Atlantic Gold

Appendix L.1

Fifteen Mile Stream Gold Project
Environmental Management System (EMS) Framework Document

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Fifteen Mile Stream Gold Project
Environmental Management System Framework Document

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1.0 INTRODUCTION

The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, (" the Company") in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for the Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during the construction, operation and closure phases of the Project minimize the effects of the mine and promote the protection of the environment and human health.

The Company will implement the EMS consisting of three key elements:

- a series of integrated environmental management plans;
- a formal employee site induction and training program with an environmental awareness and management component; and
- a series of ongoing environmental monitoring programs.

This document provides an overarching framework for the series of management plans that have been developed by the Company to provide guidance for site operation. These plans include information on how the mine's interaction with the environment, including but not limited to the handling of all wastes and water, will be managed during the various phases of mine life, as well as contingencies in cases where unexpected events may occur.

The following Environmental Management Plans (EMP) are being developed in conjunction with the Environmental Impact Statement (EIS) for the Project and form part of the development plan for approval by the federal government under the Impact Assessment Agency of Canada (IAAC) and provincial Government of Nova Scotia. As the Project is currently under development and assessment, the management plans are still being developed and finalized. The EMP that have drafts available for preliminary stakeholders and regulators are attached to this EMS framework, and are denoted as having a draft attached to this document by being identified in bold below:

EMP 1 Environmental Protection Plan

EMP 2 Erosion Prevention and Sediment Control Plan

EMP 3 Acid Rock Drainage Prediction and Mine Rock Management Plan

EMP 4 Historical Tailings and Waste Rock Management Plan

EMP 5 Fugitive Dust Management Plan

EMP 6 FMS TMF Management Plan

EMP 7 Touquoy Pit Integrated Water and Tailings Management Plan

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EMP 18 Explosives Management Plan

EMP 19 Reclamation and Closure Plan

EMP 20 Recovery Plan

EMP 21 Stakeholder Engagement Plan

EMP 22 Indigenous Peoples Engagement Plan

The Company understands that the management plans developed in conjunction with the EMS will be “living documents” and that they, along with their supporting documents, will evolve as conditions change, additional information is collected, and detailed engineering is completed during each phase of the Project. Modifications will likely also be required as a result of adaptive management decisions, or changes resulting from direction received from regulatory bodies.

The Company is committed to an open and transparent process, providing regulatory agencies and interested stakeholders with updates to the Project activities and management plans in annual reports, or in a series of facility-specific or management plan-specific reports, as appropriate. These reports will include monitoring results and progress updates on the Project related terms, conditions and commitments defined under the various permits, licences and other authorizations, as applicable.

1.1 Project Description

The Project is an open pit gold mining and milling operation being developed by the Company and is located at the eastern boundary of Halifax County, central Nova Scotia, approximately 95 km northeast of Halifax and 17 km to the northeast of the Company’s Beaver Dam Project.

Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, is a well-financed, growth-oriented gold development group with a long-term strategy to create a mid-tier gold production group focused on manageable, executable projects in mining-friendly jurisdictions. Its board and management team, with extensive experience in geology, mining and mine development, process and metallurgy and project financing, are currently focused on the development of its project portfolio of advanced gold development properties located in Nova Scotia, Canada.

Operations at the Fifteen Mile Stream (FMS) Mine Site will include mining, crushing, ore processing and concentration, and operation of a waste rock storage area (WRSA), ore stockpiles and a tailings management facility (TMF). Two streams of gold concentrate will be produced at site and transported to the Touquoy Mine Site processing facility for final processing into gold doré bars.

The primary components associated with the Project include the following:

FMS Mine Site

- open pit for extracting ore and waste rock;
- mine site haul roads;

- local traffic bypass roads;
- powerline;
- waste rock storage area (WRSA);
- overburden till piles;
- topsoil and organics storage piles;
- separate run of mine (ROM) stockpile and low grade ore (LGO) stockpile;
- Seloam Brook diversion and diversion berms around open pit;
- crusher and concentrator facilities;
- tailings management facility (TMF); and,
- water management system including water discharge.

Existing Touquoy Mine Site

- concentrate storage;
- gravity concentrate leach reactor;
- Gravity electrowinning cell;
- tailings management facility to store FMS concentrate tailings for 6-12 months; and,
- exhausted pit for remaining FMS concentrate tailings storage.

The FMS Mine Site will have a total disturbed area of approximately 375 hectares (ha). A full project description is available within Section 2.0 of the EIS.

1.2 Purpose and Objectives

This EMS has been developed to act as the primary environmental management tool for all construction, operation and closure works associated with the mine. The primary purpose of the EMS is to provide a reference document that ensures that planned environmental commitments, safeguards and mitigation measures will be implemented, monitored, and improved upon as the Project progresses. The Company will use the EMS, in conjunction with its permits, licences and other authorizations, to manage its regulatory and environmental commitments in an effective manner.

The EMS is comprised of this framework document, supported by a series of stand-alone management plans that contain processes and procedures related to specific areas of interaction between the mine and valued ecosystem components that will be implemented to prevent, minimize and/or mitigate impacts to the environment. The plans are designed to form the basis for more detailed procedures and policies to be developed concurrent with project permitting and associated construction and commissioning phases.

The EMS is based on prevention, minimization, mitigation and management of potential impacts. This document is a management tool to be used as a reference for key aspects of environmental risk assessment and implementation of mitigation measures, responsibilities, reporting procedures and monitoring and compliance checks.

Key objectives of the EMS are to develop a process whereby the Company will:

- Establish its commitment to prevent or minimize adverse environmental effects;
- Prevent or minimize downstream impacts to surface water and groundwater quality due to mining activities;
- Achieve a no net loss of fish and fish habitat through protection, mitigation and habitat compensation;
- Minimize point source and fugitive air emissions through the use of appropriate air emissions control systems and fugitive dust control measures;
- Minimize land disturbance and practice progressive reclamation to reduce impacts on wildlife and habitat;
- Review activities during construction, operation, decommissioning and reclamation, and identify those that have an impact on the environment; and
- Put programs in place to prevent, eliminate or minimize these impacts.

The EMS will be used to identify actions that the Company will need to undertake to improve its efforts to minimize impacts on the environment. The environment is defined as the surroundings within which the Project will operate, including air, water, land, natural resources, flora, fauna, humans and their interrelationships. Where appropriate, meaningful targets and/or performance indicators will be set for specific environmental components and monitoring programs will be implemented to measure whether these targets are being met.

1.3 Regulatory Context

Federal approval for the development of the Project is required under *CEAA 2012*, and Provincial approval from Nova Scotia Environment is required under the NS Environment Act Environmental Assessment Regulations.

The Project Description was submitted to IAAC (previously CEAA) and the Government of Nova Scotia in May 2018.

The federal, provincial, and municipal regulatory framework outlines requirements for the EA process, the permits required for construction, operation and reclamation, and the conditions under which the Project will be operated. General legislation that may be applicable to the Project is outlined in Table 1.3-1.

Table 1.3-1 Legislation Potentially Applicable to the Project

LEGISLATION	Physical Activity and/or Trigger	Regulatory Authority
Federal		
CEAA 2012	Assessment due to the construction, operation, decommissioning of a gold mine with an ore production capacity greater than 600 tonnes per day.	IAAC
Fisheries Act	Potential authorization and compensation due to physical activities in wetlands, watercourses, and water bodies.	DFO
Metal and Diamond Mining Effluent Regulations	Mine effluent regulation and environmental effects monitoring program due to mining effluent discharge to aquatic habitat.	ECCC
Migratory Birds Convention Act & Regulations	Potential authorization due to physical activities potentially relocating birds and destroying their habitat.	ECCC
Species at Risk Act	Potential authorization due to physical activities potentially impacting SARA listed species and/or their habitat.	DFO/ECCC

Table 1.3-1 Legislation Potentially Applicable to the Project

LEGISLATION	Physical Activity and/or Trigger	Regulatory Authority
Canadian Navigable Waters Act	Potential authorization due to physical activities, diverting water or activities that may interfere with navigation on non-scheduled waterways. Requirements to be ascertained following submission of a Notice of Work.	TC
Canadian Environmental Protection Act	Promotes sustainable development through pollution prevention and the protection of the environment and human health from risks associated with toxic substances.	ECCC
Transportation of Dangerous Goods Act	The movement of dangerous goods to, from, and within the site must comply with applicable regulations.	TC
Provincial		
Environment Act – EA Regulations – Schedule A	Assessment due to the construction, operation, decommissioning of a facility that extracts or processes metallic or non-metallic minerals.	NSE
Environment Act – Activities Designation Regulations	Industrial Approval for the construction, operation, or reclamation of a surface mine using explosives and procuring mineral bearing ore.	NSE
Environment Act – Activities Designation Regulations	Water approval and/or notification for water withdrawal, alteration of water bodies, watercourses, and/or wetlands.	NSE
Environment Act – Air Quality Regulations	Ambient air quality standards for baseline environmental conditions discussion.	NSE
Special Places Protection Act and Regulations	Authorization required prior to conducting intrusive archaeological work.	NSCCH
Wildlife Act	Prohibits taking, hunting, killing or possessing eagles, osprey, falcons, hawks, owls, and any other protected wildlife.	NS&LF
Endangered Species Act	Prohibits killing, injuring, disturbing, taking, or interfering with endangered or threatened species and/or their habitat.	NS&LF
Mineral Resource Act	Providing a framework for efficient and effective mineral rights administration	NS&LF
Crown Lands Act	Crown Lands Lease due to new haul road construction being located on Crown Lands.	NS&LF
Municipal Government Act	Authorizes municipalities to develop Municipal Planning Strategies and Land Use By-laws.	NSDMA
Municipal		
National Building Code of Canada	Approval for construction and occupation of buildings.	HRM

Construction, operation and reclamation of the Project will also be directed by a variety of guidelines, policies, and best management practices that may be applicable during the design, construction, operation, and reclamation phases. Some of those that may potentially be applicable to the Project are listed below.

Federal

- Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FWAL) (CCME 1999a);
- CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME 1999b);
- CCME Canadian Sediment Quality Guidelines for the Protection of Aquatic Life (CCME 2001);
- CCME Canada Wide Standards for Particulate Matter (PM) and Ozone (CCME 2010);
- Environmental Codes of Practice for Metal Mines (ECCC 2009);
- Guidelines for the Assessment of Alternatives for Mine Waste Disposal (ECCC 2011);
- Streamlining the Approvals Process for Metal Mines with Tailings Impoundment Areas (ECCC 2012);
- Guidance Document for Flow Measurement of Metal Mining Effluents (ECCC 2001);
- Guidance Document for Sampling and Analysis of Metal Mining Effluents (ECCC 2002);
- Federal Environmental Quality Guidelines (FEQG); for Cobalt. May 2017. (ECCC2017a);
- Fisheries Protection Policy Statement (DFO 2013a);
- Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting (DFO 2013b);
- Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012: Interim Technical Guidance (CEAA 2018);
- Guide for Reporting to the National Pollutant Release Inventory (NPRI) 2016 and 2017 (ECCC 2016a); and
- Federal Policy on Wetland Conservation (ECCC 1991).

Provincial

- Guidelines for Environmental Noise Measurement and Assessment (NSE 1990);
- Toward a Greener Future: Nova Scotia's Climate Change Action Plan (NSE 2009a);
- Guide to Consider Climate Change in Project Development in Nova Scotia (NSE 2011a);
- Nova Scotia Wetland Conservation Policy (NSE 2019);
- The Path We Share: A Natural Resource Strategy for Nova Scotia 2011-2020 (NSDNR 2011);
- Water for Life: Nova Scotia's Water Resource Management Strategy (NSE 2010a);
- Environmental Quality Standards (NSEQS) for Contaminated Sites (Tier 1) for Groundwater, Surface Water (fresh water), Soils and Sediment (NSE 2013b);
- Remediation Levels Protocol. Table 3, Pathway Specific Standards for Groundwater (NSE 2013a);
- Nova Scotia Standard Specifications: Highway Construction and Maintenance (NSTIR 1997);
- Erosion and Sediment Control Handbook for Construction Sites (NSE 1988);
- Guide to Altering Watercourses (NSE 2015a);

- Nova Scotia Watercourse Alterations Standard (NSE 2015b);
- Generic Environmental Protection Plan for Construction of 100 Series Highways (NSTIR 2007);
- Storm Drainage Works Approval Policy (NSE 2002a);
- Pit and Quarry Guidelines (NSDEL 1999);
- Blasting Safety Regulations made under Section 82 of the Occupational Health and Safety Act S.N.S. 1996, c. 7 O.I.C. 2008-65 (February 26, 2008, effective April 1, 2008), N.S. Reg. 89/2008 as amended by O.I.C. 2013-65 (March 12, 2013, effective June 12, 2013), N.S. Reg. 54/2013;
- Air Quality Regulations (NSE 2007); and
- Greenhouse Gas Emissions Regulations (NSE 2018).

Municipal

- Musquodoboit Valley/Dutch Settlement Municipal Planning Strategy (HRM 1996a);
- Musquodoboit Valley/Dutch Settlement Land Use By-law (HRM 1996b);
- Eastern Shore (East) Municipal Planning Strategy (HRM 1996c); and
- Eastern Shore (East) Land Use By-law (HRM 1996d).

2.0 ORGANIZATION AND IMPLEMENTATION

2.1 Organization of Document

This EMS sets out the structure and framework for the management of potential environmental impacts associated with the Project and is broad and conceptual given the current phase of the Project. The EMS and supporting management plans are considered to be "living documents" that will be continuously improved through amendments and updates, as appropriate, in response to new information, adaptive management, detailed design, and changes in regulation and scientific knowledge.

Following detailed design and prior to construction and operation, the Company will prepare detailed, functional operating procedures and outline Best Management Practices (BMPs) to be adhered to for each activity during the relevant stage of the Project. Detailed plans for closure and site reclamation will be prepared prior to closure, and will be based on then current regulations and environmental management measures and in accordance with IA requirements. The purpose of this section of the EMS is to provide the framework within which individual management plans will be implemented, maintained, and revised as necessary.

2.2 Risk Assessment

Construction and operational activities can create circumstances that may cause an environmental impact. The environment is comprised of the surroundings in which the Project will operate, including air, water, plants, animals, resources, and existing infrastructure. An environmental impact is an observed change to the environment, either adverse or beneficial and either direct or indirect.

The relationship of aspects and potential impacts is one of cause and effect: the process of identifying potential impacts is one of progressively breaking down work activities into environmental aspects. Any work, activity, product or service that interacts with its surroundings will have an environmental aspect. Impacts will depend on the sensitivity of the receiving environment and the scale of the environmental aspect. Each of the component plans of this EMS will identify and describe the environmental aspects and potential impacts of activities in each stage of project development pertinent to the scope of the plan. Risk assessment is an inherent aspect of project design and management.

2.3 Responsibility

The Company has the obligation of ensuring that all commitments are met and that all relevant obligations are made known to site contractors during the construction phase, as well as all mine personnel during the operations and closure phase. A clear understanding of the roles, responsibilities, and level of authority that employees and contractors have when working at the mine site is essential to meet the objectives of the EMS.

The Company employs a qualified person as an Environmental Manager (EM) who will ensure that throughout the construction period the EMS requirements are established, implemented and maintained, and that performance of the plan is reported to management for review and action. The EM is responsible for retaining the services of qualified persons or professionals with specific scientific or engineering expertise to provide direction and management advice in their areas of specialization. All documentation associated with the EMS will clearly state who is responsible for ensuring the defined requirements are fulfilled.

During the construction period, the Construction Manager and individual Site Contractors will be responsible for ensuring that impacts are minimized and environmental obligations are met during the construction phase.

The Company will maintain overall responsibility for management of the construction and operation of the mine, and will therefore be responsible for establishing employment agreements for employees and contractors, communicating environmental requirements to them, and conducting periodic reviews of performance against stated requirements.

The EM will ensure that commitments and obligations are being met during the construction phase. The EM will be responsible for ensuring that construction activities are in accordance with the objectives of the EMS and associated plans. The EM will be responsible for reporting non-compliance to the contractor, the Company and regulatory agencies, where required. The EM will have the authority to stop any activity that is deemed to pose a risk to the environment; work will only proceed when the identified risk has been addressed and concerns rectified.

Environmental management during operation of the Project will be integrated under the direction of the EM who will liaise closely with Operations Managers and will report directly to the Project's General Manager. The EM will be supported by the Company Corporate Office in order to provide an effective and integrated approach to environmental issues and to ensure adherence to corporate environmental standards. The site EM will be responsible for development of the final operations EMS and for the implementation of the management plans. Department heads (e.g., mining, milling, and plant services) will be directly responsible for implementation of EMS relevant to their areas. All employees and contractors are responsible for daily implementation of the practices and policies contained in the EMS.

2.4 Adaptive Management

The EMS will be developed using an adaptive management philosophy, whereby it will be periodically reviewed and revised, as warranted, to accommodate new information or scientific knowledge, new or amended legislation, industry standards, conditions of required approvals or authorizations, and changes to the project design or development schedule.

Management plans will be implemented during project development and monitoring will be initiated following implementation to assess whether management plans are working as designed. Monitoring programs will be designed to assess the effectiveness of the mitigation measures and changes to any environmental media that may be affected by project activities. If impacts are noted, additional mitigation measures will be implemented and the applicable management plan revised to reflect these required measures.

3.0 COMPONENT PLANS

The following provides a summary of the component EMP that have been developed in conjunction with the EIS for the Project and form part of the development plan for approval by the federal government under *CEAA 2012* and by Nova Scotia under the Environmental Act. These plans are currently in draft form, and based upon feedback from regulators, stakeholders and staff these plans will be revised and finalized after receipt of the Industrial Approval and other authorizations and prior to site construction being undertaken.

3.1 Environmental Protection Plan (EMP 1)

The Environmental Protection Plan (EPP) will be developed as the permit and environmental assessment conditions are finalized. The general purpose for an EPP is to provide a single document to facilitate field implementation of permit requirements, regulations and procedures required at site to minimize environmental impacts as a result of the project. As such, the objectives of the EPP are as follows:

- Provide a reference plan to ensure that commitments to minimize environmental effects will be met;
- Document environmental concerns and ensure appropriate protection measures are implemented;
- Provide concise (short and clear) instructions to project personnel regarding measures for protecting the environment and minimizing environmental effects;
- Provide a reference document for personnel when planning and/or conducting specific activities and working in specific areas;
- Provide for a training aid during implementation efforts;
- Communicate changes in the program through the revision process; and
- Provide a reference to applicable legislative requirements and guidelines.

3.2 Erosion Prevention and Sediment Control Plan (EMP 2)

The Erosion Prevention and Sediment Control Plan is a living document whereby the Company will continue to review and identify potential sediment sources and implement appropriate control measures.

The erosion and sediment control plan will include, but not be limited to:

- Use of sediment and erosion control prevention techniques, material and equipment;
- Control strategies for on-site water, and off-site water as it pertains to the project area, for each mine feature including diversion ditch designs and sediment control ponds;
- Sediment and erosion control procedures around fish-bearing waters during installation of any road crossings;
- Delineation of potential erosion control areas of concern;
- Restoration of erosion control areas of concern;
- Contingency and response plans; and,
- Monitoring and surveillance program.

The plan will be updated in conjunction with detailed project design and all necessary sediment and erosion control mitigation measures will be in place and operational in conjunction with site-specific construction activity.

3.3 Acid Rock Drainage Prediction and Mine Rock Management Plan (EMP 3)

The purpose of this Acid Rock Drainage Prediction and Mine Rock Management Plan is to provide the initial framework for the proposed Project for managing the possible effects that may result from the extraction, processing and disposal of waste rock, low grade ore, overburden, and tailings during the various phases of the Project, by outlining the operating procedures and preventive measures for achieving effective management of potential Acid Rock Drainage. This plan will be developed and implemented prior to project implementation.

3.4 Historical Tailings and Waste Rock Management Plan (EMP 4)

Nova Scotia has a rich history of gold mining in the area of the Project, dating back to 1800s. As a result of these historical mining practices, historical tailings which contain elevated concentrations of mercury and arsenic are located near surface in a variety of areas on site. The historical tailings management plan has the following objectives:

- Provide a framework of permit conditions related to historical tailings;
- Provide historical context and information for site staff;
- Provide a framework for site staff to identify and report historical tailings if encounter during operations;
- Illustrate the current understanding of historical tailings rich locations on site to inform site development; and,
- Describe recommended action levels, known backgrounds and procedures for the identification, removal and secure disposal of historical tailings.

3.5 Fugitive Dust Management Plan (EMP 5)

The purpose of the Fugitive Dust Management Plan is to identify potential sources and where necessary, plan for and implement mitigation measures to reduce fugitive dust emissions associated with mining and related activity during all phases of the Project. Minimizing fugitive dust emissions at the source will have a combined benefit of protecting the health and safety of workers on site and enhancing aesthetics, as well as protecting the environment and minimizing long-term impacts associated with the Project.

3.6 FMS Tailings Management Plan (EMP 6)

The FMS Tailings Management Plan outlines the specific strategies to responsible manage tailings produced by the Project. The Project will generate tailings that will be stored in a TMF, located to the east of the Open Pit, adjacent to the Plant Site.

The primary objectives of this plan include ensuring the long-term physical and chemical stability of the tailings and preventing contamination of groundwater and surface waters proximal to the TMF. This plan outlines the:

- Applicable legislation and guidelines;
- The design basis and operating requirements of the TMF;
- Environmental protection measures to be implemented;
- Proposed monitoring to confirm the effectiveness of the mitigation strategies; and,
- The responsibilities of the Company and its contractors

3.7 Touquoy Pit Integrated Water and Tailings Management Plan (EMP 7)

The Touquoy Pit Integrated Water and Tailings Management Plan provides a framework for the site management of tailings and water at the Touqouy Mine site, including tailings coming from the FMS project. The principle objectives of this plan are:

- To provide a framework for understanding the integrated nature of water flow and tailings deposition on site;
- To outline and provide an understanding of the water management on site (including modelling); and
- Outline the future development of water management and tailings deposition planned at Touqouy as a result of the FMS project.

3.8 TMF Operation, Monitoring and Surveillance Manual (EMP 8)

The purpose of the TMF Operation, Monitoring and Surveillance manual, when developed, is to provide a single location where site staff can compile the operational considerations and instructions for undertaking monitoring and equipment operation while on site, specifically relating to the TMF. This plan will reference other appropriate EMPs as required to ensure staff are aware of the broader context. The objectives of this plan are to define and describe the following:

- Roles and responsibilities of personnel assigned to the TMF;
- Procedures and processes for managing change;
- The key components of the facility;
- Procedures required to operate, monitor the performance of, and maintain the facility to ensure that it functions in accordance with its intended design and design criteria, meets regulatory and corporate policy obligations, and links to emergency planning and response; and,
- Requirements for documentation of the performance of the facility.

3.9 Surface Water and Groundwater Management and Contingency Plans (EMP 9)

The purpose of the Surface Water and Groundwater Management and Contingency Plans are to establish a long-term water management strategy that includes the management of water resources, a mitigation plan to reduce potential effects to water resources, and an effects monitoring plan to monitor water resources in the receiving environment throughout the life of the Project.

3.10 Health and Safety Plan (EMP 10)

The purpose of the Health and Safety Plan is to provide a plan for all employees that will help control health and safety risks during company activities and operations. The plan will be the guide for health and safety culture on site, and will integrate with the goal of having an accident free and healthy workplace. The following are items that will be included in this plan, which is being developed in conjunction with the project:

- Outlining applicable policy and legal requirements;
- Providing clear health and safety objectives and targets;
- Safety procedures, including hazard identification and reporting;

- A framework for safety training and monitoring;
- A reporting and responsibility structure for incidents and incident prevention, auditing and reporting; and,
- EHS communication procedures, both internal and external.

3.11 Emergency Response Plan (EMP 11)

The Emergency Response Plan (ERP) has been designed to coordinate and effectively respond to any and all mine emergencies. The goal of the ERP is:

- To ensure and maintain a high standard of emergency response training for mine personnel;
- To identify and ensure adequate resources are available on-site and off-site in order to facilitate effective emergency response;
- To introduce and train management in the roles of the “Control Group”; and,
- To introduce and train all workers in the relevance of the Mine Emergency Response Plan.

3.12 Wildlife Monitoring and Management Plan (EMP 12)

The primary goal of the Wildlife Monitoring and Management Plan is to minimize impacts on wildlife in the project area, with particular reference to focal species of interest (Valued Components) and Species at Risk.

The Wildlife Monitoring and Management Plan will provide:

- Details on best management practices and policies to be followed during construction and operation;
- Employee education requirements and programs;
- Detailed monitoring and reporting plans;
- Provision for adaptive mitigation responses to monitoring results;
- Ongoing consultation with management agencies and stakeholders; and,
- Preliminary recommendations for consideration during reclamation.

3.13 Archaeological and Cultural Heritage Resources Management Plan (EMP 13)

The Archaeological and Cultural Heritage Resources Management Plan will be developed to identify and protect historic archaeological and heritage resources that may be potentially encountered during construction and development of various components of the Project. The focus of this plan is to identify monitoring requirements during the construction and operating phases of the Project and provide detailed procedures for identification and protection of any archaeological or heritage resources that may be present in the Project area.

Components of this plan include:

- education and awareness training;
- archaeological monitoring during construction and relevant BMPs; and,
- managing potential archaeological discoveries.

3.14 Hazardous Material Management Plan (EMP 14)

The purpose of the Hazardous Material Management Plan is to outline practices and procedures for the storage and handling of chemicals and substances that are classified as or are deemed to be potentially hazardous (including toxic) that are planned for use during the life of the Project. These substances will be regarded in terms of both health and safety and the environment. Transportation, storage, use, and disposal are considered in terms of both the safety of the workers and surrounding communities during all stages of the Project.

The Plan includes activities during operations, maintenance, shipping/receiving, and purchasing, by mine employees and contractors during all stages of the Project life. This plan briefly describes the storage and handling of the identified chemicals and substances. Workplace Hazardous Materials Information System (WHMIS) and Materials Safety Data Sheets (MSDS) systems will be used to screen and classify materials.

3.15 Solid Waste Management Plan (EMP 15)

The Solid Waste Management Plan outlines the practices and procedures for handling of non-hazardous waste, including kitchen, sewage, and general site waste, as well as non-hazardous industrial wastes, including inert bulk wastes but not including wastes generated by mining (overburden rock) and processing (tailings), which are covered under the mine plan and TMF design as approved under the Industrial Approval. Provisions for the handling of hazardous wastes are provided under the Hazardous Material Management Plan (EMP 14), Petroleum Management Plan (EMP 16) and Explosives Management Plan (EMP 18).

3.16 Petroleum Management Plan (EMP 16)

The Petroleum Management Plan outlines systems and procedures for minimizing risks and environmental impacts associated with the transportation, transfer, dispensing, and storage of petroleum-based fuel products during construction, operation, decommissioning, and closure phases of the Project.

Spill response procedures for fuel products are described in more detail in the Spill Contingency Plan (EMP 17).

3.17 Spill Contingency Plan (EMP 17)

The Spill Contingency Plan has been designed to coordinate and effectively respond to any and all spill of potentially deleterious substances. The goal of the Spill Contingency Plan is:

- To ensure and maintain a high standard of spill response training for mine personnel;
- To identify and ensure adequate resources are available on-site and off-site in order to facilitate effective spill response, and ensure adequate worker training has been undertaken; and
- Provide a clear of understanding of the external and internal response structure, including the required notifications to the Company and other regulators and stakeholders.

3.18 Explosives Management Plan (EMP 18)

The intent of the Explosives Management Plan, when developed, is to ensure explosives are transported, stored, handled and used in a safe and secure manner to not cause unintended negative effects. The objective of the Plan is to have no accidental release to the environment and cause no accidental harm to property or persons.

3.19 Reclamation and Closure Plan (EMP 19)

The conceptual Reclamation and Closure Plan will be developed to meet the following general objectives:

- To reclaim the land surface to an end land use that considers previous and potential uses;
- To achieve an overall average land ecological capability on the lands to be reclaimed that is not less than the average that existed prior to mining, unless that land capability is not consistent with the targeted end land use;
- To reclaim the land, watercourses and access roads in a manner that ensures long-term stability; and,
- To ensure ground and surface water quality and soil conditions provide the necessary conditions for terrestrial and aquatic life, including fish.

3.20 Recovery Plan (EMP 20)

The conceptual recovery plan will be developed to meet the following general objectives:

- To provide a framework for the mines long term response to emergencies or unforeseen events that can include but not be limited to:
  - Disasters (natural or otherwise);
  - Environmental Emergencies; and,
  - Temporary Mine Closure and Restart;
- Describes the roles, communication structure and responsivities during recovery efforts to provide a framework for resuming normal operations;
- It should be noted that the Emergency Response Plan provides the immediate response to an emergency on site. The Recovery Plan is a longer-term plan that is meant to assist staff by providing a framework for the long-term recovery of site operations.

3.21 Stakeholder Engagement Plan (EMP 21)

The Stakeholder Engagement Plan provides a framework and action plan for the Company to work with stakeholders to identify outcomes, implement a particular course of action to meet that outcome, measure the outcome and then make changes in an iterative way (adapting) as needed based on data and input received from stakeholder and other sources to reach the desired outcome.

The Stakeholder Engagement Plan will outline the Company's adaptive management process, which will include the following steps:

- Research and preliminary issue identification: This basic information gathering includes understanding the history, context of the project, key sensitivities, and community and regional perspectives so that preliminary issues can be identified for further discussion and exploration with the stakeholders.
- Stakeholder mapping and identification: At this stage, the "who needs to be contacted or communicated with" is determined. This allows for a fuller understanding of the stakeholder ecosystem.

- Listening and Learning: Through focused efforts to engage the initial list of stakeholders and identifying other stakeholders who were missed in the previous step, the project team will listen and learn.
- Validation: Throughout and after the listening and learning, we will validate our understanding of what we heard through follow up communications, summary documents, and other validation tools.
- Synthesis: The engagement perspectives and issues will be synthesized to identify themes, trends, areas of concerns and opportunities.
- Integration: The engagement data will be integrated into the appropriate project category. This could include the EIS, construction, operation or post closure phase of the mine. It is through the integration step that changes and adaptations to plans, operations and activities will occur.

Engagement will occur to support adaptive management and will feed into planning and operational processes throughout the life of the mine.

3.22 Indigenous Peoples Engagement Plan (EMP 22)

The Indigenous Peoples Engagement Plan provides a framework and action plan for the Company's Indigenous relations in Nova Scotia, and applies to all activities undertaken by the Company, including exploration activities, planning and development, regulatory permitting, construction, operations, and reclamation/mine closure. The Indigenous Peoples Engagement Plan will also inform our approach to entering benefits agreements with Indigenous groups and the communities they represent.

4.0 COMMUNICATIONS, REPORTING AND DOCUMENT CONTROL

4.1 Communication and Training

Effective implementation of the EMS will require clear communication between various levels and functions within the Company, and between the Company and its contractors. Procedures will be established to maintain suitable internal and external communication channels for dissemination of information regarding accidents, incidents and emergencies, and for statements of environmental performance.

A process will be developed for communicating internally to employees, receiving and responding to communication from external interested parties and communicating significant environmental aspects within the Company and externally.

Communication regarding implementation of environmental measures and adherence to practices and procedures between the Company, construction contractors, site personnel and mine employees and external parties will involve:

- Formal contracts between the Company and its contractors;
- Formal environmental policy statements in employee hiring and induction;
- Formal environmental awareness training;
- Attendance of design, construction and operational planning meetings;
- Attendance of tailgate/shift meetings;

- Field inspections and reports;
- Liaison with community groups and the public; and,
- Liaison with government regulatory agencies.

Employees and contractors will be provided with environmental training to achieve a level of awareness and competence appropriate to their assigned activity and role. All personnel will receive general environmental awareness training, prior to commencing work on-site, through a site orientation session.

The EM or Human Resources (HR) designate will be responsible for ensuring that this training is conducted during both the construction and operating phases. This will ensure that all personnel during all phases of the Project understand their responsibilities and critical environmental aspects of their respective tasks.

The environmental component of the site orientation will include, at a minimum:

- The Company's environmental policy;
- Location of any environmentally sensitive areas;
- General environmental awareness and best management practices;
- Due diligence responsibilities;
- Spill and emergency response basics; and,
- Specific environmental measures and mitigation measures for particular work site tasks.

A schedule for refresher training for site personnel during operations will be implemented. A record of training will be maintained.

4.2 Document and Revision Control

This EMS has been developed using an adaptive management approach. Adaptive management is based on developing sound management plans with the best information available regarding detailed project engineering and construction design. The plans are considered to be "living documents" and will be revised as necessary to accommodate revised design or operation, new or amended legislation, industry standards, and community concerns.

After the detailed engineering design phase and following construction and operation, monitoring will be implemented to measure whether management plans are working as designed. Monitoring programs will be designed to detect changes in environmental media that could indicate mine-related impacts. If and when an impact is identified, additional mitigative measures will be implemented and the EMS modified. This process is a continuous one and will occur through all phases of the Project.

The Company is committed to continual improvement in environmental performance. The Company will regularly meet with stakeholders and regulators; perform management reviews; analyze monitoring data; and implement corrective and preventative actions. The results of these activities will be incorporated into the EMS and any changes made will be noted. The EMS will be controlled through tracking and revision numbers to ensure that it is approved prior to issuance, and that all employees are using and have access to the most recent version. Details of the changes made to the EMS will be summarized in a tracking table and forwarded along with the revised EMS to the relevant site personnel, the Company, and regulatory agencies, as appropriate.

4.3 Reporting

Reporting requirements will stem from the conditions of the IAAC and NS EA approvals, permits, licences and other regulatory authorizations related to the Project, as well as from legislative requirements. Specific programs will be developed to monitor the key characteristics of operations and activities that are considered to potentially have a significant effect on the environment. Ongoing compliance with legal requirements will be monitored and, where necessary, reported to relevant parties. Data from monitoring and measurement will be analyzed and compared with performance criteria or predictions, or to determine compliance. Non-compliance investigations will be performed as necessary to ascertain the causes and to provide guidance for the implementation of solutions.

The Company will develop a schedule for the submission of required written reports to both federal and provincial agencies in order to comply with all permit and regulatory requirements, as well as for meetings with regulatory agencies and/or the public. The schedule will be reviewed on a regular basis and updated as required to ensure that all reporting requirements are met.

4.4 Closing

This document forms the framework for the development of EMP for the Project, and defines the methodology by which adaptive management practices will be practiced, implemented and used to update site management practices to proactively respond to changing environmental conditions and requirements at site.

Atlantic Gold

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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 1

Environmental Protection Plan

Highway 374

Trafalgar, Nova Scotia

DRAFT
Version 001
February 8th, 2021

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The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, ("the Company") in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for a comprehensive Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during each phase of the Project minimize the effects of the mine and promote the protection of the environment and human health.

The general purpose for an Environmental Protection Plan (EPP) is to provide a single document to facilitate field implementation of permit requirements, regulations and procedures required at site to minimize environmental impacts as a result of the project. The EPP will be developed as the permit and environmental assessment conditions are finalized. To provide regulators and stakeholders context for evaluation of this future plan in relation to the Environmental Impact Statement, the Touqouy Mine EPP has been attached to this document for reference. The plan for Fifteen Mile Stream Mine Site is proposed to have a similar approach, format and content, with the notable exception that the plan will be fully directed to the specifics of the Project. The EMS framework document provides additional discussion and objectives for this plan within Section 3.1.

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ATLANTIC GOLD

Environmental Protection Plan

AGC–PLN–ENV-002

RELEASE DATE

June 10, 2020

DOCUMENT REVISION RECORD

Pages affected by the current revision are listed in the table below and are identified by hash marks (lines) on the right side of the affected pages.

Revision Level	Revised By	Date MM/DD/YYYY	DC Approved	DC Release Date	Pages Affected
00	Initial Plan prepared by JA/BB/DFB	01/30/2020	MN/JM	01/30/2020	all
01	JA	06/10/2020	MN	06/10/2020	14, 23, 30, 33, 42, 45, 53, Fig. 2.23.1.1, 64, Fig. 5,

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ABBREVIATIONS

ACRONYM	DESCRIPTION
AMNS	Atlantic Mining NS Corp
CLC	Community Liaison Committee
CRM	Cultural Resource Management Group
DFO	Department of Fisheries and Oceans
DNR	Department of Natural Resources
ECCC	Environment and Climate Change Canada
EPP	Environmental Protection Plan
EPRP	Emergency Preparedness and Response Plan
ERP	Emergency Response Plan
The Company	Atlantic Mining NS Corp
The Project	Touquoy Gold Mine
ML / ARD	Metal Leaching /Acid Rock Drainage
NSE	Nova Scotia Environment
OES	Operational Environmental Standards
OPRP	Operational Preparedness and Response Plan
SOP	Standard Operating Procedure
TMF	Tailings Management Facility
WRSA	Waste Rock Storage Area

1 INTRODUCTION

The Touquoy Gold Project (the Project) is an open pit gold mining and milling operation developed by Atlantic Mining NS Corp (AMNS), a wholly owned subsidiary of St Barbara Limited, (the Company) in Moose River Gold Mines, Nova Scotia.

1.1 PURPOSE OF THE ENVIRONMENTAL PROTECTION PLAN

The Environmental Protection Plan (EPP) is a key part of the Project Environmental Management System. It has been developed to provide a single reference document to facilitate field implementation of permit and regulatory requirements and minimize the impact of the Project on the environment and surrounding communities. This document includes Operational Environmental Standards (OES) which identify and address environmental issues and concerns relevant for the construction and operation of the Project. It provides guidance and measures to ensure potential adverse environmental effects are avoided, minimized or mitigated to the greatest extent practicable. The OES are not comprehensive. They provide cross-references to other relevant documents such as Standard Operation Procedure (SOPs), environmental permits, approvals, agreements, management plans, licenses, and regulations.

The EPP is a working document for use by Project personnel (including contractors and consultants). The EPP provides a quick reference for Project personnel to monitor for compliance and to ensure a high level of importance and effort is placed on the protection of the environment. This EPP provides general protection measures for routine and unplanned activities associated with the Project, developed in recognition of applicable permits, approvals, and regulations. The EPP will be updated as necessary based on management reviews, incident investigations, regulatory changes or other Project-related changes.

The objectives of the EPP are as follows:

- Document and identify relevant environmental and community concerns and provide appropriate protection measures.
- Ensure the Company commitments to minimize adverse environmental effects.
- Integrate environmental issues and regulation with Project design/engineering.
- Provide a clear and concise guide for Project personnel regarding the implementation of appropriate standards for protecting the environment and minimizing adverse environmental effects.
- Provide a reference and training document for Project personnel when planning and/or conducting specific activities and working in specific areas.

- Communicate changes in the environmental program through the document revision process.
- Provide a reference to relevant documents such as legislative requirements, guidelines, permits, environmental management plans, SOPs, etc.

The EPP is a fundamental component of the Environmental Management System implemented for this Project. Project personnel are expected to understand and implement the environmental protection measures provided within the EPP. If, at any time, Project personnel are unclear in their understanding of how to implement an environmental protection measure, the Environmental Department must be contacted to obtain clarification.

1.2 ENVIRONMENTAL COMMITMENT

The Company recognizes that we are a part of a global community and as such we are committed to operating our business responsibly while contributing to the global pursuit of sustainability. Our success depends on our ability to establish a safe workplace for our people, to minimize potential environmental impacts and to establish collaborative relationships with local communities.

The Company seeks to ensure that its operational procedures and construction methods meet these commitments and regulatory requirements, and that, the commitments and requirements are understood, implemented and maintained by personnel at all levels involved with the Project.

The Company has developed the EPP to help ensure a high level of environmental protection throughout the Project lifecycle. It is the objective of the Company to apply appropriate and effective management practices to advance environmental management to all facets of its operations related to the Project. Management, employees and contractors of the Company are all responsible for the incorporation of environmental protection measures into their work activities.

