deployment during cargo operations.
- Sabina oil spill response equipment is on the beach, ready for immediate deployment at all times during cargo operations.
- The workboats and trained responders are available at all times during cargo operations for spill equipment deployment.
- Standard transfer procedures include hourly inspections by workboat of the floating hose for leaks or defects.
- During transfer operations, the shore manifold is manned at all times.
- A low-pressure alarm is installed at the shore manifold that is highly sensitive to differences in pressure during pumping. Any loss in the system will cause a drop in manifold pressure and results in an audible alarm, which is immediately reported by the manifold personnel.
- The bulk fuel storage facility is monitored at all times by Sabina personnel during the transfer.
- The pipeline is inspected hourly on foot during the transfer operation.

For additional information, refer to Table 7.3-3 Mitigation Measures for Identified Accidents and Malfunctions.

7.3.3 Emergency Preparedness and Spill Response Capability - Transport Over Land

Spill response capability during transport over land is addressed in the Fuel Management Plan (SD-16) and an updated SCP (SD-17).

The Fuel Management Plan (SD-16) includes detail on the safe handling and storage of fuel. Specifically, more information has been added to roles and responsibilities (Section 5), potential environmental effects (Section 7.5), environmental monitoring (Section 8) and mitigation and adaptive management (Section 9).

The SCP (SD-17) includes details of emergency response procedures for spills that could occur while transporting bulk fuel over land. Sabina acknowledges that the majority of over land fuel transfer will occur on the WIR; therefore, the approach to spills on snow and ice (Section 8.2.5) are outlined:

> In general, snow and ice will slow the movement of hydrocarbons. The presence of snow may also hide the oil slick and make it more difficult to follow its progression. Snow is generally a good natural sorbent, as hydrocarbons have a tendency to be soaked up by snow through capillary action. However, the use of snow as a sorbent material is to be limited as much as possible. Snow and frozen ground also prevent hydrocarbons from migrating down into soil or at least slow the migration process. Ice prevents seepage of fuel into the water.

Response to spills on snow and ice includes the general procedures previously detailed. Most response procedures for spills on land may be used for spills on snow and ice. The use of dykes (i.e., compacted snow berms lined with plastic sheeting) or trenches (dug in snow or ice) slow the progression of the fuel and also serve as containment to allow recovery of the fuel. Free product is recovered by using a vacuum, a pump, or sorbent materials. Contaminated snow and ice is scraped up manually or using heavy equipment depending on volumes.

Should spills enter waterways beneath ice cover, ice augers and pumps will be used when feasible to recover fuel and other materials under ice. Slots may be cut in ice over slow-moving water to contain oil. Tiger torches may be used to burn the fuel in place, if unrecoverable by other methods and when feasible and safe to do so.

The contaminated snow and ice is placed in containers or within plastic lined berms on land. For contingency purposes, a contaminated snow storage site will to be designated and located in close proximity to each of the main Project work sites to facilitate inspection and monitoring, in an area which will still be readily accessible once it is time to remove the snow (i.e., spring or summer), and at least 31 m away from any body of water or ditch. Once enough snow has melted, the oily water can be removed from the storage site and processed through an oil-water separator that would be mobilized to site. Hydrocarbons recovered will be burned in the camp incinerator or shipped off-site.

A complete list of the accidents and malfunctions assessed in FEIS Volume 9, Section 3 are presented in Table 7.3-1. Accidents and malfunctions have been categorized by Project phase (Mobilization and Construction, Operations, Closure, and/or Post-Closure) and location (Goose Property, MLA, and WIR).

Table 7.3-1. Major Accidents and Malfunctions Summary

Issue of Concern	Location	Mobilization and Construction	Operations	Closure and/or Post-Closure
Diesel spill	GSE, MLA	X	X	X
Fuel spill along shipping route	MLA	X	X	
Fuel spill during ship-to-shore transfer of fuel	MLA	X	X	
Ship grounding	MLA	X	X	
Collision with other vessels	MLA	X	X	
Release of ammonium nitrate or other explosives	GSE, MLA, WIR	X	X	
Spill of hazardous materials	GSE, MLA, WIR	X	X	X
Weather related stranding	GSE, MLA, WIR	X	X	X
Power outage	GSE, MLA	X	X	X
Fire	GSE, MLA, WIR	X	X	X
Explosives accidents	GSE	X	X	
Aircraft incidents	GSE, MLA	X	X	X
Vehicle incidents	GSE, MLA, WIR	X	X	X
Crane incidents	GSE, MLA	X	X	X
All-weather road embankment failure and/or collapse of a water crossing	GSE, MLA	X	X	X

(continued)

Table 7.3-1. Major Accidents and Malfunctions Summary (completed)

Issue of Concern	Location	Mobilization and Construction	Operations	Closure and/or Post-Closure
Winter ice road collapse over water crossing	WIR	X	X	X
Underground mine flooding	GSE		X	
Ground support failure in underground mine	GSE		X	
Underground equipment fire	GSE		X	
Open pit mine slope failure	GSE		X	
Open pit mine flooding	GSE		X	
Open pit mine blasting	GSE		X	
Falls into Pit	GSE		X	X
Waste rock storage area stability	GSE		X	X
Tailings Storage Facility (TSF) slope failure	GSE		X	X
Tailings pipeline leakage	GSE		X	
Extreme storms overtopping and washouts of the TSF and TF embankment	GSE		X	X
Seepage from TSF	GSE		X	
Saline Water Pond slope failure	GSE		X	X
Saline water pipe leakage	GSE		X	X
Extreme storms overtopping and washouts of the saline water pond embankment	GSE		X	X
Failure of contact water containment ponds	GSE	X	X	X
Falls into containment Ponds	GSE, MLA	X	X	X
Failure of Sewage Treatment Plant	GSE	X	X	X
Failure of cyanide destruction process	GSE		X	
Introduction of invasive marine species	MLA	X	X	
Introduction of invasive terrestrial species	MLA	X	X	

GSE = Goose Property; MLA = Marine Laydown Area; WIR = Winter Ice Road

Table 7.3-2 provides a summary of potential Project related effects associated with accidents and malfunctions that may occur during the life of the Project. Mitigation measures designed to prevent such accidents and malfunctions from occurring are noted in Table 7.3-3.

Table 7.3-2. Major Accidents and Malfunctions Risk Summary

Issue of Concern	Consequence	Likelihood	Risk Rating
Diesel spill	Minor	Likely	Moderate
Fuel spill along shipping route	Major	Unlikely	Moderate
Fuel spill during ship-to-shore transfer of fuel	Major	Unlikely	Moderate
Ship grounding	Major	Unlikely	Moderate
Collision with other vessels	Major	Rare	Low
Release of ammonium nitrate or other explosives	Minor	Possible	Moderate
Spill of hazardous materials	Moderate	Possible	Moderate
Weather related stranding	Moderate	Possible	Moderate
Power outage	Minor	Unlikely	Low
Fire	Major	Unlikely	Moderate
Explosives accidents	Major	Unlikely	Moderate
Aircraft incidents	Major	Unlikely	Moderate
Vehicle incidents	Major	Likely	High
Crane incidents	Major	Likely	High
All-weather road embankment failure and/or collapse of a water crossing	Minor	Unlikely	Low
Winter ice road collapse over water crossing	Major	Unlikely	Moderate
Underground mine flooding	Moderate	Unlikely	Moderate
Ground support failure in underground mine	Major	Unlikely	Moderate
Underground equipment fire	Major	Possible	Moderate
Open pit mine slope failure	Major	Unlikely	Moderate
Open pit mine flooding	Minor	Unlikely	Low
Open pit mine blasting	Major	Unlikely	Moderate
Falls into Pit	Major	Possible	Moderate
Waste rock storage area stability	Minor	Unlikely	Low
Tailings Storage Facility slope failure	Moderate	Unlikely	Moderate
Tailings pipeline leakage	Moderate	Possible	Moderate
Extreme storms overtopping and washouts of the Tailings Storage Facility and Tailings Facility embankment	Moderate	Unlikely	Moderate
Seepage from Tailings Storage Facility	Minor	Possible	Moderate
Saline Water Pond slope failure	Moderate	Possible	Moderate

(continued)

Table 7.3-2. Major Accidents and Malfunctions Risk Summary (completed)

Issue of Concern	Consequence	Likelihood	Risk Rating
Saline water pipe leakage	Minor	Possible	Moderate
Extreme storms overtopping and washouts of the saline water pond embankment	Moderate	Unlikely	Moderate
Failure of contact water containment ponds	Minor	Unlikely	Low
Falls into containment ponds	Minor	Unlikely	Low
Failure of Sewage Treatment Plant	Minor	Unlikely	Low
Failure of cyanide destruction process	Minor	Unlikely	Low
Introduction of invasive marine species	Moderate	Possible	Moderate
Introduction of invasive terrestrial species	Minor	Unlikely	Low

Table 7.3-3. Mitigation Measures for Identified Accidents and Malfunctions

Accident or Malfunction Event	Risk Rating	Mitigation Measures / Relevant Management Plan(s)
Diesel spill	Moderate	• Design of fuel storage and handling facilities in accordance with regulatory requirements. • Procedures for on-site refuelling. • Double walled storage with leak protection. • Fuel Management Plan (SD-16). • Hazardous Materials Management Plan (SD-13). • Spill Contingency Plan (SD-17).
Fuel Spill during Ship-to-shore Transfer	Moderate	• Design of fuel storage and transfer facilities in accordance with regulatory requirements. • Procedures for fuel transfers, including ship to shore communications. • Fuel Management Plan (SD-16). • Oil Pollution Emergency Plan (SD-18).
Fuel Spill along Shipping Route	Moderate	• Transport Canada approved shippers with appropriate vessels operating in accordance with the Canada Shipping Act and Arctic Waters Pollution Prevention Act, and respective regulations. • Safety Management System (in accordance with the International Safety Management Code). • Navigation safety measures (equipment, rules and procedures, and communication). • Updated nautical charts and passage plan. • Seafarers certification/crewings. • Double-hauled tankers with anti-collision devices. • Approved Shipboard Oil Pollution Emergency Plan and liability and compensation insurance as required by the *Marine Liability Act*.

(continued)

Table 7.3-3. Mitigation Measures for Identified Accidents and Malfunctions (continued)

Accident or Malfunction Event	Risk Rating	Mitigation Measures / Relevant Management Plan(s)
Ship grounding	Major but unlikely	• Adhere to established shipping lanes. • Equipped with modern navigation equipment.
Collision with other vessels	Low	• Protocols are well established for shipping in the Arctic. Communication with other vessels, surveillance systems, and anti-collision devices are among some of the mitigation measures to avoid collision.
Release of Ammonium Nitrate and Explosives	Moderate	• Use of a licensed explosives contractor with proven arctic experience. • Transport, store, and handle explosive materials in accordance with the *Transportation of Dangerous Goods Act* and regulations, Explosives Act and Regulations, the *Nunavut Mine Health and Safety Act,* and Sabina's Explosives Management Plan.
Spill of Hazardous Materials	Moderate	• Comply with Sabina's Hazardous Materials Management Plan (SD-13), including the Cyanide Management Plan. • Appropriate labeling and handling procedures in accordance with the Workplace Hazardous Materials Information System (WHMIS) and *Transportation of Dangerous Goose Ac*t and Regulations. • Use appropriate personal protective equipment.
Weather Related Standing	Moderate	• Detailed procedures will be established for dispatching of trucks in convoys on WIR. • Position markers to be established along WIR. • Emergency shelters equipped with food, survival equipment, and communication equipment to be established along WIR. • Establish a Working in Isolation Procedure
Power Outage	Low	• Routine equipment maintenance and redundancies • Authorized entry only into electrical rooms • Standby generators linked to system critical facilities (e.g., communications, heat, light, emergency response facilities, and sewage treatment plant) • Procedures for underground power failure (losing ventilation system), including worker notification, stopping use of diesel powered equipment, surface evacuation.
Fires	Moderate	• Follow applicable codes and standards for facilities, including fire and smoke detection systems, fire alarms, and fire suppression systems. • Fire extinguishers throughout buildings and on equipment; fire suppression systems on open pit and underground mining equipment. • Scheduled preventative maintenance of equipment. • Firewater main, hydrant and standpipe system and sprinkler systems servicing the Goose Property. • Sabina's ERT will be trained in firefighting and equipment use.
Explosives Accident	Moderate	• Use of a licensed explosives contractor with proven arctic experience. • Transport, store, and handle explosive materials in accordance with the *Transportation of Dangerous Goods Act* and regulations, Explosives Act and Regulations, the Nunavut Mine Health and Safety Act, and Sabina's Explosives Management Plan.

(continued)

Table 7.3-3. Mitigation Measures for Identified Accidents and Malfunctions (continued)