To this end, the Company has developed this EPP to demonstrate its commitment to environmental protection. In implementing the EPP, the Company is committed to continuous environmental improvement during the development and operation of the Project. This is expressed in St Barbara's Environmental Policy Statement.

1.3 ENVIRONMENTAL APPROVALS

The Company has been issued or applied for the environmental approvals found in Table 1.3.1: Environmental Approvals, below.

TABLE 1.3.1 – CURRENT ENVIRONMENTAL APPROVALS (JANUARY 2020)

Permit ID	Type of Permit	Regulatory Agency	Effective Date	Expiry
Active Approvals				
2012-084244-06	Industrial Approval	NSE	19-Jul-18	28-Mar-24
-	Environmental Assessment Approval	NSE	01-Feb-08	NA
2794371	Crown Land Lease Agreement	DNR	10-Feb-16	07-Feb-26
2017-103502-01	Water Approval - Water Withdrawal	NSE	03-May-19	02-Jul-27
2016-095967-03	Water Approval - Wetland Alteration (58.86 ha)	NSE	30-Jan-2020	11-Mar-26
**2016-095811*	*Wetland Alteration Infill (WL20/21)*	*NSE*	*15-Apr-16*	*22-Mar-17*
**2016-097587*	*Approval to Alter Wetland 22 and 40*	*NSE*	*28-Jul-16*	*12-Jul-26*
**2017-105447*	*Water Approval - Wetland Alteration*	*NSE*	*26-Jun-17*	*22-Jun-27*
**Italicized Approvals were incorporated into Approval 2016-095967-02 as of April 02, 2019*				

1.4 RESPONSIBILITIES

Position	Responsibility
General Manager	• Provide corporate resources and support for the implementation of the EPP.
Manager Environment and Community	• Provide technical guidance and final review and approval of revised versions of EPP. • Support the Environmental Superintendent in the development, implementation, training, and revision of the EPP.
Environment Superintendent	• Ensure the EPP is properly communicated to departmental Managers and Superintendents and ensure adequate training is being provided to all site Supervisors. • Conduct reviews and revisions of the EPP as needed, or at the request of the Environment Manager. • Ensure revisions are distributed to Managers and Superintendents.
Site Managers and Superintendents (including Contractors)	• Implement the EPP in daily operations. • Maintain a current copy of the EPP. • Provide training and support to ensure successful implementation of the EPP. • Initiate changes to improve and update the plan as needed.
Site Personnel	• Familiarization with the relevant sections of the EPP as related to the tasks at hand. • Have knowledge of reporting procedures.

2 OPERATIONAL ENVIRONMENT STANDARDS

2.1 CULTURAL HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Archaeological and historical resources are defined as any physical remnants recovered from the ground surface or below its surface which show evidence of manufacture, alteration, or use by humans. If present, these resources provide information on past human use of, and interaction with, the physical environment in the area. They can include both Pre-Contact (i.e., up to the settlement of the area by Europeans) resources and Historic Period (i.e., from European settlement to the mid-20th Century) resources. These resources may be from the earliest times of human occupation to the more recent past (e.g., 100 years before present).

The Moose River Gold Mines area has been occupied since the 1860’s for logging and forestry activities. Gold was discovered in 1866 and active mining began in the 1870’s. Mining was undertaken intermittently until a mine collapse occurred in 1936. The gold mining community had a peak population of up to 5,000 during its most productive period in the late 1800s.

2.1.1 Environmental Concern

Historical buildings and artifacts are common throughout the Project area, including a stamp mill at a provincial park located near the mine site and underground workings in the Open Pit area. The original church steps of the Moose River Gold Mines United Church were preserved and are located along Moose River Road across from the provincial park, adjacent to the current Open Pit viewing platform. A stone monument marks the location of these steps. The potential exists to encounter undiscovered cultural historical resources when conducting construction activities such as blasting, excavating and site clearing.

An archaeological screening was conducted by the Cultural Resource Management Group (CRM) in 2005 to evaluate the archaeological potential within the proposed development limits. The results of the study indicated that there is a low archaeological potential ascribed to the area. With that said, traditional land use patterns made use of water ways as travel-ways, resource bases and a home. The 2005 study also referred to local place names that are indicative of Mi’kmaq heritage.

2.1.2 Environmental Protection Measures

I. Historical Resources

The following measures will be implemented to minimize the potential for impacting historical resources:

- Project Personnel shall not deviate from already disturbed areas or established routes (existing roads and trails).
- Historical resources related to European occupation unintentionally discovered during project activities shall be provided to the Moose River Museum for curating.

II. Archaeological Resources

In the event that an archaeological or paleontological site is encountered or suspected in the course of work, the following measures will be taken to protect the feature(s) from damage:

a) Stop all work in the area.
b) Do not disturb the site.
c) Report your discovery to your supervisor and the Environment Department.
d) Note the location and leave all discoveries in place.
e) Isolate and protect the area.
f) The Environment Department will contact the Special Places Program (Sean Weseloh-McKeane: 902-424-6475), the Union of Nova Scotia Mi'kmaq (https://www.unsm.org/contact-us) and the Confederacy of Mainland Mi'kmaq (http://cmmns.com/) or other relevant groups.
g) Work at the site will not be recommence until permission to proceed has been granted by the Nova Scotia Museum

In the event that human remains are encountered, work will immediately stop and the RCMP and Nova Scotia Museum shall be notified.

2.1.3 FORMS

- N/A

2.1.4 RELATED DOCUMENTS

- 2005 Archaeological Screening Report with Appendix for 2006 Screening – Cultural Resource Management Group (November 2005)
- Mi'kmaq Knowledge Study (December 2005)

2.2 AVOIDING IMPACTS TO LOCAL LAND USERS AND COMMUNITIES

2.2.1 Environmental/Community Concern

The Project area is located near Crown and private lands used for hunting, fishing, camping and boating. In addition, the Project is located near the Ship Harbour Long Lake Wilderness Area of Nova Scotia. The Company is committed to minimizing disturbance to other land users to the extent possible.

2.2.2 Environmental/Community Protection Measures

Measures will be implemented to minimize disturbance to current land use patterns for the duration of the Project. These measures include:

- Any complaints reported by local land users or community members will be addressed by the Security department by means of the Complaint Resolution Plan and internal Security SOP procedures. The Environment Department and Communication Manager will monitor this process, provide advice to the Security Department, and report to regulatory authorities as warranted. The lessons learned from community complaints may inform ongoing project management.
- Project personnel will communicate any changes in land use or land disturbance with Community Liaison Committee (CLC) members. The CLC will also bring to the Company's attention any issues regarding project complaints or concerns they are aware of within the communities. The Company commits to addressing community issues that are brought forward by the CLC on a timely basis.
- No work activities can occur within 30 m of the Project's property boundaries unless proper approvals from NSE are obtained. See the Key Figure section (4.0) for map showing project property boundaries.
- Progressive reclamation will be implemented to reclaim disturbed areas to their natural condition throughout the lifetime of the Project
- The Project's blasting schedule will be posted at either end of the Project area to notify local land users of upcoming road closures. This schedule will be updated regularly with any changes.
- Any trap lines or snares discovered during site operations will be left intact, flagged and communicated to other staff.

- Activities along Scraggy Lake will be restricted. No disturbance activities will occur within 30 m of Scraggy Lake unless proper approvals are obtained from NSE. All recreational features, such as camp sites, will be left undisturbed.
- Road traffic will operate in accordance with guidelines outlined in the Road Traffic Management Operational Environment Standard (Section 2.17).
- Access to public roadways and logging trails must not be disturbed or restricted by project activities.

2.2.3 FORMS

- AGC - ENV FRM - 002 Environmental Incident Report
- Record of Public Complaints and Company Response Form (Version 1)

2.2.4 RELATED DOCUMENTS

- OES 2.3 – Land Disturbance
- OES 2.17 – Road Traffic Management
- AGC-PRO-MINE-012 Mobile Equipment and Light Vehicles Operation SOP
- AMNS Complaint Resolution Plan, December 2016

2.3 LAND DISTURBANCE AND WATERCOURSE/WATERBODY ALTERATIONS

Many aspects of the Project's construction activities involve potential ground disturbances or disturbance of water bodies, including road construction, water course crossings, pit development, quarry and borrow activities, and site facility construction.

2.3.1 Environmental Concern

Ground disturbance shall be minimized to protect wildlife habitats, aquatic habitats, and prevent erosion and the movement of sediment into watercourses, wetlands, and water bodies. Various permits, licenses and approvals issued to the Company contain specific conditions regarding ground disturbances and watercourse/waterbody alteration as well as necessary protection measures to minimize environmental impact.

2.3.2 Environmental Protection Measures

The following generalized measures shall be implemented to minimize impact caused by Project disturbances:

- Any new disturbance must be approved by the Environment Department before any work is started. Approval from NSE may be required if the area is outside of the current IA approval limits.
- No work is to be done within 30 m of a watercourse or wetland without the necessary permits.
- No work is to be done within 30 m of the Project's property boundaries without the necessary permits.
- The limits for all approved clearing, grubbing and topsoil overburden removal shall be clearly identified (flagging/survey stakes) in the field prior to the commencement of any work.
- Areas to be cleared shall have sediment and erosion control measures implemented prior to the initiation of any clearing activities. The sediment and erosion control measures shall be adapted to suit the field conditions associated with the specific construction activities as construction proceeds.
- Construction dewatering or runoff diversion activities are not permitted to be discharged outside of engineered water containment structures without the approval of the Environmental Department.
- All tree clearing/grubbing activities should be scheduled outside of the bird breeding window (generally between May 1 and September 30) whenever possible. Activities

occurring inside the bird breeding window can be permitted under certain circumstances and with the approval of the Environment Department. At minimum, one or more bird nesting surveys will be required.

- All work on leased crown land must be conducted in accordance with the Company's Crown Lease Agreement.
- All permanent installations are to be constructed to direct stormwater runoff to the Tailings Management Facility (TMF) catchment area (see Mine Contact Water - Section 2.19)
- Project Personnel and equipment shall travel only on existing roads and trails unless otherwise approved by the Environment Department.
- Rutting (furrow creation) shall be minimized on ground surfaces where possible.
- Equipment storage areas shall be located on gravel, sand and/or other durable land. These areas to be located such that surface runoff is directed to the TMF.
- No material shall be removed from any stream or water body without the required watercourse alteration permits. No restriction, diversion, or any other alteration to a watercourse or waterbody is allowed without the necessary permits.
- No debris or any other construction material shall be allowed to enter any water body.
- All construction material must be comprised of non-potentially acid generating rock in accordance with the Waste Rock Management Plan.
- Measures shall be undertaken to prevent and control erosion on banks of any body of water.

2.3.3 FORMS

- AGC - ENV FRM - 002 Environmental Incident Report

2.3.4 RELATED DOCUMENTS

- OES 2.8 – Erosion and Sediment Control
- OES 2.13 – Bird Protection Measures
- OES 2.19 – Mine Contact Water (TMF Wastewater Management)
- OES 2.20 – Waste Rock Management
- AMNS Crown Land Lease Agreement
- AMNS Industrial Approval 2012-084244-06
- AMNS Environmental Assessment Approval February 1, 2008
- AMNS Water Management Plan
- AMNS Erosion and Sediment Control Plan
- AMNS ML/ARD Management Plan (Draft)

2.4 WATER WITHDRAWAL/USE

2.4.1 Environmental Concern

Water is an important resource that must be protected. The use of water for the Project is currently governed by a Water Withdrawal Permit (2017-103502-01) issued to the Company by NSE to allow for water withdrawal from Scraggy Lake.

2.4.2 Environmental Protection Measures

- Surface and groundwater at the Project site is not considered potable. Drinking water is supplied to the site by bottled water.
- Watercourses cannot be used as a water source for project activities unless authorized and approved by NSE. This includes but is not limited to water use for dust suppression, drilling, and other industrial uses.
- The Water Withdrawal Approval for Scraggy Lake outlines conditions relating to the rate and volume to which water is withdrawn from the lake. The rates and volumes shall not be exceeded and are outlined in Table 2.4. All other conditions of the Water Withdrawal Approval are to be carried out as necessary.
- To conserve freshwater, mill processes will re-use process water wherever possible. Process water (or reclaim water) is utilized from the TMF via the decant barge. Freshwater from Scraggy Lake is to be used for fire suppression, domestic uses and Mill circuits where required.
- Total volumes and water withdrawal rates from any water body by the Company will be recorded and provided to the Environment Department upon request.
- Work shall be performed in such a way as to ensure that materials such as sediment, fuel or any other hazardous materials do not enter watercourses and waterbodies through the implementation of sediment control measures and proper hazardous materials management practices. In the event of a release to the environment, the Company's Spill Contingency Plan shall be implemented. For more information, refer to Section 2.8 Erosion and Sediment Control and/or Section 2.23 Spill Control Measures and Reporting.
- Monitoring of site groundwater and surface water is undertaken by the Environment Department to meet the requirements of the project Industrial Approval. Monitoring data is reviewed in a timely manner and mitigative actions taken if required as outlined by the Project Groundwater Contingency Plan. Surface water and groundwater monitoring locations can be found in the Key Figures section (4.0) attached to this document.

- Open pit dewatering activities are monitored to protect surrounding waterbodies. Sudden inflow of water into the pit must be immediately reported to the Mine Supervisor and Environment Department in accordance with the Project Groundwater Contingency Plan. All work in the vicinity of the inflow must cease until a hydrogeological assessment is completed.
- Equipment shall not be washed in any watercourse or waterbody.
- No fuelling and/or servicing of equipment shall occur within 30 metres of any water body unless controls are approved by the Environment Department.
- All water intake hoses shall be equipped with a screen of an appropriate mesh size (as approved by the Department of Fisheries and Oceans (DFO)) to ensure that fish are not entrained. Additionally, operators will ensure the water intake hoses withdraw water at such a rate that fish do not become impinged on the screen.

Table 2.4: Water Withdrawal Limits Scraggy Lake Permit (2017-103502-01)

Period of withdrawal	Year round
Daily duration of withdrawal	14.4 hours
Frequency of withdrawal	Daily
Average daily withdrawal rate	720,000 litres per day
Maximum daily withdrawal rate#	720,000 litres per day
Maximum instantaneous withdrawal rate	13.89 litres per second
Maximum volume of withdrawal (annual)	262,800,000 litres

 # Maximum daily withdrawal rate is based on each 24 hours

2.4.3 FORMS

- AGC - ENV FRM - 002 Environmental Incident Report

2.4.4 RELATED DOCUMENTS

- OES 2.8 – Erosion and Sediment Control
- OES 2.23 – Spill Control Measures and Reporting
- Scraggy Lake Water Withdrawal Permit 2017-103502-01
- AMNS Spill Contingency Plan
- AMNS Erosion and Sediment Control Plan
- AMNS Groundwater Contingency Plan
- Nova Scotia Guide to Surface Water Withdrawal Approvals (https://novascotia.ca/nse/water/docs/guideToSurfaceWaterWithdrawalApprovals.pdf)

2.5 DRILLING OPERATIONS

2.5.1 Environmental Concern

Environmental concerns associated with drilling include surface disturbances, drilling fluid and cutting disposal, impacts on dust, noise, water quality, and habitat encroachment.

2.5.2 Environmental Protection Measures

The following protection measures for drilling management shall be implemented:

- Prior to the commencement of a drill program, pre-drilling preparation is required which includes obtaining the required permits for land access, line cutting, wetland alteration and water withdrawal approvals.
- For exploration drilling, a Pre-Startup Drill Site Inspection Form shall be completed by the acting supervisor before drilling activities commence.
- Sediment and erosion control measures will be implemented prior to the commencement of drilling operations and will be maintained during the operation to minimize transport of sediment into adjacent water bodies.
- All activities, including the overland transport of workers, shall be conducted in such a way to minimize ground disturbance and the risk to forest fires.
- Daily drill site inspections for fuel/hydraulic leaks, equipment condition, sediment and erosion control, sump conditions and water intakes shall be conducted prior to commencing work activities at the start and end of each work shift/day. All concerns observed during inspection shall be immediately repaired and reported to the supervisor.
- All drill rigs shall be equipped with spill kits in the event of leaks and spills. All personnel must be trained in spill response and be familiar the use of spill kits. In the event of a release to the environment, the Spill Contingency Plan will be implemented.
- Equipment storage holding areas will be located on gravel, sand or other durable land 30 meters from any waterbody to minimize impacts on surface drainage and water quality unless otherwise permitted. Equipment storage holding areas shall be located within authorized project limits.
- Under the *Environment Act*, a water withdrawal approval is required if a surface water withdrawal exceeds 23,000 liters per day, subject to the exemptions outlined in the Activities Designation Regulations. Drill programs that exceed 23,000 liters and are not subject to an exemption must obtain a water withdrawal approval prior to a drill program.

(See Water Use Section 2.4 for additional protection measures relating to water withdrawal).

- During a drill program, contain and re-circulate drill water to the fullest extent practical in order to reduce water usage.
- Ensure that drilling area is kept clean and tidy at all times. No littering is permitted – collect and package all waste for disposal.
- Do not feed wildlife.
- All work within wetlands or near waterbodies must be approved by NSE.
- Dispose of drill water into a properly constructed sump, when necessary.
- Prior to the commencement of drilling for each hole, establish a dedicated sump location where collected drill water and cuttings are to be disposed.
- Ensure sumps are of sufficient capacity based on a combination of proposed drill hole length, water usage, and the potential residence time of the sump.
- Drilling water and cuttings must not be allowed to spread to the surrounding area or water bodies. The footprint of any spillage must be minimized to the greatest degree practical. The installation of berms, silt fences and/or other means of containment should be utilized to contain drill water runoff.
- If artesian flow (free-flowing) conditions are encountered, drill holes shall be immediately plugged and sealed.
- For exploration drill programs, when drilling near a water body or wetland a water sample should be collected and potentially analyzed to establish background conditions in the event an incident occurs.
- Equipment is not to be washed within 30m of a body of water or in an area where wash water will be transported to a watercourse.
- Equipment or material shall not obstruct any stream or watercourse.
- Upon completion of a drill hole, the drill site will be properly decommissioned including plugging the drill hole and restoring all constructed drill sumps to the natural surrounding contours of the land.
- Any other areas that were disturbed during the drill program will be restored to a pre-disturbed state, when practical.
- Upon completion of the drill hole, the casing will be removed. If the casing cannot be removed it will be cut off to be flush with surface and backfilled.
- Remove all garbage and debris from the land use area to an approved disposal site.
- A Drill Site Decommissioning Checklist Form (for Exploration) shall be completed by the acting supervisor.

2.5.3 FORMS

- AGC - ENV FRM - 001 Spill Report Heads Up Form
- AGC - ENV FRM - 002 Environmental Incident Report
- AGEF.004.00 – Pre-Drill Startup Site Inspection – AGC Exploration
- AGEF.005.01 – Detailed Drill Inspection – AGC Exploration
- AGEF.006.00 – Drill Site Simplified Checklist – AGC Exploration
- AGEF.007.00 – Drill Site Decommissioning – AGC Exploration

2.5.4 RELATED DOCUMENTS

- OES 2.4 – Water Use
- OES 2.8 – Erosion and Sediment Control
- OES 2.22 – Wetland Crossing, Alterations and Management
- OES 2.23 – Spill Control Measures and Reporting
- AGEN.003.00 – Surface Drills and Drill Sites (Exploration Safe Work Practice)
- AMNS Wildlife Management Plan
- Nova Scotia Wetland Policy - Nova Scotia Environment (https://novascotia.ca/nse/wetland/docs/Nova.Scotia.Wetland.Conservation.Policy.pdf)
- Nova Scotia Guide to Surface Water Withdrawal Approvals (https://novascotia.ca/nse/water/docs/guideToSurfaceWaterWithdrawalApprovals.pdf)

2.6 FUGITIVE DUST MANAGEMENT

2.6.1 Environmental Concern

Fugitive dust typically refers to small particles of geological or other origin that are moved into the atmosphere from non-ducted, open sources known as non-point sources. At the Project, the potential sources of fugitive dust include: open pit operations – including drilling, blasting, haul truck operations, activity around the ore processing plant, vehicle traffic along the mine site access roads, road grading, wind erosion of waste rock stockpiles, soil stockpiles, low grade ore stockpiles and exposed tailings storage area. Fugitive dust emission sources from the processing plant include mineral material transfer systems associated with the primary crusher and the crushed ore stockpile. These activities have the potential to generate emissions of airborne particulates that may result in short-lived periods of elevated particulate matter (PM10 and PM2.5) concentrations. Maximum fugitive dust generation will take place during windy weather where small and light particles are present in dry, active surface material. As a result, dust plumes tend to be most noticeable from potential sources when wind speeds are high and/or when vehicles are moving.

Minimizing fugitive dust emissions at the source will have a combined benefit of protecting the health and safety of workers on site and protecting the environment and surrounding community by minimizing long-term impacts associated with the Project.

2.6.2 Environmental Protection Measures

The following protection measures to minimize fugitive dust emissions shall be implemented:

- Water trucks will be utilized during non-freezing conditions to apply water to unpaved areas where active work is being completed unless existing conditions are sufficiently wet to prevent dust (e.g., during or immediately following a rain event).
- Water will be applied evenly and in a manner that does not generate runoff. The tailings pond will not be used as a water source for dust suppression. Dust suppression activities shall be completed in a manner that ensures water is not discharged to any watercourse or waterbody
- During the winter months and times of high fugitive dust emission magnesium chloride or similar dust suppressant reagent will be applied to unpaved areas as required. Only environmentally acceptable dust suppressant reagents will be used. No petroleum-based products will be used.
- The use of dust suppression reagents for crushing operations at the mill will be applied as required using injection nozzles.

- Process transfer points will be covered and guarded as a means to minimize dust generation and transport.
- The fine ore stockpile will be enclosed and regularly inspected for condition.
- Traffic speed is limited to 40 km/hour on the Project Admin Road (Billybell Way) and further reduced to 30 km/hour prior to the curve in the road before the security checkpoint to reduce fugitive dust.
- Dried tailings will be wetted as required during non-freezing conditions to control wind erosion of tailings.
- Ambient air quality monitoring will be conducted annually in accordance with Industrial Approval requirements.

2.6.3 FORMS

- N/A

2.6.4 RELATED DOCUMENTS

- OES 2.4 – Water Use
- OES 2.21 – Air Quality, Noise and Vibration
- AMNS Fugitive Dust Control Plan
- AMNS Industrial Approval 2012-084244-06

2.7 FUEL STORAGE AND HANDLING

2.7.1 Environmental Concern

Permanent and temporary fuel storage facilities are present on the Project site. Most fuel is stored within double walled steel fuel tanks protected by jersey barriers. Smaller quantities of fuel are stored in slip tanks and jerrycans within containment pans. Waste oil is discussed in OES 2.16.

Accidental and uncontrolled leaks, releases and spills of fuel may occur due to improper storage, poor handling procedures or equipment malfunction. Fuel releases to the environment have the potential to negatively affect worker health and safety as well as soil quality, aquatic life and wildlife. Spills are addressed in greater detail in the Company's Emergency Response and Spill Contingency Plans**.**

2.7.2 Environmental Protection Measures

The following environmental protection measures shall be used for all storage and handling of fuels at the Project:

- Project personnel refueling equipment or vehicles will always supervise re-fueling and will not leave fuel transfer operations unattended.
- Transfer of fuel to storage tanks or to vehicles shall be conducted by a fully trained and qualified person in accordance with the Refueling Mobile Equipment and Light Vehicles SOP.
- Exposed tanks and lines shall be protected from damage by vehicular collision through the installation of guard rails or barriers.
- Refueling shall not occur within 30 m of a wetland or watercourse.
- All fuel aid triggers will be removed from nozzles prior to being brought on-site.
- Drip trays and/or spill pads will be deployed during fuel transfer operations.
- Hoses and pipes used for fuel transfer shall be equipped with properly functioning and approved check valves that are spaced to prevent backflow of fuel in the case of failures. Lines should be stored up off the ground.
- All spills shall be immediately reported to the Environment Department and documented by submitting the AMNS Environmental Incident Report.
- All fuel storage tanks will be periodically inspected.
- All fuel storage tanks will adhere to the Petroleum Management Regulations pursuant to the Environment Act, Nova Scotia Environment.

- All leaks should be reported and repaired immediately.

2.7.3 FORMS

- AGC – ENV FRM – 001 Spill Report Heads Up Form
- AGC – ENV FRM – 002 Environmental Incident Report

2.7.4 RELATED DOCUMENTS

- OES 2.16 – Hazardous Materials and Hazardous Waste Management
- OES 2.23 – Spill Control Measures and Reporting
- AMNS Spill Contingency Plan
- AMNS Emergency Response Plan
- AGC – PRO – ENV – 013 Refueling Mobile Equipment and Light Vehicles
- Nova Scotia Standards for Construction and Installation for Petroleum Storage Tank Systems (novascotia.ca/nse/petroleum-regulated/)

2.8 EROSION AND SEDIMENT CONTROL

Project activities including facility and roadway construction, excavation/hauling/stockpiling of overburden, ore and construction material, and drilling programs have the potential to cause erosion and release sediment-laden runoff into nearby watercourses. Sediment and erosion control measures may include, but are not limited to, silt fencing, erosion control mats, sedimentation ponds, erosion blankets/geotextile lining, sand bags, hay bales, silt curtains, terraces, benching, and riprap structures. Project Personnel are responsible for the implementation of erosion and sedimentation control measures prior to the initiation of construction activities (i.e. clearing, grubbing, development of facilities, etc.). On-going monitoring and maintenance of operational erosion and sedimentation control measures is required to ensure continued effectiveness of these structures.

2.8.1 Environmental Concern

Storm water, which may include any surface runoff and flows resulting from precipitation, drainage or other sources, may contain suspended sediments. A release of storm water can cause sedimentation of a watercourse or wetland. Sediment may affect water clarity/quality and subsequently, aquatic life by reducing feeding success, fish egg and larval survival and fish habitat. Due diligence regarding sediment and erosion control is necessary to minimize deleterious impacts to watercourses or wetlands in accordance with site permits and provincial/federal regulations.

2.8.2 Environmental Protection Measures

An Erosion and Sediment Control Plan has been developed for the Project and can be consulted for further detailed information. Project Personnel are required to implement erosion and sediment control measures prior to the initiation of construction activities. The Environment Department should be made aware of any new construction activities that are outside of normal operation. Project Personnel may be requested by the Environment Department to implement additional sediment and erosion control measures if they deem the measures are necessary to ensure protection of the environment.

The following environmental protection procedures/measures will be taken to prevent or mitigate erosion and sediment-laden runoff impacts:

- Sediment mitigation measures will be established and maintained in accordance with the Erosion and Sediment Control Plan.
- The size of the disturbed area and duration of soil exposure shall be minimized as practical.

- Temporary and permanent drainage installations shall be designed, constructed, and maintained to an appropriate standard.
- Appropriate erosion and sediment control measures will be implemented and may include a combination of silt fences, silt (turbidity) curtains, sediment traps, settling ponds, collection ponds and berms.
- Surface water runoff from mine infrastructure must be managed and all runoff directed to the TMF catchment area.
- Access and haul roads shall be constructed with gradients and drainage systems for the purpose of managing run-off and limiting the potential for erosion.
- Disturbance from borrow activities will be limited to the maximum extent possible.
- Project Personnel shall maintain, as required, all sediment and erosion control measures prior to, during and following rain or storm events to minimize environmental damage. All repairs shall be undertaken to the satisfaction of the Environment Department.
- Monitoring of watercourses and waterbodies will be conducted in accordance with the Rain Event Monitoring Protocol SOP by the Environment Department when necessary.

If there is visual discoloration or turbidity identified in a watercourse and/or wetland notify the Environment Department for further assessment. In the event of a sediment release, sampling/monitoring is completed by the Environment Department in accordance with the Rain Event Monitoring Protocol. In addition, the following key actions are required:

- Immediately determine the point source of sedimentation.
- Halt all construction activities if necessary.
- Ensure that all erosion and sedimentation controls are working effectively.
- Correct any issues that need attention or maintenance.
- Additional controls may be needed to stop silt escapement including the installation of trenches, berms, or pumps.
- A follow-up investigation is required to determine whether additional corrective actions are needed to prevent future sediment release events. This should be completed using the Environmental Incident Report form. Results of follow-up investigations are reported to regulators by the Environment Department.

2.8.3 FORMS

- AGC – ENV FRM – 001 Spill Report Heads-Up Form
- AGC – ENV FRM – 002 Environmental Incident Report

2.8.4 RELATED DOCUMENTS

- OES 2.3 – Land Disturbance
- OES 2.19 – Mine Contact Water
- OES 2.23 – Spill Control Measures and Reporting
- Metal and Diamond Mining Regulations – Government of Canada (https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html)
- AMNS Erosion and Sediment Control Plan
- AMNS Industrial Approval 2012-084244-06
- AMNS Rain Event Monitoring Protocol SOP

2.9 WILDLIFE SIGHTINGS

The Company has implemented a Wildlife Management Plan (WMP) in accordance with Condition 5.4 of the Environmental Assessment Approval. The plan was developed to minimize interactions between wildlife and Project activities. The WMP should be consulted for more information regarding your response to a wildlife encounter. Refer to EPP Sections 2.10 to 2.13 for further protection measures for bears, moose, turtles, and birds.

2.9.1 Environmental Concern

There is a variety of wildlife to encounter in the Project Area, including mainland moose, white-tailed deer, black bears, bobcats, coyotes, foxes, snapping turtles, wood turtles, a variety of raptors, swallows, owls, and other bird species.

Project activities can impact wild species in a number of ways. Development of infrastructure can cause direct impacts to habitat used by terrestrial fauna, including upland forested habitat and wetlands. Sensory disturbance to terrestrial fauna would result from rock blasting, clearing, grubbing, infrastructure construction and overall increased traffic during the construction, operation and decommissioning phases. This could result in localized avoidance of the Project Area by some wild species. Increased human activity could result in increased usage of the Project Area by opportunistic species such as Coyotes, Raccoons, Skunks or Black Bears. These opportunistic species generally have a higher risk of becoming habituated to human activity, which can lead to nuisance or aggressive behaviors, increasing risk to both wildlife and site personnel.

2.9.2 Environmental Protection Measures

The Environment Department maintains a system of tracking wildlife encounters. Sightings of predatory or protected wildlife should be reported to the Environment Department as soon as possible. The general steps for completing the Wildlife Log are as follows:

- Record your name and the date of the observation.
- Briefly describe the location, noting any significant landmarks (i.e. road kilometre marks, water bodies, road crossings, etc.)
- Record the type of animal. Identify the species, if possible, or the general type or group.
- Record the number of animals observed and the life stage, if possible (juvenile or adult). When identifying life stage of a bear note the size of the ears – big ears indicate most likely a juvenile, smaller ears indicate an adult.

- Record observations on the behaviour of the animal. What was it doing at the time you observed it? Was it making any sound? How did it react to your presence? How far away was it? Were you walking or driving?

2.9.3 FORMS

- N/A

2.9.4 RELATED DOCUMENTS

- OES 2.10 – Black Bear Encounters
- OES 2.11 – Moose Protection Measures
- OES 2.12 – Snapping Turtle Protection Measures
- OES 2.13 – Bird Protection Measures
- AMNS Environmental Assessment Approval February 1, 2008
- AMNS Wildlife Management Plan
- AMNS Mainland Moose Management Plan

2.10 BLACK BEAR ENCOUNTERS

2.10.1 Environmental Concern

Black bear encounters have occurred at various locations around the Project site. Black bears can be dangerous animals and measures must be taken to reduce the risk of an encounter as much as possible. Project Personnel should be familiar with black bear behavior to be prepared if an encounter should occur. Preventative actions should be taken to minimize the risk of bear encounters.

The Department of Natural Resources (DNR) no longer traps nuisance bears and any nuisance bears will be killed on site. To reduce the risk of decreasing the local bear population, appropriate measures must be taken to reduce human/bear interactions

2.10.2 Environmental Protection Measures

The following measures must be implemented to minimize the potential for bear-human interactions:

- Site and working areas will be kept clean of food scraps and garbage always. Littering of any kind on site is strictly prohibited. Effective food waste management is important to reducing the likelihood of encounters.
- All field employees should become familiar with black bear behaviors. A review of the "Black Bear Safety PowerPoint", along with the video, before entering the field is advised.
- Carrying a noise maker when doing fieldwork is advised. This can include a bear bell, whistle, air/fog horn or a bear banger.
- When entering the field make as much noise as possible. Honking the truck horn, carrying loud music and talking loudly with your field partner are all good examples. It is important to make your presence known.
- Scan your surrounding area often and look for fresh bear signs (scat, tracks, feeding areas, marking trees).
- Do not enter an area where there has been a bear sighting in the previous 24hrs.

2.10.3 FORMS

- N/A

2.10.4 RELATED DOCUMENTS

- OES 2.9 – Wildlife Sightings
- AMNS Wildlife Management Plan
- Black Bear Safety PowerPoint (Department of Natural Resources presentation)

2.11 MOOSE PROTECTION MEASURES

2.11.1 Environmental Concern

The mainland moose is listed as an endangered species under the Nova Scotia Endangered Species Act (NSESA), and as critically imperiled by the Atlantic Canadian Conservation Data Group. The mainland moose population has been reduced to 1200 individuals, restricted to isolated sub-populations. Development of any kind increases access to moose habitat, which can ultimately increase the threat of poaching. Land development can also result in the fragmentation or the direct loss of habit, while potentially further isolating sub-populations from one another.

2.11.2 Environmental Protection Measures

The Company has implemented a Mainland Moose Monitoring Program to describe frequency of occurrence of moose around the Project. Full details of this program can be found in the Mainland Moose Management Plan. Outside of the monitoring program, the Company will work with Project Personnel to assist in reducing mainland moose mortality by:

- Working to reduce poaching within and surrounding the Project area through an awareness campaign. Report a Poacher signs will be posted in site offices and lunch rooms and reviewed during site orientation. Any evidence of moose poaching will be reported immediately to Environment Department, who will ensure immediate reporting to the Nova Scotia Department of Natural Resources (NSDNR) and the local RCMP.
- Reducing motor vehicle collision by limiting all mine vehicles to a 50km/hr speed limit within the Project.
- Limiting access for moose to the pit area using berms and fencing.
- Limiting disturbance to the approved areas, and maintaining vegetative buffers, wherever possible.
- Limiting use of ATV's on site for all purpose except those required for mining related activities.
- Controlling public access in the active mine and processing area.
- Consult with NSDNR Wildlife Division during the Project in revisions to the Reclamation Plan.
- Enacting a no wildlife harassment policy on the Project site (See Wildlife Management Plan for more general wildlife management measures).
- Report all moose sightings to the Environment Department. Appropriate reporting to NSDNR will be completed by the Environment Department as required

2.11.3 FORMS

- N/A

2.11.4 RELATED DOCUMENTS

- OES 2.9 – Wildlife Sightings
- AMNS Mainland Moose Management Plan
- AMNS Wildlife Management Plan

2.12 SNAPPING TURTLE PROTECTION MEASURES

2.12.1 Environmental Concern

Snapping Turtles are listed as Special Concern under the Species at Risk Act, and Vulnerable under the Nova Scotia Endangered Species Act. As such, appropriate steps should be taken to reduce interactions with Snapping Turtles. Snapping Turtles have been observed on site, most commonly where the public roads intersect Moose River at the western boundary of the Project site. Sightings typically occur in the month of June.

Wood Turtles are listed as Threatened under the Species at Risk Act and the Nova Scotia Endangered Species Act. While Wood Turtles have not been observed within the project area, they are known to reside in the Musquodoboit Watershed and it would be prudent to presume that they could be found within the Project Area.

2.12.2 Environmental Protection Measures

If a turtle is found, it must be immediately reported to the Environment Department. If a turtle is found on or near a road, efforts may be taken by trained workers to move the turtle away from the road, provided it is safe to do so and the turtle is not actively nesting.

If a nest, or nest in progress has been identified, the Environment Department will place a predator excluder on the nest. The predator excluder is a simple wooden frame (approximately 2’ square), covered with wire mesh.

Signs are posted in areas where Snapping Turtles are active.

2.12.3 FORMS

- N/A

2.12.4 RELATED DOCUMENTS

- OES 2.9 – Wildlife Sightings
- AMNS Wildlife Management Plan

2.13 BIRD PROTECTION MEASURES

2.13.1 Environmental Concern

Project activities have the potential to adversely affect bird populations by influencing migration and behavior patterns. These influences include habitat degradation from clearing and grubbing, noise levels and periodic vibrations from blasting.

2.13.2 Environmental Protection Measures

The Company has implemented the following protection measures for the protection of birds:

- All Project Personnel shall comply with regulations outlined in the Migratory Bird Convention Act, which prohibits the disturbance of migratory birds, their nests and eggs.
- If a nest is identified, the Environment Department must be notified immediately, so that steps can be taken to determine appropriate mitigation or avoidance if required.
- Clearing and grubbing activities should be completed outside the accepted breeding bird window (generally between May 1 and September 30).
- A nesting survey is to be performed by a qualified Environmental Professional if clearing or grubbing is performed inside of the breeding bird window. Clearing and grubbing should only be performed if there are no confirmed signs of breeding.
- Site and working areas will be kept clean of food scraps and garbage always. Littering of any kind on site is strictly prohibited.

2.13.3 FORMS

N/A

2.13.4 RELATED DOCUMENTS

- OES 2.9 – Wildlife Sightings
- Migratory Bird Convention Act – Government of Canada (https://laws.justice.gc.ca/eng/acts/M-7.01/)
- AMNS Wildlife Management Plan

2.14 SOLID WASTE MANAGEMENT

2.14.1 Environmental Concern

A material is generally considered to be waste once it can no longer be used for its original purpose. Non-hazardous solid waste is generated during operational activities of the Project. Non-hazardous solid waste includes, but is not necessarily limited to, domestic garbage, food waste, construction debris, commercial non-hazardous waste, and other non-hazardous materials. Solid waste management standards are required to ensure the practices employed during the Project minimize the effects of the mine on workers, local community and wildlife.

2.14.2 Environmental Protection Measures

- The four main principles of waste management to be followed in order of hierarchy include reduce, reuse, recycle and dispose. Once reduce, reuse and recycle have been implemented the remaining waste will be responsibly handled, stored and disposed of in accordance with regulatory requirements.
- The Company's operating principle is to recycle wherever economically and technically feasible and to use proven management practices to reduce waste on site to the extent feasible.
- Consumption should be assessed by evaluating procedures, processes and consumed material quantities for possible reduction in consumable material usage, as well as possible reductions in generated waste volumes.
- Waste that is produced during the Project will be reused whenever possible (ie materials removed during clearing/stripping are to be reused during reclamation activities)
- Waste that can neither be reduced nor reused will be recycled where practical.
- Waste streams will be segregated in a manner to avoid mixing and minimize improper recycling or disposal.
- Untreated, clean wood waste products including lumber, timber, and pallets will be reused whenever possible. Wood waste products not immediately reused will be placed in designated bins in the waste collection areas for removal offsite for proper disposal. Pressure-treated lumber will be removed by a licensed waste management company to a permitted disposal facility.
- Non-contaminated scrap metal waste will be segregated and placed in designated bins for reuse or salvage. The unused scraps will be sent offsite to a licensed facility for recycling.

- All food waste will be collected in clearly labelled compost bins with closed lids as to not attract wildlife and will be sent offsite to a proper facility for composting.
- Waste accumulated on site prior to disposal will be confined so that it does not pose health or environmental hazards.
- Time lapse between collection and disposal shall be minimized to the extent practical.
- All Project Personnel are responsible for daily clean-up of the area in which their work activities are being conducted.

2.14.3 FORMS

- N/A

2.14.4 RELATED DOCUMENTS

- OES 2.9 – Wildlife Sightings
- OES 2.16 – Hazardous Materials and Hazardous Waste Management
- AMNS Wildlife Management Plan

2.15 WASTEWATER MANAGEMENT

2.15.1 Environmental Concern

Wastewater, such as sewage, grey water, laboratory waste, and water contaminated with petroleum-based products will be generated during the life of the Project's construction and operation. Uncontrolled or untreated releases of wastewater to the environment may impact drinking water, aquatic resources, or wildlife and should be reported immediately to the Environment Department.