Accident or Malfunction Event	Risk Rating	Mitigation Measures / Relevant Management Plan(s)
Aircraft Incidents	Moderate	• Sabina will use only well-established and safety-conscious air carriers. • There are extensive safety and preventative maintenance programs which follow federal aviation requirements. • Acceptable provision of marking, lighting, electronic beacons, and weather reporting services defined by consultation with air carriers.
Vehicle Incidents	High	• All access and haul roads will be regularly maintained, with speed limits enforced. • Motor vehicle accidents at the mine site would be dealt with by the mine Emergency Response Team. • Detailed procedures presented in the Road Management Plan (SD-02), Spill Contingency Plan (SD-17), and Fuel Management Plan (SD-16).
Crane Incidents	High	• Sabina will contract a licensed and experienced crane operator. • Establish procedural, operator and rigger and ground worker requirements.
All-Weather Road Embankment Failure and/or Collapse of Water Crossing	Low	• Apply best engineering practices to the design of all-weather road. • Regular monitoring to identify icing or other debris blockages
Winter Ice Road Collapse over Water Crossing	Moderate	• Initial ice profiling prior to initiating road construction to ensure minimum ice thickness is met. • Use light bearing pressure equipment during initial construction. • Incorporate best practices with respect to ice road design and construction (ice profiling, road width, snow bank management, emergency shelters) • Regular inspection and maintenance of the road once constructed.
U/G Mine Flooding	Low	• Mine is in low hydraulic conductivity rock such that flooding is unlikely. • Adequate contingency pumping capacity will be provided.
Ground Support Failure in U/G Mine	Moderate	• Use geotechnical analyses to anticipate poor ground conditions • Adopt proper blasting, backfilling, rock bolting, screening, and concreting practices. • Monitoring and regular inspections by ground control staff.
U/G Equipment Fire	Moderate	• Scheduled preventative maintenance programs • Daily vehicle inspections, including looking for broken or leaking hydraulic or fuel lines. • Extinguishers and automatic fire suppression systems.
Open Pit Mine Slope Failure	Moderate	• Considered unlikely given proper pit design, slope monitoring, and proper pit operation. • Proactive slope monitoring program will be in place for all stages of development at each deposit (may include geotechnical and tension crack mapping and/or surface displacement monitoring). • Integrated mine dewatering and slope depressurization program.
Open Pit Mine Flooding	Low	• Mine is in low hydraulic conductivity rock such that flooding is unlikely. • Diversion of surface waters away from the open pits. • Adequate contingency pumping capacity will be provided.

(continued)

Table 7.3-3. Mitigation Measures for Identified Accidents and Malfunctions (continued)

Accident or Malfunction Event	Risk Rating	Mitigation Measures / Relevant Management Plan(s)
Open Pit Mine Blasting	Moderate	• Possible due to flyrock, lack of blast area security, premature blasting, and misfires. • Good blast design and execution by qualified personnel only. • All employees will be removed a safe distance from the blast area, and all entrances to the blast area will be guarded. • Site-specific blasting plans to match explosives, spacing, hole diameter, etc. with rock characteristics. • Proper communication between driller, blaster, access control guards and other personnel.
Falls into Pit	Moderate	• Use of barriers and operator training.
Waste Rock Storage Area Stability	Low	• Engineered structures with short- and long-term stability analyzed and high factors of safety applied in the designs. • Regular survey of WRSA walls for movement; any unanticipated or unusual observations will be reported and the area secured.
Tailings Storage Facility (TSF) Slope Failure	Moderate	• Design, operation, and monitoring of TSF in accordance with appropriate regulations and industry best practices (i.e., Canadian Dam Safety Association Guidelines). • TSF designed to meet risks presented by high water flows, slope instability, internal erosion, or earthquake. • Dam hazard classification and hazard analysis completed. • Regular survey of TSF embankment for movement; any unanticipated or unusual observations will be reported and the area secured and deposition of water and tailings will cease until stabilized or remedial measures taken.
Tailings Pipeline Leakage	Moderate	• Frequent inspection • Preventative maintenance program. • Processing will be shut down if a leak is detected. • Spill Contingency Plan will be implemented if a leak is detected.
Extreme Storm Causing Overtopping and Washouts of TSF	Moderate	• Natural and engineered controls to ensure TSF is not overfilled. • Design, operation, and monitoring of TSF in accordance with appropriate regulations and industry best practices (i.e., Canadian Dam Safety Association Guidelines). • Use alternate storage facilities if necessary.
Seepage from the TSF	Low	• Seepage collection will be undertaken using a downstream berm. Seepage may be directed to sumps and discharged back to the TSF or to environment, as appropriate.
Saline Water Pond Slope Failure	Moderate	• Natural and engineered controls to ensure pond is not overfilled. • Design, operation, and monitoring of pond embankments in accordance with appropriate regulations and industry best practices (i.e., Canadian Dam Safety Association Guidelines if applicable). • Use alternate storage facilities if necessary.
Saline Water Pipe Leakage	Moderate	• Frequent inspection • Preventative maintenance program. • Processing will be shut down if a leak is detected. • Spill Contingency Plan will be implemented if a leak is detected.

(continued)

Table 7.3-3. Mitigation Measures for Identified Accidents and Malfunctions (completed)

Accident or Malfunction Event	Risk Rating	Mitigation Measures / Relevant Management Plan(s)
Extreme Storm Causing Overtopping and Washouts of Saline Water Pond or Contact Water Containment Ponds	Low to Moderate	• Natural and engineered controls to ensure pond is not overfilled. • Design, operation, and monitoring of pond embankments in accordance with appropriate regulations and industry best practices (i.e., Canadian Dam Safety Association Guidelines). • Use alternate storage facilities if necessary.
Falls into Containment Ponds	Low	• People, animals or vehicles could fall into the containment ponds. • Adequate design of service roads and operator training. • Routine inspections and implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan, if required.
Failure of Sewage Treatment Plant	Low	• Sewage Treatment Plant will be equipped to handle variations in influent characteristics. • Preventative maintenance program. • Monitoring program to detect operational problems. • Back-up power supply in case of failure of main power supply. • Spill Contingency Plan to respond to unplanned discharges.
Failure of Cyanide Destruction Process	Moderate	• Regular monitoring of process water streams and final effluent.
Introduction of Invasive Marine Species	Low	• Ballast water exchange in accordance with the Ballast Water Control and Management Regulations.
Introduction of Invasive Terrestrial Species	Low	• Routine inspections of storage sites at MLA. • Consult with Government of Nunavut and take appropriate species-dependent actions.