In addition to the above, the Project has a single permitted discharge location for process wastewater, located at the downstream end of the TMF that discharges treated effluent to Scraggy Lake. Further requirements for the management of process water and mine effluent are provided in Section 2.19.

2.15.2 Environmental Protection Measures

- All sewage and greywater will be directed to a septic field that has been installed by a certified installer.
- Levels in all septic tanks will be monitored regularly and serviced as required.
- Any issues concerning the septic tanks or field shall be reported immediately to Site Services and Environment Departments.
- All water contaminated with petroleum-based waste products will be directed to an oil-water separator or containment vessel for off-site removal by a licensed facility.
- All water contaminated by reagent use in the lab will be transferred into the Mill process for disposal in the TMF or contained and disposed of off-site by a licensed facility.
- All process water captured in the mill facility will be captured in sumps and re-introduced into the milling process.
- To conserve freshwater, mill processes will re-use process water or use collected surface facility runoff wherever possible. Process water (or reclaim water) is pumped from the TMF to the mill via the decant barge.
- In the event of an accidental release of wastewater immediate action will be taken to ensure that the release is contained and prevented from reaching any waterbody. Refer to the Emergency Response Plan and Spill Contingency Plan. All spills must be reported to the Environment Department.

2.15.3 FORMS

- AGC – ENV FRM – 001 Spill Report Heads-Up Form
- AGC – ENV -FRM – 002 Environmental Incident Report

2.15.4 RELATED DOCUMENTS

- OES 2.23 – Spill Control Measures and Reporting
- AMNS Spill Contingency Plan
- AMNS Emergency Response Plan

2.16 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

2.16.1 Environmental Concern

A variety of potentially hazardous materials will be required throughout the life of the Project. Hazardous materials are defined as those with properties such as flammability, corrosiveness, or inherent toxicity. Hazardous materials that will be transported, handled, and stored at the Project include, but are not limited to, petroleum products, propane, explosives, batteries, mill reagents, antifreeze, solvents, grease, glycol coolant, nuclear gauges for slurry density measurement and other chemicals. Hazardous waste material generated by the Project include, but are not limited to, used batteries, waste oil, oil filters, solvents, oily rags and absorbent material, contaminated soil, empty petroleum and reagent drums and pails, used laboratory reagents, scrap treated lumber and solvent waste.

Hazardous waste management standards are required to ensure the practices employed during the Project are protective of human health (workers and nearby community) as well as the surrounding environment. Specific protection measures are in place to minimize exposure to hazardous materials resulting from spills, leaks or releases. For more information refer to the Company's Spill Contingency Plan, Emergency Response Plan and Emergency Response Plan - Propane.

2.16.2 Environmental Protection Measures

The following measures will be implemented to protect the environment and the health and safety of the workers and surrounding communities:

- The four main principles of waste management in order of hierarchy include reduce, reuse, recycle and dispose. Once reduce, reuse and recycle have been implemented the remaining hazardous waste will be responsibly handled, stored and disposed of in accordance with regulatory requirements. Project personnel will work to reduce the amount of hazardous waste generate by recycling and re-using materials, and/or using less toxic or non-toxic alternatives when possible.
- Hazardous materials and hazardous waste materials will be handled, stored, transported and disposed of in accordance with regulatory requirements.
- All material will be clearly labelled according to Workplace Hazardous Materials Information System (WHMIS) and be accompanied by applicable Material Safety Data Sheets (MSDS).
- Hazardous material will be stored in areas designed to adequately and safely store the required quantity over a prescribed period.

- Sufficient storage space between containers will be maintained to allow for safe access and handling.
- Storage areas will be properly designed to contain and prevent contamination of the environment. The transfer of hazardous waste material will employ secondary containment (drip trays) and spill response material.
- Spill kits, protective equipment, and/or other equipment necessary to contain, clean and mitigate effects of spills will be maintained on site.
- Spills and/or releases of any hazardous materials will be reported immediately to the Environment Department and the Emergency Response Plan and Spill Contingency Plan will be implemented.
- Only containers that are in good condition will be used and will be properly labelled, marked, placarded and secured.
- Incompatible materials (bases and acids) will not be stored in the same container and will be stored safely and sufficiently far apart to prevent accidents.
- Containers or liners that previously held hazardous material will be subject to hazardous waste disposal, unless the containers are classified as empty.
- Hazardous material storage facilities will be inspected routinely by Project personnel, dependent upon volume and risk, to ensure compliance with relevant regulations and Best Management Practices (BMPs). Inspections will include, but not limited to, ensuring labeling and signage on containers are legible and in good condition, inspection of storage areas, secondary containment and condition of containers for possible leaks, drips or indications of any loss.
- Site hazardous materials and waste storage facilities will be inspected by the Environment Department, Safety Department, and/or Occupational Health and Safety Committee on at least a semi-annual basis.
- All hazardous waste materials shall be clearly labelled, properly stored and properly segregated from the non-hazardous waste stream as to minimize cross contamination.
- Smoking is only permitted in designated areas.
- All Project personnel, including contractors, are responsible for maintaining the current MSDS on site for all hazardous materials pertaining to their activities.
- The transport of hazardous material offsite for recycling or disposal will be handled by licenced contractors. The contractors will comply with relevant legislation and will be responsible for the development of a hazardous materials handling plan, including spill contingency and emergency response plans. Hazardous waste materials will be

transported to provincially licenced disposal facilities and copies of waste transport and disposal manifests will be kept on file.

- Waste oils, lubricants, and other used oil shall be stored in accordance with Guidelines for the Storage of Used Oil, implemented August 26, 2003, until removed from site for disposal at an approved, licenced waste management facility.
- The use of used oil as a dust suppressant is strictly prohibited.

2.16.3 FORMS

- AGC – ENV FRM – 001 Spill Report Heads Up Form
- AGC – ENV -FRM – 002 Environmental Incident Report

2.16.4 RELATED DOCUMENTS

- OES 2.23 Spill Control Measures and Reporting
- AMNS Spill Contingency Plan
- AMNS Emergency Response Plan
- AMNS Emergency Response Plan - Propane
- Guidelines for the Storage of Used Oil, August 26, 2003 (novascotia.ca/nse/dept/docs.policy/Guidelines-Storage.of.Used.Oil.pdf)

2.17 ROAD TRAFFIC MANAGEMENT

2.17.1 Environmental Concern

Traffic during construction and operation, if not properly managed, may cause disruption, accidents, impacts to local wildlife and surrounding communities.

Project-related traffic will be managed to:

- Ensure safe operation for all road users.
- Ensure smooth flow of road traffic during the Project's operation.
- Minimize wildlife injury and mortality from vehicle collisions.
- Ensure that adequate information is given to drivers and pedestrians in a timely manner to avoid accidents and delays.
- Ensure assessment, monitoring and improvement of the existing road traffic site plans

Over the life of the Project, there will be different levels of traffic flow. The peak flow periods of vehicles and equipment, and construction workers are expected to be during the day. Low flow periods will be during the night and on weekends.

2.17.2 Environmental Protection Measures

- The Run of Mine (ROM) Road has restricted access to public vehicles and requires clearance from the Mine Supervisor for vehicles and equipment other than haul trucks. The ROM road crossing at Moose River Road requires all mine traffic to yield to public vehicles within the identified signed area. The same procedure is followed at the Waste Rock crossing at Moose River Road adjacent to the Alva trailers. All mine traffic must share the road and be respectful of other users.
- Traffic traveling on Billybell Way is restricted to 40 km/hr. The traffic speed reduces to 30 km/hr prior to the security checkpoint. Traffic speed will be monitored by laser (LIDAR) when required.
- All mine vehicles and equipment are equipped with two-way radios. All light (LT) vehicles must radio when entering and exiting the pit and will only proceed if no communication directs otherwise. LT vehicle operation, including two-way radio call procedures, will follow the Mobile Equipment and Light Vehicle Operations (AGC-PRO-MINE-012) Safe Operating Procedure.
- All traffic will be restricted to designated access roads and trails.

- During blasting activities on site, all traffic will be restricted from the blast area as indicated by the Blast Safety Zone Map. Blasting activities (date/time) will be posted on Moose River Road, Mooseland Road and communicated to all Project Personnel 24 hrs in advance of the blast.
- Wildlife has the right-of-way if crossing, or attempting to cross, the Project roadways. Drivers will be obligated to stop (when safe to do so) for all wildlife seen on, or immediately adjacent to roadways, giving wildlife the opportunity to move off. Wildlife sightings must be reported to the Environment Department in accordance with EPP Section 2.9.
- Snapping turtles frequently cross Moose River Road during the spring and summer months. The most common location for turtle sightings is near the Moose River crossing at Moose River Road, at the western boundary of the Project site. Signage has been installed in the crossing area to alert drivers to the potential for turtle encounters. If a turtle is found, it must be immediately reported to the Environment Department. See Section 2.12 for more details.
- Dust suppression will be utilized when necessary to improve visibility and reduce fugitive dust emission. Refer to Section 2.6 for further details.
- The Project's Mine Operations team and Site Services Department are responsible for on site road maintenance to ensure the roads are safe for designated uses.

2.17.3 FORMS

- AGC – ENV FRM – 001 – Spill Report Heads Up Form
- AGC – ENV -FRM – 002 – Environmental Incident Report

2.17.4 RELATED DOCUMENTS

- Touquoy Mine Site Traffic Plan
- OES 2.2 – Avoiding Disturbance to Local Land Users
- OES 2.6 – Fugitive Dust Management
- OES 2.9 – Wildlife Sightings
- OES 2.12 Snapping Turtle Protection Measures
- AGC-PRO-MINE-012 Mobile Equipment and Light Vehicles Operation SOP
- AMNS Wildlife Management Plan

2.18 BLASTING

2.18.1 Environmental Concern

Blasting will be conducted at the Project site to access and extract ore. Blasting will typically occur two to three times per week. Emulsion is the primary blasting agent used. Although this type of explosive contains ammonium nitrate, the chance of ammonium nitrate escaping and contaminating the surrounding area is considered low. Ammonia is toxic to aquatic life at certain concentrations; therefore, the proper handling of explosives during blasting operations is crucial in preventing spills from having an impact to nearby watercourses. Blasting will generate dust and noise emissions therefore air quality and noise levels will be monitored by the Environment and Mine Operations Departments.

2.18.2 Environmental Protection Measures

- The use of explosives is governed by Natural Resources Canada. The Company utilizes a Drill and Blast Contractor to carry out all Project blasting. The Drill and Blast Contractor shall have all required certifications including a valid Blasting Certificate issued by the Province of Nova Scotia.
- A technical blast design will be prepared by a qualified person to ensure the ground vibration and air concussion limits can be achieved.
- Prior to blasting, the climatic conditions will be assessed to ensure no thermal inversion is anticipated at the time of the proposed blast. Blasting will not occur during thermal inversion conditions.
- All necessary precautions shall be taken to safely handle the explosives and to minimize spillage during blasting operations.
- All spills shall be reported to the Environment Department immediately.
- Environmental personnel will monitor water bodies and watercourses adjacent to blasting activities to ensure operational activities are not causing deleterious effects on aquatic resources.
- All blasts are to be monitored for air concussion (128 dBL) and ground vibration (12.5mm/s) limits to ensure parameters are achieved. Any non-compliant result must be reported to the Environment Department immediately.
- During blasting, all traffic will be restricted from the blast area as indicated by the Blast Safety Zone Map. All persons not associated with the blast must remain in this zone during blasting activities.

- Blasting date and time will be posted on signage at Moose River Road and Mooseland Road. The Blast Safety Zone Map will be communicated to all Project Personnel 24 hrs in advance of the blast.

2.18.3 FORMS

- AGC – ENV FRM – 001 Spill Report Heads-Up Form
- AGC – ENV -FRM – 002 – Environmental Incident Report

2.18.4 RELATED DOCUMENTS

- OES 2.21 – Air Quality, and Noise and Vibration
- AGC-PRO-MINE-001 Blasting Procedure
- AGC-PRO-MINE-003 Blast Traffic Control Procedure
- AMNS Industrial Approval 2012-084244-06

2.19 MINE CONTACT WATER, FACILITY RUNOFF, PROCESS WATER, AND EFFLUENT

2.19.1 Environmental Concern

Any water that comes in contact with the mine facility can potentially be impacted by ore and waste rock storage, handling, and processing activities. IA Condition 15 requires all wastewater and surface runoff, associated with the Project's Facility to be directed to the TMF for treatment apart from the two overburden stockpiles located on site. This includes water processed through the Mill and surface water collected within the haul road runoff collection ponds, Mill Site Pond, Open Pit, Waste Rock Collection Ponds, and TMF Seepage Ponds. The discharge of effluent from the Project is regulated via the Metal and Diamond Mining Effluent Regulations.

The quality and quantity of water directed to and from the TMF must be monitored in order to manage water levels and maintain compliance with permit and regulatory requirements. Uncontrolled or untreated releases of mine contact water to the environment may impact drinking water, aquatic resources, wildlife and human health and must be reported to regulators.

2.19.2 Environmental Protection Measures

The following measures will be implemented to minimize the potential for accidental releases of mine contact water on site:

- Mine contact water, facility runoff, and waste process water will be captured and directed to the TMF in accordance with IA Condition 15 and the Project's Water Management Plan.
- The quantity of water directed to the TMF is monitored by the Mill and Environment Department via the use of inline flow meters. All inputs to the TMF must have flow meters installed.
- Water levels within the TMF are managed by the Mill via monthly updates to the site Water Balance in accordance with the TMF Operations, Maintenance, and Surveillance (OMS) Manual. TMF capacity is also reviewed by the TMF's Engineer of Record on a semi-annual basis.
- Prior to release to the environment, process/mine water is treated via the TMF Effluent Treatment Plant (ETP). Further passive treatment occurs within the polishing pond and engineered wetland prior to release to Scraggy Lake.
- The Project is permitted to discharge treated effluent to the environment from a single discharge point at the south end of the TMF. The quantity and quality of treated effluent is monitored to meet federal MDMER requirements. Control of discharge is maintained via an engineered discharge control structure. Samples of effluent are collected by the Environment Department to meet the testing requirements. In the event that results of

water quality testing fail to meet discharge requirements, the discharge valve must be immediately closed.

- Operating levels within all site collection ponds must be met, as to avoid overtopping of these ponds. This includes the TMF seepage ponds, tailings pond, polishing pond, mill pond, waste rock ponds, and other collection ponds located along the haul roads. Water levels must be regularly monitored to maintain water levels below allowable levels. Dewatering and pumping procedures are to be conducted in accordance with the relevant SOPs.
- Any problems associated with pumping operations, including improper operation, pipeline rupture, system breakdown, etc. shall be reported to an employee's direct Supervisor and the Environmental Department.
- In the event of an accidental release of contact water, process water, or facility runoff, immediate action will be taken to ensure that the release is contained and prevented from reaching any water body. All process water, facility runoff, or contact water release events must be reported to the Environmental Department.
- Divert surface runoff from entering the Project Site whenever possible to reduce amount of contact water or facility runoff generated.

2.19.3 FORMS

- AGC – ENV FRM – 001 Spill Report Heads-Up Form
- AGC – ENV -FRM – 002 Environmental Incident Report

2.19.4 RELATED DOCUMENTS

- AGC-PRO-MINE-004 Dewatering
- AGC-PRO-MILL-015 TMF Seepage Pond Pumping
- AGC-PRO-ENV-016 Waste Rock Collection Pond Pumping
- Metal and Diamond Mining Regulations – Government of Canada (https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html)
- AMNS TMF Operations, Maintenance, and Surveillance Manual
- AMNS Industrial Approval 2012-084244-06
- AMNS Water Management Plan

2.20 WASTE ROCK MANAGEMENT

2.20.1 Environmental Concern

Metal leaching (ML) and acid rock drainage (ARD) are naturally occurring processes which may have negative impacts on the receiving environment if they occur in the absence of adequate neutralization, dilution and/or attenuation. ARD occurs when pyrite and other sulphide minerals are exposed to the weathering effect of water and oxygen. ARD is generated from the oxidation of sulphur and the precipitation of ferric iron. Although this can occur naturally, the process of ARD is increased by large scale developments such as quarry development and storage of waste rock during mining operations. ML/ARD can impact the environment and nearby waterbodies if not properly managed. The Project has developed a ML/ARD Management Plan to formalize the monitoring procedures as well as to provide guidance with respect to best practice mitigation strategies that may be considered.

2.20.2 Environmental Protection Measures

- All Supervisors involved in quarry development and waste rock management will be familiar with the AMNS ML/ARD Management Plan.
- Samples of fresh waste rock will be collected from the open pit mine for a least every 100,000 tonnes of ore mined. Samples are collected by the Geology Department in accordance with the Blast Materials Sampling SOP.
- Samples from the tailing's slurry are collected for every 100,000 tonnes of ore processed. Samples are collected by the Mill Department in accordance with the Tailings Solid Sampling SOP.
- Samples from the TMF Quarry are collected by the Geology Department and analyzed for at least every 20,000 tonnes of rock quarried. Samples are collected by the Geology Department in accordance with the Blast Materials Sampling SOP
- Samples from waste rock are screened for total sulphur at the on-site AMNS laboratory (as per AGC-PRO-ASSAY 300) and the remaining geochemical test work is carried out at an external laboratory and are analyzed for parameters as prescribed in the ML/ARD Management Plan. Results of analysis are reviewed by Geology and Environment Departments as well as an independent professional geochemist.
- There are four material types expected as a result from the operation: ore, quarry rock (suitable for construction), clean waste rock, or potentially acid generating (PAG) waste rock. Material is stored based on classification as described in the ML/ARD Management Plan.

- Waste rock within the storage area will be tracked in case it is determined that management is required.
- Quarry materials used for construction shall be non-potentially acid generating (NPAG) waste rock.
- Weekly monitoring of pH, conductivity, total dissolved solids, and temperature in the waste rock collection ponds and open pit will be conducted by the Environment Department.
- Any signs of ML/ARD (staining, stressed vegetation, snowmelt) should be reported to the Environmental Department immediately.

2.20.3 FORMS

- N/A

2.20.4 RELATED DOCUMENTS

- AMNS ML/ARD Management Plan (Draft)
- AGC-PRO-GEO-007 Blast Material Sampling & Handling
- AGC-PRO-MILL-951 Tailings Solids Sampling
- AGC-PRO-ASSAY 300 Eltra CS800 Sulphur Analyzer Operation
- AMNS Industrial Approval 2012-084244-06

2.21 AIR QUALITY, AND NOISE AND VIBRATION

2.21.1 Environmental Concern

Project related sources that may affect air quality include exhaust emissions from vehicles and other mine equipment, stack emissions from the plant facility along with fugitive dust emissions. Further details regarding potential sources of fugitive dust are outlined in Section 2.6. Minimizing emissions at the source will have a combined benefit of protecting the health and safety of workers on site and protect the environment and surrounding residents by minimizing long-term impacts associated with the Project.

Project related sources that have the potential to generate elevated noise and vibration levels would include open pit operations such as machinery, diesel generators, vehicles, drilling, excavation, crushing of aggregate, blasting, milling operations, etc. Mitigation measures are put in place in order to protect Project Personnel working with or near noisy equipment or processes to minimize and/or avoid the impact of high direct or ambient noise which could potentially result in noise induced hearing loss. Noise and vibration may also affect wildlife in areas surrounding the Project site.

2.21.2 Environmental Protection Measures

Particulate emissions shall not contribute to an ambient concentration of total suspended particulate matter that exceed the following limits (in micrograms per cubic meter of air) at or beyond the Project property boundaries:

- Annual Geometric Mean 70 µg/m3
- Daily Average (24 hr.) 120 µg/m3

Ambient air monitoring is completed annually at the end of July and beginning of August at designated stations across the site and along site property boundaries. See the Key Figure section (4.0) for a map showing the location the air monitoring stations.

Sound levels measured at stations situated at or beyond the Project property boundaries shall not exceed the following equivalent sound levels (Leq):

- Leq 65 dBA 0700-1900 hours (Days)
- 60 dBA 1900-2300 hours (Evenings)
- 55 dBA 2300-0700 hours (Nights)

Blasting limits shall be measured every blast for air concussion and ground vibration. Air concussion values shall not exceed 128 dBL within 7 m of the nearest structure outside the

Project boundary. Ground vibrations shall not exceed 12.5 mm/s below grade or less than 1 m above grade in any part of the structure located outside of the Project boundary.

For fugitive dust emissions mitigation measures please see Section 2.6 of this EPP.

2.21.3 FORMS

- N/A

2.21.4 RELATED DOCUMENTS

- OES 2.6 Fugitive Dust Management
- OES 2.18 Blasting
- AMNS Industrial Approval 2012-084244-06
- AMNS Air Quality Management Plan

2.22 WETLAND CROSSINGS, ALTERATIONS AND MANAGEMENT

2.22.1 Environmental Concern

The term wetland is land commonly referred to as a marsh, swamp, fen or bog, that is either periodically or permanently with standing water. Wetlands sustain aquatic processes that are indicated by the presence of poorly drained soils, hydrophytic (water-loving) vegetation and biological activities that are adapted to wet conditions. Wetlands perform many important functions for our ecosystems including improving overall water quality, controlling floods and recharging groundwater. They are among the most productive and diverse ecosystems on earth. The loss of wetland can mean the loss of local fish population, wildlife and plant species. Many of Nova Scotia's wetlands have already been lost and therefore they take on a heightened level of importance.

2.22.2 Environmental Protection Measures

The Project has a Wetland Protection Plan (WPP) which provides an overview of methods by which wetlands existing in, adjacent to and down-gradient of the Project are protected. There are two main activity types that are addressed in the WPP and are as follows:

- Direct impacts as a result of construction activities *i.e.* grubbing, machinery access, removal of buffers, etc. and;
- Indirect impacts as a result of altering hydrological conditions *i.e.* change in water inputs and outputs, water quality considerations, etc.

Protection measures outlined in this document are as follows:

- As per IA Condition 7m: There shall be a 30m undeveloped buffer on all adjacent watercourses and wetlands unless specific approval has been given to alter the watercourse/wetland. See the Key Figure section (4.0) for wetland delineation within the Project area.
- To encroach on this limit, a wetland or watercourse alterations approval from NSE is required. All work associated with wetland or watercourse alterations will have site-specific terms and conditions which must be adhered to.
- All employees must adhere to the specific conditions covered in the wetland alteration listed below:
    - Approval #2016-095967-03, Effective Date January 30, 2020
- A Wetland Monitoring Plan (WMP) has been developed to ensure protection of all remaining wetland habitat, outside of the permitted alteration. An annual report is to be

compiled at the end of each calendar year detailing the results of the monitoring completed that year. This report will also include:
    - Actual areas of wetland that have been altered that calendar year
    - An updated schedule for alteration areas expected for the forthcoming year.
- All work operations shall be conducted in a manner to protect watercourses and wetlands from siltation and disturbance. Sediment control measures shall be installed prior to construction and properly maintained until erodible material is stabilized. Refer to Sediment and Erosion control Section 2.8 for more information on appropriate control measures.
- Regular monitoring of nearby wetlands during construction activities is required to ensure protective measures are effective;
- Driving and use of machinery within wetland habitat will be limited to the use of swamp maps/corduroy bridges in wet areas to prevent rutting, diverting water flow and sedimentation;
- Ensure all development related activity (*i.e.* construction areas, access roads, etc.) are located within areas where biophysical field evaluations have been completed and approvals/written authorizations are in place as required, including work within 30m or a wetland and watercourse;
- Clearing within wetland habitat outside of approved wetland alteration areas is prohibited;
- Clearing of vegetation within wetlands should occur outside of the breeding bird window, otherwise a nesting survey must be completed to ensure compliance with federal and provincial legislation. The provincial wetland alteration permits require nesting surveys be completed for clearing activities within a wetland between the period of May 1 to September 30.
- Refueling shall not occur within 30m of a wetland or watercourse.
- All spills shall be immediately reported to the Environment Department and the Emergency Response Plan and Spill Contingency Plan will be implemented.

2.22.3 FORMS

- AGC – ENV FRM – 001 Spill Report Heads-Up Form
- AGC – ENV -FRM – 002 Environmental Incident Report

2.22.4 RELATED DOCUMENTS

- OES 2.8 Erosion and Sediment Control
- OES 2.7 Fuel Storage and Handling
- OES 2.23 Spill Control Measures and Reporting
- AMNS Water Approval – Wetland Alteration 2016-095967-03
- AMNS Industrial Approval 2012-084244-06
- AMNS Wetland Monitoring Plan
- AMNS Wetland Protection Plan
- Nova Scotia Wetland Policy - Nova Scotia Environment (NSE). (https://novascotia.ca/nse/wetland/docs/Nova.Scotia.Wetland.Conservation.Policy.pdf)

2.23 SPILL RESPONSE AND REPORTING

2.23.1 Environmental Concern

A variety of potentially hazardous supplies and materials will be required throughout the life of the Project. Hazardous materials are defined as those with properties such as flammability, corrosiveness, or inherent toxicity. Hazardous materials that will be stored and handled at the Project include, but are not limited to, petroleum products, propane, mill reagents, antifreeze, solvents, grease, glycol coolant and other chemicals. For more information on the management of hazardous materials onsite see Section 2.16 Hazardous Materials and Hazardous Waste Management.

Accidental and uncontrolled leaks, releases and spills of hazardous material may occur due to improper storage, poor handling procedures, equipment malfunction or process failures. Spills, leaks or releases have the potential to negatively impact human health and the environment. Refer to the Spill Contingency Plan and Emergency Response Plan for various response action levels based on the type of hazardous product spilled, volume spilled and type of receiving environment. A brief summary of the various spill response action levels is provided below.

The levels of emergency response for spills are detailed in the Spill Contingency Plan. The Company has adopted a tiered emergency classification scheme that includes three levels of emergencies. Each level of emergency, based on the significance of the event, requires varying degrees of response, effort and support. The three response levels are as follows:

Level 1 (Low) – Minor accidental release of a deleterious substance with;

- No threat to public safety; and/or
- Negligible environmental impact to receiving environment

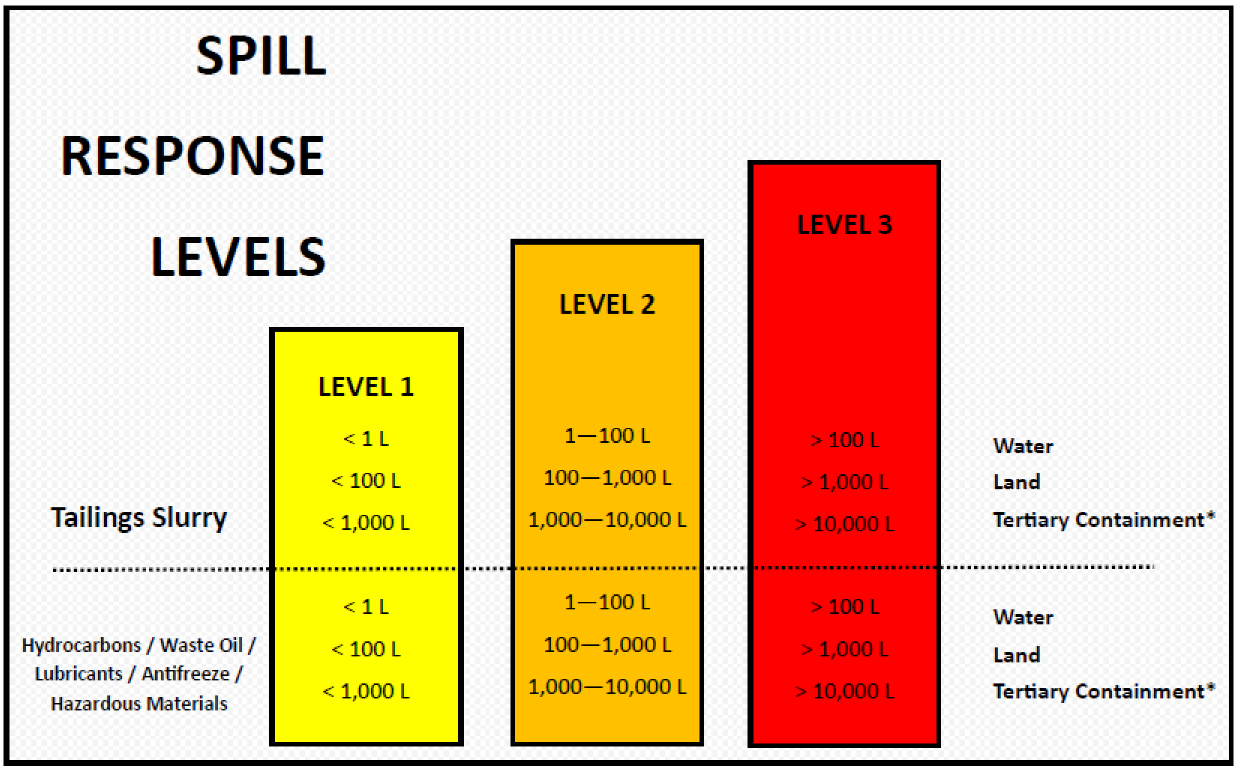
Level 2 (Medium) – Moderate accidental release of a deleterious substance with;

- No threat to public safety; and/or
- Moderate environmental impact to receiving environment

Level 3 (High/Extreme) – Major accidental release of a deleterious substance with;

- A threat to public safety and jeopardizes project personnel safety; and/or
- Significant environmental impacts to receiving environment

Spill response levels are provided in Figure 2.23.1.1 for tailings, hydrocarbons and hazardous materials.



*Engineered containment ditches or collection ponds

ANY accidental release of a deleterious substance into a fish habitat is reportable to regulatory authorities

Figure 2.23.1.1: Spill Response Levels for Tailings Slurry, Hydrocarbons and Hazardous Materials

2.23.2 Environmental Protection Measures

Detailed environmental response measures are provided in the Spill Contingency Plan. A high-level summary of a generic spill response steps is provided below:

Source Control – If safe to do so, reduce or stop the flow of product. This may include actions such as turning off a pump, closing a valve, sealing a puncture, raising a leaking or discharging hose to a level higher than the material inside the tank, or transferring the material to a secondary container.

Contain and Control the Free Product – If safe to do so, prevent or minimize the spread of 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 (socks), dykes, berms, or trenches.

Protection – Evaluate the risk of the impacted area to the surrounding environment. If safe to do so, protect sensitive ecosystems and natural resources at risk by isolating the area and/or diverting the spilled material away from sensitive receptors such as watercourses, water bodies and wetlands.

Report the Spill - See below for further details.

Spill Clean-up – Recover and contain as much free material as possible. Ensure proper clean-up and spill controls are in place. Ensure proper disposal of spill clean-up materials.

Spill control materials are available in spill kits (yellow drums) located throughout the site.

Emergency spill response training shall be completed in conjunction with the Company's Emergency Response Plan. Supervisors should be trained in general spill response procedures relevant to their work area. Third party consultants and contractors may be retained as required for technical support and resources.

Various aspects of the emergency spill response such as organization, roles and responsibilities, general spill response procedures, internal and external contacts list, training, resources, and reporting are detailed in the Spill Contingency and Emergency Response Plans.

2.23.3 Spill Reporting Procedures

All spills (whether reportable externally or not) must be reported by the first responder to their immediate supervisor and then to the Environment Department. The supervisor of the responsible department will notify the Environment Department and conduct the necessary spill response with support as required.

Department supervisors are required to report the spill as soon as reasonably practicable, no more than four hours from the time of the spill. Initial reporting can be made via the Company's Spill Report Incident Heads Up Form. Alternatively, if access to the form is not readily available, an email to the Environment Department's incident email address will be accepted (environmental.incident@atlanticgold.ca) and should include:

- Substance spilled
- Estimated volume
- Receiving environment (land/water/wetland/facility infrastructure)
- Immediate cause
- Summary of clean-up actions

Further information may be requested depending on the nature of the release. The Environmental Incident Report form must be initiated within 24 hours, if required by the Environment Department. This report requires inclusion of photos, a description of clean-up activities, subsequent actions, identifies root cause and determines any additional corrective actions.

All external reporting requirements for regulatory agencies shall be submitted by the Environment Department.

2.23.4 FORMS

- AGC – ENV FRM – 001 Spill Report Heads Up Form
- AGC – ENV FRM – 002 Environmental Incident Report Form

2.23.5 RELATED DOCUMENTS

- OES 2.7 Fuel Storage and Handling
- OES 2.16 Hazardous Material and Hazardous Waste Management
- AMNS Spill Contingency Plan
- AMNS Emergency Response Plan

3 DOCUMENTATION LOGS AND FORMS

Current versions of all documents, logs and forms can be accessed on the Company's network under the Policies Procedures folder. Exploration logs and forms are accessible on the Exploration X drive under the Health and Safety folder. A summary of all documents, logs and forms referenced in the EPP is provided in the table below.

Note: The version numbers referenced in the table below are the most recent versions at the time of EPP update in June 2020. These documents may have been updated since the time of issuance of this EPP. Refer to the Policies and Procedures folder for most recent revision.

Table 3.0: Documentation Logs and Forms

FORM / DOCUMENT	VERSION / DOCUMENT #	DOCUMENT DATE
AGC-PRO-ASSAY 300 Eltra CS800 Sulphur Analyzer Operation	Refer to Policies Procedures folder for most up to date versions of SOPs and forms.	
AGC-PRO-ENV-016 Waste Rock Collection Pond Pumping		
AGC – PRO – ENV 006 Rain Event Monitoring Protocol		
AGC - ENV FRM - 002 REV 3 Environmental Incident Report		
AGC-PRO-GEO-007 Blast Material Sampling & Handling		
AGC-PRO-MILL-015 TMF Seepage Pond Pumping		
AGC-PRO-MILL-951 Tailings Solids Sampling		
AGC-PRO-MINE-001 Blasting Procedure		
AGC-PRO-MINE-001 Blasting Procedure		
AGC-PRO-MINE-003 Blast Traffic Control Procedure		
AGC-PRO-MINE-004 Dewatering		
AGC-PRO-MINE-012 Mobile Equipment and Light Vehicles Operation		
AGC – PRO – ENV – 013 Refueling Mobile Equipment and Light Vehicles		
AGEN.003 Surface Drills and Drill Sites (Exploration Safe Work Practice)	Refer to Exploration X drive for most up to date versions of SOPs and forms.	
AGEF.004 Pre-Drill Startup Site Inspection – AGC Exploration		
AGEF.005 Detailed Drill Inspection – AGC Exploration		

FORM / DOCUMENT	VERSION / DOCUMENT #	DOCUMENT DATE
AGEF.006 Drill Site Simplified Checklist – AGC Exploration	Refer to Exploration X drive for most up to date versions of SOPs and forms.	
AGEF.007 Drill Site Decommissioning – AGC Exploration		
Air Quality Management Plan, Touquoy Gold Mine Project, Moose River Gold Mines, NS – Conestoga-Rovers & Associates	-	July 2008
Archaeological Screening, Halifax Regional Municipality, Archaeological Screening Report with Appendix for 2006 Screening – Prepared by Cultural Resource Management Group Ltd	-	November 2006
Complaint Resolution Plan	Version 1	December 2016
Crown Land Lease Agreement	2794371	February 10, 2016
Environmental Assessment Approval, Touquoy Gold Project, DDV Gold Ltd., Proponent, Halifax Regional Municipality, Nova Scotia	-	February 1, 2008
Emergency Response Plan	AGC-PLN-HS-001	August 1, 2018
Emergency Response Plan – Propane	AGC-PLN-HS-007	November 2018
Erosion and Sediment Control Plan, Prepared by Stantec Consulting Ltd.	Revision 2	January 31, 2020
Fugitive Dust Control Plan, Touquoy Gold Mine Project, Moose River Gold Mines, NS	-	February 2008
Groundwater Contingency Plan, Prepared by Stantec Consulting Ltd.	Revision 1.2	January 18, 2019
Industrial Approval – Nova Scotia Environment	2012-084244-06	Effective Date: April 9, 2020
Mainland Moose Management Plan, Submitted by McCallum Environmental Ltd.	-	January 26, 2017
Metal and Diamond Mining Regulations - Government of Canada	Refer to https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html for most up to date version	
Mi’kmaq Knowledge Study, Touquoy Gold Project Moose River Gold Mines, Nova Scotia – Mi’kmaq Environmental Services, The Confederacy of Mainland Mi’kmaq	-	December 2005

FORM / DOCUMENT	VERSION / DOCUMENT #	DOCUMENT DATE
Migratory Bird Convention Act – Government of Canada	Refer to https://laws.justice.gc.ca/eng/acts/M-7.01/ for most up to date version	
ML/ARD Management Plan (DRAFT)	-	May 2019
Spill Contingency Plan	AGC-PLN-ENV-001	May 22, 2019
Spill Report Heads Up Form	AGC - ENV FRM – 001 REV 1	December 3, 2018
Touquoy Mine Site Traffic Plan	April 2019	April 9, 2019
TMF Operations, Maintenance, and Surveillance Manual	Revision 3	May 24, 2020
Water Approval – Water Withdrawal Permit (Scraggy Lake)	2017-103502-01	Effective Date: May 3, 2019
Water Approval - Wetland Alteration (all wetlands)	2016-095967-03	Effective Date: January 30, 2020
Water Management Plan, Touquoy Gold Project, Prepared by Stantec Consulting Ltd.	Version 1.0	February 9, 2017
Wetland Monitoring Plan	-	August 1, 2017
Wetland Protection Plan, Prepared by McCallum Environmental Ltd.	-	April 12, 2016
Wildlife Management Plan, Submitted by McCallum Environmental Ltd.	-	January 27, 2017

4 Key Figures

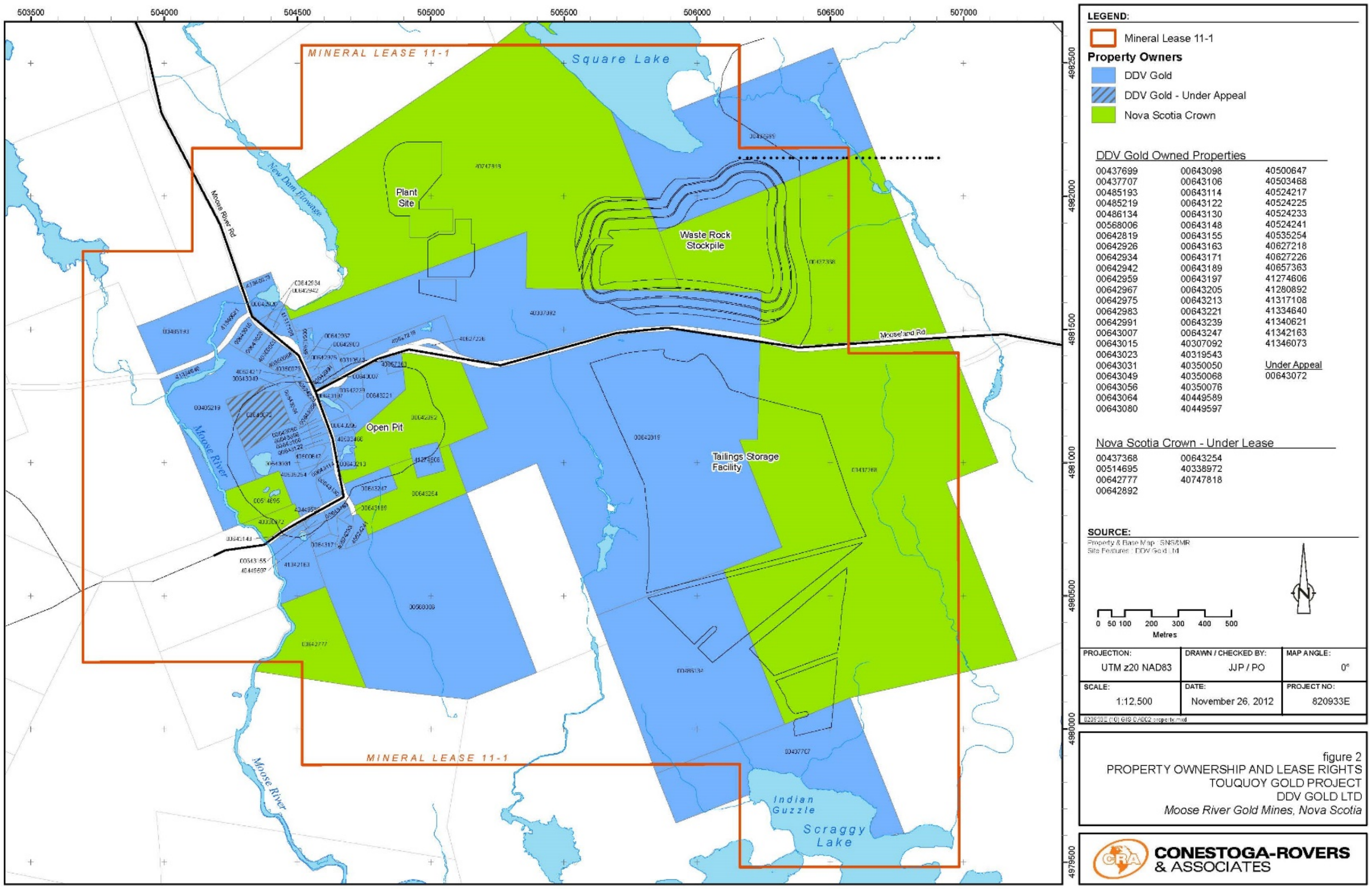


Figure 4.1: AMNS Property Ownership and Lease Rights Map

Figure 4.2: Wetland Location Map

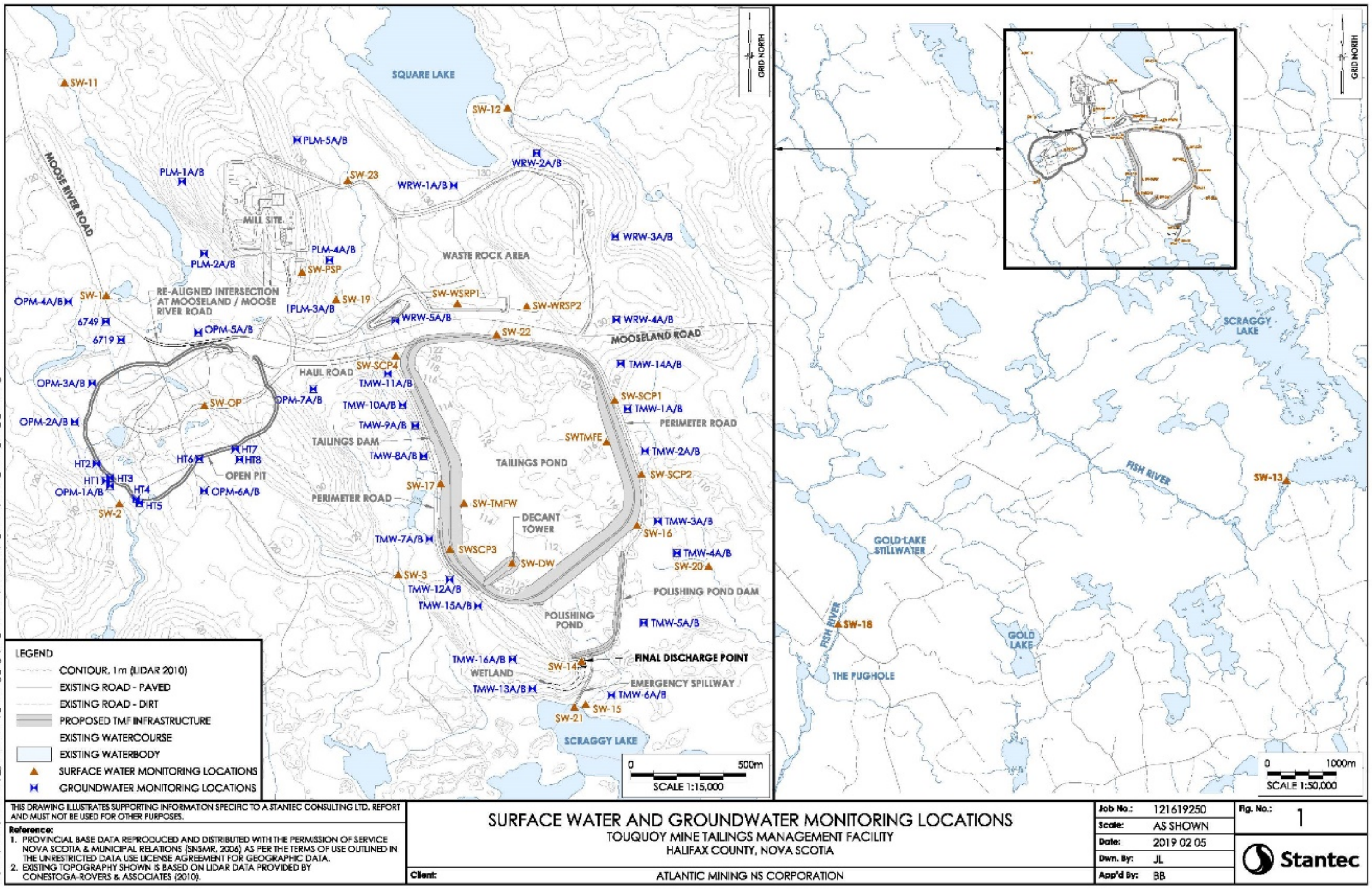


Figure 4.3: Groundwater and Surface Water Monitoring Location Map

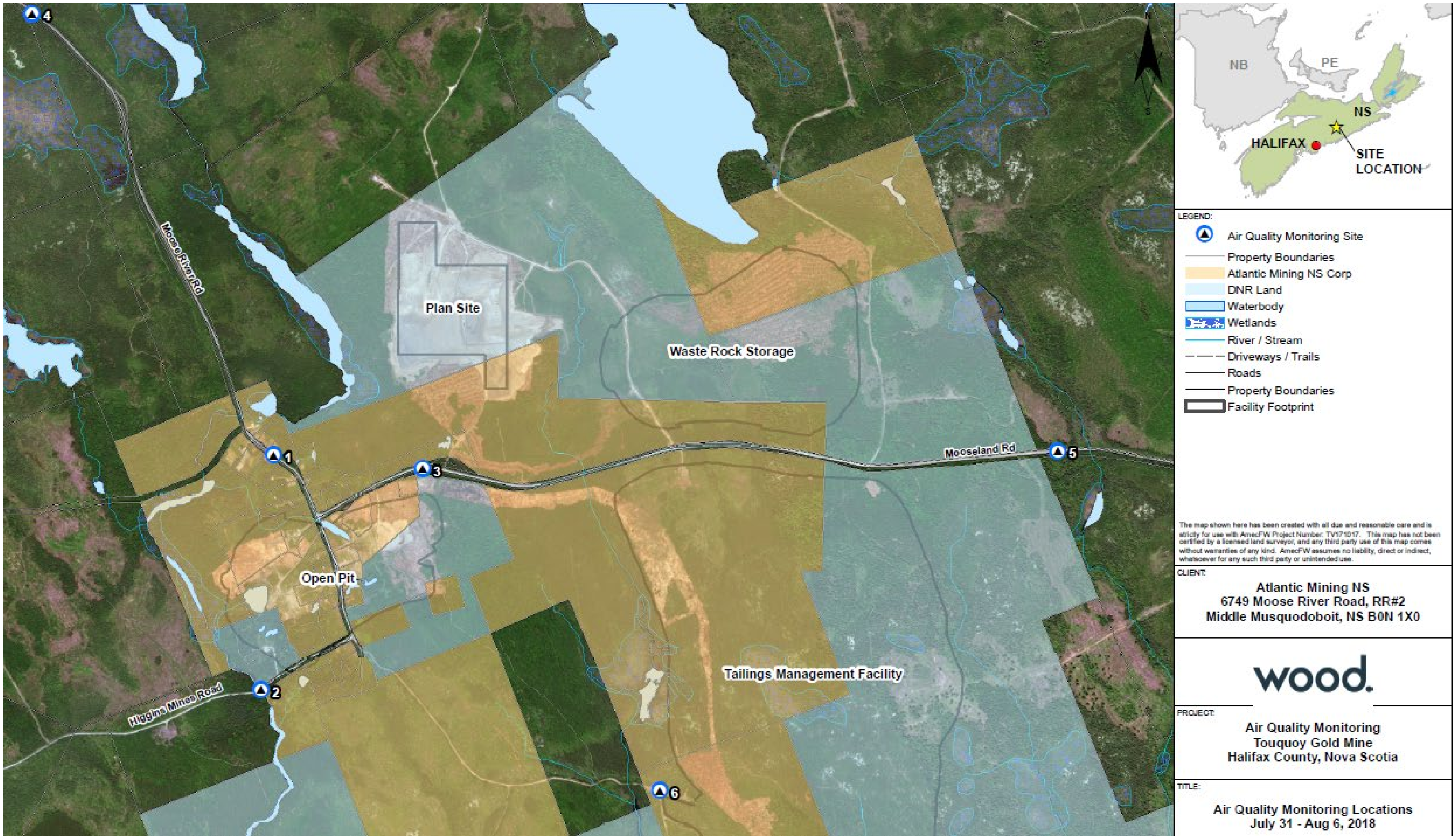


Figure 5.: Ambient Air Monitoring Station Location Map

Atlantic Mining NS Inc
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Middle Musquodoboit, Nova Scotia, Canada B0N 1X0
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A wholly owned subsidiary of **St Barbara Limited**
www.stbarbara.com.au

Fifteen Mile Stream Gold Project

Environmental Management System

EMP 2

Erosion Prevention and Sediment Control Plan

Highway 374

Trafalgar, Nova Scotia

DRAFT
Version 001
February 8th, 2021

Atlantic Mining NS Inc
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A wholly owned subsidiary of **St Barbara Limited**
www.stbarbara.com.au

The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, ("the Company") in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for a comprehensive Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during each phase of the Project minimize the effects of the mine and promote the protection of the environment and human health.

The Erosion Prevention and Sediment Control Plan is an important component of this system, and will include, but not limited to the following items:

- Use of sediment and erosion control prevention techniques, material and equipment;
- Control strategies for on-site water, and off-site water as it pertains to the project area, for each mine feature including diversion ditch designs and sediment control ponds;
- Sediment and erosion control procedures around fish-bearing waters during installation of any road crossings;
- Delineation of potential erosion control areas of concern;
- Restoration of erosion control areas of concern;
- Contingency and response plans; and,
- Monitoring and surveillance program.

To provide regulators and stakeholders context for evaluation of this future plan in relation to the Environmental Impact Statement, the Touqouy Mine Erosion and Sediment Control Plan has been attached to this document for reference. The plan for Fifteen Mile Stream Mine Site is proposed to have a similar approach, format and content, with the notable exception that the plan will be fully directed to the specifics of the Project. The EMS framework document provides additional discussion and objectives for this plan within Section 3.2.

Appendix

Erosion and Sediment Control Plan Update
Touquoy Gold Project, Moose River Gold Mines, Nova Scotia
Stantec Consulting Ltd.

EROSION AND SEDIMENT CONTROL PLAN - UPDATE

TOUQUOY GOLD PROJECT, MOOSE RIVER GOLD MINES, NOVA SCOTIA

June 30, 2020

Prepared for:

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Project Number: 121619250

This document entitled Touquoy Gold Project, Moose River Gold Mines, Nova Scotia was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Atlantic Mining NS Corp (the "Client") to support the permitting requirements for Client's submission under the Environment Act 122A(1) Approval number 2012-084244-05 (the "Application") for the Touquoy Gold Project (the "Project"). In connection thereto, this document may be reviewed and used by the provincial and municipal government agencies participating in the permitting process in the normal course of their duties. Except as set forth in the previous sentence, any reliance on this document by any third party for any other purpose is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

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Executive Summary

The Touquoy Gold Project involves the construction and operation of an open pit gold mine that includes a process plant and waste management facilities. The project is located at Moose River Gold Mines in Halifax County, approximately 115 km from Halifax. Approximately 262 ha of the site has been disturbed as a result of the development of the mine site, as of January 2020.

This document is the Erosion and Sediment Control Plan (ESCP) for the development and operation of the site. The site has been operational since October 2017. The ESCP has purposely been broken down into phases to better define the existing conditions and proposed work activities at the site and the environmental controls that will be installed and/or maintained for those activities and ongoing operations.

The ESCP has been developed based on the following four principles:

1. Keep clean water clean;
2. Minimize the amount of exposed soil;
3. Minimize the time of exposure of bare soil; and
4. Keep sediment onsite.

The ESCP consists of two parts: drawings that show existing conditions and known near future conditions (Appendix A and B); and the corresponding text that details the erosion and sediment controls that are in place or will be implemented to minimize offsite impacts). The environmental controls and their implementation have been presented on Drawing 1 in Appendix A, while near future conditions are presented on Drawing 2 in Appendix B.

Typical practices for ESC are presented along with a process for developing a project specific ESC Plan for any future works. Where future works are known and current plans in place to construct, this report provides guidance for implementation for those specific works.

The ESCP should be considered a “living document” that may have to be changed or adapted during the life of the Project to be continually effective.

Changes or adaptations to the ESCP may occur if:

1. Environmental controls and/or practices for a specific area of the site are not effective;
2. Project scheduling prevents certain activities from being completed; and
3. Contractor presents an alternative procedure for environmental control in a specific area of the site that meets the intent of the original ESCP and complies with Site Approvals and Permits.

1.0 INTRODUCTION

This report is prepared as an update to the Erosion and Sediment Control Plan (ESCP) (Stantec, 2010) for the Touquoy Gold Project (the Project). It is presented as a response to a Nova Scotia Environment (NSE) Environment Act Directive with Process RSN number 12677396, updated November 25, 2019, which states that, pursuant to Environment Act 122A(1):

> Atlantic Mining NS Corp. shall submit an updated version of the 2010 Erosion and Sediment Control Plan for the Touquoy Gold Mine to the Department by January 31, 2020. This updated plan shall be prepared, signed and stamped by a Qualified Independent Professional Engineer licensed to practice in Nova Scotia.

The Project is carried out in compliance with existing legislation, consistent with Federal and Provincial guidelines, best practices and Atlantic Mining NS Corp (AMNS) Corporate Policies;

- Measures to mitigate environmental effects are documented;
- Benefits from the Project are enhanced; and
- Reporting is structured to inform adaptive management and continual improvement.

As a subsidiary of St. Barbara, key aspects of AMNS environmental management program include:

- Ongoing, progressive rehabilitation of previously mined areas;
- Focus on water and energy efficiencies and sustainability;
- Proactive reporting and managing of environmental hazards and incidents;
- Environmental training and awareness;
- Ensuring compliance with statutory guidelines; and

Community and stakeholder consultation (St. Barbara, 2019).

1.1 PROJECT SUMMARY

The Touquoy Gold Project involves the construction and operation of an open pit gold mine that includes a process plant and waste management facilities. The project is located at Moose River Gold Mines in Halifax County, approximately 115 km from Halifax. Approximately 262 ha of the site is occupied or has been disturbed as a result of the development of the mine site as of January 2020. The mine has been operational since October 2017.

The mine site is centered in an area characterized by substantial historical gold mining disturbance. Moose River Gold Mines owes its origin to these activities with the initial discovery dating back to the 19th Century. Refer to Figure 1 for the location of the site.

The project site is located within relatively flat topography with maximum relief of 25 m. Elevations within the catchments vary from approximately from 160 masl (metres above sea level) in the headwater areas to 110 masl at the outlet. The site is characterized by low relief, hummocky type terrain, with frequent drumlins and numerous lakes, ponds, streams, and wetland areas. Presently, as calculated from Drawing 1 the property is covered with 54.5% undisturbed area (standing regrowth forest, wetlands, and waterbodies) 43% mine related disturbed area, and 2.5% clear-cut land or cleared residential or built-up lots.

As of 2020, the mine is estimated to be in production until 2023, followed by five years of active reclamation (Stantec, 2019b).

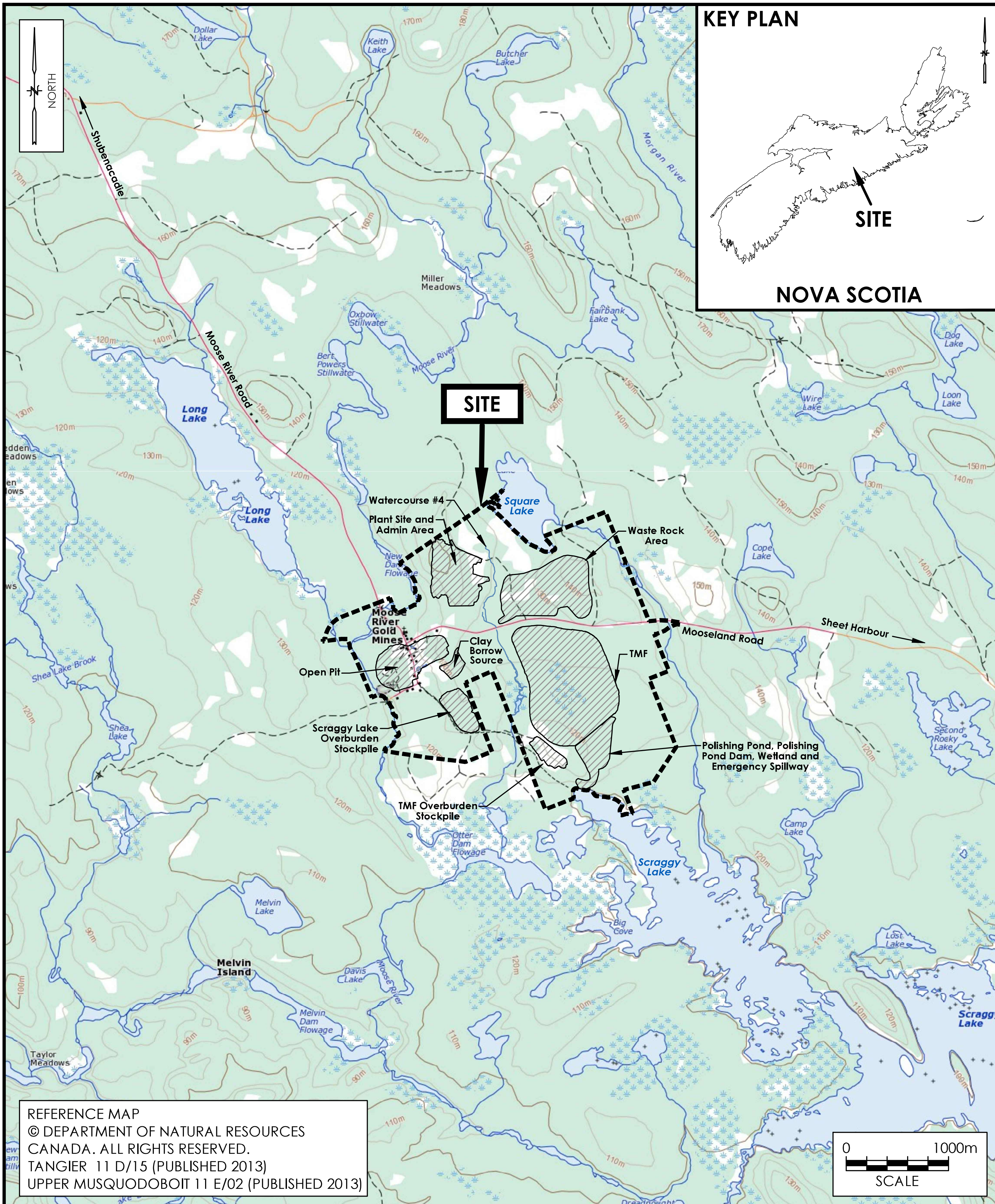
Refer to Drawing No. 1 in **Appendix A**, which shows the existing operational and water features at the Touquoy Gold Project site

1.1.1 Key Project Components

An open pit mine site requires many components to run. The key components of this Project are as follows:

- Open pit
- Waste rock storage area (WRSA)
- Plant site, buildings and supporting infrastructure, run of mine pile
- Tailings management facility (TMF) with polishing pond and engineered wetland
- Topsoil and overburden storage areas designated as TMF stockpile, and scraggy lake stockpile
- Clay borrow area
- Site roads, parking areas, and haul roads
- Water management facilities for contact water including collection ditches, ponds, and pumping infrastructure
- Effluent treatment plant
- Watercourse crossings
- Onsite pipelines
- Fuel and hazardous materials

A public roadway, Mooseland Road / Moose River Road, runs through the project site.



THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

SITE LOCATION PLAN

EROSION AND SEDIMENT CONTROL PLAN
TOUQUOY GOLD PROJECT
HALIFAX COUNTY, NOVA SCOTIA

Client:	ATLANTIC GOLD CORPORATION
Job No.:	121619250
Scale:	1 : 50,000
Date:	2019 11 21
Dwn. By:	JL
App'd By:	HA
Fig. No.:	1

Stantec

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2.0 EROSION AND SEDIMENT CONTROL PLAN (ESCP)

As part of the ongoing works at the Touquoy Gold Project site AMNS is committed to:

- Work with an independent professional engineer who will be retained to inspect, design, report and/or advise on the status of soil erosion and sedimentation controls during construction to ensure issues are addressed in a timely manner.
- Oversee site erosion and sediment control efforts to ensure compliance with NSE approvals.

2.1 PURPOSE AND OBJECTIVES

The purpose of the Project ESCP is to provide measures and Best Management Practices to minimize site erosion and protect nearby waterbodies from sedimentation for the protection of the environment.

Objectives and targets are established to drive continuous improvement in environmental performance and are consistent with the overall strategic goals of the Project. Objectives are measurable (where possible), monitored, communicated, and updated as appropriate.

In support of AMNS environmental objectives, the following performance objectives for the ESCP consider key Project interactions and compliance obligations:

- Prevent the uncontrolled release of sediment to natural watercourses
- Compliance with applicable legislation and regulations including the Industrial Approval (2012-084244-06) and other approvals issued by NSE (Wetland Alteration Permit 2016-095967-03 and Water Withdrawal Permit 2017-103502-01)
- Compliance with environmental monitoring criteria established as part of the environmental approvals process

The ESCP should provide an effective tool for minimizing environmental impacts involving earthwork and operations activities during the operations of the project by:

- Identifying erosion and sediment control requirements before new site work commences
- Managing surface water runoff where required
- Providing measures to control erosion and sediment
- Identifying potential impacts of erosion and sedimentation
- Identifying mitigation measures and their sequencing

2.2 LIVING DOCUMENT

The ESCP identifies the location, design, and construction sequencing for appropriate erosion and sediment control. The ESCP should be considered a "living document" that may have to be changed or adapted during the life of the Project to be effective.

Changes or adaptations to the ESCP may occur if:

1. Environmental controls and/or practices for a specific area of the site are not effective.
2. Project scheduling prevents certain activities from being completed (e.g., hydroseeding being delayed until the following year due to lateness of season).
3. Either the contractor or project personnel presents an alternative procedure for environmental control in a specific area of the site that meets the intent of the original ESCP and complies with Site Approvals and Permits.

2.3 PLANNING

2.3.1 Organizational Roles and Responsibilities

All persons working for or on behalf of AMNS, including employees and contractors, have a role in the successful implementation and maintenance of the Erosion and Sediment Control Plan. Table 1 outlines roles and responsibilities for erosion and sediment control activities:

Table 1: Organizational Roles and Responsibilities

Role	Responsibility
Construction Manager (could be Project Manager for construction phase or relevant Departmental Manager during operation phase)	Oversee clearing and grubbing activities during the Construction and Operation phases of the Project. Collaborate with the Environment Manager/Superintendent to plan soil handling activities.
Environmental Manager/Superintendent	Collaborate with the Construction Manager to plan and direct soil handling activities. Identify, document, track, and maintain up-to-date compliance obligations. Communicate compliance obligations and provide training to employees and contractors. Report non-compliances to NSE, ECCC and/or DFO as required
Environmental Specialist/Environmental Technician	Collaborate with Construction Management to delineate areas of disturbance for construction activities.

	Supervise clearing and grubbing activities to minimize ground disturbance and supervise installation of erosion and sediment control measures. Complete environmental monitoring as per AMNS's Rainfall Event Monitoring Protocol (AGC-PRO-ENV 006)
Contractors	Provide competent and trained staff. Provide equipment and material for installation and maintenance of erosion and sediment control measures as requested by Construction Manager.
Operations Personnel/Equipment Operators	Complete applicable training in clearing activities, soil salvage, soil handling, and erosion and sediment control. Conduct clearing/grubbing and soil salvage/handling activities according to defined procedures. Responsible for monitoring and maintenance of ESC measures within regular work areas (for example, the Mine Department is responsible for ESC measures along haul roads, the Mill Department is responsible for ESC measures within the plant complex, Construction Managers are responsible for ESC measures within project areas including the TMF)
Independent professional	Inspect, design, report and/or advise on the status of soil erosion and sedimentation controls during construction as per 10.c) of the Industrial Approval.

It is essential throughout the implementation of this ESCP that communication between all parties be maintained. The following are key issues that must be addressed:

- Prior to installation of the environmental structures, the assigned Environmental Department team member must properly communicate the intention and details of the ESCP to the Contractor, and the Contractor must provide feedback if measures appear ineffective when constructed.
- During monitoring, the Environment Department must inform the Contractor of the surface water monitoring results as soon as possible when maintenance and repair to erosion and sediment controls is necessary.
- In the event that erosion and sediment controls fail, AMNS Operations personnel or the Environmental team member must immediately notify the Environmental Manager/Superintendent who will notify regulatory agencies as required and instruct the Contractor to make repairs within 12 hours.
- Field records will be kept by AMNS Environment Department and Operations personnel of all activities that could affect erosion and sediment control on this project to demonstrate due diligence to the regulatory agencies.

2.3.2 Competence, Training and Awareness

AMNS requires that persons working under its management, including employees and contractors, have the knowledge, understanding, skills and abilities to complete work in a manner that protects the environment. The following actions are established to provide worker competency, training and awareness:

Competency: As per Condition 10(c) of the Industrial Approval, AMNS will retain an independent professional engineer with specific ESC training and/or relevant experience to provide input and advice on sediment and erosion controls measures during construction activities and as needed during operations.

Training: Contractors shall provide a manager or site foreperson with specific ESC training or a minimum of 10 years of experience in installation and maintenance of ESC measures. Personnel involved with construction and earthworks are instructed by the environmental superintendent or senior operations staff on appropriate erosion and sediment control measures and requirements for the particular ESC component being constructed. Works-specific information is available through tender packages, tailgate discussions, and regular communication with site Environmental personnel. Lessons learned are communicated through tailgate discussions and internal memoranda as necessary.

AMNS workforce training is completed through instruction from the environmental superintendent and/or senior operations staff. The site Environmental Protection Plan is a training tool available to all employees and provides further information on erosion and sediment control procedures.

Awareness: As part of site orientation, applicable field personnel are made aware of erosion and sediment control concerns and obligations for the Project. General instructions for reporting potential erosion and sediment control concerns to site Environmental personnel are provided during this orientation. Lessons learned are communicated through tailgate discussions and internal memoranda as necessary.

2.4 BASIC PRINCIPLES OF EROSION AND SEDIMENT CONTROL

The approach taken on this project will emphasize erosion control techniques in an effort to eliminate or minimize the amount of sediment that is mobilized due to earthwork activities.

Nevertheless, Sediment Control Best Management Practices (Sediment Control BMPs) will be required. In some cases, additional sediment control (i.e., sediment ponds) may be required as a back-up or contingency in the event of large or frequent precipitation events.

The four basic principles of erosion and sediment control that have been included in the ESCP for the Touquoy Mine Project are described below.

2.4.1 Keep Clean Water Clean

Mixing clean water with sediment-laden water produces a larger volume of sediment-laden water to manage. Therefore, runoff will be directed away from active work areas prior to work commencing. If active work intercepts defined watercourses or wetlands, regulatory approval will be sought to divert the watercourse or alter the wetland prior to work commencing. Also, water from disturbed areas within the construction site will be intercepted and kept separate from surface runoff from undisturbed areas of the site.

2.4.2 Minimize the Amount of Exposed Soil

The most important consideration on this project and the one that has the potential to result in the largest adverse impact is the amount of exposed soil left open at any one time. The more soil that is exposed at any one time, the greater the erosion risk. The severity of this impact is based on soil erodibility, runoff erosivity (more frequent or intense runoff), slope length, and steepness.

Therefore, cover management and erosion control practices are emphasized in this ESCP as they are the most practical and cost-effective measures that can be utilized to control erosion.

2.4.3 Minimize the Time of Exposure

Another important consideration on this project is the amount of time that soils are left exposed. The longer the duration of exposure, the greater the risk.

Again, cover management and erosion control practices are emphasized in this ESCP as they are the most practical and cost-effective measures that can be utilized to control erosion.

2.4.4 Keep Sediment Onsite

Sediment leaving the site will be minimized. This will be achieved through the installation of sediment control measures along the perimeter of the site. These measures will be installed prior to the disturbance of any soils, with the exception of what is necessary to install these controls.

2.5 REQUIREMENTS OF THE ESCP

he following provisions have been included in the ESCP:

- Control measures will be in place prior to disturbance of the ground surface;
- Control measures will be constructed in accordance with applicable specifications;
- Periodic inspection of erosion and sediment controls will be carried out. Please refer to AMNS Rain Event Monitoring Protocol (AGC-PRO-ENV-006 Rain Event Monitoring Protocol) for procedures to follow prior to and during rainfall or freshet events;
- Erosion and sediment controls will be installed where they can easily be maintained;
- Buffer strips will be maintained around the construction site and wetlands; and
- Sections of the site will be stabilized as soon as they are brought to final grade.

2.6 RECEPTORS

There are a number of sensitive receptors on and adjacent to the site that will require protection from sediment-laden runoff generated during site development. The most sensitive receptors, based on their proximity to active work areas where land disturbance will be encountered, include:

- Moose River;
- Watercourse #4
- Unnamed tributaries to Moose River and associated wetlands;
- Scraggy Lake;
- Unnamed tributaries to Scraggy Lake; and
- Square Lake.

Figure 1 Illustrates the locations of these receptors.

In addition to the above receptors, third party properties are to be protected from sediment impacts. Property boundaries are indicated on Figure 1.

2.7 SOILS

Stockpiles onsite contain organic-rich soil and were constructed from the initial removal of topsoil and overburden materials from areas of the mine. The overburden materials include organic materials, silty-sand sediments, glacial tills, and rock (Stantec, 2019a). Runoff from topsoil / overburden areas can be identified by its brownish colour. Based on experience onsite, the site soils (topsoil and overburden) generate sediment laden runoff that will settle in a smaller sized settling basin.

Site roads are constructed from waste rock, which degrades into very fine particulates as traffic compacts and breaks the rock down. Runoff from waste rock areas can be identified by its grey colour. Based on experience onsite, sediment laden runoff from these roadways does not settle well in the smaller basins onsite. The best method that has been found to prevent these fine sediments from leaving the site has been to collect the runoff in collection ponds and pump it to the TMF pond where it can settle.

2.7.1 Surficial and Bed Rock Geology

Based on findings of an intrusive investigation conducted by GHD (2016a,b), the subsurface conditions in areas consistent with the Site generally consisted of a surficial layer of root mat, topsoil or peat overlying a sand and/or silt layer overlying glacial till and/or bedrock. Bedrock in the area predominantly consists of Meguma Group meta-sandstones and mudstones that have undergone alterations due to weathering, typically more permeable near the surface than the underlying bedrock (Stantec 2015). Mineralization associated with quartz vein gold within the Meguma group also includes the presence of arsenopyrite that that is documented to elevate background arsenic geochemical conditions. Bedrock was previously encountered in subsurface investigations at between 0.6 m to 21.4 m below ground surface (GHD 2016a,b).

2.8 SELECTION OF BEST MANAGEMENT PRACTICES

2.8.1 Water Management BMPs

Water Management BMPs (i.e., offsite and onsite water control procedures) have been included in the ESCP to manage surface runoff and reduce the erosion potential of the site.

2.8.2 Erosion Control BMPs

Erosion Control BMPs have been included in the ESCP to manage exposed soil where there is the potential for erosion due to wind, rain splash, or flowing water.

Preventing erosion at the source reduces the amount of sediment that needs to be managed by down-gradient or perimeter sediment control measures. Cover is the most effective erosion control practice.

2.8.3 Sediment Control BMPs

Sediment Control BMPs have been included where there is a need to prevent mobilized sediment from leaving the site or entering a water body. Sediment controls will be placed close to the source to reduce the quantity of water that has to be managed.

Sediment control will primarily be accomplished by either filtering (i.e., sediment control fence) or settling sediment-laden runoff water (i.e. flow checks). Settling of sediment from onsite runoff has proven to be difficult and /or unsuccessful within smaller individual settling basins. The preferred methodology for treating sediment laden site runoff from site roadways and high traffic areas as of the time of writing this report is to collect the runoff via ditches and collector ponds and to pump the collected water to the TMF. This approach has resulted in reduced numbers of reportable events related to sediment releases.

3.0 TYPICAL PRACTICE FOR ESC

The Erosion and Sediment Control Handbook for Construction sites by the Nova Scotia Department of the Environment (NS ESC Handbook, 1989) provides guidelines for the preparation of an ESC plan. Typical ESC plans for any project undertaken onsite consist of a written report explaining the methods for erosion control and drawings showing the location of the erosion control measures within the existing site topography. Several site-specific considerations should be made in preparation of an ESC plan. These include, but are not limited to, existing topography and slopes, type of soil, drainage characteristics, proximity to watercourses. Furthermore, while erosion may occur in different locations at similar magnitude, it may be caused by different phenomena. As such, each issue should be addressed independently.

Regardless of site-specific features or issues present onsite, a typical ESC plan for any new site activity or activity expansion should contain the following documentation:

1) General statement of the project (on the report)
2) Topographic features (on the drawings)
3) Soil information (on both report and drawings)
4) Stormwater Management (SWM) program (on both report and drawings)
5) Proposed site alteration (on the drawings)
6) Temporary ESC measures to be used during construction (on both report and drawings)
7) Long-term ESC measures (on both report and drawings)
8) Maintenance for ESC measures (on report)

The “Factsheets” section of the NS ESC Handbook outlines in detail some potential ESC measures that can be used for this project. Other useful references include:

- Division 7 of the Standard Specification Highway Construction and Maintenance.by the Nova Scotia Department of Transportation and Public Works (1997).

Individual plans can be developed using the typical approaches outlined below and the information contained in the documents referenced in this section.

Refer to Drawing No. 3 in Appendix C for typical details.

3.1 CLEARING

Clearing activities specific to Erosion and Sediment Control plans should consider:

- What is the area of site to be cleared?
- What is the nearest waterbody? How near is it? How sensitive is it?
- What is the direction of surface water flow across the disturbed area?
- Is grubbing required or is clearing enough?
- Other environmental or regulatory considerations for tree clearing – i.e. approvals, surveys, etc.

Initial step of any clearing activity is to clear only enough area to install ESC measures. ESC measures, such as silt barriers, should be installed such that they prevent sediment laden runoff from leaving the proposed disturbance area and impacting a natural area or waterbody.

Clearing for large areas should proceed in phases, with each phase protected and / or stabilized before proceeding to the next.

Keep clean water clean – divert clean water around site using lined ditches. Should diversion of watercourses or wetlands be necessary, approval from NSE is required.

Prevent erosion onsite. Minimizing rutting and the exposure of bare soil during the clearing operation will be the most effective erosion control for any clearing activity. All vehicles used in the clearing operation shall use floatation tires, properly fitted for the vehicle. Any areas where extensive rutting or bare soil occurs as a result of the clearing operation should be temporarily covered with straw/hay mulch.

Prevent sediment laden runoff from leaving the site through the use of silt barriers, settling, or collection and treatment of runoff.

Cross culverts through cleared areas may be required as localized drainage dictates. These cross culverts will be installed prior to the commencement of grubbing on the site. Initially, grubbing should be limited to that required for cross culvert installation(s). After the cross culverts have been installed and erosion control measures have been placed at the culvert inlet and outlet locations, grubbing required for the balance of the work may proceed.

Grubbing of cleared areas should take place only if required for the ultimate purpose of the cleared land.

3.2 SITE GRADING

Consider:

- What is the area contributing flow to the grading area? Can external flows be directed around the area?
- What is the nearest waterbody? How near is it? How sensitive is it?
- Where is the runoff from the graded area being collected / treated?
- How long will the site grading take? Should long-term and / or temporary ESC measures be put in place?
- What is the material that is being graded (e.g. Overburden / topsoil or waste rock)? How does this affect erosion potential?

3.2.1 Slopes

Slope grading can be designed to reduce erosion potential. Techniques that can be applied include:

- Reduce the grade of the slope (i.e., create a 3:1 slope instead of a 2:1 slope)
- Reduce the height of the slope, either by keeping piles short, or by including benches / terraces into the slope to break up the overall slope length (See Figure 2) (NSE, 1989)
- If a slope will be in place for a long-term, stabilize the slope berms using an appropriate stabilization method (See Section 3.2.3).

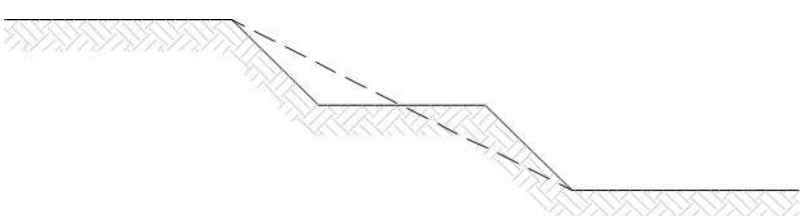
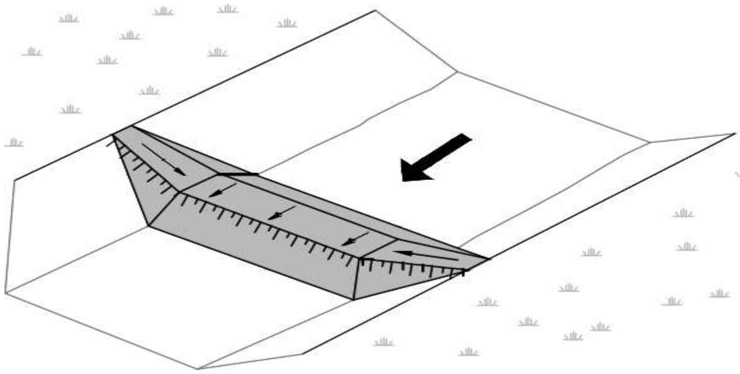


Figure 2: Slope Benching

3.2.2 Berms

Berms can be created to keep runoff moving along a certain path (acting like the side of a ditch) or to slow or collect runoff (acting like a dam).

When constructing berms that are intended to act like a dam it is important to configure the ends of the berm so that water does not by-pass the retention area behind the berm. This configuration includes constructing both ends of the dam on an uphill slope (see Figure 3).



Berms should be constructed using material suited to their long-term use. Impermeable berms can be constructed with clay cores or highly compacted materials. Impermeable berms should be used in situations where water seeping through the berm would be unacceptable. Permeable berms can be constructed with rocks or gravels or using grubbing material. Permeable berms should be used in situations where the berm is intended to provide an opportunity for settling and water seeping through the berm would be clean.

Figure 3: Berm Configuration to Avoid Flow Around Ends

3.2.3 Stabilization

The best erosion protection is to not have exposed soils. This can be accomplished through vegetating the exposed soil area or covering the exposed area with a material that separates the soil from the cause of erosion (water or wind).

To establish vegetation a thin layer of topsoil is desirable over the area to be stabilized. Hydroseeding is an effective way to quickly establish vegetative cover and also works well on moderate slopes. Hydroseeding should be completed during the growing season. On shallow slopes straw mulch and hand broadcast seed may be sufficient to establish vegetation. On slopes with very low quality soils / substrate hydroseeding using biotic soils technology (also known as engineered soils) could be considered if vegetation growth is required. Outside the growing season areas may be stabilized using a rolled erosion control product (RECP) placed over hand broadcast seed or using a rock protection layer. Vegetated protection is usually best for a long-term application. For short term applications or on steep slopes a rock protection layer may be most appropriate.