8. Emergency Response

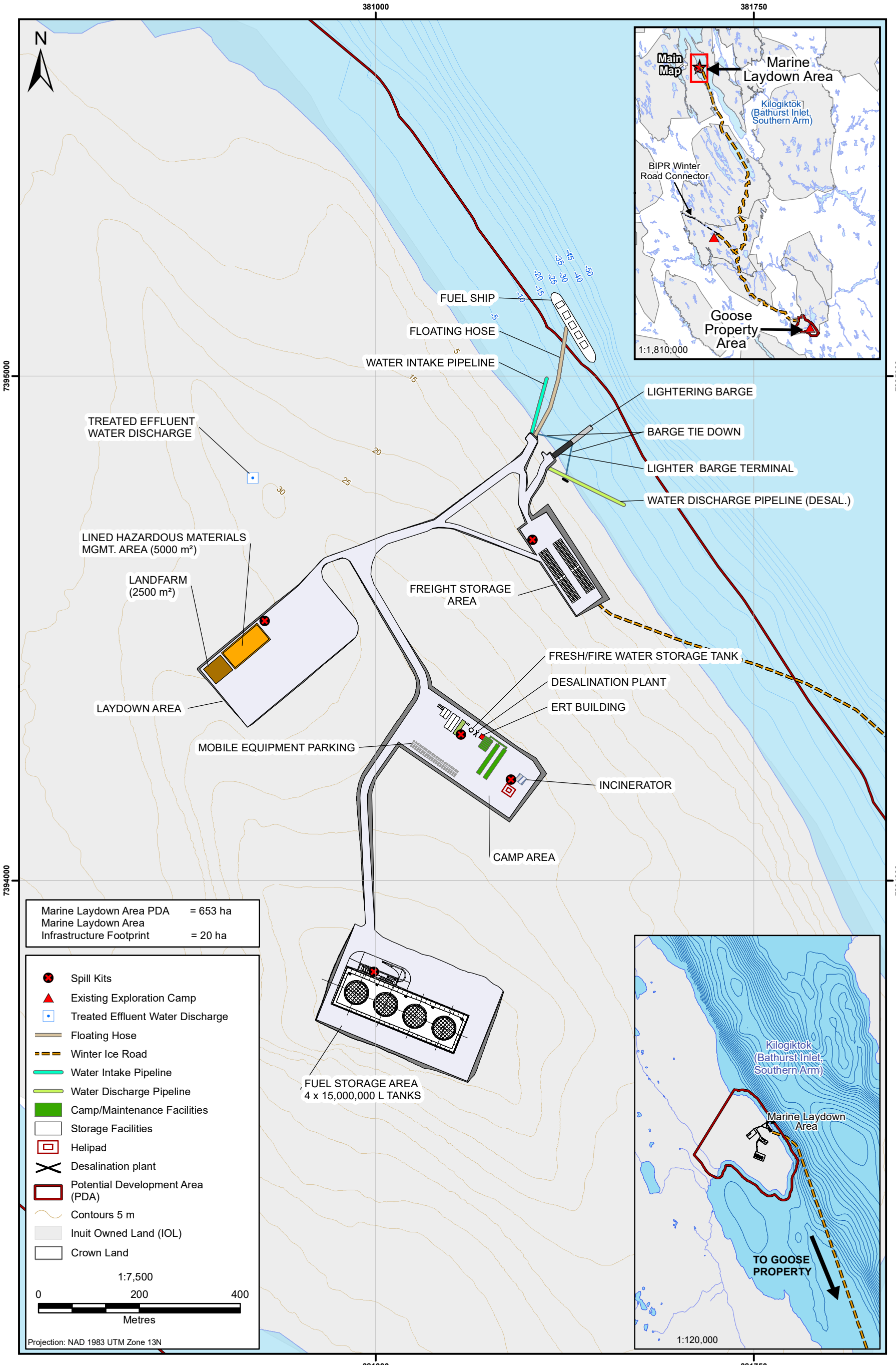
8.1 EMERGENCY RESPONSE EQUIPMENT

Important information will be posted conspicuously throughout the Project area, including:

- Location of emergency response equipment (first aid kits, personal protective equipment, fire protection equipment, spill response kits) and details of proper use.
- Location of Muster Points and First Aid Stations.
- Lists of personnel trained in emergency response procedures (first aid, fire suppression, spill response).
- Outlines of Emergency Response Procedures.
- Emergency contact lists.

The location of emergency response equipment at the MLA, Goose Property, and Goose Plant Site is shown on Figures 8.1-1, 8.1-2, and 8.1-3, respectively.

GIS # BR_NA_tab_MLASiteLayoutERT_WL_A W:\BackRiver\04_Exploration\BackRiverRegion\GIS_Products\ESRI_MXD\Water_Permitting\FINAL FIGURES\BR_NA_tab_MLASiteLayoutERT_WL_A.mxd September 25 2017



NOTE: All roads at the MLA are service roads

Sabina GOLD & SILVER CORP.

Figure 8.1-1

Marine Laydown Area
General Arrangement Plan with Spill Kit Locations

425050 430050 435050

7270500

N

Goose PDA = 5,358 ha
Goose Infrastructure Footprint = 560 ha

Culvert
Spill Kits
Existing Exploration Camp
FEIS_Infrastructure_Points
Underground Portal
10 m Contour Interval
Service Road
Haul Road
Water Diversion Structure
Winter Ice Road
Water Intake Pipeline
Water Discharge Pipeline
Airstrip
Laydown Area
Other Infrastructure
Open Pit
Camp/Plant Site
Ore Stockpile
TSF Containment Dam
TSF South Dyke
Tailings Storage Facility/ Waste Rock Storage Area
Water Management Structure
Landfarm
Tailings Emergency Pond
Flow Direction
Potential Development Area (PDA)
Inuit Owned Land (IOL)
IOL and Crown Land Border
Crown Land

1:32,500
0 0.5 1
Kilometres

Projection: NAD 1983 UTM Zone 13N

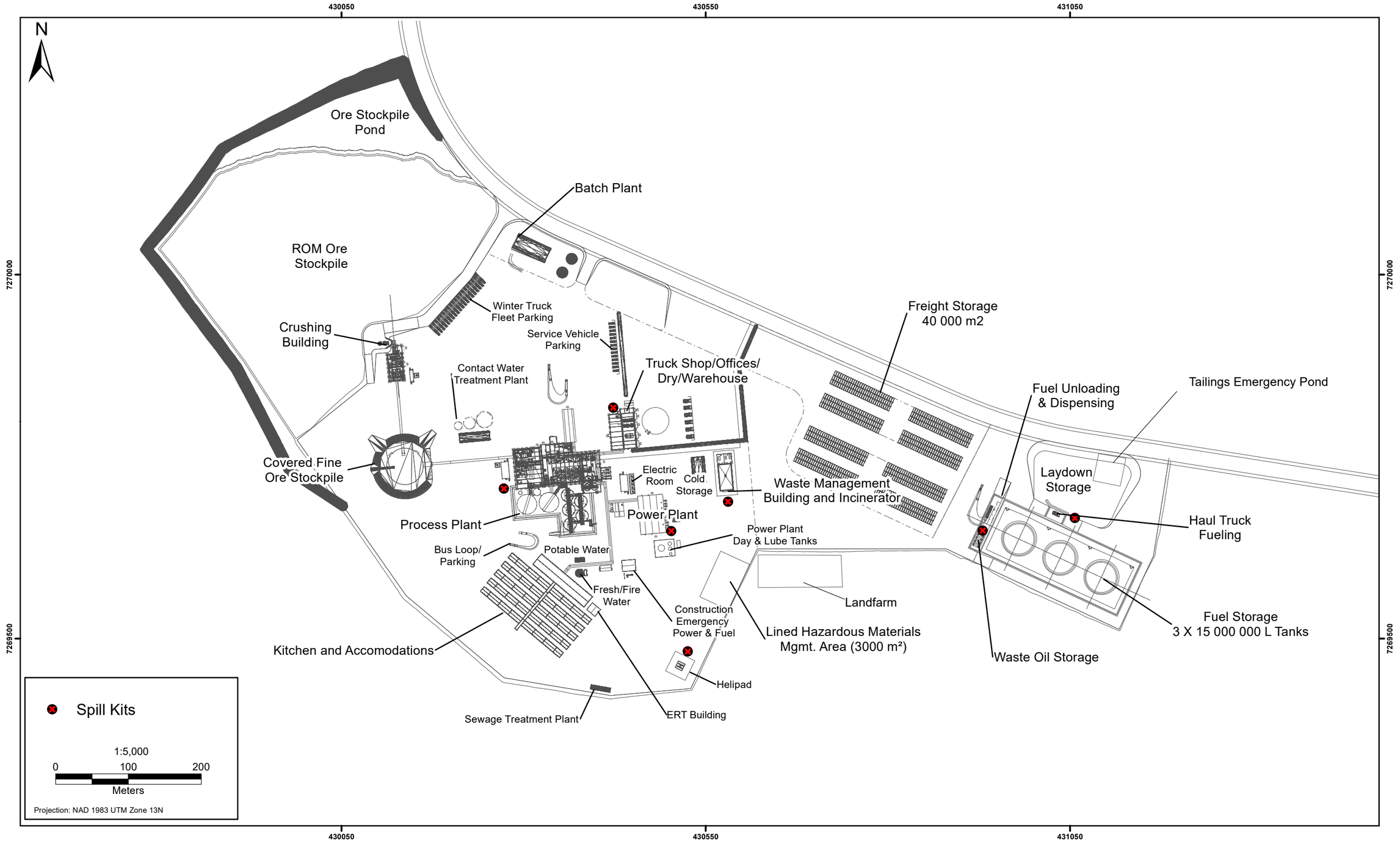
Mam Lake
Llama Lake
Llama Pit
Llama WRSA
Llama Portal
Primary Pond
Pipeline and Access Trail
Saline Water Pond
Water Intake Pipeline
Umwelt WRSA
Umwelt Pit
Umwelt Portal
AN Storage and AN Facility
Cap Magazine
Powder Magazine
Effluent Discharge Pipeline
Ore Stockpile
Landfarm
Goose Plant Site
ERT Building
Treated Effluent Water Discharge
Tahikyuak (Big Lake)
Giraffe Lake
Giraffe Outflow
Attituq (Goose Lake)
Goose Outflow
Tahikafalok Nahik (Propeller Lake)
Water Intake Pipeline
Goose Portal
Goose Main Pit
Echo WRSA
Gander Pond
Airstrip
Echo Outflow
Echo Portal
Echo Pit
Echo Lake
IOL
CROWN LAND
TSF WRSA Pond
TSF/TSF WRSA
Fox Lake
Rascal Lake

TO MARINE LAYDOWN AREA
Goose Property Area
IOL
CROWN LAND
1:270,000

Goose Property
General Arrangement with Spill Kit Locations

Figure 8.1-2

Sabina GOLD & SILVER CORP.



Sabina GOLD & SILVER CORP.

Goose Plant Site Layout with Spill Kit Locations

Figure 8.1-3

8.1.1 Fire Protection Equipment

All work areas will be equipped with proper fire protection equipment and signage will be posted where required. The inspection, and if necessary, testing and maintenance of all firefighting equipment are carried out by a qualified person at least once a month.

All precautions necessary will be taken to prevent fire hazards when working:

- Flammable substances will be managed in accordance with the Fuel Management Plan (SD-16), Hazardous Materials Management Plan (SD-13), and Explosives Management Plan (FEIS Volume 10, Chapter 13).
- All areas will be kept clear of any accumulation of material to enhance safe access and egress in case of emergency.
- Scrap, paper, rags, etc. will be disposed by placing them in proper containers with lids secured.
- Oil and grease spills will be cleaned-up immediately.
- Smoke and carbon monoxide detectors will be located throughout the camp area.
- Air horns and/or sirens will be posted by all building exits for use in alerting others in camp of an emergency situation. Air horn signal will be:
  - 1 long blast = all emergency situations.

8.1.2 First Aid and Medical Equipment

First aid kits will be strategically located in vehicles and all Project sites. They will be stored in marked areas, readily accessible to responders.

Additional medical equipment will be located at the on-site Medical Clinic.

8.1.3 Spill Response Equipment

Available heavy equipment and aircraft will be used as appropriate for emergency use to respond to spill incidents.

Appropriately equipped spill response kits, additional on-site spill response equipment and safety data sheets will be strategically located in vehicles and at all Project sites, especially the active mining areas. A location map is provided in the SCP (SD-17).

A vehicle outfitted with a self-contained collection of spill response materials for rapid deployment to spill sites will be utilized.

Reserve spill response equipment such as booms, socks and pads will be available for response to larger spill incidents, or to replenish materials used in the smaller equipment spill kits. Spill kits will be inspected routinely and restocked after use.

Further information on spill response equipment, including conceptual location maps, is provided in the SCP (SD-17) and OPEP (SD-18).

8.2 COMMUNICATION SYSTEMS

The primary means of on-site communication will be the phone system, hand-held radios, and vehicle radios. The primary means of external communication will be the phone system and stand-alone SAT phones.

Backup power sources and replacement batteries will be available to ensure continuous operation of communication systems.

In an emergency situation the "CAMP" radio channel will be used. The emergency call over the radio is "Code 1, Code 1, Code 1". Once an emergency call is given over the radio, all work must stop and radio silence is initiated. The CAMP channel will be used as the Emergency Channel.

Members of the ERT will be on-call for emergency situations 24 hours a day.

Emergency contact information is provided in Section 6.

8.3 MUSTER POINTS

In the event of an emergency, affected personnel must leave the emergency area and report to pre-determined Muster Points.

Muster Points will be designated based on Feasibility Study designs of the Project site and will be identified in updates on this plan. A map of the Muster Points will be included in the Plan and will be posted around the Project site.

Emergency supplies (sleeping bags, stoves, and food) will be kept at the Muster Points.

8.4 SURVEILLANCE PROCEDURES

Aircraft used to service the Project will be subject to surveillance procedures as specified by Transport Canada and the internal procedures of the contractors supplying the aircraft. Aircraft contractors will provide Sabina with documentation of minimum flying height and seasonal flight restrictions for the Project area.

8.5 EMERGENCY RESPONSE PROCEDURES

The location of an emergency incident, weather conditions, and the time of year will influence the response time and available resources. At both the Goose Property and the MLA, ERT manpower and emergency response equipment will be readily available, and road access around the properties will enable to rapid response to emergencies, and medivac if necessary.

Response to emergencies that occur as a result of Project traffic along the WIR will have varying response time, depending on the distance from nearby vehicles, the distance from the incident location along the WIR from either of the properties, and the weather conditions which could slow the response. Radio communication on the WIR is an important tool for communicating an incident. The time of day will be a factor where helicopter use is required, and weather events such as blizzards could delay response times or the ability to medivac injured personnel.

8.5.1 Medical Emergency

8.5.1.1 On-site Medical Assistance

If the worker is injured but does not require immediate medical assistance or transportation:

- Provide immediate First Aid.
- Make arrangement with supervisor, or other personnel if needed, for transportation of the injured worker to the on-site Medical Clinic.
- Ensure worker's supervisor is informed of the injury to the worker and that they are being transported to the Medical Clinic.
- Worker is to remain at the Medical Clinic until the supervisor arrives.
- The Principal Medical Aide Designee who treated the patient is responsible for filling out the appropriate forms and reports.