3.3 DITCHES

Consider:

- What is the area contributing flow to the ditch? Is this area planned to change or remain the same over the life of the structure?
- What is the nearest waterbody? How near is it? How sensitive is it?
- Where is the water in the ditch being collected?
- How long will the ditch be in use? What flow / volume should it have capacity for?
- What is the slope and conveyance capacity of the ditch? What size of material should be used to line it?

Ditches may be constructed into native till without a clay liner if the material is competent. Clay liners may be employed to keep flows within the ditch and prevent seepage. Where seepage is desired as part of the function of the ditch the clay liner may be left off one or both sides of the ditch as appropriate to the desired function of the ditch (e.g. – if the ditch is conveying runoff along a haul road it may be appropriate to clay line the full ditch, if the ditch is conveying runoff / seepage from a pile onsite it may be appropriate to leave out the clay liner along the side of the ditch adjacent to the pile.)

Ditches should have a lining of erosion resistant material. This material should be sized to remain stable under the proposed design flow.

Some ditches onsite include or may be designed to include seepage ponds. These ponds should be pumped out and cleaned out regularly. See Section 3.4 for details on pond clean-out. Appropriate setbacks from property limits and environmental features should be considered when constructing new ditches.

3.4 PONDS

Consider:

- What is the area contributing flow to the pond? Is this area planned to change or remain the same over the life of the structure?
- What is the nearest waterbody? How near is it? How sensitive is it?
- How long will the pond be in use? What volume should it have capacity for?
- What is the cleanout procedure for the pond? What material should be used to line it?

Ponds may be constructed into native till without a clay liner if the material is competent. Clay liners may be employed to keep flows within the pond and prevent seepage. Where seepage is desired as part of the function of the pond the clay liner may be left out. To prevent erosion on the side slopes and at the inlet, ponds should be lined with rock material. Rock material at the inlet should be sized to remain stable under design flow conditions.

If the pond is being used for settling, the pond should be designed based on the particles found in site runoff. Operational experience has indicated that settling ponds can be effective for runoff from overburden or topsoil areas but have proven ineffective for runoff from areas containing waste rock (i.e. WRSA, or haul roads). A laboratory analysis of settling characteristics should be conducted to support pond design if settling is desired for runoff from waste rock areas. Longer settling distances will increase the amount of sediment that settles in the pond (See Figure 4).

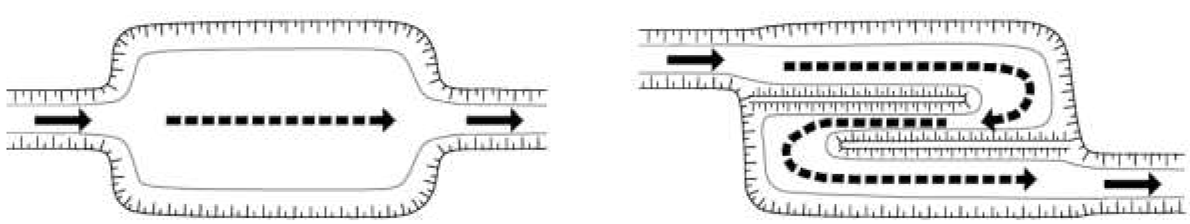


Figure 4: Flow Plath Lengths in Settling Basins

3.4.1 Pond Cleanout Procedures

If sediment build up occurs in a pond it should be cleaned out. Clean outs should be scheduled based on the rate of accumulation and the size of the pond facility. Ponds that accumulate sediment quickly should be cleaned more regularly. Ponds that are small and have limited storage capacity should also be cleaned more regularly. Pond clean out can be completed using a hydro-vac to extract accumulated sediment or using an excavator where space and safety permits. If excavator cleanouts result in some of the pond liner rock being removed this rock should be replaced.

New pond design or pond modifications should consider access for clean out as well as clean out equipment size and availability. Appropriate setbacks from property limits and environmental features should be considered when constructing new ponds.

Sediment that is cleaned out from a collector pond should be disposed of in the WRSA or TMF.

Many of the ponds onsite do not have outlets into the environment but are rather controlled by pumping out the collected water. Pumping should be conducted on a regularly scheduled basis and / or as needed based on accumulated runoff volumes. Pumped pond water should ultimately be discharged to the TMF or other purpose built pond with controlled discharge meeting Metal and Diamond Mining Effluent Regulation (MDMER) requirements. Fueling of pumps should take place over a spill protection container.

In preparation for a rain or snowmelt event, ponds should be pumped to their lowest level to provide maximum capacity for runoff collection. Ponds with lower capacities should have pumps available during runoff events to ensure that ponds do not overflow into the environment.

3.5 ROADWAYS

Consider:

- What is the direction of surface flow on the roadway?
- What is the nearest waterbody? How near is it? How sensitive is it?
- What is the roadway material? How does this affect erosion potential from rain or wind?
- Where is the water from the roadway being collected?
- How could road grading be used to affect flow on the roadway?

Most of the access and haul roads onsite have been constructed with berms on one or both sides of the road to control the flow of road runoff. While roads are regularly maintained and graded, the roads generate some of the most sediment laden runoff onsite. Road drainage is typically directed into ditches through irregularly spaced cuts into roadside berms or into collector ponds at low points in the road profile.

Berms are required along roadways in areas where the absence of a berm would allow road runoff to discharge into the environment. In areas where road runoff is directed into a collector pond or a ditch leading to a collector pond a berm may not be required.

Road grading configurations, such as super elevation or a reverse crown grading can help direct and control runoff (see Figure 5). In areas where it is desirable to keep runoff away from the edges of the road, such as where the waste rock haul road crosses the Watercourse 4 a reverse crowned road grading configuration is appropriate. In areas where it is desirable to have all road runoff flow towards a collection point such as a ditch or pond, for example the TMF access road between the pit haul road and the TMF perimeter road the super elevation of the roadway is appropriate to direct runoff towards the north side of the road.

Road berm maintenance will be required periodically to remove accumulated sediments that have been pushed to edge of road along the berms by grading operations. During this maintenance activity, ensure berms remain intact and reinforce as required.

Figure 5: Road Grading Configurations

In the non-freezing months water from the polishing pond is used for on-site road dust suppression at areas of controlled drainage including the tailings dam crest, haul roads and access roads. Dust suppressant is applied evenly and in quantities that do not cause direct surface runoff to the environment. Water is not taken from the engineered wetland as this water has already been metered for MDMER purposes. Water from the Open Pit is used for dust suppression within the open pit area. Raw water from Scraggy Lake is used for dust suppressant at the Mill crushing circuit.

In the winter months a Magnesium Chloride solution is used for onsite road dust suppression at the time of writing. This suppressant is in flake form and is applied using a salt spreader. At the Mill crushing circuit an Antifreeze dust suppressant named IPAC 1299F is also used.

3.6 STOCKPILES

Consider:

- What is the direction of surface flow on and around the stockpile?
- What is the nearest waterbody? How near is it? How sensitive is it?
- What is the stockpile material (e.g. Overburden / topsoil or waste rock)? How does this affect erosion potential?
- Where is the water from the stockpile being collected?

Appropriate setbacks from property limits and environmental features should be considered when constructing new stockpiles.

Runoff from exposed stockpile slopes should not be discharged directly into the environment. Containment features such as ditches or sediment barriers should be included around stockpiles to prevent sediment eroded from stockpile slopes from entering the environment. A perimeter drain may be used to control both sediment and flow direction. Section 3.2.1 ‘Slopes’ and Section 3.2.3 ‘Stabilization’, can be referenced when developing strategies to reduce erosion potential on stockpile slopes. Where stockpile slopes are at a grade that is either final, or not going to change for several years, stabilization using vegetation should be implemented.

3.7 RAIN EVENT PREPARATION

In preparation for a rain or snowmelt event there are many things that mine environmental and operation staff can do to allow ESC measures to perform well.

- Ponds should be pumped to their lowest level to provide maximum capacity for runoff collection. Ponds with lower capacities should have pumps available during runoff events to ensure that ponds do not overflow into the environment. Verify that pond inlets are stable, and that rock lining is in place to resist erosion.
- Preparation for pumping should include fueling pumps, verifying that pumps and any required backup systems are in the right locations and accessible.

- Check that road grading is in place in areas where road grading (super elevation or reverse crown) is used specifically to control runoff. Verify condition of road berms and make repairs as required.
- Install extra berm cuts in roadway berms where required to allow flows more direct route into perimeter ditches or collector ponds.
- Where silt barriers are providing runoff / sediment control verify condition of barrier and make repairs as required.
- Consider adding temporary rock or RECP protection to sites that are in active transition or where final ESC measures have not yet been placed. Grade areas under construction to direct runoff towards collection or treatment areas.

Consider the need to reinforce and stabilize areas that have had erosion issues previously.

4.0 CURRENT CONDITIONS

The current conditions of ESC controls and measures are presented on Drawing No. 1 in Appendix A. Operations staff are responsible for maintaining the current ESC measures. These measures are described in further detail in the following subsections.

4.1 PLANT SITE AND ADMINISTRATION AREA

This site is vulnerable to erosion through traffic movement and runoff from precipitation. ESC measures in place include:

- Ditches to convey runoff to collector pond(s)
- A large collector pond to the south of the plant site
- A smaller settling pond near the security area
- A small settling pond near the access road crossing of watercourse #4
- Road berms
- Stabilization of disturbed areas with hydroseeding

Table 2 presents a summary of issues and solutions for ESC at the plant site and administration area.

Table 2: Plant Site and Admin Area Issues and Solutions

Issues	Solutions
Dust	Wetting of roads in summer using water from the polishing pond Dust suppressant in winter months.
Undersized collector pond at road crossing #4	Regular inspection during rain events, ongoing pumping during rain events, including a back-up pump system. Prepare design for larger collector pond.
Sediment from haul road south of plant site accumulates in areas near the haul road crossing of Mooseland Road	Design for improved drainage conveyance on roads and in ditches and new / upsized collector ponds is under development.
Impacts to roadways from traffic and runoff	Road grading and maintenance to maintain road drainage patterns and road berms. Grade roads to slope water towards ditches using super elevated or crowned road method as appropriate.

4.2 OPEN PIT AND CLAY BORROW AREA

This site is vulnerable to erosion through traffic movement, runoff from precipitation, and erosion and sedimentation due to clearing, grubbing and grading in the clay borrow area. ESC measures in place include:

- Ditches to convey runoff
- Grading of pit and surrounding roads, and clay borrow pit to direct runoff towards pit sump
- Diversion ditches
- Road berms
- Grubbings berm at perimeter of clay borrow area.

Table 3 presents a summary of issues and solutions for ESC at the open pit and clay borrow area.

Table 3: Open Pit and Clay Borrow Area Issues and Solutions

Issues	Solutions
Dust	Wetting of roads in summer using water from the polishing pond Dust suppressant in winter months.
Sediment from haul road towards WRSA and plant site accumulates in areas near the haul road crossing of Mooseland Road	Design for improved drainage conveyance on roads and in ditches and new / upsized collector ponds is under development.
Impacts to roadways from traffic and runoff	Road grading and maintenance to maintain road drainage patterns and road berms. Grade roads to slope water towards open pit using super elevated road method as appropriate.
Pit and clay borrow area expansion requires new clearing, grubbing, and grading	Follow ESC practices outlined in this document. Keep site graded towards pit. Erect sediment barrier to protect natural areas around clay borrow site.

4.3 WASTE ROCK STORAGE AREA AND ACCESS ROAD

This site is vulnerable to erosion through traffic movement, runoff from precipitation, and maintenance activities on haul road at watercourse #4 crossing. ESC measures in place include:

- Perimeter ditches to convey runoff
- Road berms with berm cuts

- Super elevated and reverse crown road grading on haul roads
- Collector ponds

Table 4 presents a summary of issues and solutions for ESC at the WRSA and access road.

Table 4: WRSA and Access Road Issues and Solutions

Issues	Solutions
Dust	Wetting of roads in summer using water from the polishing pond Dust suppressant in winter months.
Sediment from haul road between large collector ponds collects in low spot next to roadway	Keep super elevated road grading in place, verify before large rain / melt events. Consider construction of collector pond at low spot. Consider need for this section of haul road and remove / restore if not necessary for operations.
Impacts to roadways from traffic and runoff	Road grading and maintenance to maintain road drainage patterns and road berms.
Crossing of Watercourse #4	Follow ESC practices outlined in this document. Keep reverse crown grading in place on haul road, verify before large rain / melt events. Extra care in grading / maintenance of roadway at watercourse crossing to ensure road berm remains effective barrier to water crossing through berm / retaining wall. Preparation for large runoff events should include preparing berm cut in access road to convey runoff into perimeter ditch so that flows don’t overwhelm small collector pond at access road crossing of watercourse #4.

4.4 TAILINGS MANAGEMENT FACILITY

This site is vulnerable to erosion through traffic movement, runoff from precipitation, and construction activities on the TMF dam and perimeter roads. ESC measures in place include:

- Perimeter ditches to convey runoff
- Road berms with berm cuts to control runoff to collector ponds and seepage ponds.
- Super elevated road grading on access roads
- Turbidity curtains
- Stabilization of disturbed areas with hydroseeding and rock fill cover

Table 5 presents a summary of issues and solutions for ESC at the TMF.

Table 5: Tailings Management Facility Issues and Solutions

Issues	Solutions
Dust	Wetting of roads in summer using water from the polishing pond Dust suppressant in winter months.
Impacts to roadways from traffic and runoff	Road grading and maintenance to maintain road drainage patterns and road berms. Grade roads to slope water towards ditches using super elevated or crowned road method as appropriate.
Runoff from site towards Scraggy Lake	Ensure runoff is captured before entering Scraggy Lake Ensure roads are compacted and have appropriate berms, berm cuts, and grading. Ensure turbidity curtains are in place in Scraggy Lake prior to large rain / melt events. Stabilize slopes and disturbed areas with hydroseeding or granular cover.
Crossing of Watercourse #4	Follow ESC practices outlined in this document. Keep reverse crown grading in place on haul road, verify grading before large rain / melt events. Extra care in grading / maintenance of roadway at watercourse crossing to ensure road berm remains effective barrier to water crossing through berm / retaining wall.

4.5 TMF OVERBURDEN STOCKPILE

This site is vulnerable to erosion through traffic movement, runoff from precipitation, and slope erosion. ESC measures in place include:

- Road berms
- Settling pond
- Stabilization of disturbed areas with hydroseeding or rock fill covering.
- Coir logs

Table 6 presents a summary of issues and solutions for ESC at the TMF Overburden Stockpile.

Table 6: TMF Overburden Stockpile Issues and Solutions

Issues	Solutions
Dust	Wetting of roads in summer using water from the polishing pond Dust suppressant in winter months.
Impacts to roadways from traffic and runoff	Road grading and maintenance to maintain road drainage patterns and road berms.
Slope runoff / erosion	Stabilize slopes with hydroseeding. Benching or terracing in slopes to shorten slope lengths.
Runoff from site towards Scraggy Lake	Ensure runoff is captured in settling pond before leaving site. Verify flow path from stockpile to historic road/ drainage draw and place sediment barriers to collect sediment and disperse flows. Monitor and maintain coir logs, placing additional measures if required. Ensure turbidity curtains are in place in Scraggy Lake prior to large rain / melt events.

4.6 SCRAGGY LAKE OVERBURDEN STOCKPILE

This site is vulnerable to erosion through traffic movement, runoff from precipitation, and slope erosion. ESC measures in place include:

- Road berms
- Partial perimeter ditch
- Silt fencing
- Grubbing berm
- Stabilization of disturbed areas with hydroseeding

Table 7 presents a summary of issues and solutions for ESC at the Scraggy Lake Overburden Stockpile.

Table 7: Scraggy Lake Overburden Stockpile Issues and Solutions

Issues	Solutions
Dust	Wetting of roads in summer using water from the polishing pond Dust suppressant in winter months.
Impacts to roadways from traffic and runoff	Road grading and maintenance to maintain road drainage patterns and road berms. Grade roads to slope water towards ditches using super elevated or crowned road method as appropriate.
Slope runoff / erosion	Stabilize slopes with hydroseeding. Consider benching or terracing in slopes to shorten slope lengths. Design for extension of perimeter ditch is under development. Further ESC measures for consideration: • Construction of a settling wetland to the north of the stockpile, • Construction of a ditch to convey water from the top of the stockpile to the pit.

4.7 MAINTENANCE OF EXISTING WORKS

Ongoing maintenance of current ESC measures is the responsibility of the AMNS Operations personnel. Monitoring of existing conditions is required to determine when maintenance is required. Additional details on ESC monitoring are included in Section 6. Changes or upgrades to existing controls involving a change in the type of control or a significant relocation of the control shall incorporate guidance from an independent professional engineer.

The mine is nearing its full extent of operations. No major expansions to the footprint of existing infrastructure described above in Section 4 are planned in the near future, except for minor expansions to the pit, waste rock storage area, access roads, and clay borrow areas. ESC measures required for existing infrastructure are in line with those identified for the current conditions, with ongoing maintenance or replacement required as identified in Table 8.

Table 8: ESC Measures, Maintenance Triggers, and Actions

ESC Measure	Maintenance Trigger	Action Required
Silt Fence or Other Silt Barrier	Sediment build up to 1/3 of height,	Removal of accumulated sediment, re-establish silt barrier. Or establish new silt barrier downstream of barrier that is full of sediment.
Vegetation	Presence of rills Bare patches	Regrade and reseed.
Road Grading	Rutting	Road regrading.

Table 8: ESC Measures, Maintenance Triggers, and Actions

ESC Measure	Maintenance Trigger	Action Required
	specific grading, such as reverse crown, not in place	
Berms	Breaks in berm Erosion on berm slopes Flow through berms meant to be impermeable Berm overtopped	Repair berms.
Ditches	Rock liner out of place Sediment accumulation affecting conveyance capacity	Reinstall rock liner – evaluate possibility that larger rocks are required to withstand flows. Mechanical / or hydrovac removal of sediments.
Perimeter Ditches	Rock liner out of place Sediment accumulation affecting conveyance capacity	Reinstall rock liner – evaluate possibility that larger rocks are required to withstand flows. Mechanical / or hydrovac removal of sediments.
Collector Ponds	Water levels nearing 1/2 pond capacity OR Capacity less than required for a 1 in 25-year storm event.	Pump pond to empty it. Ensure pumping capacity is available.
Settling Ponds	Sediments more than 0.3 m deep on average	Mechanical / or hydrovac removal of sediments. Re-establish pond lining if required.

5.0 NEAR FUTURE PHASE

The near future phase consists of all works anticipated in the next 2-3 years that are required to bring the mine into its full extent of operation for the life of the mine. While rerouting of roads and ditches and expansions to the open pit, waste rock storage area and borrow areas are anticipated, most infrastructure is in place and primary efforts are focused on maintenance of existing works. Refer to Drawing No. 2 in Appendix B for the mine layout and infrastructure anticipated in the near future. Installation and maintenance of new ESC measures related to near future specific site improvements is the responsibility of the Contractor.

5.1 PLANNED WORKS

The following subsections describe projects and expansions that are planned for the near future to support ongoing mine operations and improve site water management. Refer to Drawing No. 2 in Appendix B for the location of these features.

5.1.1 Scraggy Lake Overburden Stockpile Ditch and Pond

Under existing conditions, the water from the southwest ditch around the stockpile discharges to the wetland east of the stockpile, while the ditch to the northwest is directed to a vegetated area adjacent to the unnamed Moose River tributary to the west. The surface of the pile is graded to direct the majority of the water to the north in the direction of the open pit, with minor amounts directed to the east, west, or south.

The overburden ditch project consists of approximately 460 m of rock lined ditching to be constructed of waste rock material along the east side of the stockpile and a storm water storage pond to the south. Additional ditching work is also planned for the northwest side of the stockpile to redirect drainage along the west side of the pile and the top of the pile to the proposed storm water pond to the south. The project serves to mitigate issues identified in Section 4.6. There is a small wetland area (Wetland 28) +/-30m adjacent to the working area. Therefore, the project is considered to be of high environmental sensitivity. Authorization will be required from NSE prior to implementing any works outside the current approved project footprint at this site.

As the project is itself an ESC measure, ESC concerns for the project are primarily related to the construction phase. Construction activities consist of Clearing and Grubbing of work area, the excavation of ditches, lining Ditches with clay and rock, and seeding outer ditch slopes. Typical ESC Measures identified in section 3.1 (Clearing), Section 3.2 (Grading), Section 3.3 (Ditches) and Section 3.7 (Rain Event Preparation) shall be referenced throughout the project, as summarized below.

Erosion Control:

- Prevent erosion onsite. Minimizing rutting and the exposure of bare soil during the clearing operation will be the most effective erosion control for any clearing activity.
- Any areas where extensive rutting or bare soil occurs as a result of the clearing operation should be temporarily covered with straw/hay mulch.
- Construct temporary berms or barriers to reduce volume of upgradient runoff entering the working area.
- Work from downstream to upstream such that the first component constructed is a temporary pond which can receive runoff for pumping to a treatment area.
- Grade and vegetate slopes adjacent to natural areas

Sediment Control:

- Inspect, repair or reinstall sediment control fence along the perimeter of the Construction Areas prior to the commencement of any clearing (only clear and grub wide enough to allow the installation of fence);
  - Replace with coir logs and establish vegetated buffer at outer slope toes adjacent to natural areas for long-term erosion control at close of construction

Maintain sumps as needed during construction, pumping water to the existing perimeter diches. Pump intake or discharge filters may be required to ensure ditches are not overwhelmed with sediment.

5.1.2 Haul Road Crossing Ponds

A number of improvements and upgrades are planned for the intersection area at the center of the plant site, including new settling ponds and ditch upgrades. The work to the west of the main haul road (two ditch upgrades and a 0.3 ha footprint settling pond) is considered to be of low environmental sensitivity due to the +/-335 m buffer between Watercourse #4 and the works. The work to the east, (ditch upgrades and a 0.2 ha footprint settling pond, surrounded by roads), is considered to be of moderate environmental sensitivity due to the adjacent Watercourse #4 within +/- 70 m.

ESC concerns for the project are primarily related to the construction phase. Best Management Practices (BMPs) will be implemented to reduce risk of sediment-laden runoff leaving the site and entering into any of the above noted watercourses. Typical ESC Measures identified in Section 3.1 (Clearing), Section 3.2 (Grading), Section 3.3 (Ditches) and Section 3.7 (Rain Event Preparation) shall be referenced throughout the project, as summarized below.

<u>Erosion Control:</u>

- Prevent erosion onsite. Minimizing rutting and the exposure of bare soil during the site preparation and excavation operations
- Any areas where extensive rutting or bare soil occurs as a result of the clearing operation should be temporarily covered with straw/hay mulch.
- Hydroseed bare soils or cover with rock for long-term stabilization at close of construction works

<u>Sediment Control:</u>

- Where downgradient runoff is not captured by the collector pond system, install sediment control fence along the perimeter of the work footprint prior to the commencement of any site preparation or grading works (only clear and grub wide enough to allow the installation of fence initially, as applicable);

Maintain temporary sumps, ditches, and berms as needed within the perimeter of the working area, pumping sediment-laden water to the collector pond system for management and discharge to the environment via the TMF

5.1.3 Access Road Collector Pond Improvements

A small sediment collection pond exists near the Plant Access Road water crossing for Watercourse #4, between the Plant Site and WRSA. Runoff from the roadway is intercepted by the collector sump and pumped to the TMF via a series of ditches and ponds. The sump is undersized for purpose and is scheduled for upgrading to a collector pond. The construction footprint of the pond is in draft format and portions of the upgraded ditching are within 30 m of Watercourse #4 and its associated wetland areas. The Collector Pond construction project is therefore considered to be of high environmental sensitivity. Authorization will be required from NSE prior to implementing any works outside the current approved project footprint at this site.

ESC concerns for the project are primarily related to the construction phase, as pond improvements are an ESC measure. Best Management Practices (BMPs) will be implemented to ensure that no sediment-laden runoff leaves the site and enters into any of the above noted watercourses. Typical ESC Measures identified in Section 3.1 (Clearing), Section 3.2 (Grading), Section 3.3 (Ditches) and Section 3.7 (Rain Event Preparation) shall be referenced throughout the project, as summarized below.

<u>Erosion Control:</u>

- Prevent erosion onsite. Minimizing rutting and the exposure of bare soil during the site preparation and excavation operations.
- All vehicles used in clearing operations shall use floatation tires, properly fitted for the vehicle.

- Any areas where extensive rutting or bare soil occurs as a result of the clearing operation should be temporarily covered with straw/hay mulch.
- Hydroseed bare soils or cover with rock for long-term stabilization as indicated on design drawings.

Sediment Control:

- Where downgradient runoff is not captured by the collector pond system, install sediment control barriers along the perimeter of the work footprint prior to the commencement of any site preparation or grading works (only clear and grub wide enough to allow the installation of fence initially, as applicable).
- Maintain temporary sumps, ditches, and berms as needed within the perimeter of the working area, pumping sediment-laden water to a collector pond for management and discharge to the environment via the TMF.

5.1.4 Open Pit Expansion, Waste Rock Storage Area Expansion, and Clay Borrow Expansion

The disturbance footprint of the open pit is expected to increase by 0.5 ha in the near future (pending NSE approval). This area has been harvested for merchantable timber previously, but will be cleared of remaining brush, grubbed and then excavated. The Open Pit Expansion area is considered to be of moderate environmental sensitivity due to the proximity of Moose River to the west, which has ESC measures in place to act as a buffer (diversion ditches, hydroseeded slopes), and the presence of an unnamed stream which originates in the wetland area at the south east. Authorization will be required from NSE prior to implementing any works outside the current approved project footprint at this site.

The footprint of the WRSA is expected to increase by 5.7 ha under future conditions (pending NSE approval). The WRSA expansion is considered to be of high environmental sensitivity due to its proximity to the Square Lake and Watercourse #4.

Similarly, the footprint of the clay borrow expansion, adjacent to the Open Pit is expected to increase by 2.2 ha in the near future. The clay borrow expansion area is considered to be of moderate environmental sensitivity because of the close proximity to the stream originating in the Open Pit area and associated wetlands.

Best Management Practices (BMPs) will be implemented to ensure that no sediment-laden runoff leaves the expansion site(s) and enters into any of the above noted watercourses. Typical ESC Measures identified in Section 3.1 (Clearing), Section 3.2 (Grading), Section 3.3 (Ditches) and Section 3.7 (Rain Event Preparation) shall be referenced throughout the project, as summarized below.

Near Future Phase

Erosion Control:

- Prevent erosion onsite. Minimizing rutting and the exposure of bare soil during the clearing operation will be the most effective erosion control for any clearing activity.
- Any areas where extensive rutting or bare soil occurs as a result of the clearing operation should be temporarily covered with straw/hay mulch.
- Hydroseed bare soils for long-term stabilization.
- Reinstate diversion ditches and/or berms as applicable.

Sediment Control:

- Where possible grade sites to Drain water towards open pit(s).
- Where downgradient runoff is not captured by an open pit install or inspect and repair sediment control barriers along the perimeter of the Expansion Areas prior to the commencement of any clearing (only clear and grub wide enough to allow the installation of fence initially, as applicable).
- Maintain temporary sumps and ditches as needed within the perimeter of the sediment control fence, pumping sediment-laden water to the open pit or collector pond system for management and discharge to the environment via the TMF.

6.0 MONITORING AND MAINTENANCE

It is essential throughout the implementation of this ESCP that communication between all parties be maintained. The following are key issues that must be addressed:

- Prior to installation of the environmental structures, the assigned Environmental Inspector must properly communicate the intention and details of the ESCP to the Contractor, and the Contractor must provide feedback if measures appear ineffective when constructed.
- During monitoring, the Environmental Inspector must inform the Contractor of the surface water monitoring results as soon as possible when maintenance and repair to erosion and sediment controls is necessary.
- In the event that erosion and sediment controls fail, AMNS and the regulatory agencies must be notified immediately of failure and potential impacts and the Contractor instructed to make repairs within 12 hours.

Field records will be kept of all activities that could affect erosion and sediment control on this project to demonstrate due diligence to the regulatory agencies.

6.1 REVIEW OF EROSION AND SEDIMENT CONTROL MEASURES

All erosion and sediment control measures must be installed in compliance with specifications and manufacturer's instructions. Improper installations may not be effective or may fail allowing the mobilization and transport of sediment offsite.

Environmental control measures will be reviewed by the trained Environment Department team member or independent professional engineer during construction and any deficiencies will be corrected by the Contractor or Operations personnel as soon as possible. If the environmental controls included in the ESCP have to be replaced or adapted, then this process should be recorded in a written addendum to the ESCP.

Weather forecasts should be consulted during site preparation on a daily basis. In the event of a forecasted precipitation event in excess of 15 mm in 24 hours, or 5-10 mm within three hours, environmental controls will be inspected in the field by the trained Environment Department team member and preventative maintenance carried out by the Contractor or operations personnel in advance of a storm.

If deficiencies arise that that cannot be rectified through regular maintenance procedures, an independent professional engineer should be retained to provide advice on resolving the deficiency.

6.2 DURING CONSTRUCTION MONITORING AND MAINTENANCE

Effective monitoring, including frequent inspections of environmental control measures, is critical to demonstrating due diligence and for managing the consequences of the project. Through early detection of problems, long-term consequences can be minimized.

Monitoring will be undertaken for active construction areas to ensure the effectiveness of the ESCP and compliance with regulatory requirements. Monitoring of environmental controls will be carried out at the construction area each day construction is active. A more detailed examination of controls will be carried out prior to and immediately after a rainfall event; a snowmelt event; or a combination of the two (where the combined total is $\geq$ 15 mm). Areas that will be routinely monitored include:

- Areas of exposed soil;
- Areas adjacent to watercourses;
- Site access points and roadways; and
- All environmental control measures.

Maintenance and monitoring of the erosion and sediment controls is the responsibility of AMNS and the site Contractor as outlined inTable 1. Maintenance activities should be according to the conditions outlined in this ESCP.

Flow checks and sediment ponds require sediment removal when the sediment reaches a height of 0.3 m or one-third the effective height of the control.

Inspection observations and maintenance requirements completed by the Environmental Technician/Specialist should be recorded on a standard form.

Inspection and monitoring for TSS may suggest that some environmental controls need to be replaced or modified because they are ineffective. Advice from an independent professional engineer will be sought to develop remedial ESC solutions.

6.3 POST-CONSTRUCTION MONITORING

Effective long-term monitoring of ESC measures will be essential to minimizing erosion and sedimentation on the site. If problem areas are identified, the cause will be identified and a remediation plan prepared to correct deficiencies. Monitoring onsite is the responsibility of the Environmental Technician/Specialist. Advice from an independent professional engineer will be sought to develop remedial ESC solutions.

In situations where considerable ongoing erosion has occurred, regrading work (earthwork) may have to be undertaken to redesign slopes and/or drainage channels. The regulatory agencies should be kept apprised of all proceedings by the Environmental Department manager.

6.4 CONTINGENCY PLANNING MEASURES

In case the ESC measures in place onsite are ineffective or are overwhelmed by significant flows it is important to have a contingency plan and backup supplies available. Contingency planning should include consideration of the following information:

- Quantity and location of stored erosion and sediment control mitigation materials onsite;
- Instructions on how construction equipment can be made available on short notice (including owner/operator details);
- Plan for preventing the offsite discharge of sediment-laden runoff from the site; and
- A plan for emergency sequence of activities, including shutdown of the activity.

AMSN has systems and protocols in place to address these items, as follows:

AMNS maintains a list of Emergency Preparedness supplies and locations onsite, including supplies that could be required to remediate or maintain ESC measures, such as pumps, silt fencing, coir logs, and strawbales. Mine equipment (E.g. excavator, bobcat) can also be mobilized in case of need. Additionally, the mine's Environmental Protection Plan "Section 2.8 Erosion and Sediment Control" and Standard Operating Protocol (SOP) "PRO ENV 006 Rain Event Monitoring Protocol" includes details on what to watch for and an action plan if a silt release event is suspected. Steps include:

- The person who discovers the ESC issue should notify their supervisor of the visual sedimentation.
- The supervisor should contact the Environmental Department about the sediment issue. If the runoff is in a watercourse or has the potential to enter a watercourse, notification to the Emergency Spill Line may be required.
- Environmental Department staff will:
  - Work with the relevant department to determine the point source of sedimentation.
  - Provide Notification to the Emergency Spill Line if runoff is in a watercourse or has potential to enter a watercourse.
  - Work with an independent professional engineer to ensure issues are addressed in a timely manner.
  - Oversee site erosion and sediment control efforts to ensure compliance with NSE approvals.
- Operations staff, with direction/support from the Environment Department, will:
  - Correct any issues that need attention or maintenance using proper tools / equipment.
  - Halt all construction activities if necessary.
  - Work with the independent professional engineer to ensure issues are addressed in a timely manner

    - Install additional ESC controls if needed to prevent further release of sediment (e.g. installation of silt fencing or the placement of straw bales).

- Environmental Department will confirm and compile documentation, including:
    - The location of the silt release and cause of ESC failure (if known).
    - A description of the issues and corrective actions.
    - Communication, decision making discussions, and outcomes, including any regulatory notification.
    - Photos, water levels, water flow (if possible), water quality (deleterious substances and acute toxicity) estimated duration of release (for reporting under MDMER), weather and amount of precipitation received.

Recorded GPS coordinates for sample locations and any breakout locations.

6.5 INCIDENT REPORTING

In the event that the release of TSS in runoff from the site exceeds provincial guidelines (see below) regulatory agencies should be alerted. Even failures that do not result in the release of sediment from the site should be recorded by the Environmental Department staff. Such incidents will be discussed with the Contractor / operations manager to prevent future occurrences.

- For Clear Flows (Normal background Conditions):

    i) Maximum increase of 25 mg/L from background levels (24 hours or less); and
    ii) Maximum average increase of 5 mg/L from background levels (inputs lasting between 24 hours and 30 days).

- For High Flow (Spring freshets and Storm Events):

    i) Maximum increase of 25 mg/L from background levels when background levels are between 25 mg/L and 250 mg/L; and

ii) Shall not increase more than 10% over background levels when background is > 250 mg/L.

6.6 DECOMMISSIONING OF ENVIRONMENTAL CONTROLS

It is important that temporary sediment controls are removed at the appropriate time. These measures will only be removed after site inspection by the Environmental Department has concluded that areas are sufficiently stabilized and that downstream controls are no longer required. These controls will be removed once:

- The disturbed area is sufficiently stabilized;
- No areas of active erosion are observed;
- Monitoring indicates stable conditions; and

Compliance with provincial guideline for TSS in runoff can be consistently met.

6.7 DOCUMENTATION

To establish due diligence during normal operations and in the event of the release of sediment-laden runoff during extreme events, it is important to demonstrate that all reasonable actions have been undertaken to prevent such an occurrence.

All ESCP activities will be recorded in order to demonstrate that process was followed. Copies of these documents will be kept onsite for reference by construction personnel, the Company, Contractors and the Environment Department. This documentation should include:

- Original project / activity specific ESCP;
- Revisions to the ESCP;
- Regular inspection and maintenance reports;
- Reports on effectiveness of environmental controls;
- Maintenance control records;
- ESCP related incident reports, if applicable; and
- ESCP decommissioning report.

The preparation of documentation is a joint effort between the Environment Department and responsible Operational Department or Construction Manager. The ESCP preparation and update is ultimately the Environment Department's responsibility. The Environment Department documents routine monitoring of control measures as outlined in the Rain Event Monitoring Protocol. All other monitoring, maintenance and incident documentation is completed by the responsible Department or Construction Manager with the support of the Environment Department.

7.0 CLOSURE

This ESCP is based on an assessment of the Touquoy Gold Project property and its environmental sensitivities at a level of detail necessary to provide confidence that the plan will minimize offsite impacts during earthwork activities on this site. This ESCP is meant to be a living document and it is anticipated that changes in the plan may be warranted to ensure that the most effective BMPs are incorporated on this project in a timely fashion.

8.0 REFERENCES

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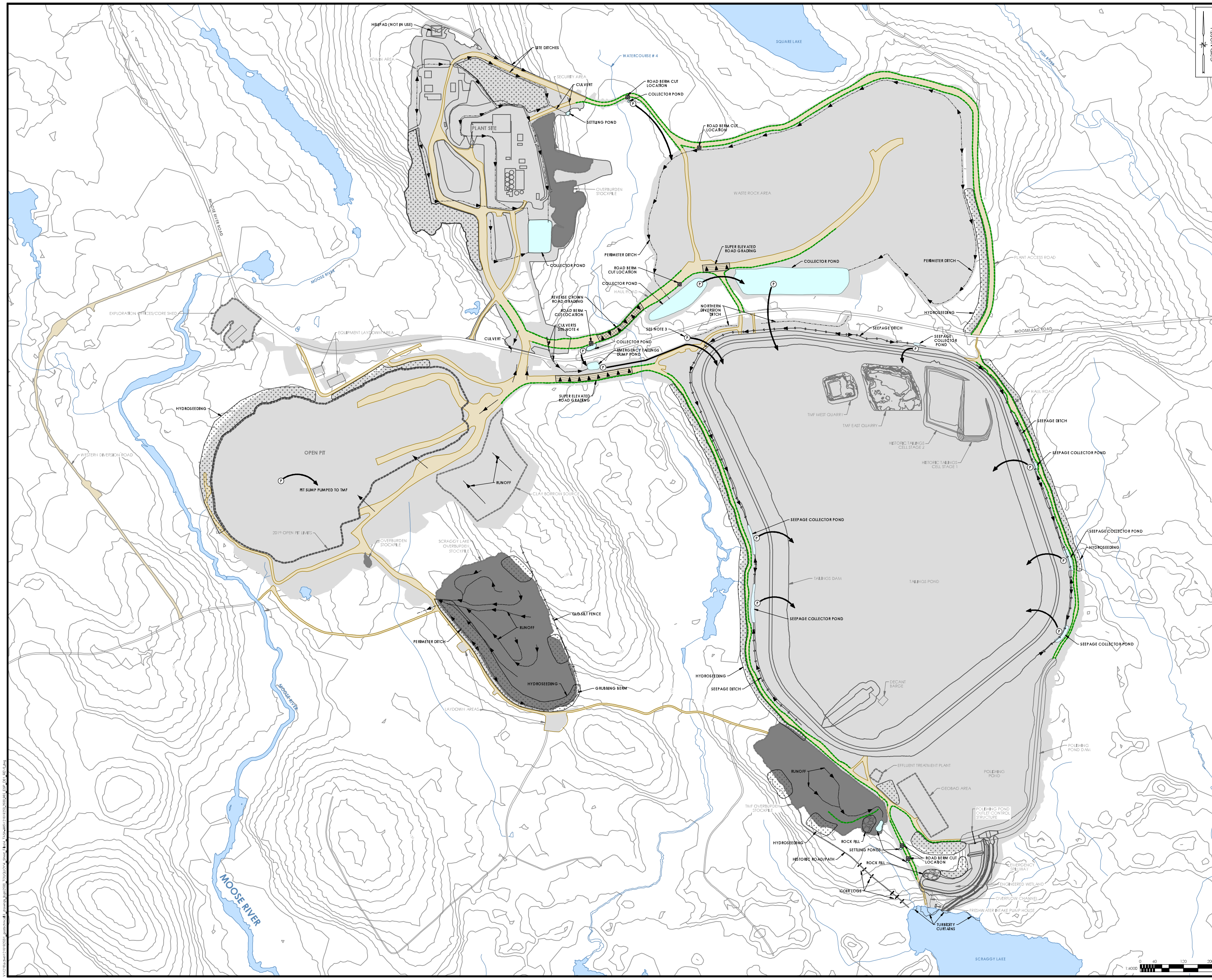
APPENDIX A

EXISTING CONDITIONS AND SITE DEVELOPMENT PLAN



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Legend

- CONTOUR, 2m (LIDAR, 2010)
- EXISTING ROAD
- HISTORIC ROAD/PATH
- EXISTING WATERCOURSE
- WATERBODY
- DISTURBED AREAS (DEC. 31, 2019)
- OVERBURDEN STOCKPILE
- HAUL/ACCESS ROAD
- ROAD BERMS
- ROAD BERM CUT LOCATION
- REVERSE CROWN ROAD GRADING
- SUPER ELEVATED ROAD GRADING
- HYDROSEEDING
- ROCK FILL
- COLLECTOR / SETTLING POND
- PUMP
- PUMPED DISCHARGE
- PERIMETER/SITE DITCH AND FLOW DIRECTION
- SEEPAGE DITCH AND FLOW DIRECTION
- RUNOFF FLOW DIRECTION
- TURBIDITY CURTAIN
- HELIPAD (NOT IN USE)

Notes

1. BACKGROUND TOPOGRAPHY SHOWN IS BASED ON LIDAR DATA PROVIDED BY CONESTOGA-ROVERS & ASSOCIATES (2010). ACTUAL FIELD CONDITIONS MAY VARY.
2. SITE DATA PROVIDED BY ATLANTIC GOLD CORPORATION.
3. TO BE PUMPED ONLY IF CONSTRUCTION ACTIVITIES REQUIRE IT (ACTS AS ROADSIDE DITCH).
4. TAILINGS LINE CULVERTS CONVEY TURBID WATER TO EMERGENCY TAILINGS DUMP POND.

STAMP | STAMP

No.	DETAILS	BY	APPD	DATE

REVISIONS

CLIENT: ATLANTIC GOLD CORPORATION

PROJECT: TOUQUOY GOLD PROJECT
TAILINGS MANAGEMENT FACILITY

PROJECT LOCATION: HALIFAX COUNTY, NOVA SCOTIA

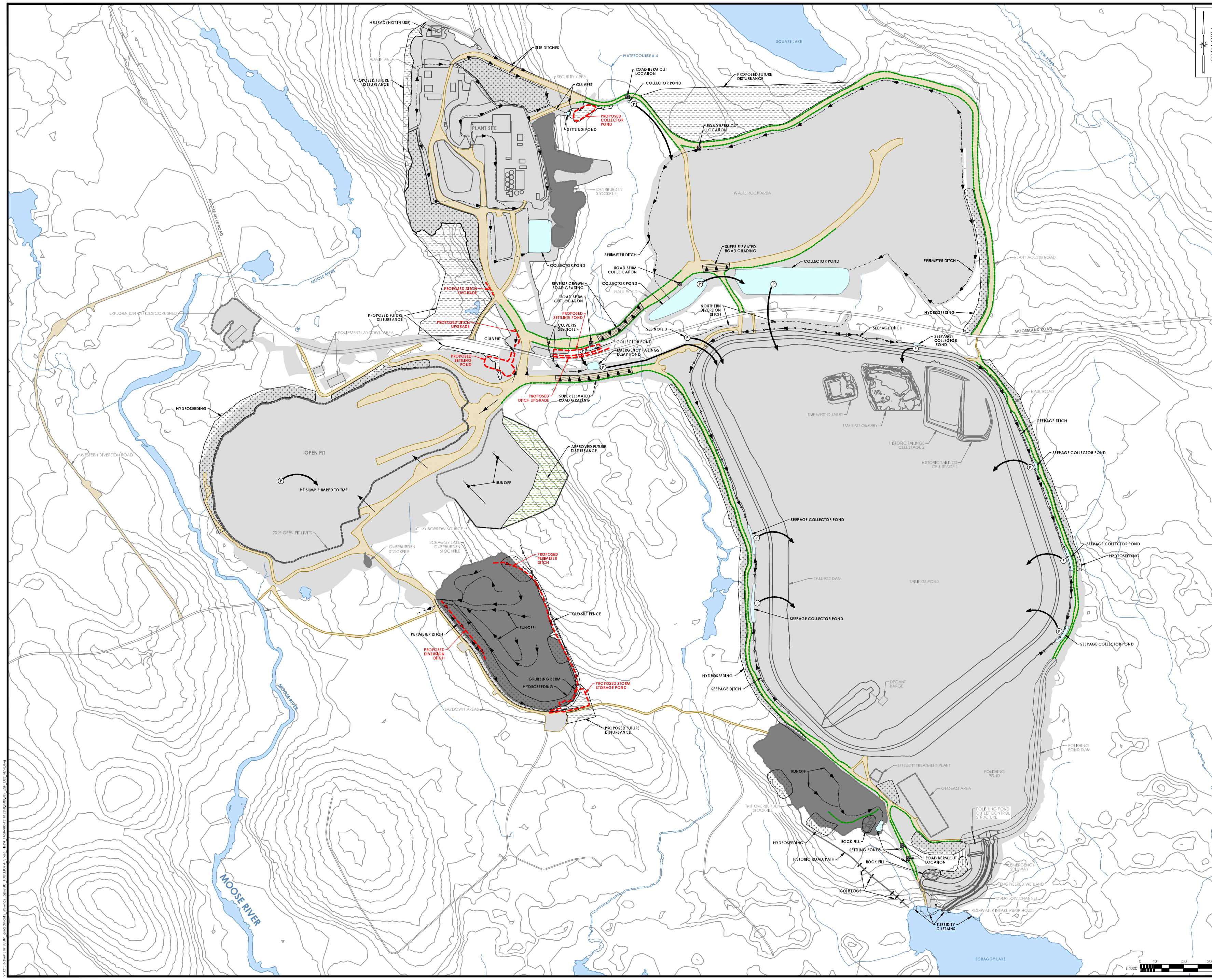
JOB No.:	SCALE:	DATE:
121619250	1 : 4000	2020-06-17
DRAWN BY:	DESIGNED BY:	APPROVED BY:
JL	HA	MF

DRAWING TITLE: EROSION AND SEDIMENT CONTROL
EXISTING CONDITIONS

DRAWING No.: 1 | REVISION No.: 0

APPENDIX B

CONSTRUCTION ACTIVITIES AND EROSION AND SEDIMENT CONTROLS



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Legend

- CONTOUR, 2m (LIDAR, 2010)
- EXISTING ROAD
- HISTORIC ROAD/PATH
- EXISTING WATERCOURSE
- WATERBODY
- DISTURBED AREAS (DEC. 31, 2019)
- OVERBURDEN STOCKPILE
- HAUL/ACCESS ROAD
- ROAD BERMS
- ROAD BERM CUT LOCATION
- REVERSE CROWN ROAD GRADING
- SUPER ELEVATED ROAD GRADING
- HYDROSEEDING
- ROCK FILL
- COLLECTOR / SETTLING POND
- PUMP
- PUMPED DISCHARGE
- PERIMETER/SITE DITCH AND FLOW DIRECTION
- SEEPAGE DITCH AND FLOW DIRECTION
- RUNOFF FLOW DIRECTION
- TURBIDITY CURTAIN
- HELIPAD (NOT IN USE)
- PROPOSED ESC MEASURES
- APPROXIMATE AREA OF APPROVED FUTURE DISTURBANCE
- APPROXIMATE AREAS OF PROPOSED FUTURE DISTURBANCE (BASED ON CONCEPTUAL PLANS AND ARE SUBJECT TO APPROVAL)

Notes

1. BACKGROUND TOPOGRAPHY SHOWN IS BASED ON LIDAR DATA PROVIDED BY CONESTOGA-ROVERS & ASSOCIATES (2010). ACTUAL FIELD CONDITIONS MAY VARY.
2. SITE DATA PROVIDED BY ATLANTIC GOLD CORPORATION.
3. TO BE PUMPED ONLY IF CONSTRUCTION ACTIVITIES REQUIRE IT (ACTS AS ROADSIDE DITCH).
4. TAILINGS LINE CULVERTS CONVEY TURBID WATER TO EMERGENCY TAILINGS DUMP POND.

STAMP | STAMP

No.	DETAILS	BY	APPD.	DATE

REVISIONS

CLIENT: ATLANTIC GOLD CORPORATION

PROJECT: TOUQUOY GOLD PROJECT TAILINGS MANAGEMENT FACILITY

PROJECT LOCATION: HALIFAX COUNTY, NOVA SCOTIA

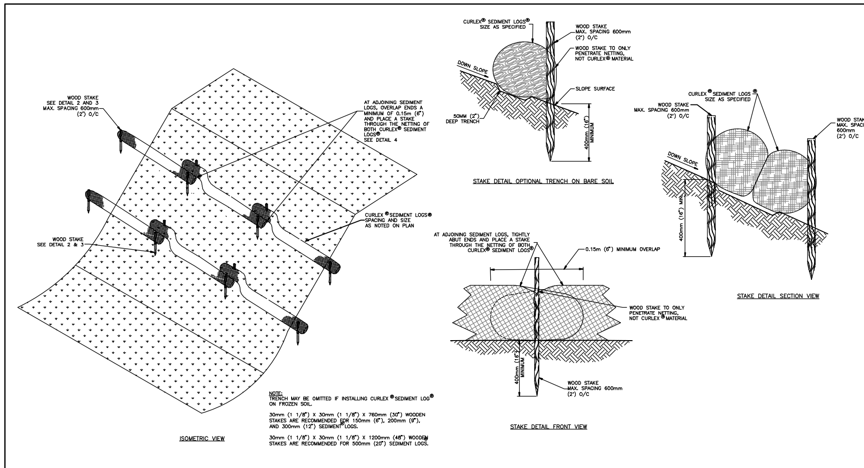
JOB No.:	SCALE:	DATE:
121619250	1 : 4000	2020-06-17
DRAWN BY: JL	DESIGNED BY: HA	APPROVED BY: MF

DRAWING TITLE: **EROSION AND SEDIMENT CONTROL NEAR FUTURE ESC PLAN**

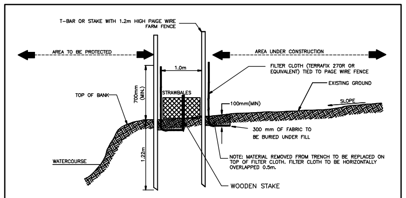
DRAWING No.: 2 | REVISION No.: 0

APPENDIX C

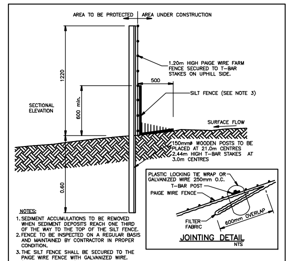
ENVIRONMENTAL CONTROL CONSTRUCTION DETAILS



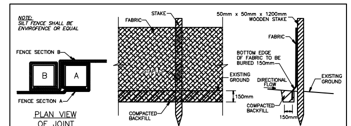
STRAW LOG EROSION CONTROL
NTS



REINFORCED DOUBLE ROW OF SILT FENCE
NTS



HEAVY DUTY SILT FENCE DETAIL
NTS



SILT FENCE DETAILS
NTS

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Legend

Notes

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Stamp

No.	DETAILS	BY	APPD.	DATE

REVISIONS

Client:
ATLANTIC GOLD CORPORATION

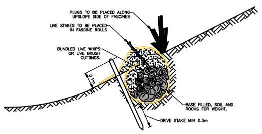
Project:
TOUQUOY GOLD PROJECT
TAILINGS MANAGEMENT FACILITY

Project Location:
HALIFAX COUNTY, NOVA SCOTIA

Job No.:	Scale:	Date:
121619250	NTS	2019-11-27
Drawn By:	Designed By:	Approved By:
JL	HA	MF

Drawing Title:
DETAILS AND NOTES

Drawing No.:	Revision No.:
C-500	0



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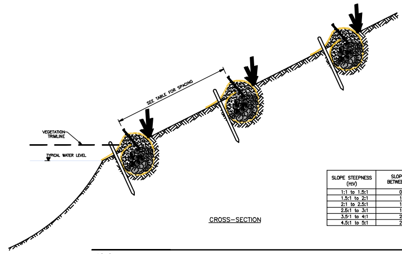
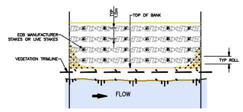


CROSS–SECTION

SLOPE STEEPNESS (H:V)	SLOPE DISTANCE BETWEEN TRENCHES
1:1 to 1.5:1	0.9 to 1.2
1.5:1 to 2:1	1.2 to 1.5
2:1 to 2.5:1	1.5 to 1.8
2.5:1 to 3:1	1.8 to 2.4
3.5:1 to 4:1	2.4 to 2.7
4.5:1 to 5:1	2.7 to 3.0



PLAN VIEW

Notes

1. BUNDLES OF LINE CUTTINGS, SOIL, ROCKS PLACED HORIZONTAL TO THE SLOPE.
2. BUNDLES TO BE KEYED INTO THE SLOPE AND SECURED WITH STAKES
3. BUNDLES TO BE 300–400mm IN DIAMETER AND PROTRUDE APPROX. 100mm ABOVE SLOPE
4. LINE CUTTING TO CONFORM WITH CONSERVATION AND RECLAMATION DOCUMENT SPECIES REQUIREMENTS
5. TO BE USED ON LONG SLOPES
7. USE ON SITE TRANSPLANT MATERIAL WHERE POSSIBLE. IF APPROPRIATE HARVESTING MATERIAL IS NOT AVAILABLE, NURSERY STOCK MAY BE USED.
8. TRIM OFF SPLIT, CRACKED AND DAMAGED (IN TOP 10% TO 20% OF STAKE) ENDS AFTER INSTALLATION, MAKE SURE TO LEAVE AT LEAST 3 BUDS TO ENSURE GROWTH. IF AFTER TRIMMING DAMAGED ENDS, NOT ENOUGH BUDS EXIST, REPLACE STAKE.
10. LIVE STAKES TO BE HARVESTED, STORED AND INSTALLED AS PER STANDARD PRACTICE AND BEST MANAGEMENT PRACTICE FOR LIVE WILLOW CUTTINGS.

IMPLEMENTATION

- LAYOUT THE LOCATION OF CONTOUR FASCINES ON SLOPE USING SPRAY PAINT AND LASER OR HAND LEVEL.
- TRENCH INSTALLATION IN LIVE FASCINES TO A DEPTH SLIGHTLY SHALLOWER THAN THE FASCINE BUNDLE DIAMETER.
- INSTALL CONTOUR FASCINES IN TRENCHES AT REQUIRED VERTICAL SPACING BASED ON SLOPE GRADIENT (SEE TABLE ABOVE).
- BUNDLES TO BE SECURED IN PLACE USING WOODEN STAKES.
- BACKFILLED ON EITHER SIDE LEAVING APPROXIMATELY 1/3 OF THE BUNDLE EXPOSED. ENSURING THAT FILL IS PLACED BETWEEN THE EXPOSED STEMS.

LIVE FASCINE ROLLS

N.T.S

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Legend

Notes

STAMP

STAMP

No.	DETAILS	BY	APPD.	DATE

REVISIONS

CLIENT: ATLANTIC GOLD CORPORATION

PROJECT: TOUQUOY GOLD PROJECT TAILINGS MANAGEMENT FACILITY

PROJECT LOCATION: HALIFAX COUNTY, NOVA SCOTIA

JOB No.: 121619250	SCALE: NTS	DATE: 2019-11-27
DRAWN BY: JL	DESIGNED BY: HA	APPROVED BY: MF

DRAWING TITLE: DETAILS AND NOTES

DRAWING No.: C-501

REVISION No.: 0

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A wholly owned subsidiary of **St Barbara Limited**
www.stbarbara.com.au

Fifteen Mile Stream Gold Project

Environmental Management System

EMP 4

Historical Tailings and Waste Rock Management Plan

Highway 374

Trafalgar, Nova Scotia

Version 001
February 8th, 2021

Appendix

Fifteen Mile Stream Historical Tailings
and Waste Rock Management Plan,
Stantec Consulting Ltd.

Fifteen Mile Stream Historical Tailings & Waste Rock Management Plan

September 25, 2019

Prepared for:

Atlantic Mining NS Corp
409 Billybell Way, Mooseland
Middle Musquodoboit, Nova Scotia, Canada
B0N 1X0

Prepared by:

Stantec Consulting Ltd.
102-40 Highfield Park Drive
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Job No.: 121619250

Table of Contents

LIST OF APPENDICES

1.0 INTRODUCTION

At the request of Atlantic Mining NS (AMNS) Corp, a Historical Tailings and Waste Rock Management Plan has been developed to address historical tailings and waste rock identified at the Fifteen Mile Stream (FMS) site as part of the mine re-development. This also includes the sediments potentially impacted from the tailings and waste rock associated with historical mining activities.

1.1 PROJECT OVERVIEW

The Fifteen Mile Stream Gold Project (hereafter referred to as the "Project") is located in Trafalgar, NS, and is a proposed open pit mine located in a historical gold mining district located 57 km northeast of the currently operating Touquoy mine. As a result, historical tailings and waste rock (HTWR) are known to be present on site due to the existence of at least one historical stamp mill and various mine related infrastructure as well as mine workings. Recent Environmental Site Assessment (ESA) studies conducted at the site revealed that proposed site infrastructure related to the mine re-development are located within HTWR areas.

1.2 GOALS AND PURPOSE OF THE PLAN

The purpose of this plan is to provide a methodology for managing HTWR at the Project site through the life of operations and throughout reclamation. To achieve this purpose, this management plan has been developed with the following goals:

1. Define procedures for the identification, and if required, delineation and assessment of HTWR prior to Project development.
2. Provide a methodology for the selection of HTWR management and disposal technologies as required.
3. Define responsibilities for the notification and reporting for issues related to HTWR management.
4. Provide a summary of the current understanding of HTWR within the Project footprint.
5. Provide a summary of proposed management and mitigation for known areas of HTWR that may be disturbed by potential Project activities.
6. Provide recommendations for further assessment of background conditions of the Site to support the understanding and proposed management strategies applicable to future HTWR management activities.

These goals lay out the basis for achieving the purpose of this plan in a safe, cost effective manner. The historical tailings delineation and remediation work conducted as part of the Touquoy Project has been reviewed and methods as well as lessons learned incorporated into the preparation of this management plan. The documents reviewed in this context are presented in Section 7.0, References.

2.0 IDENTIFICATION OF HISTORICAL TAILINGS AND WASTE ROCK

Due to the nature of historical mining within the Project area, the extent of HTWR has been poorly documented prior to the development of the site. This is a result of the age of the deposition of these HTWR (approximately 100 years old) and is inherent to the nature of tailings deposition by stamp mills themselves, dependent on unknown piping layouts and local topography; the location of trenching work; and placement of historical tailings and waste rock piles. The historical mill tailings appear to be concentrated in the flood plain around and in Seloam Brook identified in the Phase I and II ESA investigations conducted by Stantec (Stantec 2018a; Stantec 2019). This section outlines the current understanding of HTWR distribution at the Project site and provides a methodology for future identification of areas suspected to contain HTWR prior to development.

2.1 HISTORICAL TAILINGS AND WASTE ROCK DISTRIBUTION ON SITE

2.1.1 Known Historical Tailings and Waste Rock Investigations

This section gives a summary of known studies and investigations that quantify the presence of HTWR, and stamp mills, and where possible delineates the extent of known tailings. Several previous reports and studies have been conducted for FMS, including:

- *Jacques Whitford (now Stantec), 1989. Design Brief for Flood Protection Levee and Effluent Retention Structure at Fifteen Mile Stream Gold Property, Halifax County, Nova Scotia. February 1989.*
- *Hudgtec Consulting Limited, 2008. NI 43-101 Technical Report and Resource Estimate on the Fifteen Mile Stream Gold Property, Halifax County, Nova Scotia. Prepared for 6179053 Canada Inc., Acadian Mining Corporation, Annapolis Gold Corporation. May 27, 2008.*
- *Acadian Mining Corporation, 2012. NI 43-101 Technical Report on Updated Mineral Resource Estimate – Fifteen Mile Stream Property, Halifax County, Nova Scotia, Canada. August 29, 2012.*
- *Stantec Consulting Ltd., 2018. Final – Phase I Environmental Site Assessment, Fifteen Mile Stream.*
- *Stantec Consulting Ltd., 2019. Limited Phase II Environmental Site Assessment - Fifteen Mile Stream.*

More recently, to build upon the continued work to delineate the HTWR at the Project site, AMNS commissioned a Phase I Environmental Site Assessment (ESA) to identify environmental considerations (Stantec, 2018a), which was followed by a Phase II ESA (Stantec, 2019). Further details of those investigations and analytical results are provided in those reports, which are available upon request, with findings summarized in this report.

2.1.2 Summary of Historical Operations

Stantec completed a Phase I ESA at Fifteen Mile Stream (FMS) in 2018. A summary of the findings included a review of historical operations and site conditions as follows:

- Stantec conducted an historical overview and LIDAR analysis to produce a Digital Elevation Model (DEM) of the Project site. The DEM was used to approximately delineate potential HTWR storage areas.
- Between 1865 and 1940s there were various surface excavations, mine shafts of various depths, and stamp mill(s) or crushers utilized for the extraction of gold from the quartzite ore.
- The nearby outflows from Seloam Lake to the northeast were historically modified with diversions, dams, and flumes to provide wash water and power for the gold mining operations. Extensive tailings and WR were observed in and along the existing Seloam Brook.
- The 1947 aerial photographs show the dams along Seloam Lake are no longer in operation with the lake level appearing lower and exposed ground around the perimeter, and at Seloam Brook. Flooding which appears to have occurred, based on Department of Natural Resources (DNR) records, would account for the possible wide distribution of the tailings.
- Based on the information reviewed there were at least four mine operations in the area of Fifteen Mile Stream; the largest was Egerton Workings located in the area of the currently proposed pit. Several other mines and pits extended westward approximately 1 km along what is now the gravel access road to the current development.
- Between the 1940s and the 1980s, the area of the Site was allowed to become overgrown with trees.
- During a site visit completed on November 13, 2018, the foundations of a suspected stamp mill and other mine related features were located.

2.1.3 Determination of Suspected Tailings and Waste Rock Areas

Stantec completed a Phase II ESA at FMS in 2018, which included intrusive test pits and surface water sampling to determine tailings and WR distribution and potential impacts across the Project site. Figure 1 (Appendix A) displays test pit locations, surface water sample locations and highlighted areas of identified tailings and WR. Further details of the investigation and analytical results can be found in the Phase II ESA report completed by Stantec in 2019. A summary of the findings for the identified tailings and WR during the Limited Phase II investigation are as follows:

- Based on the amount of ore crushed it was estimated that there were 51,000 tonnes of tailings produced at Fifteen Mile Stream between the 1860s and 1940s. Test pits conducted during the Phase II ESA extended to depths ranging from 0.21 to 0.57 metres below ground surface.
- Work completed by Jacques Whitford (now Stantec) as part of a geotechnical project in the late 1980s identified WR and tailings on the site along Seloam Brook to a depth of 1.5 to 2 metres.
- Estimated bedrock depths range from approximately 2 to 3 metres below grade,
- The tailings material found was well sorted, firm, and ranged from a light grey to a brown. Typically, deposited tailings material was stratified, and few clasts/cobbles were present.
- Areas of possible tailings and WR were generally located to the north and northwest of the field identified WR storage area along Seloam Brook. It should be noted that at the time of site assessment, test pits could not be excavated in the northern portion of the proposed open pit along Seloam Brook due to high water levels.
- A WR storage area was observed in the southwestern portion of the proposed open pit that covers an approximate area of 12,500 m² and consists of several large piles of WR.
- WR was also identified along several trenches located to the south and east of the proposed open pit (historical mine workings), and along the access road to the west of the proposed open pit.
- Analytical results from the Limited Phase II ESA revealed concentrations of arsenic in soil exceeding the applicable Nova Scotia Environment (NSE) Tier 1 Environmental Quality Standards (EQS) for an Industrial Site in multiple test pit locations. The highest concentrations of arsenic, lead, and mercury

were found to be localized to the southwestern portion of the proposed open pit, in the area of identified WR storage and probable tailings storage (Appendix A – Figures 2, 3, 4, respectively).

- Concentrations of aluminum, arsenic, cadmium, chromium, and iron exceeding the applicable NSE Tier 1 EQS were identified in one or more surface water samples analyzed. The highest concentration of arsenic was detected in the surface water sample collected immediately north of the WR storage area (Appendix A - Figure 5). The detected metals concentrations did not exceed the applicable Metal and Diamond Mining Effluent Regulations (MDMER) Authorized Limits, where such guidelines exist. Complete analytical results, figures and methodologies are included in Stantec's Limited Phase II ESA and can be provided by request.

2.2 METHODOLOGY FOR DELINEATION AND CHARACTERIZATION OF HISTORICAL TAILINGS AND WASTE ROCK

HTWR identification have specific considerations to the Project site and background characteristics that should be accounted for when delineating and assessing HTWR. The following is a general methodology for identifying HTWR including visual and material sampling and chemical analysis techniques. It should be noted that HTWR delineation can be highly site specific, and as such professional judgement is a key component of any impact delineation exercise.

A review of available guidance from NSE and academic sources was undertaken with regards to the identification of tailings and is summarized herein:

- Tailings are a sand-like material, generally with no rocks mixed in;
- The color of them can vary between light brown and dark grey;
- Tailings often look like a 'fine sand beach' but inland without the water.

The bullets above are consistent with observations of historical tailings in the Touquoy Gold District (Stantec, 2018b), Cochrane Hill Gold District (Mosher, 2004), and the Montague and Goldenville Gold Districts (Parsons et al., 2015).

Visual delineation methods, while useful, need to be combined with sampling and chemical analysis. Using visual observation methods alone is not necessarily indicative of elevated metals concentrations as noted during Stantec's investigation and Limited Phase II ESA report. Within Nova Scotia, gold deposits tend to occur in areas with high incidences of arsenopyrite. Historical milling operations have used mercury in processing, as it was a common technology applied at that time. A general understanding of background concentrations of arsenic, mercury and lead is essential in quantifying tailings and WR.

Site specific approaches need to be applied when undertaking tailings and WR impact investigations. A combination of physical visual identification (where possible) and chemical analysis methods are used for delineating the tailings/WR and their associated impacts.

Physical identification is the primary method to initially ascertain whether an area contains historical tailings. Due to the primary method of processing used historically (stamp mills), there are physical characteristics common to tailings deposited in the late 19th/early 20th century. Physical samples are compared to the following general physical criteria:

- Fine grained sand-like, well sorted material, generally less than 1mm in size. Few or no large cobbles (or clasts) present.
- Highly bedded deposition, with visually identified depositional layers. Some areas may not display this layering depending on how the stamp mill and tailings deposition occurred.
- Color ranging from light grey, through to a brownish red. The characteristics of the local ore body should be considered in this evaluation.

In conjunction with the physical identification of tailings and WR, chemical characterization is also required. Metals and acid generating potential are to be considered when dealing with HTWR. Not all tailings and/or WR are identified to have negative effects on the receiving environment. To determine the potential for adverse downstream impact, a series of geochemical tests are conducted including static analyses (acid base accounting (ABA) tests) and short-term leach tests to assess the potential for acid rock drainage and metals mobilization from historical tailings. The following analysis should be conducted to help determine the potential impact of tailings and/or WR on the receiving environment:

- Total metals analysis
- Acid base accounting (ABA)
- Shake flask extraction tests

Background samples should be collected near the area of suspected tailings deposition. However, there are several considerations that should be observed when selecting a background location, including:

- Selecting a location that overlays the same host rock as the area of potential tailings deposition.
- Background samples should be collected in undisturbed areas that have not been recently worked or show signs of historical activities.
- Collection of samples at a similar depth to the tailings impact delineation samples, to account for historical weathering and the potential for arsenic transport.

When background samples have been collected and analyzed for chemical characteristics, an appropriate value for background parameters of interest should be selected, reflecting risk exposures (human health and ecological) that exist already on the site and in the area, regardless of whether there are tailings or WR. For example, there can be naturally elevated arsenic in soils that overlie or are adjacent to an ore deposit that is enriched in arsenic.

2.3 REPORTING

The results of studies, whether externally commissioned or internally completed shall be provided to the Site Environmental Department for their review. Information regarding the known location, chemical makeup and extent of tailings and WR on the Project site shall be integrated into this plan as part of this Plan's ongoing adaptive management and updating process. Where appropriate or required, reporting should be directed to NSE for their review as well.

3.0 SELECTION OF REMEDIAL OPTIONS FOR HISTORICAL TAILINGS AND WASTE ROCK

Studies completed to date have shown that HTWR have been deposited by a variety of mining endeavors throughout the history of the Project site. The chemistry of HTWR can be variable, due to the primitive nature of the processing at the time and the effects of natural attenuation. The following section outlines the available remedial options for HTWR at the Project site. It should be noted that any permanent or temporary placement of HTWR material outside of an approved tailings management facility (TMF) will likely require the approval of NSE. Options for permanent disposal methods and locations within the TMF are expected to be included in conditions of the Industrial Approval for the site.

3.1 AVAILABLE REMEDIAL OPTIONS

3.1.1 Re-Processing

The re-processing of HTWR may be an option, depending on the variability of the tailings/WR and milling capacity. During the reprocessing of old tailings and WR material, the metal(s) of interest are extracted using modern mill technology, and the residual material processed and deposited within the TMF. No special engineered containment would be required within the TMF and the residual material would be mixed in with the tailings originating from the ore processing. The material would be permanently encapsulated within the TMF.

While this option can be attractive due to the possibility of enhanced revenue generation (assuming gold is present in the HTWR), in practice the re-processing of tailings and WR can be difficult. Mill processes are tuned to the expected chemistry of the material being processed. Appropriate metallurgical and other testing would be implemented as required to proceed with this option. Tailings of the age expected to be found on the Project site commonly contain organic materials and other substances that can be detrimental to an efficient re-processing of tailings. Also, if mercury is present in the HTWR a mercury abatement strategy may be required during reprocessing.

3.1.2 Short Term Storage

Short term storage options for tailings disposal will be required during the initial stages of site construction prior to TMF or Process Plant construction. The type of storage facility required would be based on analytical test results and comparison of the results to applicable provincial or site based regulatory criteria. Considerations for temporary short-term storage on-site are as follows:

1. Site specific locations should be reviewed such as new WR storage facilities (WRSF) where material could be deposited at designated locations. WRSFs will typically include water management structures such as ditches and ponds that contain and manage mine contact water.
2. Physical characteristics of proposed site locations (i.e., away from potential flooding, or within similar background conditions).
3. Apply appropriate measures for the construction and maintenance of containment areas.

If tailings and/or WR are tested and are confirmed to be below applicable provincial or site-based criteria, the tailings and WR material could be used as site overburden and/or for construction purposes.

3.1.3 Long Term Storage

It is currently proposed that a TMF will be constructed at FMS as part of the mining operation. Placement of material within this facility with the regular tailings stream may be an appropriate remedial option if the HTWR from the Project site are chemically and physically consistent with the current design of the TMF.

For tailings and WR material to be placed within the TMF, it must meet the following two criteria:

1. The HTWR are chemically similar to the design tailings criteria for the TMF.
2. A geochemical study has shown that no adverse chemical reactions will occur between the HTWR and the geochemical conditions within the TMF.

If HTWR material are not appropriate for direct disposal within the TMF, cell encapsulation within the facility will be an option. Cell encapsulation involves the design and construction of a capped cell, either impermeable or semi-impermeable, within the footprint of the TMF at the Project site. The design goal of the cell is to increase the level of containment provided by the TMF, and limit the infiltration of water into the tailings and WR, and out into the environment. There are other potential technologies available including dry-stacking, or remedial technologies that would also require appropriate testing to ensure selected methods are cost effective and environmentally protective.

3.1.4 Off-Site Disposal

Off-site disposal is an option, in particular for historical tailings for material for which no other suitable remedial measures are feasible, which could be the case for high levels of mercury if found in historical tailings. There are currently no facilities located in Nova Scotia or New Brunswick that can receive solid materials that contain high levels of mercury. The nearest facilities are located at Quebec and have limits on the levels of arsenic and mercury for material acceptance. For FMS, the available analytical mercury results for historical tailings indicate that such high levels of mercury will not likely be encountered.

3.2 REMEDIAL OPTION SELECTION

The following section outlines some of the general considerations when selecting a preferred remedial option for HTWR, should remedial options be pursued at the Project site. The guiding principles for the selection of a remedial option are:

1. The risk of adverse environmental impacts is minimized and improved from existing conditions.
2. The risk to human health is minimized and improved from existing conditions.
3. The remedial option is technically feasible and cost effective.
4. The remedial option selected is permanent to the degree practicable and minimizes future liability to AMNS and the Province.
5. Any HTWR disturbed by AMNS operations must be remediated.
6. Requirements of the Nova Scotia Industrial Approval for the site are met.

4.0 PROCEDURES FOR THE REMEDIATION OF HISTORICAL TAILINGS AND WASTE ROCK

4.1 TAILINGS AND WASTE ROCK EXCAVATION

HTWR within the project disturbance footprint will be excavated to delineated extents or to bedrock via excavator, with a trained environmental professional directing the removal of material. The material identification methodology described in Section 2.2 will be used to identify tailings and WR during excavation, with special emphasis placed on ensuring the vertical extent of the tailings and WR are identified. Systematic exploratory trenching of a portion of the suspected areas of tailings and WR is an effective method of visually and analytically identifying the vertical and horizonal extent of the HTWR (AECOM, 2019; Stantec, 2018c).

Tailings and WR will be placed directly in trucks for transport. The volume of material transported by trucks should be recorded, and photos should be taken both during excavation and material placement for record keeping purposes.

Soil samples will be collected along the final horizontal and vertical extents of the excavation for confirmatory sampling (where the excavation has not been extended to bedrock). Sufficient samples should be taken to be representative of the soil remaining in place. Where arsenic, lead, or mercury contaminated soil is excavated in conjunction with HTWR, confirmatory sampling will be completed by a trained environmental professional (AMNS, 2018). If impacted soil or HTWR conditions have been identified which are not compatible with the design of the TMF, these materials should be segregated so that they can be dealt with appropriately.

The vertical (if not extended down to bedrock) and horizontal extents of the excavation should be surveyed once excavation activities are complete.

4.2 WATER MANAGEMENT

Due to the nature of historical tailings deposition, tailings material is typically found close to the existing ground surface, often saturated in water, and on or along the Seloam Brook as observed during investigations at the Site. Therefore, any water associated with the HTWR that are to be excavated must be controlled at the Site and during potential movement or remedial activities, as it has the potential for the mobilization and transport of contaminants. Regional undisturbed surface drainage appears to be to the west following Seloam Brook toward Fifteen Mile Stream. To minimize potential contaminant transport, prior to the start of construction, a section of Seloam Brook that overlies the proposed pit footprint is planned to be diverted, which will re-route the upstream water north and then west through a diversion channel. The diversion channel will allow for the HTWR to be excavated in relatively dry conditions. In addition, it is understood that post-diversion, residually impacted waters may still remain within the saturated HTWR as well as additional water from groundwater seepage. Potentially impacted effluent coming from these features will be collected and stored in engineered containment and settling ponds, and treated passively or with a modular water treatment facility, if required to meet the applicable water quality criteria prior to discharge to the receiving environment.

Regional undisturbed surface drainage is to the west following Seloam Brook toward Fifteen Mile Stream. Anticipated shallow groundwater flow is also to the west but may, in limited areas, also be influenced by the presence of underground mine workings.

A water management plan and further confirmatory delineation and groundwater assessment of these locations should be investigated and included as part of removal, placement or remediation of tailings prior to development of infrastructure and design of open pit operations at the site.

4.3 TAILINGS AND WASTE ROCK TRANSPORT AND PLACEMENT

If tailings and WR are to be transported, they should be deposited directly into available trucks via excavator for transport to selected areas for remediation. If the material is dry and dust generation is a concern during transport, the material in the trucks will be covered.

If the material is excessively wet, the material will be dewatered prior to placement in the truck boxes. Alternatively, truck boxes can be sealed to minimize discharge of water from the trucks during transport. Existing access roads will be used to the extent possible; new temporary roads may be constructed to facilitate remediation if required.

If material is to be transported off site, the material should be assessed to see if it falls under the Transportation of Dangerous Goods Regulation. If the material does meet the requirements under the regulation, appropriate permits shall be obtained prior to transportation.

4.4 MONITORING AND REMEDIAL VERIFICATION

All confirmatory samples should be sent to an accredited laboratory and tested for, at minimum, total metals in soil. These samples should be compared to the Tier 1 EQS for an industrial site, and any site specific (i.e., background) criteria developed. If the confirmatory samples exceed the relevant soil quality guidelines, additional assessment should be completed to ensure the remedial objectives are met.

Installation of groundwater wells will be required in areas of HTWR and sampled prior to removal of the bulk of the HTWR material. Groundwater wells will be monitored in order to assess whether source removal and/or dewatering of the open pit mine have an impact on downgradient groundwater quality.

4.5 REPORTING

4.5.1 Internal

The following information should be reported internally, and where appropriate, integrated into this Plan, as well as provided to the Site Environmental Department for record keeping and planning purposes, when or if remedial activities occur:

- Confirmatory sampling results and laboratory certificates.

- The surveyed delineated extents of the HTWR excavation.
- Photos of the excavation, placement and transport of the material.
- Groundwater sampling results and water levels, both preliminary and ongoing results.
- Volumes of removed material, and placement location if an on-site remedial option is chosen.
- Any contractor disposal certificates if an off-site remediation method is chosen.
- Any reprocessed tailings quality results, if re-processing is selected as a remedial option.

4.5.2 External

The external reporting requirements to NSE will be outlined in the future Industrial Approval and approved HTWR Management Plans. The types of information to be provided could include:

- Confirmatory sampling results and laboratory certificates.
- Surveyed delineated extents of the excavation.
- Groundwater sampling results and water levels, both preliminary and ongoing results.
- Volumes of removed material, and placement locations (on and off-site)
- Contractors' disposal certificates if an off-site remediation method is chosen.
- Reprocessed tailings quality results, if re-processing is selected as a remedial option.
- Design of the containment cell, if selected as a remedial option.

5.0 CLOSURE

The FMS Gold Project is still in the early stages of development and as such, tailings and WR identification and delineation are on-going. This Management Plan describes the understanding, proposed procedures and methodologies on how HTWR material at the Project site may be managed, assessed, delineated, and remediated. As further information becomes available, the plan may be amended and improved to include these items.

6.0 LIMITATIONS

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

Submitted by,

Stantec Consulting Ltd.