If a worker is injured and immediate medical assistance or medivac transportation is required:

- Provide immediate First Aid.
- Call, or send someone else to notify of need for medical assistance.
- Contact the Principal Medical Aide Designee via the hand-held VHF radio on "CAMP" Channel.
- Call: "Medic-Medic-Medic" and provide the following information:
  - "My name is _____; I am located at _____. (State worker's name) has been injured and requires immediate medical assistance." Describe the nature of the injury. Await confirmation that the message was received.
- Once an emergency call is given over the radio, all work must stop and radio silence is initiated. The CAMP channel will be used as the Emergency Channel.
- Stay at the scene:
  - Maintain contact with the Principal Medical Aide Designee if possible.
  - Render First Aid.
  - Post a spotter for direction.
  - If needed, send an escort vehicle to meet the Principal Medical Aide Designee enroute.
- Hand over the care of the patient to the Principal Medical Aide Designee when they arrive and provide assistance.
- The Principal Medical Aide Designee to assume control over the injured worker and further medical response. The Principal Medical Aide Designee will decide on the need for mobilization and transport.
- Logistics and Camp Supervisor to be on standby for instructions regarding medivac, runway preparation, lighting, clearing, etc.

8.5.1.2 Medivac Procedure

If a medical emergency is declared by the Principal Medical Aide Designee, the following will be executed:

- Logistics will be contacted via radio on CAMP Channel, and will be provided the required medical information by the Principal Medical Aide Designee, or their designate.

- Logistics will contact Cambridge Bay Heath Centre (867-983-4500) and inform on-duty nurse of emergency.

  *Important: A doctor must be receiving to initiate the Medivac.

- If Cambridge Bay Health Centre is unavailable, Logistics will call Stanton Hospital in Yellowknife (1-800-661-0867) and inform the on-duty nurse of emergency.
- Provide the following information to the on-duty nurse:

Company	Sabina Gold & Silver Corp.
Project	Back River Project
Camp No.	TBD (Update annually or whenever changed)
Patient Location	Latitude: 65° 32' 42" N Longitude: 106° 25' 43"W
Medicare/Health #	May need to be given at a later time.
# Of Injured Persons	
Patient Information	What happened?
Condition	Conscious or unconscious?
History	Any other known medical conditions
Age of Patient	
Time of Accident	

- Doctor from Cambridge Bay Health Centre will contact a doctor in Yellowknife with the injury details and that they are initiating a medivac.
- Await a call from Cambridge Bay doctor who will provide the name of the receiving doctor in Yellowknife.
- Call Air Tindi to request a medivac plane and provide them with the name of the receiving doctor and a brief incident description.
- Flight Paramedics will call back to have complete incident details; request any medical equipment that is necessary.
- Principal Medical Aid Designee to continue to update Logistics with patient's status and vitals.
- If a medivac is initiated, Logistics to get direction from Air Tindi as to the estimated time of arrival (ETA).
- Logistics to notify the Principal Medical Aide Designee of ETA for the medivac.

Secondary Contacts

If Air Tindi cannot be reached, contact:

- Summit Air 867-873-4464.
- Great Slave Helicopters 1-867-873-2081.

Compromised Air Transportation

Should air transport be unavailable due to weather or daylight hours, the patient will remain on-site at the on-site medical clinic until air support can be provided.

In Case of Death

- Do not move the body unless it would be destroyed by a fire or other hazard.
- Cover the body.
- Contact supervisor.
- Supervisor to call the RCMP, Emergency Response Coordinator, Chief Inspector of Mines.

8.5.2 Fire/Explosion

If a **minor fire** is discovered:

- Sound the alarm (Code 1 call on the radio).
- Where it is safe to do so, on-site personnel will take immediate steps to extinguish small fires. All workers will be trained in use of fire extinguishers.
- If it is safe to do so, shut off equipment, warn others and use the planned escape route.
- In the event of a fire, all workers must report to the primary muster point, if this is not possible report to the secondary muster point.

When approaching a fire:

- Always seek help before approaching.
- Before approaching, be sure to check the extinguisher is charged, and complete a visual inspection for any obvious signs of deterioration to the extinguisher or low pressure.
- Always ensure you keep the fire in front of you and that you have a means of escape. Stay upwind of the fire.
- Use the PASS method when operating a fire extinguisher:
  - **P**ull the pin at the top of the extinguisher. The pin releases a locking mechanism that will allow you to discharge the extinguisher.
  - **A**im at the base of the fire, not the flames. This is important – in order to put out the fire, you must extinguish the fuel. Spraying the fire directly could cause it to spread.
  - **S**queeze the lever/nozzle slowly. This will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.
  - **S**weep from side to side. Using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out, or until all expellant is used.
- Operate the extinguisher from a safe distance, several feet away and then move towards the fire once it starts to diminish.
- Never use a Class A extinguisher on an electrical fire.
- Do not hesitate to leave the area if the fire continues to grow.
- Once the fire is out, don't walk away immediately. Watch the area for a few minutes in case it re-ignites.
- Replace the fire extinguisher with a recharged one.
- Bring the discharged fire extinguishers to the warehouse for recharging.

For a **major fire** that cannot be easily and safely extinguished as described above, sound the alarm and the ERT will be notified and the mine rescue team will be mobilized to respond to the fire.

For emergencies associated with explosives, procedures outlined in the Explosives Management Plan (FEIS Volume 10, Chapter 13) and the explosives supplier's Emergency Response Assistance Plans will be initiated. The explosives supplier's Emergency Response Assistance Plans will be provided in a later update of this plan. This information will be available in later revisions of this plan. Transport Canada's 2016 Emergency Response Guides for explosives (Guide 112) provides the following advice for fighting fires involving explosives:

- CARGO Fire
  - DO NOT fight fire when fire reaches cargo! Cargo may EXPLODE!
  - Stop all traffic and clear the area for at least 1,600 m (1 mile) in all directions and let burn.
  - Do not move cargo or vehicle if cargo has been exposed to heat.
- TIRE or VEHICLE Fire
  - Use plenty of water - FLOOD it! If water is not available, use CO_2, dry chemical or dirt.
  - If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.
  - Pay special attention to tire fires as re-ignition may occur. Stand by, at a safe distance, with extinguisher ready for possible re-ignition.

8.5.3 Air Emergency

As soon as an air emergency is identified the Project Air Traffic Controller or security personnel will notify the ERC who will assess the need for additional emergency response resources.

In the event of a helicopter or plane crash:

- The ERC will contact the RCMP who will establish access and traffic control.
- Medical response procedures will be initiated (Section 8.5.1).
- If required, fire response procedures will be initiated (Section 8.5.2).
- Emergency response personnel will not move debris associated with the wreckage, unless it inhibits passenger rescue.
- The RCMP/Coroner will be responsible for dealing with fatalities.
- Following the emergency response, the ERC will direct the ERT in the investigation and cleanup of the crash site.

8.5.4 Hazardous Material Spill

Spills may result from any of the following situations:

- Leaks or ruptures in tanks, drums or containers;
- Equipment failure including valves, hoses, piping or containment structures;
- Overfilling containers;
- Improper storage;

- Spills during transfer; and
- Accidents during transportation.

Procedures will vary seasonally and be based on the nature of the hazardous material spilled. The applicable safety data sheets will be consulted to ensure that the materials are being handled safely and appropriately. Response procedures specific to land, water, snow and ice are presented in the SCP (SD-17) and the OPEP (SD-18).

All site personnel will be briefed on the procedures to be followed to report a spill and initiate spill response. The following details the steps to be taken in the event of a spill. Steps are listed in order of importance; however, circumstances and conditions may alter the order of these steps to meet a specific situation.

- Source Control:
  - Identify the product and determine the source.
  - Reduce or stop the flow of product without endangering anyone. This may involve very simple actions such as turning off a pump, closing a valve, sealing a puncture hole with almost anything handy (e.g., a rag, a piece of wood, tape, etc.), raising a leaky or discharging hose at a level higher than the product level inside the tank, or transferring fuel from leaking containers.
- Control of Free Product:
  - Prevent or limit the spread of the spilled material.
  - Accumulate/concentrate spilled product in an area to facilitate recovery.
  - Barriers positioned down-gradient of the spill will slow or stop the progression of the spill. Barriers can consist of absorbent booms, dykes, berms, or trenches (dug in the ground or in snow/ice).
- Protection:
  - Evaluate the potential dangers of the spill in order to protect sensitive ecosystems and natural resources.
  - Block or divert the spilled material away from sensitive receptors. This can also be achieved by using various types of barriers.
- Clean up the Spill:
  - Recover and contain as much free product as possible.
  - Recover and containerize/treat contaminated soil, water, and snow.
  - Pressure-wash contaminated bedrock surfaces, shorelines, ice and recover as much as possible oily water for containerization and/or treatment.
- Report the Spill:
  - If the volume or type of spill warrants it, notification must be made as soon as reasonably practicable to the 24-hour Spill Report Line by calling **(867) 920-8130**. Use form NT-NU Interactive spill form. Contact information is also located on the top right corner of the form.
  - Provide basic information such as date and time of the spill, type and amount of product discharged, photographic records, location and approximate size of the spill, actions already

taken to stop and contain the spill, meteorological conditions and any perceived threat to human health or the environment.

Additional details on responding to spills on land, water, snow, and ice, and for specific materials (i.e., fuel, tailings, chemicals, etc.) are provided in the SCP (SD-17) and OPEP (SD-18). The SCP (SD-17) describes Nunavut spill reporting requirements, as well as TDGR reporting requirements (both immediate and follow up reporting) applicable to spills that occur during transport. Information on the storage and more detail on the safe handling of hazardous materials can be found in the Hazardous Materials Management Plan (SD-13). The Hazardous Materials Management Plan (SD-13) identifies hazardous materials types potentially used and or generated during the Construction, Operations, and reclamation and Closure phases of the project, characterizes the potential environmental hazards associated with the proposed materials, assigns responsibilities for the management of hazardous materials, identifies practices for handling, storing, and disposal of hazardous materials at the Back River mine site that are safe, secure, and environmentally sound and confirms conformance with applicable Federal and Territorial regulations.

8.5.5 Natural Hazards

The primary natural hazards potentially affecting the Project include extreme precipitation events (rainfall or snowfall), extreme cold, and geo-hazards (seismicity, ground and slope instabilities). Related to extreme snowfall events is the potential for white-out conditions that reduce visibility to near zero.

Weather events are usually anticipated ahead of time; when these events are known and have the potential to affect operations and worker safety, workers will be notified ahead of time and will be urged to take additional precautions and be aware of the potential for operations to be suspended due to adverse conditions. The following additional measures will be undertaken in regard to natural hazards:

- Extreme rainfall events – Visual inspection of water management facilities and engineered structures will be conducted prior to, during (if safe), and immediately following major rainfall events. Notification will be made to cease pumping of tailings or water if conditions are unsafe.
- Extreme snowfall (potential white-out conditions) – If visibility is deteriorating making work unsafe, workers will notify their supervisor, who will inform the General Manager. Workers will stop work if considered unsafe, and the General Manager will make a site-wide decision on the suspension of work when weather conditions are potentially adverse.
- Extreme cold – Workers will be advised to take additional precautions in the event of extreme cold conditions, or to cease work or change work plans according to the weather.
- Seismic activity – Workers will cease work, seek safe refuge, and implement emergency response measures for natural hazards:
  - Sound the alarm (Code 1 call on the radio).
  - If it is safe to do so, shut off equipment, warn others and use the planned escape route.
  - Workers must report to the primary muster point, if this is not possible report to the secondary muster point.

Ground instability – Incidents related to ground instability could include pit wall, road embankment, ore or waste storage area failures, and underground workings leading to injuries to personnel, damage to equipment and or unsafe conditions. The design of these structures incorporate geotechnical knowledge and engineering best practices to mitigate the risk of ground instability events. In the case of an incident, workers will cease work, seek safe refuge, and implement emergency response measures for natural hazards (see above) as appropriate. A qualified professional will inspect the suspected area to document

the incident and any appropriate corrective and or mitigation measures required. More information can be found in Table 7.2-1.

Natural hazard events may trigger the occurrence of other emergencies (accidents and malfunctions) that will necessitate other emergency response procedures described in this section.

8.5.6 Evacuation

The need to evacuate part of or the entire Project site may result from:

- Extreme weather events;
- Seismic activity;
- Tundra fire;
- Toxic gas release;
- Hazardous material spill; and
- Power outage in extreme cold.

If an evacuation is required:

- All personnel will be under the direction of the ERC.
- All employees will report to the designated Muster Point.
- Supervisors will perform a count of personnel to ensure all are accounted for and call the ERT with the message “All persons accounted for.”
- The ERT will coordinate airplane/helicopter support as required and handle telephone notifications and inquiries.
- The ERT will have the site helicopters stand-by and await instructions. If needed for fighting fires, the ERT will ask to have the Bambi basket ready.
- The situation will be accessed, and personnel will be given instructions for which areas have been cleared and can be used as shelter.
- If required, personnel will be evacuated to Cambridge Bay, Kugluktuk or Yellowknife, where accommodation and any further transport arrangements will be handled by the ERT.

8.5.7 Security

If security is required, contact Cambridge Bay RCMP: 867-983-0123 and if needed Yellowknife RCMP: 867-669-1111.

8.6 MULTIPLE EMERGENCY EVENTS

The potential exists for multiple emergencies to occur simultaneously, or for one emergency to lead to other emergency events occurring. Examples of this could include an extreme precipitation event resulting in an unplanned discharge, slope failure, etc. or a major storm resulting in a vehicle or aircraft collision.