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Appendix A FIGURES

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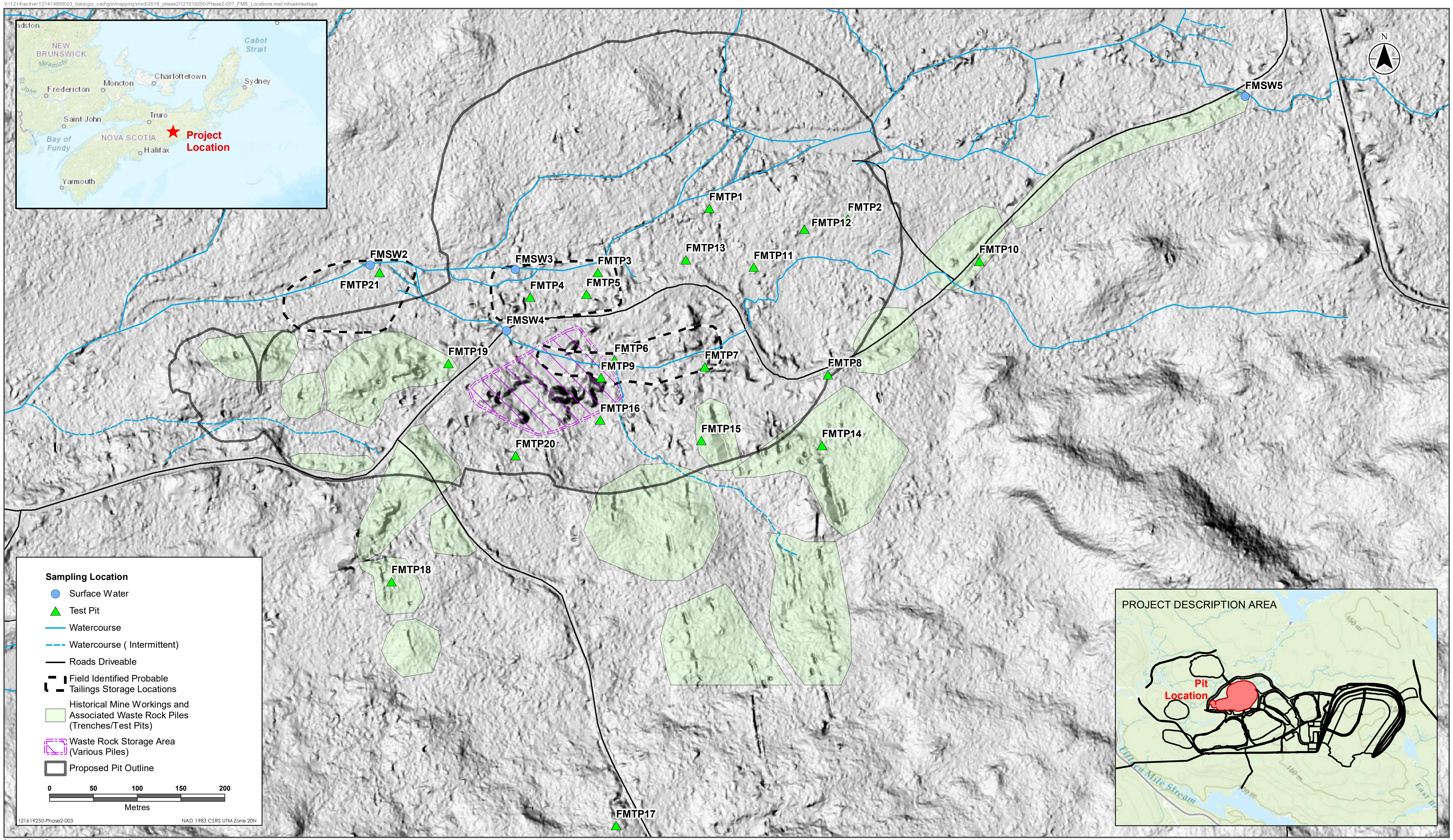

Sources: Client, Government of Nova Scotia and Canada

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Test Pit and Surface Water Sampling Locations
Atlantic Mining NS - Fifteen Mile Stream Project

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Figure 1

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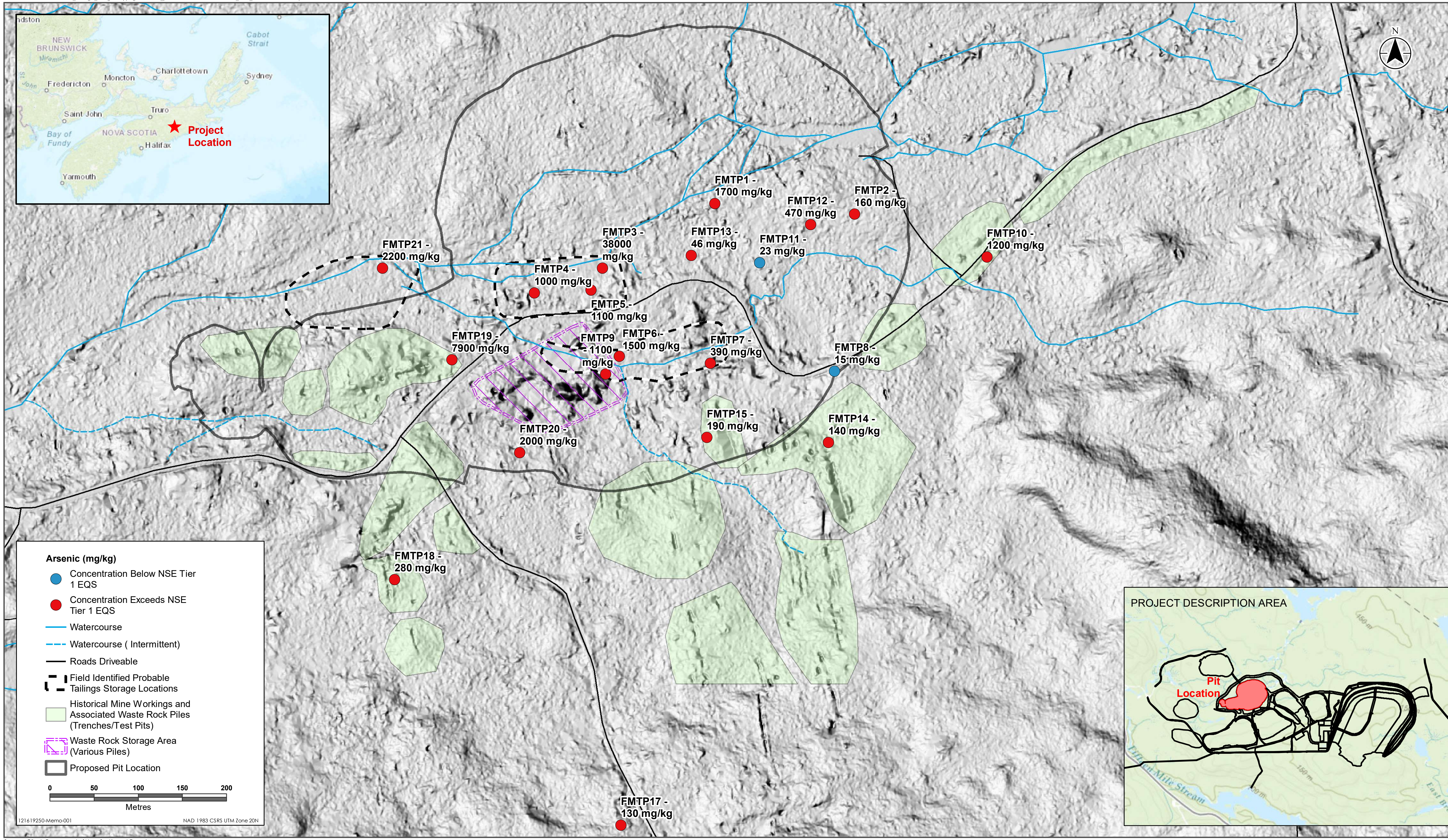

Sources: Client, Government of Nova Scotia and Canada

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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Arsenic Concentrations in Soil
Atlantic Mining NS - Fifteen Mile Stream Project

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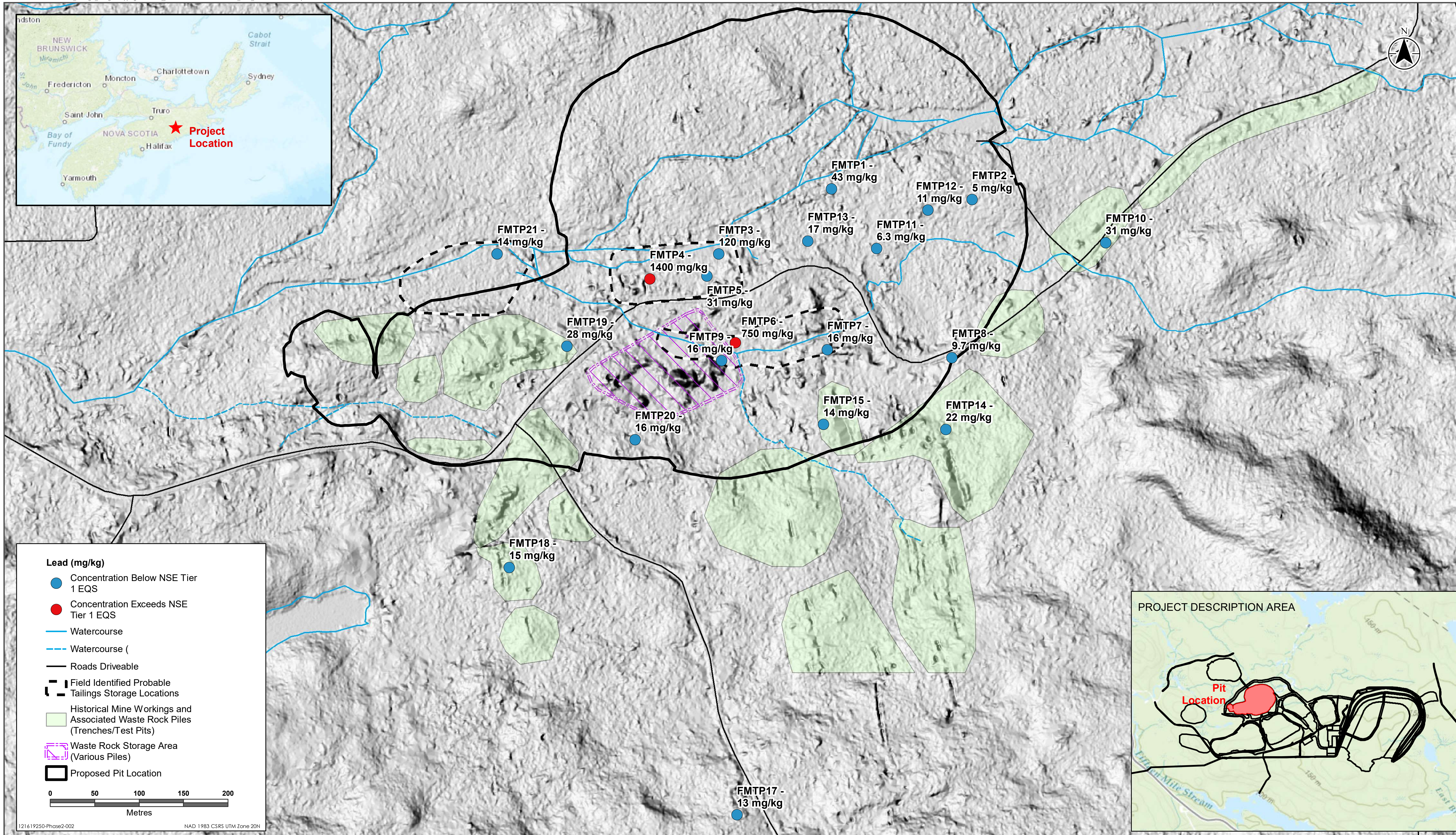
Figure 2



Sources: Client, Government of Nova Scotia and Canada

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Lead Concentrations in Soil
Atlantic Mining NS - Fifteen Mile Stream Project

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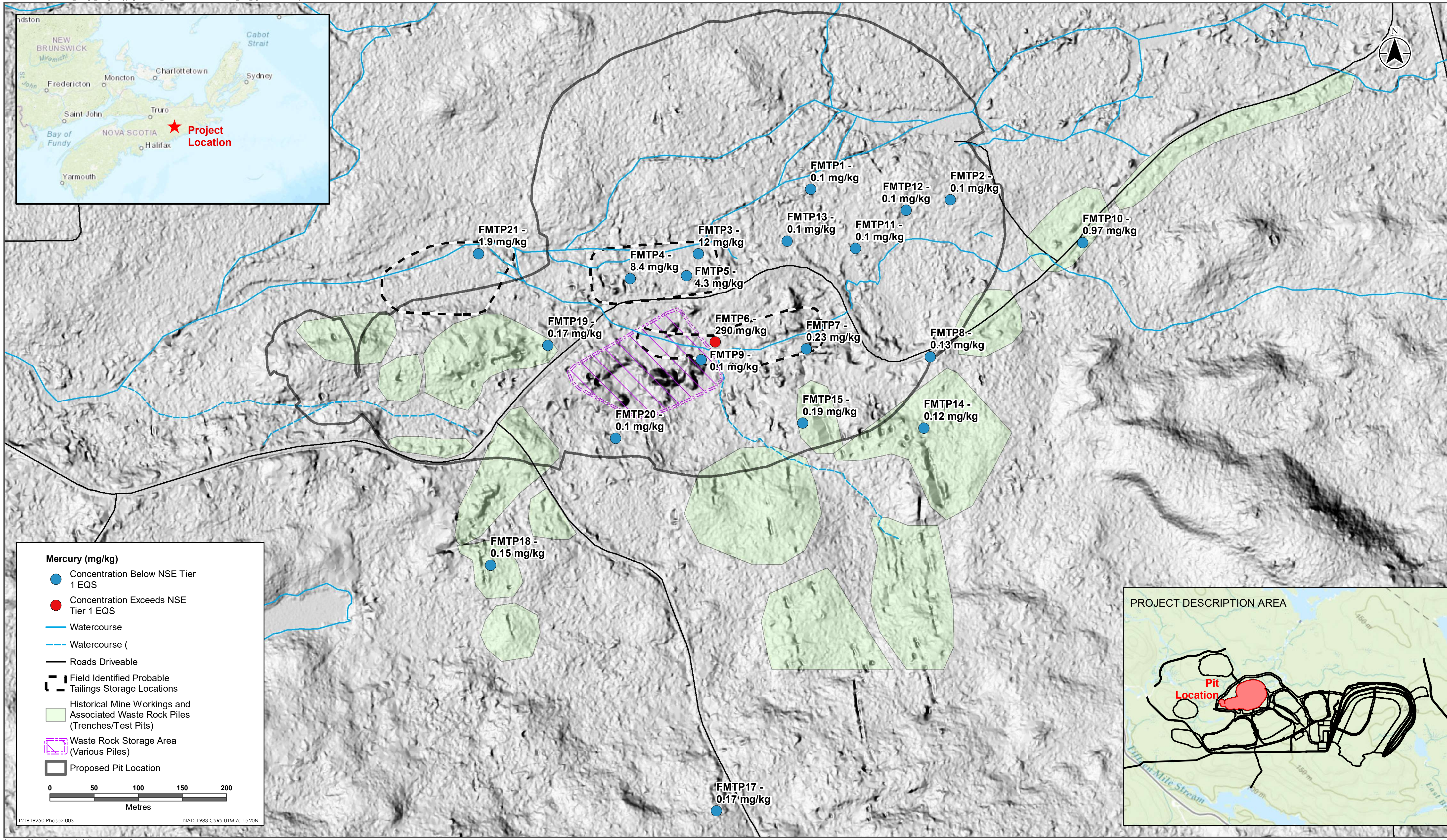
Figure 3



Sources: Client, Government of Nova Scotia and Canada

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Mercury Concentrations in Soil
Atlantic Mining NS - Fifteen Mile Stream Project

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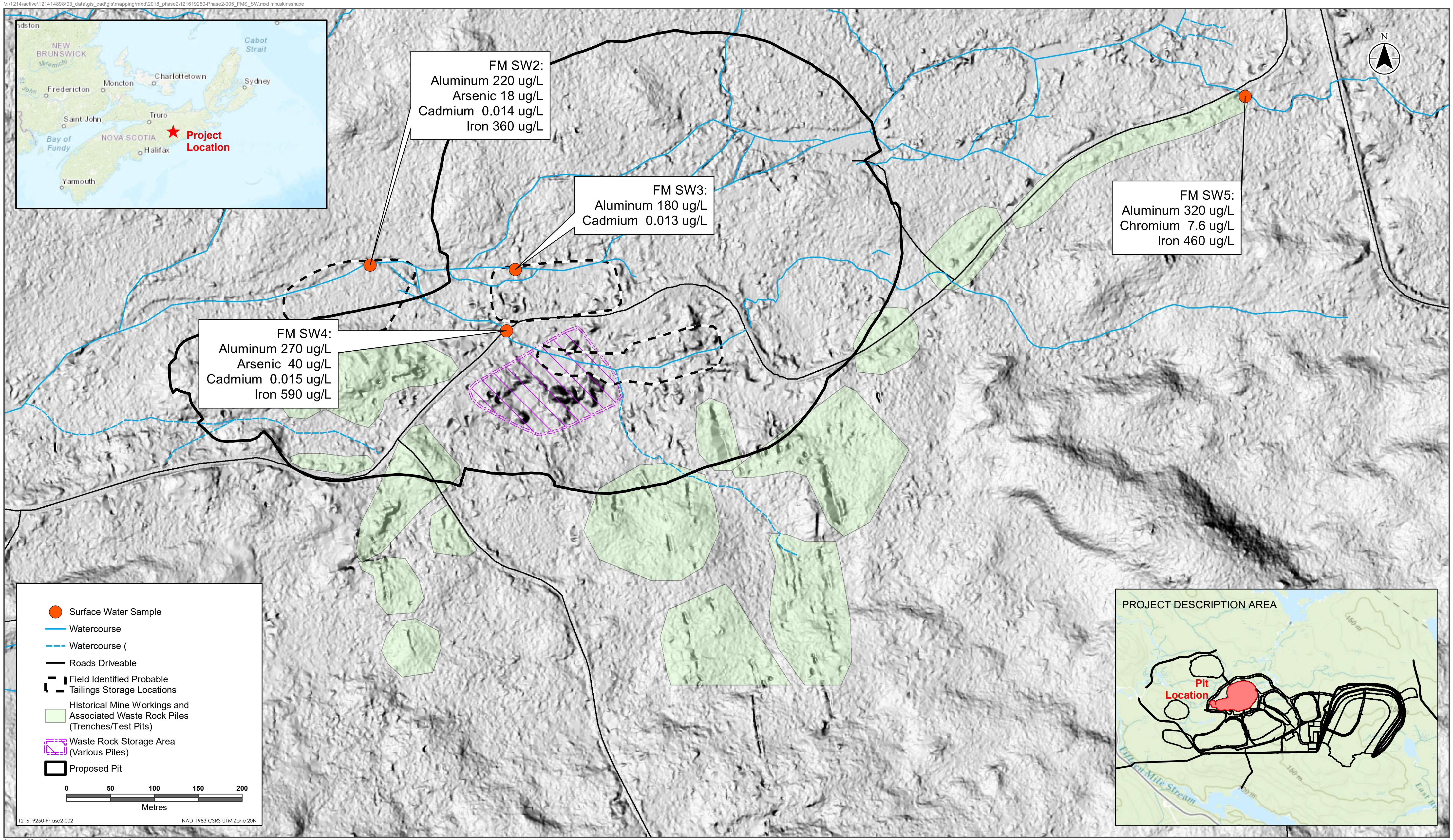
Figure 4



Sources: Client, Government of Nova Scotia and Canada

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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Surface Water Quality Exceeding NS Tier 1 EQS
Atlantic Mining NS - Fifteen Mile Stream Project

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Figure 5

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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 5

Fugitive Dust Management Plan

Highway 374

Trafalgar, Nova Scotia

Version 001

February 8th, 2021

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Overview

The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, (the Company) in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for a comprehensive Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during each phase of the Project minimize the effects of the mine and promote the protection of the environment and human health. For additional information on the overall EMS structure and other Environmental Management Plans (EMP), please refer to the EMS Framework Document.

The general purpose of the Fugitive Dust Management Plan (the Plan) is to identify potential sources and where necessary, plan for and implement mitigation measures to reduce fugitive dust emissions associated with mining and related activity during each phase of the Project. Minimizing fugitive dust emissions at the source will have a combined benefit of protecting the health and safety of workers at the Fifteen Mile Stream (FMS) Mine Site as well as protecting the environment and minimizing long-term impacts associated with the Project.

Fugitive dust typically refers to small particles of geological or other origin that are moved into the atmosphere from non-ducted, open sources known as non-point sources. Non-point fugitive dust sources may originate from both stationary and mobile sources, including such things as open fields, open burning, agricultural activity, construction sites, logging road traffic, vehicle traffic on paved and unpaved public roads, aggregate pits and storage piles, as well as open pit mines.

By contrast, point sources are typically ducted stationary sources, such as stacks or vents at industrial or commercial facilities. These typically operate under some form of government authorization (e.g., a permit, approval or regulation). These sources include emissions points from dust control and building ventilation systems such as at the primary crusher, coarse reclaim tunnel and the concentrator building which are in each case treated by baghouse and/or wet scrubber air emission control systems.

At the FMS Mine Site, the potential sources of fugitive dust will include: open pit operations - including drilling, blasting, haul truck operations, activity around the ore processing plant (concentrator building), concentrate hauling, vehicle traffic along the mine site access road and on site road network, road grading, wind erosion of waste rock stockpiles, soil stockpiles, low grade ore stockpiles and exposed tailings storage areas. Fugitive dust emission sources from the processing plant include mineral material transfer systems associated with the primary crusher and the crushed ore stockpile.

Studies undertaken at other mining operations have indicated that, in the absence of mitigation measures, dust entrainment by the wheels and the wake created by moving haul trucks generate almost 97% of suspended particulate emissions associated with mining activity, although most of this dust settles out rapidly and decrease to insignificant levels within the mine property boundaries.

In terms of geologic origin, potential fugitive dust will originate predominantly from a combination of relatively inert naturally occurring matter including background soils such as dirt, clay, silt and sand, ore-grade materials or host rock materials.

The extent of fugitive dust emissions depends on several factors, the most important being particle size, wind speed, moisture content and dust density. Maximum fugitive dust generation will take place during windy weather where small and light particles are present in dry, active surface material. As a result, dust plumes tend to be most noticeable from potential sources when wind speeds are high and/or when vehicles are moving.

The potential drift distance of fugitive dust particles is governed by the initial injection height of the particle, the terminal settling velocity of the particle, and the degree of atmospheric turbulence. Dispersion models have been used to compute theoretical drift distance specifically for this site, as a function of particle diameter and mean wind speed, for fugitive dust emissions. Results indicate that, for example, at a wind speed of 16 km/h, particles larger than about 100 µm are likely to settle out within 6 to 9 m from the point of emission. Smaller particles have much slower gravitational settling velocities and are much more likely to have their settling rate slowed by atmospheric turbulence. As a result, particles that are 30 µm to 100 µm in diameter are likely to undergo impeded settling.

The information contained in the Plan is at a level of detail appropriate for an Environmental Impact Statement (EIS) submission. The Plan is a "living document" and will be further developed by the Company into a more detailed plan prior to commencement of the construction phase of the Project.

1.2 Purpose

The purpose of the Plan is to identify potential sources and where necessary plan for and implement mitigation measures to reduce fugitive dust emissions associated with mining and related activity during the construction, operation, decommissioning, and closure phases of the Project. Minimizing fugitive dust emissions at the source will have a combined benefit of protecting the health and safety of workers on site and protect the environment and minimizing long-term impacts associated with the Project.

The Company will implement the management practices and procedures outlined here in the Plan to minimize the potential for dust generation at the mine.

1.3 Scope and Objectives

As identified, there will be a variety of non-point sources spread throughout the property which will have the potential for generating varying degrees of fugitive dust emissions depending upon the level of activity and a variety of weather and other conditions which will change on a daily and seasonal basis.

The objective of the Plan is to establish practices and procedures to identify potential and/or active fugitive dust sources and to implement either proactive or responsive mitigation measures to minimize the amount of particulate matter released into the atmosphere as a result of mining and materials handling activity at the FMS Mine Site in order to protect worker safety and that of the surrounding environment.

The Plan includes the following practices and procedures:

- Identification of potential fugitive dust emission sources in conjunction with the design, development and implementation of the mine operating plan;
- Establishment of mitigation measures for each potential source of fugitive dust emissions based upon industry standard methods which constitute best practice;
- Establishment of routine observation practices and inspection procedures to identity active sources, and to provide feedback as to the effectiveness of mitigation measures and the need for corrective actions;
- Reporting procedures to provide the basis for corrective action and, if necessary, amending mitigation measures; and,
- Training of personnel on the objectives of the Plan, inspection procedures, implementation of corrective action and/or reporting procedure.

The information contained in the Plan is at an appropriate level of detail given the current state of the Project and for submission in support of the Environmental Impact Statement (EIS). As a "living document", the Plan will be updated prior to the commencement of construction as more detailed information is developed in conjunction with the FMS Mine Site design.

2.0 REGULATORY CONTEXT

The construction, operation and reclamation of the Project, including those aspects covered under the Plan, will be governed by a number of federal and provincial acts and regulations. The development and implementation of the Plan will be directed by a variety guidelines, policies, and best management practices (BMPs).

For reference to those which may potentially be applicable to the Project and the Plan please refer to the EMS Framework Document.

3.0 SAFETY AND ENVIRONMENTAL MANAGEMENT MEASURES

Potential fugitive dust sources and mitigation measures to minimise the amount of particulate matter released into the atmosphere as a result of mining and materials handling activity at the FMS Mine Site are discussed in detail below. The environmental protection measures relating to the Plan include reasonable operating practices and procedures aimed at minimizing the potential for dust generation.

3.1 Open Pit Operations

Open pit operations have the potential to create fugitive dust emissions though drilling and blasting, materials handling and the transportation of ore and waste rock by a variety of heavy equipment and vehicles. The coarse nature and the natural moisture content of the materials, as well as depth of the pit will minimize the potential for effects from fugitive dust emissions beyond the pit limits. The greatest potential for impacts associated with fugitive dust beyond the pit boundaries exists where activity is undertaken near or outside of the pit rim.

Operations Supervisors will visually monitor pit activity and implement mitigation measures as necessary, when possible, which may include the following:

- Use of dust curtains and water lubrication of blast hole drilling equipment;
- Use of delay blasting techniques, where practical;
- Ensuring all-unpaved roads are regularly maintained and kept in good repair;
- Application of water or dust suppressants to roadways to minimize dust from ore and waste rock haulage and grading, when ambient air temperatures permit;
- Use of appropriately sized large haul trucks for ore and waste transport to minimize the number of trips required between the source and destination; and,
- Ensuring vehicles will be driven at designated speeds on site roads.

3.2 Mobile Equipment Sources

Mobile equipment sources consist of the various vehicles used at the FMS Mine Site. This includes haul trucks, dozers, front-end loaders, graders, and light vehicles. Fresh crushed construction waste rock used as road construction material is predicted to contain an average moisture content of 10%, a typical value for this type of aggregate. Dust generation will typically become greater as road base material ages, is pulverized by traffic and dries out during periods of warmer weather. Operation Supervisors will visually monitor site road activity and implement mitigation measures as necessary which may include the following:

- Ensuring all-unpaved roads are regularly maintained and kept in good repair;
- Wet suppression controls on unpaved surfaces (watering during dry seasons and possible application of chemical dust suppressant);
- Harden surfaces where practical;
- Speed reduction to keep dust levels at minimum;
- Use of appropriately sized haul trucks for ore and waste transport to minimize the number of trips required between the source and destination;
- Optimize FMS Mine Site layout to minimize the distance travelled, thereby reducing vehicle emissions and dust generation, where practical; and,
- Reclaim and re-vegetate decommissioned roads as soon as practical.

3.3 Primary Crusher and Crushed Ore Conveyor

Run-of-mine ore grade material will be hauled from the open pit and stockpiled adjacent to or directly into the primary crusher feed bin. From the feed bin the run-of mine ore drops by gravity directly into the crusher. An apron feeder below the crusher then feeds the crushed ore onto a transfer conveyor system which transports the crushed ore to a crushed ore stockpile. The crushed material size will be nominally minus 6 inch in size. The coarse nature and the natural moisture content of the pit-run materials (approximately 5%) will minimize the potential for effects from fugitive dust emissions at the crusher.

As well, the primary crusher is equipped with a downdraft dust collection system to capture and recover dust particles from the crusher cavity thereby controlling dust emissions and the overland conveyor is covered to minimize dust emissions on windy days.

Within the crusher building, emission control systems in the form of baghouses are in place to control dust emissions at transfer points. The operation of these point source emissions is generally regulated under the Industrial Approval for the Project.

The crusher operators will visually monitor crusher operations for fugitive dust generation. Potential mitigation measures may include:

- A water spray system to wet ore prior to or concurrent with discharge into the feed bin, where practical under permitting weather conditions;
- The crushing facility will be equipped with a dust suppression/collection system to control fugitive dust that will be generated during crushing, material loading, and related operations;
- Overland conveyors will be covered/semi enclosed to prevent dust generation;
- Enclose discharge from crushers onto conveyors or into other equipment as far as is practicable; and,
- Minimize the drop/discharge heights at material transfer points, where practical.

3.4 Coarse Ore Stockpile and Reclaim Tunnel

Crushed ore is discharged from the overland conveyor onto the top of an outdoor, uncovered crushed ore stockpile to be located near the concentrator building.

Dust emission levels from an open surface of the conical stockpile due to wind erosion will depend on the following factors:

- Age of the material on the pile;
- Moisture content of the crushed ore at the surface of the pile;
- Particle size and density;
- Precipitation;
- Wind speed; and
- Time of the year.

The majority of the outer surface of the stockpile is composed of coarser material due to gravity separation and will therefore be resistant to the effects of wind erosion. As a result, fugitive dust emissions from the coarse ore stockpile will primarily be associated with wind erosion at the ore drop from the conveyor to the top of the pile. The crushed material size will be nominally 6 inch-minus in size and the estimated 5% moisture content of the crushed ore will assist in minimizing the potential for effects from fugitive dust emissions at the coarse ore storage.

The mill operations personnel will visually monitor the coarse ore storage pile for fugitive dust generation. Potential mitigation measures may include, when practical:

- Minimize the drop/discharge height from the overland conveyor onto the coarse ore stockpile;
- Installation of a shroud around the drop point; and,
- A water spray system to wet crushed ore prior to or concurrent with discharge from the conveyor onto the coarse ore pile, weather conditions permitting.

The reclaim tunnel is located under the crushed ore stockpile where reclaim drop feeders load a conveyor feeding the primary grinding circuit semi-autogenous grinding (SAG) mill inside the concentrator building. Transfer points within the reclaim are equipped with baghouse emission control systems. The reclaim tunnel is enclosed and air through the baghouses is re-circulated within the tunnel.

3.5 Concentrator and Associated Facilities

The milling and material handling processes within the concentrator building from the SAG mill through to the production of final concentrate will take place under wet conditions. For this reason, no particulate matter emissions to the atmosphere are anticipated from wet streams.

Within the concentrator building, point source emissions are associated with the lime silo, sample preparation or bucking room, and the assay lab. Emission control systems in the form of baghouses and a wet scrubber are in place to control emissions at these locations. The operation of these point source emissions will be regulated under the Industrial Approval for the Project.

3.6 Clearing, Grubbing, and Stripping

As vegetation is cleared for construction areas or earthworks projects are undertaken, soil materials have the potential to become airborne. The natural moisture content of in-place native materials will mitigate against significant dust generation.

Surface operations personnel and supervisors will visually monitor activity and implement mitigation measures as necessary which may include the following:

- Complete clearing, grubbing and stripping activities on an area by area basis in as efficient a manner as practical such that work is completed on fresh materials and not allowed to dry our unnecessarily;
- Install windbreaks around identified problem areas, where practical, to limit the dust emissions from equipment and stockpiles, and other activities likely to generate dust; and,
- Reclaim and re-vegetate decommissioned areas as soon as practical.

3.7 Overburden Stockpiles

Soil stripped from construction areas will be stockpiled for future use in reclamation as required under the Project's Industrial Approval and Reclamation and Closure Plan. The natural moisture content of native soils will mitigate against any such dust generation in the short term, until these materials dry out at which point, they will become more susceptible to wind erosion.

Operations personnel and supervisors will visually monitor overburden stockpiles and undertake mitigation measures as necessary which may include the following:

- Vegetate overburden stockpiles as soon as practical to minimize both wind and water erosion;
- Fencing or other windbreaks may be considered around stockpiles to reduce wind velocities; and
- Reclaim and re-vegetate decommissioned areas as soon as practical.

3.8 Waste Rock and Low-Grade Ore Storage

Fugitive dust emissions from waste rock and low-grade ore storage areas have the potential to result from various activities associated with the materials handling and storage process:

- Equipment traffic in storage area;
- Materials handling (unloading, dozing, grading); and,
- Wind erosion of exposed surfaces.

Dust emissions from an open flat surface depend on the following parameters:

- Proportion of waste rock fines;
- Particle size distribution;
- Material moisture content;
- Wind speed; and
- Quantity of material processed and equipment traffic (trucks, front-end loaders, dozers, etc.).

Generally speaking, the natural moisture content of the materials will minimize dust generation during the initial handling stages and the coarse nature of the pit-run materials will minimize the potential for effects associated with fugitive dust emissions from the storage areas over the longer term.

Operations personnel and supervisors will visually monitor waste rock and low-grade stockpiles and undertake mitigation measures as necessary which may include the following:

- Vehicle traffic within the storage areas will be limited to specific roadways to minimize the effects of pulverization of coarser surface materials;
- Storage areas will be revegetated as soon as practical once complete;
- Installation of windbreaks around identified problem areas, where practical, to limit the dust emissions from equipment and stockpiles, and other activities likely to generate dust; and,
- Reclaim and re-vegetate decommissioned areas as soon as practical.

3.9 Tailing Management Facility

The Tailings Management Facility (TMF) is an engineered structure designed:

- To impoundment tailings slurry transported by pipeline from the concentrator;
- To act as a recycled water reclaim pond; and,
- To store tailings solids over the long term.

The tailings solids are ground up rock of ore grade material the consistency of fine sand and silt like particles from which the mineralized component has been largely removed. During operations, the majority of the impoundment surface is flooded with the reclaim pond and/or subject to inundation and coverage on a relatively constant basis by the tailings slurry introduced into the impoundment. The faces of the dams are constructed of coarser sand like material and during construction over the course of the summer months are also kept relatively moist. As a result, both the impoundment and the dams tend to be less susceptible to wind erosion during active operations. When dry, the tailings solids are more susceptible to wind erosion and generation of fugitive dust.

Tailings personnel and supervisors will visually monitor the TMF on a regular basis and undertake mitigation measures as necessary which may include the following:

- The TMF will be regularly monitored for tailings beach saturation and dust emissions. Tailings spigots will be rotated as required to maintain beach saturation; additional spigots or dust suppression may be required;
- Cover exposed, dewatered tailings, if applicable, with appropriate material to prevent wind erosion; and,
- Vegetate TMF upon decommissioning to prevent erosion of tailings.

3.10 Concentrate Haul

Thickened concentrate consisting of 56% solids will be shipped from FMS Mine Site a distance of 93 km to the Touquoy processing facility by eight axle B-Train tanker truck with a payload of 41 tonnes. Truck payloads will be consistent with the Nova Scotia TIR limits for the proposed route and will follow all Transport Canada requirements and specifications. The trucks are loaded inside concrete engineered containment. At design production, there is anticipated to be up to 11 return trips per day.

The Company will maintain inventory control and reconciliation of concentrate produced and shipped in order to track any concentrate losses. As this concentrate is the mine's payable product, any loss of inventory would be investigated.

No further actions are considered necessary in relation to fugitive dust relating to concentrate transport. If concentrate loss during transport were to be identified as an issue, tarping efficiency would be investigated.

The haul trucks used to transport concentrate from FMS Mine Site will be hauled to the Touquoy processing facility using a haul road. Fresh crushed construction waste rock used as road construction material is predicted to contain an average moisture content of 10%, a typical value for this type of aggregate. Dust generation will typically become greater as road base material ages, is pulverized by traffic and dries out during periods of warmer weather. The haul road will be visually monitored and implement mitigation measures as necessary which may include the following:

- Ensuring all-unpaved roads are regularly maintained and kept in good repair;
- Wet suppression controls on unpaved surfaces (watering during dry seasons and possible application of chemical dust suppressant);
- Harden surfaces where practical;
- Speed reduction to keep dust levels at minimum; and
- Use of appropriately sized haul trucks for ore and waste transport to minimize the number of trips required between the source and destination;

4.0 IMPLEMENTATION

The Company will implement the management practices and procedures outlined here in the Plan to minimize the potential for dust generation at the mine.

The Plan will be updated prior to the commencement of construction as more detailed information is developed in conjunction with the Project design.

4.1 Roles and Responsibilities

The Company will be responsible for ensuring that overall site performance objectives and protection measures are achieved under the Plan. All employees, contractors, and contractor employees are responsible for complying with the intent of the Plan.

As identified in the introduction, there will be a variety of non-point sources with potential for fugitive dust emissions spread throughout the property which will have potential to generate such emissions depending upon a variety of weather and other conditions which will change on a daily and seasonal basis.

As a result, individual operating departments will have overall responsibility, as delegated through their reporting structure, for monitoring and implementing appropriate levels of mitigation for the control of fugitive dust generation within their operational areas. Fugitive dust emissions will be visually monitored on a regular basis by operating personnel and mitigation measures implemented as conditions warrant.

4.1.1 Mine Manager

- The Mine Manager has overall responsibility for ensuring compliance with all regulatory requirements at the FMS Mine Site and with meeting corporate standards and policies including those of the Company’s EMS;
- Routine monitoring and maintenance of facilities will be the responsibility of the Operations personnel responsible for the area in question;

- Operating personnel will record and report to their respective Supervisors and Superintendents on any incidents within the purview of the Plan, who will then inform and report to the Mine Manager and Environment Department.

4.1.2 Environment Manager

- The Environment Manager will be responsible for the oversight of the Plan and will inform and report to the General Manager; and,
- The Environment Manager has the responsibility to ensure that management and Operational Supervisors are aware of the objectives of the Plan, and for the overall property wide oversight of fugitive dust emissions and effectiveness of implemented mitigation measures.

4.1.3 Safety Manager

- The Safety Manager will be responsible for the oversight of the Health and Safety Plan (EMP 10), which includes the implementation of practices and procedures and training in respect of unsafe work conditions including dusty conditions;
- The Safety Manager will coordinate with the Environment Manager in all matters pertaining to compliance with the intent of this plan; and,
- The Safety Manager along with the Occupational Health and Safety Committee (OHSC) will participate in inspections and reporting pursuant to the Plan as it pertains to their responsibilities under the Health and Safety Plan (EMP 10).

4.2 Training

Qualified personnel will be employed throughout the life of the Project to supervise, direct, monitor, and implement the management actions required by the Plan.

Personnel requiring specific training will be identified by the Company and will receive such training prior to assuming any related responsibility. All employees will be made aware of the general issues and concerns surrounding dust generation as part of their routine health and safety induction and training. Specific training requirements for each operational post will be maintained and a record kept of the training received by each person.

Training and instruction for on site staff with duties related to activities that may cause fugitive dust will involve:

- Problem recognition;
- Personal safety practice; and,
- Job specific task training.

Problem recognition training will focus on the potential sources of fugitive dust, how to recognize them, and the nature of appropriate follow-up procedures.

Personal safety training courses will instruct employees on correct behaviors to avoid exposure to and the effects of fugitive dust.

Job specific task training would instruct personnel how to implement fugitive dust management practice in the course of performing their specific job functions.

Basic knowledge of fugitive dust issues and the responsibility of each employee to report occurrences will be imparted during initial employment orientation. Safety meetings will be the most used forum to discuss how crews can employ BMP to manage fugitive dust at site.

4.3 Monitoring, Inspections, Record Keeping and Reporting

Routine observational monitoring of will be the responsibility of the Operations personnel responsible for the area in question. The Environment Manager and/or Safety Manager will ensure that inspections are conducted and records of inspection maintained. The Environment Manager or Safety Manager will coordinate with the Operations and Mill Superintendents with respect to their areas of responsibility.

Regular inspections will be conducted and documented to ensure meet all safety specifications. Visual inspections of the equipment for abnormal conditions will be made by the operator prior to use and/or at the start of each shift. Formal inspections of working areas will be conducted monthly by management and employee representatives of the OHSC. Monthly inspections will also be conducted by each shift supervisor in each respective area.

The inspections will use the principles and objectives of the Plan as a guide. The course of inspections will adhere to the following pattern:

- Review dust management practices for the area;
- Conduct physical inspection;
- Identify any sources of fugitive dust not being effectively managed;
- Recommend existing corrective action;
- Suggest alternatives if existing practice ineffective;
- Determine if additional resources are required;
- Establish accountability for corrective action;
- Document inspection finding in report form; and,
- Submit report for review and to enable follow up.

OHSC inspection reports will be circulated at the general management level. Shift supervisor reports will be circulated at the department management level. Observations made each shift will be recorded in the shift log book along with corrective action taken and any other pertinent information. Shift supervisors and department managers will be responsible for addressing recognized fugitive dust issues in cooperation with the Safety and Environment Department which will serve as a technical resource to operating groups.