The conduct of risk assessment and the identification of mitigation measures and emergency response procedures is the first defence in preventing multiple emergency events from occurring. The risk assessment ensures that adequate factors of safety are incorporated in the design of embankments, pit and stockpile slopes, and water management features.

Relevant factors of safety implemented into operations includes ceasing operations (mining, WIR construction, and operation) if conditions do not permit the safe continuance of work. For example, WIR dispatch operations will constantly monitor weather and, with the indication of pending adverse weather conditions, will notify operators on the road and prevent additional convoys from entering the road.

A key emergency response measure that minimizes the potential for multiple emergency events from occurring is to immediately communicate an emergency site-wide, and to order cease work orders if appropriate.

In the event of multiple emergencies, all emergency response activities will continue to be coordinated through the ERC, who will designate multiple incident commanders to oversee the response to each individual emergency. Operations will be shut down and all personnel not assisting with response will be on standby, awaiting instructions to assist if necessary.

8.7 FOLLOW-UP TO A SERIOUS INCIDENT

All emergency situations are to be reported to the ERC or designated representative. It is their responsibility to notify Sabina headquarters staff and external parties as outlined in the roles and responsibilities section of this plan (Section 5).

9. Adaptive Management

The RMERP will be reviewed periodically and updated as necessary to incorporate lessons learned from any incidents that may have occurred, amendments to legislation, new characteristics of the sites, the equipment on-site, new policies of the company, environmental issues and to provide updated information on new staff, external contact details, and other changes.

Most important will be the review of aspects of the Plan affecting safety of employees of the facility, contractors, and the general public. Operational aspects of the Plan, as well as any paperwork that deals with the Plan, will be reviewed. All aspects of the Plan will be continuously audited for effectiveness.

The updated version of the Plan will be distributed to regulators. Formal evaluations of the RMERP will be documented, deficiencies noted in the report, and progress in addressing deficiencies tracked in writing. Responsibilities to address deficiencies and accountabilities will be assigned and deadlines for addressing required changes will be set.

10. Record Keeping

An internal log of incidents resulting in a response from the ERT will be kept and maintained by the ERC. The Principal Medical Aide Designee will maintain records of all medical incidents. Each record will include date, location, nature of emergency situation, factors leading to emergency situation, details of response, any negative impact, status of cleanup, and corrective actions taken.

Training records for emergency response personnel and records of emergency response exercises will be kept by the ERT.

A record will document all significant changes that have been incorporated in the RMERP subsequent to the latest annual review. The record will include the names of the persons who made and approved the change, as well as the date of the approval.

Documentation will be maintained in accordance with Sabina's standard operating procedures. All records are available to an INAC Inspector upon request.

11. Loss Prevention

Loss prevention measures are required for a mining development or similar undertaking. Loss prevention practices available to Sabina and other potentially affected parties include:

- Periodic project risk reviews to update Sabina's risk register and related management plans and procedures for the Project.
- Security measures to protect the Project from vandalism and theft.
- Insurance policies to be held by Sabina for liability and loss related to its own operations.
- Insurance policies held by Sabina's contractors related to the services or products provided; this includes marine liability insurance to be held by shipping companies contracted for the Project (see the Shipping Management in FEIS Volume 10, Chapter 15) and others (i.e., explosives contractor, airlines, etc.)
- Compensation programs established under the Inuit Impact and Benefit Agreement covering potential environmental impacts, such as compensation for impacts to wildlife and harvesting.

12. References

BNQ (Bureau de normalisation du Quebec) and the Standards Council of Canada (SCC). 2015. National Standard of Canada CAN/BNQ 2910-500/2015 – Explosives – Magazines for Industrial Explosives. ISBN 978-2-551-25699-0 (PDF). Copyright: BNQ 2015.

CCME (Canadian Council of Ministers of the Environment). 2003. Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (PN 1326). ISBN 1-896997-33-3. Available: http://www.ccme.ca/files/Resources/csm/pn_1326_eng.pdf.

CCME. 2008. *Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil*. Available: http://www.ccme.ca/files/Resources/csm/phc_cws/phc_standard_1.0_e.pdf.

GN. 2010a. *Environmental Guideline for the General Management of Hazardous Waste*. October 2010. Available: http://env.gov.nu.ca/sites/default/files/Guideline%20-%20General%20Management%20of%20Hazardous%20Waste%20%28revised%20Oct%202010%29.pdf. Accessed: October 13, 2015.

GN. 2010b. *Environmental Guideline for Waste Paint*. November 2010. Available: http://env.gov.nu.ca/sites/default/files/waste_paint_2010.pdf. Accessed: October 28, 2013.

GN. 2010c. *Environmental Guideline for Mercury-Containing Products and Waste Mercury*. November 2010. Available: http://www.gov.nu.ca/sites/default/files/mercury-containing_products_and_waste_mercury_2010.pdf. Accessed: October 13, 2015.

GN. 2011a. *Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Disposal Facilities*. April 2011. Available: http://www.gov.nu.ca/sites/default/files/industrial_waste_discharges_2011.pdf. Accessed: October 13, 2015.

GN. 2011b. *Environmental Guideline for Waste Batteries*. January 2011. Available: http://env.gov.nu.ca/sites/default/files/waste_batteries_2011_0.pdf. Accessed: October 13, 2015.

GN. 2011c. *Environmental Guideline for Waste Solvent*. January 2011. Available: http://env.gov.nu.ca/sites/default/files/waste_antifreeze_2011.pdf. Accessed: October 13, 2015.

GN. 2011d. Department of Environment: Environmental Guideline for Waste Antifreeze. January 2011. Available: http://env.gov.nu.ca/sites/default/files/waste_antifreeze_2011.pdf. Accessed: October 13, 2015.

GN. 2012. *Environmental Guideline for Used Oil and Waste Fuel*. June 2012. Available: http://www.gov.nu.ca/sites/default/files/guideline_-_used_oil_and_waste_fuel_final_2012-en.pdf. Accessed: October 13, 2015.

GN. 2014. *Environmental Guideline for Biomedical and Pharmaceutical Waste*. March 2014. Available: http://www.gov.nu.ca/sites/default/files/biomedical_and_pharmaceutical_waste.pdf. Accessed: October 13, 2015.

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).

NRCan. 2013. *Quantity Distance Principles User's Manual*. Retrieved from: http://www.nrcan.gc.ca/explosives/publications/standards/9961.

NRCan. 2014. *Guidelines for Bulk Explosives Facilities Minimum Requirements*. Prepared by the Explosives Regulatory Division Explosives Safety and Security Branch Minerals and Metals Sector, February 2014. Revision # 6. Retrieved from: http://www.nrcan.gc.ca/explosives/publications/9925.

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.

Transport Canada and the U.S. Department of Transportation. 2016. *2016 Emergency Response Guidebook: A guidebook for intended for use by first responders during the initial phase of a transportation incident involving dangerous goods/hazardous materials.*