Reporting will be conducted as per the Industrial Approval and where required, reports will be forwarded to relevant government agencies as stipulated by regulations and licences.

4.4 Adaptive Management and Continual Improvement

The Plan is a “living document” and components of the plan may be revised over the life of the Project based on regulatory changes, technological advances and/or site experience and conditions. Inspections and audits will help identify opportunities for improvement and overall effectiveness of the Plan and identify components needing correction, adjustment, or upgrading.

Formal evaluations of the Plan shall be documented, with deficiencies noted and corresponding 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.

5.0 FUGITIVE DUST MONITORING

It is anticipated that there may be conditions related to allowable dust concentration at specific locations within the project footprint as part of the Industrial Approval, or as a condition of the Environmental Assessment. This section will be updated with the monitoring procedures that will be conducted by trained staff. Prior to activities on site being undertaken, the fugitive dust monitoring program and associated criteria will be discussed with regulators and relevant stakeholders.

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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 6

FMS Tailings Management Plan

Highway 374

Trafalgar, Nova Scotia

Version 001
February 8th, 2021

Atlantic Gold

Appendix

Fifteen Mile Stream Project Tailings Management Plan

Knight Piésold Ltd

Prepared for
Atlantic Mining NS Corp
409 Billybell Way, Mooseland
Middle Musquodoboit, Nova Scotia
Canada, B0N 1X0

Prepared by
Knight Piésold Ltd.
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Canada, V6C 2T8

VA101-708/4-3

FIFTEEN MILE STREAM PROJECT
TAILINGS MANAGEMENT PLAN FOR ENVIRONMENTAL IMPACT STATEMENT SUBMISSION

Rev	Description	Date
0	Issued in Final for EIS Submission	September 30, 2019
1	Issued with Revisions to Water Management Infrastructure	June 16, 2020

Knight Piésold CONSULTING

EXECUTIVE SUMMARY

The Tailings Management Plan outlines Atlantic Mining NS Corp.'s strategies to responsibly manage tailings produced by the Fifteen Mile Stream Project. The Project will generate tailings that will be stored in a Tailings Management Facility, located to the east of the Open Pit, adjacent to the Plant Site.

The primary objectives of this plan include ensuring the long-term physical and chemical stability of the tailings and preventing contamination of groundwater and surface waters proximal to the TMF.

This plan outlines the:

- Applicable legislation and guidelines
- The design basis and operating requirements of the TMF
- Environmental protection measures to be implemented
- Proposed monitoring to confirm the effectiveness of the mitigation strategies
- The responsibilities of AMNS and its contractors

The plan applies to the construction and operational phases of the Project. At closure, the TMF will be reclaimed as described in the Project Description of the EIS (Chapter 2).

The Tailings Management Plan is a discipline-specific biophysical management plan that forms part of AMNS's overall Environmental Management Plan (EMP) developed for The Project. AMNS will update this as part of the Industrial Approval (IA) application process and prior to construction to reflect relevant design changes during detailed engineering, and through the life of the Project based on the outcome of management reviews, incident investigations, regulatory changes, or other Project-related changes.

Related environmental management plans are presented in the Environmental Management System Framework document provided in the appendices to the EIS.

This plan has been prepared to comply with existing regulations and follow the available guidelines provided by the federal and provincial governments.

The proposed Process Plant throughput is approximately 5,500 tonnes per day (tpd). Tailings will be produced at a slurry solids content of approximately 38% solids by weight before being pumped to the TMF. The tailings will be conveyed in a single overland pipeline and discharged from the TMF embankment via spigotted offtakes.

A total of 13.4 million tonnes (Mt) of tailings will be discharged to the TMF over the 7-year mine life. The estimated average settled dry density of the tailings is approximately 1.3 tonnes per cubic metre (t/m^3).

During the Construction Phase, a starter dam will be constructed using material generated from pre-stripping of the Open Pit and from excavation of a local till borrow source and will provide approximately 12 months of tailings storage. An embankment raise is scheduled to take place during the first year of operations. The TMF embankments will be progressively expanded at scheduled intervals during operations, utilizing the downstream method of construction.

Materials from the Open Pit (non-acid generating (NAG) waste rock) and borrow pits (low-permeability till) will be used to construct the expansions. The embankment will include an upstream liner system with the liner extending from the upstream toe of the embankment into the TMF basin to control seepage gradients prior to the development of the tailings beaches.

Measures will be taken to:

- Minimize exposure of the tailings to the atmosphere, to reduce ML/ARD, and also reduce potential dusting
- Prevent runoff and seepage from interacting with surface or groundwater
- Stabilize the TMF embankments
- Prevent harm to wildlife

Adaptive management may be required if environmental performance monitoring indicates results that differ from those predicted. The need for any corrective actions to on-site management of the TMF or installation of additional control measures will be determined on a case-by-case basis, based on monitoring conducted as described above.

Guidelines for monitoring, inspection and reporting on the performance of the TMF are outlined in the Canadian Dam Association Dam Safety Guidelines and the CDA Technical Bulletin on the Application of the Dam Safety Guidelines to Mining Dams.

These documents provide requirements for dam safety inspections and reviews, and the development of an Operations, Maintenance, and Surveillance (OMS) Manual as well as an Emergency Preparedness and Response Plan (EPRP) specific to the TMF. The OMS Manual and EPRP will be prepared as part of an Industrial Approval Application and will be reviewed and revised annually and as each staged TMF expansion is constructed.

Geotechnical instrumentation will be installed in the TMF embankments and foundation during construction, and will be utilized during the Operation, Closure and Reclamation, and Post-Closure Phases of the Project.

AMNS will submit annual reports as required by the Nova Scotia Department of the Environment (NSE) and as outlined in the IA.

Roles and responsibilities with respect to tailings management will be developed and assigned as part of the preparation of the OMS Manual. Prior to conducting any work on the mine site, AMNS will designate a Mill Operations Manager who must be present onsite regularly, and who is ultimately responsible for application of all requirements on the site. As such the Mill Operations Manager is ultimately responsible for the safety of the TMF.

The Mill Operations Manager or designate will conduct regular evaluations of the monitoring activities as needed. This Plan may be updated if additional methods for monitoring are found to be more appropriate.

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FIGURES

ABBREVIATIONS

AEMP .... aquatic effects management plan
AMNS .... Atlantic Mining NS Corp.
AQDMP .... air quality and dust management plan
ARD .... acid rock drainage
CDA .... Canadian Dam Association
EDF .... environmental design flood
EDGM .... earthquake design ground motion
EIS .... environmental impact statement
EMP .... environmental management plan
EoR .... Engineer of Record
EPRP .... emergency preparedness and response plan
ERP .... emergency response plan
ESCP .... erosion and sediment control plan
FMS .... Fifteen Mile Stream
IDF .... inflow design flood
ITRB .... independent tailings review board
KP .... Knight Piésold Ltd.
MAC .... Mining Association of Canada
MDE .... maximum design earthquake
MDMER .... Metal and Diamond Mine Effluent Regulations
ML .... metal leaching
mm .... millimetres
Mt .... million tonnes
NPAG .... non-potentially acid generating
NSE .... Nova Scotia Department of Environment
OBE .... operating basis earthquake
OMS .... operating, maintenance and surveillance
PAG .... potentially acid generating
PGA .... peak ground acceleration
PMF .... probable maximum flood
Project, the .... Fifteen Mile Stream Project, the
QA/QC .... quality assurance/quality control
QPO .... quantitative performance objective
SOP .... standard operating procedure
SWMP .... site water management plan
SWMS .... surplus water management system
t/m^3 .... tonnes per cubic metre
TMF .... tailings management facility
TMP .... tailings management plan
tpd .... tonnes per day
TSS .... total suspended solids
WTP .... water treatment plant

1.0 GENERAL

1.1 PURPOSE

The Tailings Management Plan (TMP) outlines Atlantic Mining NS Corporation's (AMNS) strategies to responsibly manage tailings generated at the Project. The Project will generate tailings that will be stored in a Tailings Management Facility (TMF) located to the east of the Open Pit (Figure 1.1).

The TMP is a discipline-specific biophysical management plan that forms part of the Project's Environmental Management System (EMS). AMNS will update this plan prior to construction to reflect relevant design changes resulting from detailed engineering. It will also be refined throughout the life of the Project based on the outcome of management reviews, incident investigations, regulatory changes, or other Project-related changes.

Related environmental management plans are presented in the Environmental Management System Framework document provided in the appendices to the EIS.

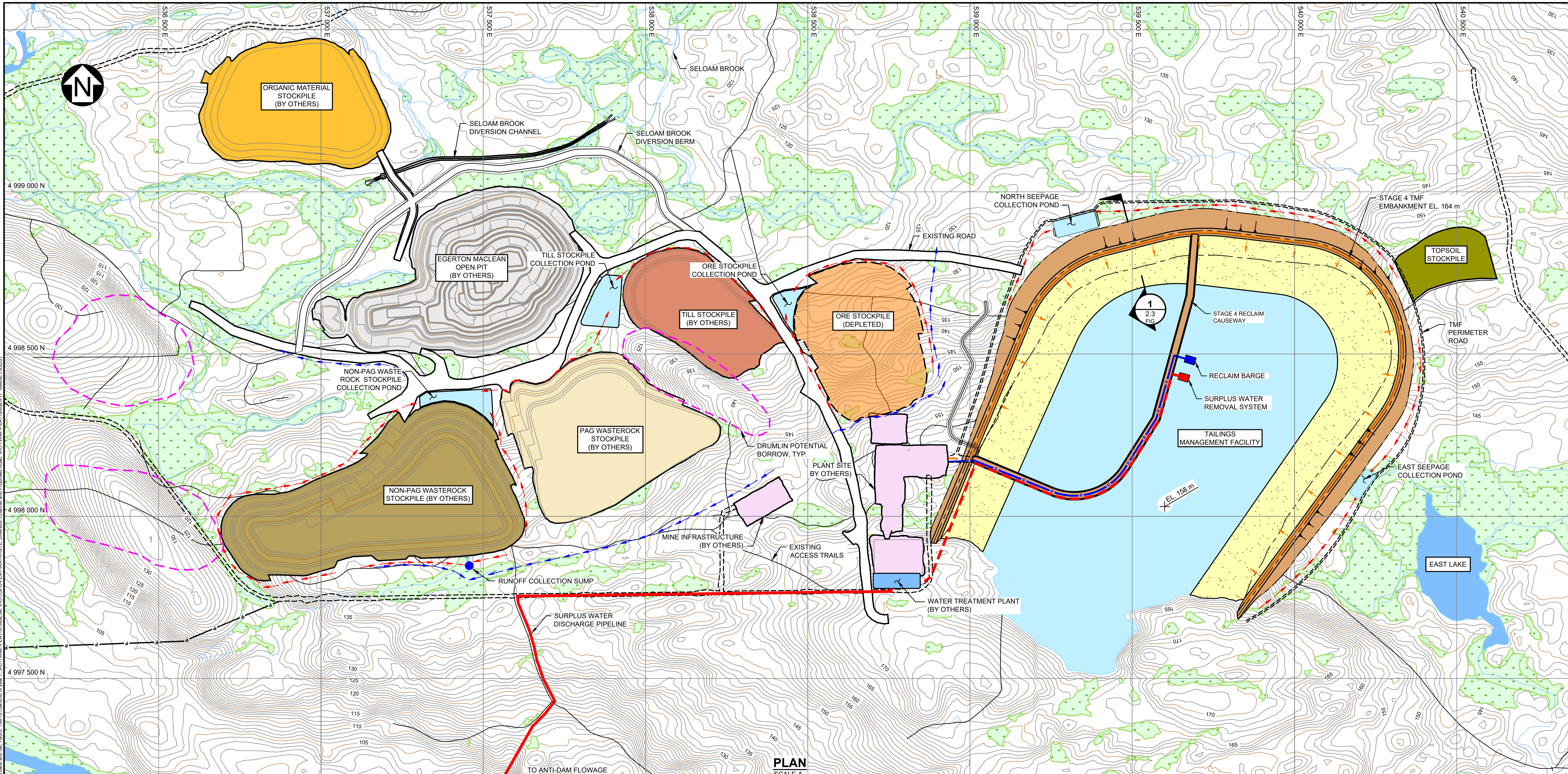
1.2 SCOPE AND OBJECTIVES

The primary objectives of tailings management activities are to ensure the long-term physical and chemical stability of the tailings and prevent contamination of groundwater and surface waters proximal to the TMF.

This plan outlines:

- Applicable legislation and guidelines
- Design basis and operating requirements of the TMF
- Environmental protection measures to be implemented
- Proposed monitoring to confirm the effectiveness of the mitigation strategies
- Responsibilities of AMNS

This plan applies to the Construction and Operation Phases of the Project. At closure, the TMF will be reclaimed as described in Project Description of the EIS (Chapter 2).



LEGEND:

MINE WATER	PLANT SITE (BY OTHERS)
FRESH WATER	TOPSOIL PILE (BY OTHERS)
TAILINGS	RECLAIM PUMPS
	SURPLUS WATER REMOVAL SYSTEM
EMBANKMENT FILL	WATER MANAGEMENT POND
WETLAND	STREAM
OPEN PIT (BY OTHERS)	EXISTING ROAD
ORE STOCKPILE (DEPLETED)	PROPOSED ROAD
PAG STOCKPILE (BY OTHERS)	SEEPAGE COLLECTION DITCH
NON-PAG STOCKPILE (BY OTHERS)	NON-CONTACT WATER DITCH
TILL STOCKPILE (BY OTHERS)	POWERLINE
ORGANIC MATERIAL STOCKPILE (BY OTHERS)	RECLAIM WATER PIPE
	SURPLUS WATER PIPELINE
	SURPLUS WATER DISCHARGE PIPELINE
	TAILINGS DISCHARGE PIPE
	TAILINGS DEPOSIT

NOTES:

1. COORDINATE GRID IS NAD83, ZONE 20 T.
2. CONTOURS BASED ON 2014 LIDAR OBTAINED FROM GEONOVA, REPRODUCED AND DISTRIBUTED WITH THE PERMISSION OF INTERNAL SERVICES. CONTOURS HAVE BEEN PRODUCED BY KNIGHT PIESOLD LTD. AND INCLUDES DATA PROVIDED BY INTERNAL SERVICES. THE INCORPORATION OF DATA SOURCED FROM INTERNAL SERVICES WITHIN THIS PRODUCT SHALL NOT BE CONSTRUED AS CONSTITUTING AN ENDORSEMENT BY INTERNAL SERVICES OF OUR PRODUCT.
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4. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

FOR INFORMATION ONLY

SCALE A 100 50 0 100 200 300 400 500 600 m

ATLANTIC MINING NS CORP.

FIFTEEN MILE STREAM PROJECT

PROJECT OVERVIEW

Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-708/4	3

FIGURE 1.1 REV 1

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	12JUN'20	ISSUED WITH REPORT	JEF	RMM/SC	DDF

SAVED: M:\1\01\00708\04\A\Acad\FIGS\B36, 6/12/2020 3:07:25 PM , SCAMMAYO PRINTED: 6/15/2020 11:02:43 AM, FIG 1.1, SCAMMAYO ACAD VERSION: 23.0S (LMS TECH)
XREF FILE(S): BNDY-CLAIM; BNDY-PPTY-PRIVATE; UPDATE ACCESS Roads; X-C-TOPO-CONT-TIFF - SIMPLIFIED; roads and rail; Hydro; TMF-STG4-End of year 7; X-C-TWMF-FEAT-STAGES4; X-C-TOPO-FEAT-WATR-SITE; Diversion Channel and Proposed Road; X-C-TWMF-FEAT-SNGL-PIT IMAGE FILE(S):

1.3 CORPORATE GOVERNANCE

AMNS is committed to developing an Environmental Management System (EMS) based on environmental risk; as a due diligence procedure from the perspectives of fiscal, legal, social and environmental responsibility. Development and implementation of the EMS, with associated procedures to be detailed in an Environmental Protection Plan (EPP), will include all phases of the TMF from construction to operation, maintenance, monitoring and ultimately closure, as well as integrate other aspects such as documentation. It is intended that the EMS and associated procedural level EPP will integrate systems, plans and processes across the Fifteen Mile Stream Project, including the Best Applicable Practices (BAPs) for tailings management.

1.4 APPLICABLE LEGISLATION AND GUIDELINES

This plan has been prepared to comply with existing regulations and follow the available guidelines provided by the federal and provincial governments. The following guidelines and regulations have been considered in the development of the tailings management plan:

- Canadian Dam Association, 2013. 2007 Dam Safety Guidelines – 2013 Revision.
- Canadian Dam Association, 2014. Technical Bulletin – Application of Dam Safety Guidelines to Mining Dams.
- Government of Canada, 2016. *Fisheries Act, 1995.* R.S.C., 1985, c. F-14. Amended 2016.
- Government of Canada, 2018. *Canadian Environmental Protection Act, 1999.* S.C. 1999, c.33. Amended 2018.
- Government of Canada, 2018. *Metal and Diamond Mining Effluent Regulations*. SOR/2002-222. Amended 2018.
- Environment and Climate Change Canada, 2009. *Environmental Code of Practice for Metal Mines*.
- Government of Nova Scotia, 2017. Nova Scotia *Environment Act,* Chapter 1 of the Acts of 1994-95 (Amended 2017).
- Government of Nova Scotia, 2018. Nova Scotia *Mineral Resources Act*, Chapter 3 of the Acts of 2016 (Amended 2018).
- Government of Nova Scotia, 2016. Nova Scotia *Occupational Health and Safety Act*, Chapter 7 of the Acts of 1996 (Amended 2016).
- Government of Nova Scotia, 1995. Nova Scotia *Water Act,* Chapter 500 of the Revised Statutes, 1989 (Amended 1995).
- Government of Nova Scotia, 2000. Nova Scotia *Water Resources Protection Act,* Chapter 10 of the Acts of 2000.
- Mining Association of Canada (MAC), 2017. *A Guide to the Management of Tailings Facilities.* Third Edition.
- Mining Association of Canada (MAC), 2019. *Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities*. Second Edition.

1.5 STAKEHOLDER ENGAGEMENT AND COLLABORATION

AMNS will develop or continue existing procedures for collaborative engagement with all stakeholders and the Mi’kmaq of Nova Scotia in the areas impacted by tailings or dam activities to improve overall tailings and watershed stewardship. Evidence demonstrating stakeholder and Mi’kmaq engagement on tailings issues will be reviewed on an ongoing basis. All tailings related complaints from stakeholders or the Mi'kmaq within the geographic setting will be summarized as part of Complaints Response Procedure and reviewed at least annually.

Regulatory liaison on all phases of tailing management is of mutual benefit to AMNS and regulatory bodies. Development of BAPs for tailings management is intended to be a collaborative process. While inputs from broader stakeholder and Mi'kmaq engagement will support this, AMNS intends to directly collaborate with staff of Nova Scotia Environment (NSE) and Department of Natural Resources (DNR) on all aspects of its tailings management strategy from design through to construction, operation, maintenance, monitoring and ultimately closure of the TMF.

AMNS is committed to providing summaries of comments and documents from the IE and ITRB on an ongoing periodic basis. In the event that the IE or ITRB identify conditions that demonstrate the potential for non-compliant conditions, these findings will be conveyed to regulators immediately with together with an appropriate corrective action plan.

2.0 RELEVANT PROJECT ACTIVITIES

2.1 TAILINGS PRODUCTION

The proposed Process Plant throughput is approximately 5,500 tonnes per day (tpd). Tailings will be produced at a slurry solids content of approximately 38% solids by weight before being pumped to the TMF. The tailings will be conveyed in a single overland pipeline and discharged from the TMF embankment via spigotted offtakes.

A total of 13.4 million tonnes (Mt) of tailings will be discharged to the TMF over the 7-year mine life. The estimated average settled density of the tailings is approximately 1.3 tonnes per cubic metre (t/m^3).

2.2 TAILINGS GEOCHEMISTRY

The geochemistry of the FMS tailings are presented in a separate report provided in the appendices of the EIS (Lorax Environmental Services Ltd. (Lorax), 2019).

2.3 TAILINGS MANAGEMENT FACILITY

The TMF will contain tailings for the life of the Project. While this plan describes the TMF, supporting information is provided in the report *Preliminary Waste and Water Management Design for Submission of the Environmental Impact Statement* (Knight Piésold Ltd., 2019), included as an appendix to the EIS.

2.3.1 TMF BEST APPLICABLE PRACTICES

Key aspects for tailings management include:

- Identifying issues and concerns
- Managing liabilities
- Identifying opportunities for cost and operational efficiency
- Providing input into design, construction, operation and closure and rehabilitation
- Providing input into the monitoring, surveillance and associated record keeping
- Educating operators and the Mi'kmaq and external stakeholders alike
- Improving data management
- Providing a standardized review process to ensure implementation of BAPs

AMNS's corporate governance supports development of Best Applicable Practices (BAPs) specific to the FMS TMF. BAPs will be adhered to in all phases of construction, operation, and closure and reclamation of the TMF. BAPs will be developed based on industry definition and relevant guidelines and legislation, including CDA Dam Safety Guidelines (CDA 2013 & 2014), and the MAC guidelines on *Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities* (MAC, 2019).

BAPs will be adhered to through the development of Quantitative Performance Objectives (QPOs) to be incorporated into the standard operating procedure for the TMF. These will include measuring and reporting on tailings beach lengths, calibration of TMF filling schedule during operations, water balance audits, construction material availability, and scheduling to ultimate TMF embankment heights. QPOs will be developed as part of the Operation, Maintenance and Surveillance (OMS) Manual that will be prepared for the TMF.

2.3.2 GENERAL DESCRIPTION AND FILLING SCHEDULE

The general arrangement of the TMF is presented in Figure 2.1, and its location is at UTM 539,045 E and 4,998,615 N (Zone 20T NAD 83). The TMF will utilize natural topographical containment provided to the south of the facility to minimize embankment construction requirements. The TMF has one rock/earthfill embankment that impounds the TMF to the west, north, and east. The embankment is approx. 3,000 m long at its centreline with a maximum height of approx. 28 m. The embankment will include an upstream liner system with the liner extending from the upstream toe of the embankment into the TMF basin to control seepage gradients prior to the development of the tailings beaches.

The TMF will be constructed in four stages, as shown with the TMF filling curve on Figure 2.2. The first stage during the Construction Phase will involve constructing a starter dam using non-potentially acid generating (NPAG) material generated from pre-stripping of the Open Pit and from excavation of a local till borrow source and will provide approximately 12 months of tailings storage. Embankment raises will be undertaken during the first year of operations and subsequently in year 3 and year 6 of operations, all utilizing the downstream method of construction. Non-potentially acid generating (NPAG) waste rock from the Open Pit and low-permeability till from borrow pits will be used to construct the expansions.

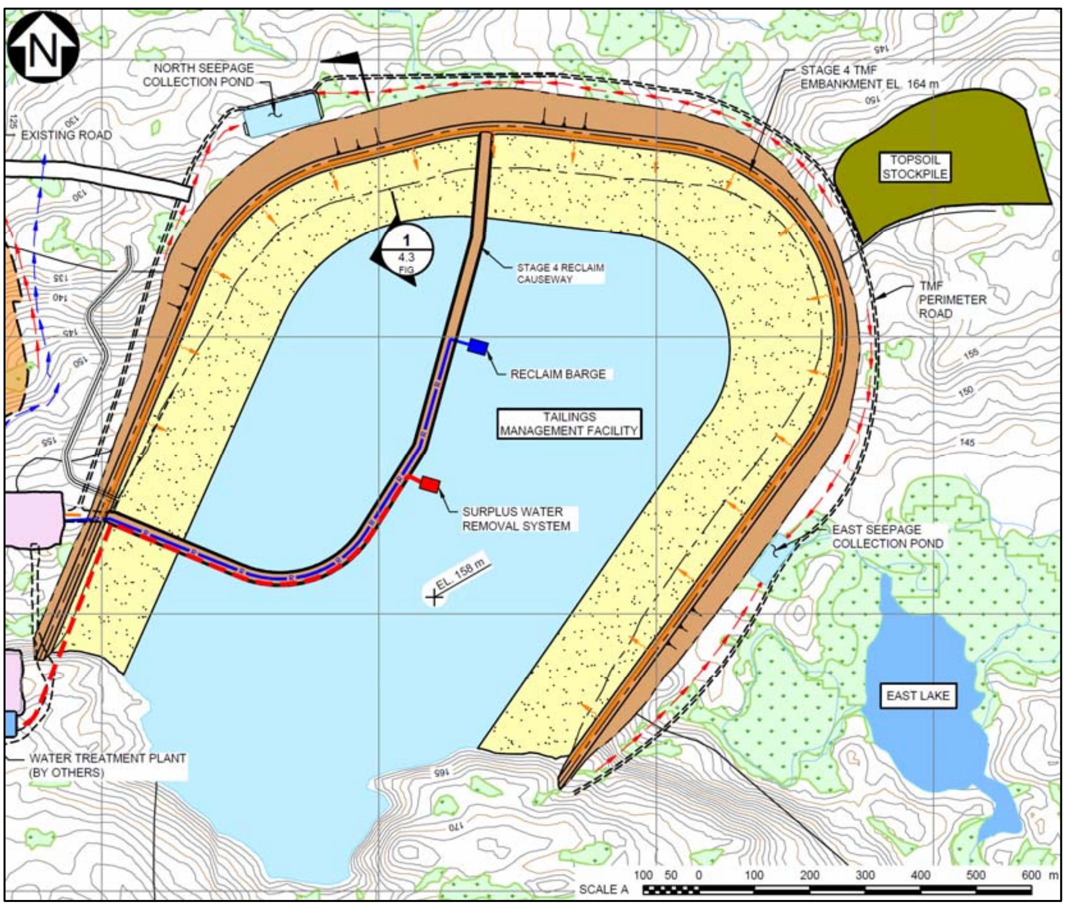
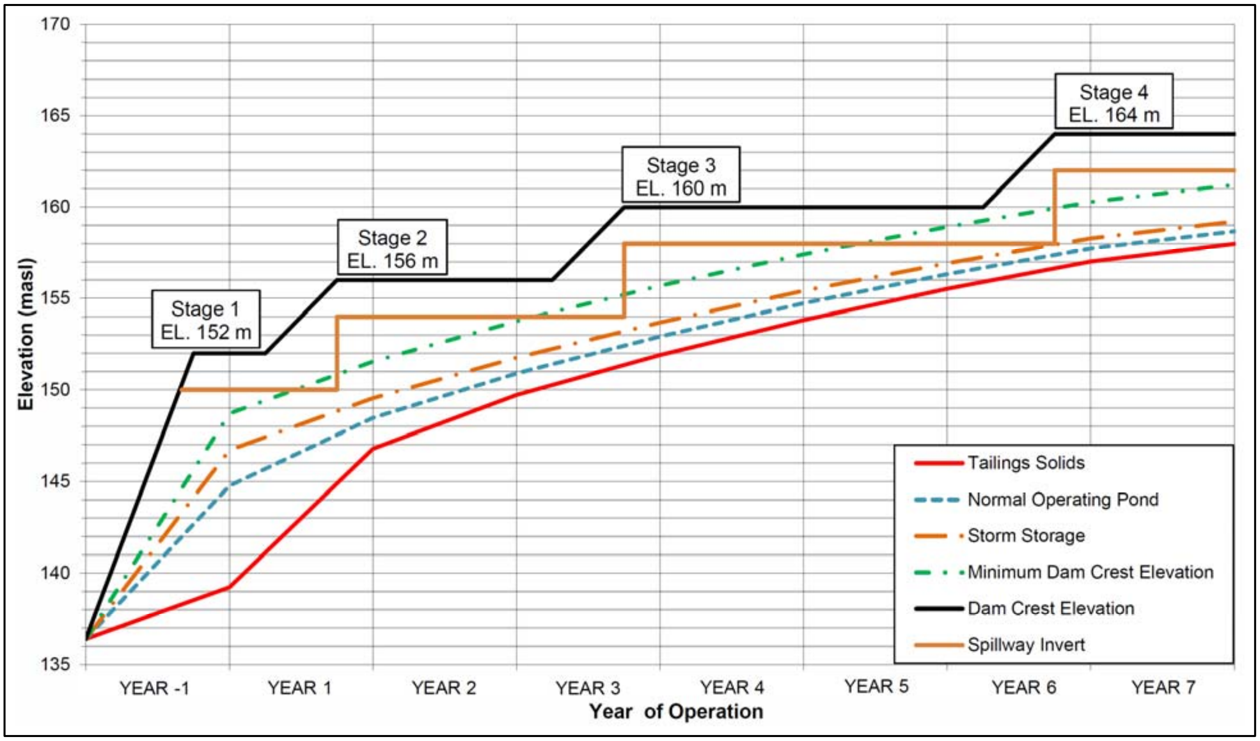


Figure 2.1 TMF General Arrangement



NOTES:

1. TAILINGS TONNAGE AND MILL RAMPUP SCHEDULE BASED ON JUNE 2019 PRODUCTION SCHEDULE.
2. AVERAGE SETTLED TAILINGS DENSITY ASSUMED TO BE 1.3 TONNES PER M^3 DURING OPERATIONS.
3. MINIMUM DAM CREST ELEVATION ASSUMED 2 METRES ABOVE REQUIRED ELEVATION FOR STORM STORAGE (INCLUDES ALLOWANCE FOR SPILLWAY DEPTH).

Figure 2.2 TMF Filling Schedule

2.3.3 DESIGN BASIS AND OPERATING CRITERIA

The design of the TMF has considered the following requirements:

- Permanent, secure, and total confinement of all solid waste materials within an engineered disposal facility
- Control, collection, and removal of free draining liquids from the tailings during the Operation Phase for recycling as process water to the maximum practical extent
- The inclusion of monitoring features for all aspects of the facility to ensure performance goals are achieved and design criteria and assumptions are met

The following factors have been considered in the design of the TMF:

- Assumed physical and chemical characteristics of the tailings material, including metal leaching and acidic drainage potential as well as the potential for liquefaction
- Hydrology and hydrogeology, including local climatic conditions and extreme weather events (including projections of climate variability)
- Availability and characteristics of construction materials
- Topography of the TMF footprint and adjacent areas

The TMF will store runoff from an Environmental Design Flood (EDF) as per Canadian Dam Association (CDA) Dam Safety Guidelines (CDA, 2013 & 2014). The EDF for the facility is equivalent to the total precipitation from a 1-in-200 year 24-hour precipitation event in addition to the estimated maximum monthly precipitation across the entire TMF catchment. Flood events exceeding the EDF, up to a Probable Maximum Flood (PMF) event will be safely conveyed from the TMF through an emergency discharge spillway, located in the southwestern abutment of the TMF embankment.

Non-contact water will be diverted around site facilities to the maximum practicable extent to minimize the impact to local water courses and the unnecessary collection of fresh water. Diversion channels will collect and divert runoff from undisturbed catchment areas for precipitation events up to a 1-in-200-year precipitation event.

Contact water from site facilities will be collected in a system of ditches that convey collected flows to water management ponds. The ponds were designed to store catchment runoff for the 1-in-10 year 24-hour storm event (conveyed by systems of collection ditches) plus direct precipitation for the 1 in 200-year 24-hour storm event on the surface of the ponds.

2.3.4 DAM CLASSIFICATION

The design, construction, operation, and monitoring of dams, including tailings embankments, must be completed in accordance with appropriate provincial and federal regulations and industry best practices. The primary guidance documents for dam classification are the Dam Safety Guidelines published by the Canadian Dam Association (CDA, 2013), and the CDA Technical Bulletin on the Application of the Dam Safety Guidelines to Mining Dams (CDA, 2014).

A key component of these guidelines involves assigning the dam into a classification category (Low, Significant, High, Very High, or Extreme) using the following criteria:

- Population at risk
- Loss of life
- Environmental and cultural values
- Infrastructure and economics

The overall dam classification is defined by the criterion with the highest (i.e., most severe) rating. The dam classification helps to identify appropriate geotechnical and hydrotechnical design criteria. It is important to note that the classification refers to the downstream consequences in the inundation zone of a dam breach.

The Fifteen Mile Stream Project TMF embankments have been assigned a dam classification of **HIGH**. The potential incremental losses are as follows:

- **Population at Risk:** The population at risk was determined based on the likelihood of people being in the potential inundation zone. There is no permanent population downstream of the TMF. Temporary population will be present in the form of mine workers, and users of nearby roads. Therefore, the risk to population was determined to be **Significant**.
- **Loss of Life:** The loss of life factor considers the most probable size of the population at risk if failure occurs. For the Project site, this includes mine workers and users of nearby roads, and is estimated to be fewer than 10 people at any one time. The potential loss of life was therefore determined to be **HIGH**.

- **Environmental and Cultural Values:**
  - Environmental loss considers the potential loss or deterioration of fish and wildlife habitat in the affected area. In the event of a breach of the TMF embankment, tailings and supernatant water will flow north into Seloam Brook and subsequently into the Open Pit. While Seloam Brook has evidence of brown trout and dolly varden populations, it is not critical fish habitat. Therefore, the impact on wildlife was classified as **HIGH**.
  - Cultural losses are based on the potential impact to areas of cultural significance in the inundation zone. No considerable impact on culturally sensitive areas is predicted, therefore potential loss of cultural values was determined to be **Low**.
- **Infrastructure and Economics:** Infrastructure and economic losses consider potential damage to transportation routes, commercial and recreational facilities, other infrastructure, services, and storage facilities. Minor highways and seasonal roads are located downstream of the TMF along potential breach flow paths to the south or the northeast. Therefore, the infrastructure and economic losses were determined to be **Significant**.

2.3.5 INFLOW DESIGN FLOOD

The Canadian Dam Association Dam Safety Guidelines (CDA, 2013 & 2014) states that for tailings dams of a 'HIGH' dam classification, the minimum target design criteria for design flood events corresponds to the following return period events:

- Construction and Operations Phase: 1/3 between the 1/1,000-year return period event and the Probable Maximum Flood (PMF)
- Post-Closure Phase: 2/3 between the 1/1,000-year return period event and the PMF

2.3.6 SEISMICITY

The Canadian Dam Association Dam Safety Guidelines (CDA, 2013 & 2014) states that for tailings dams of a 'HIGH' dam classification, the minimum target design criteria for seismic loading corresponds to the following return period events:

- Construction and Operations Phase: the 1/2,475-year return period seismic event
- Post-Closure Phase: 1/2 between the 1/2,475 year and the 1/10,000-year (or MCE) return period seismic events

The Earthquake Design Ground Motion (EDGM) for the Construction and Operations Phases is the Operating Basis Earthquake (OBE). The OBE is the earthquake that a structure must safely withstand no damage and has a reasonable probability of occurring during the life of the structure.

The EDGM for the Post Closure Phase is the Maximum Design Earthquake (MDE) for the life of the TMF. The MDE is the earthquake that would generate the most critical ground motions for evaluation of the seismic performance of a structure among those loadings to which the structure might be exposed.

2.3.7 TMF EMBANKMENTS

A typical embankment cross-section is shown on Figure 2.3. The main design features of the TMF embankments are as follows:

- Starter dam sized to provide approximately 12 months of tailings and supernatant water storage; starter dam crest elevation of 152 m
- Progressive embankment raises throughout operations using downstream expansion methods
- Low-permeability till (Zone S) liner on upstream TMF embankment face and partial coverage of TMF basin
- Filter (Zone F) and Transition Zone (Zone T) zones on upstream face of embankment to minimize migration of fines using processed NPAG waste rock from Open Pit mining
- Shell zone (Zone C) consisting of NPAG waste rock from Open Pit mining activities

The ponds and ditches downstream of the TMF embankment will also be sized to collect and manage seepage flows through the TMF embankments in addition to runoff and precipitation. The seepage collection ponds were sized to collect flows up to a 1 in 10-year precipitation event falling on the contributing catchment area. Collected flows will be pumped back to the TMF supernatant pond over a 10-day drawdown period.

2.3.8 WATER MANAGEMENT

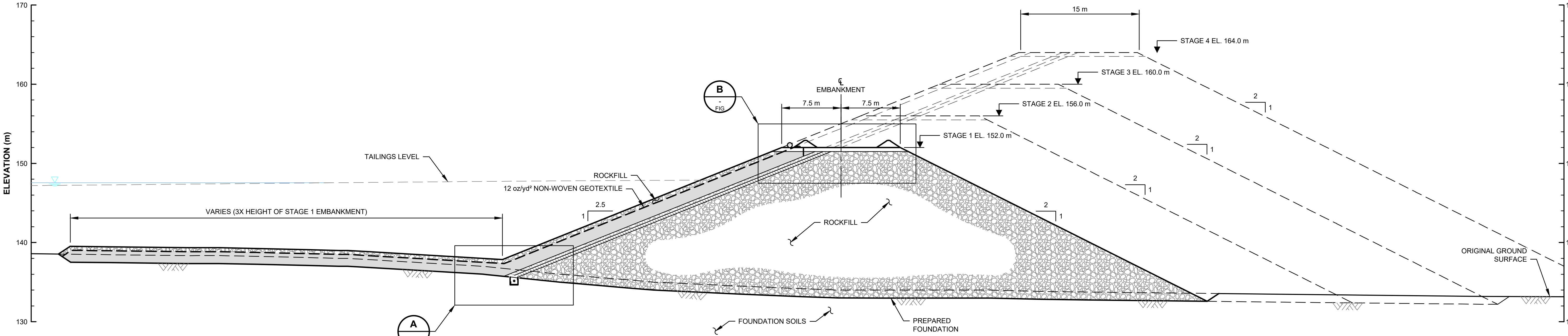
Site water management planning considers the management of surface water at the Project site during the construction, operations, closure, and post-closure phases of the Project. Surface water will be managed by constructing systems of ditches, ponds, berms, and pump and pipeline systems, and by selective grading disturbed surfaces. Two types of surface water are considered in the water management strategy.

- Contact water, which is water impacted by mine workings or disturbed areas (open pit dewatering flows; TMF seepage; runoff from the waste rock stockpile, ore stockpile, till stockpile, topsoil stockpiles, TMF embankments, etc.)
- Non-contact water, which is runoff from undisturbed areas

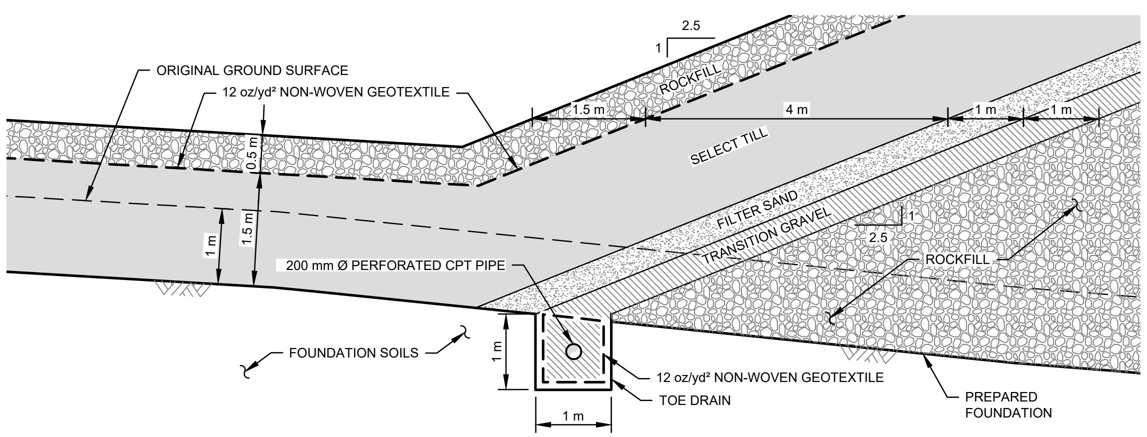
The water management plan forms the basis of a site wide water balance, which has been developed on a monthly basis and considers a range of climatic conditions consistent with historic variability in the project area. The primary goal of the water balance model is to estimate the anticipated volume of surplus water that must be released from the mine site on an annual basis to manage the inventory of water stored in the TMF within a target range consistent with the design basis of the impoundment.

The following water management components are associated with the TMF:

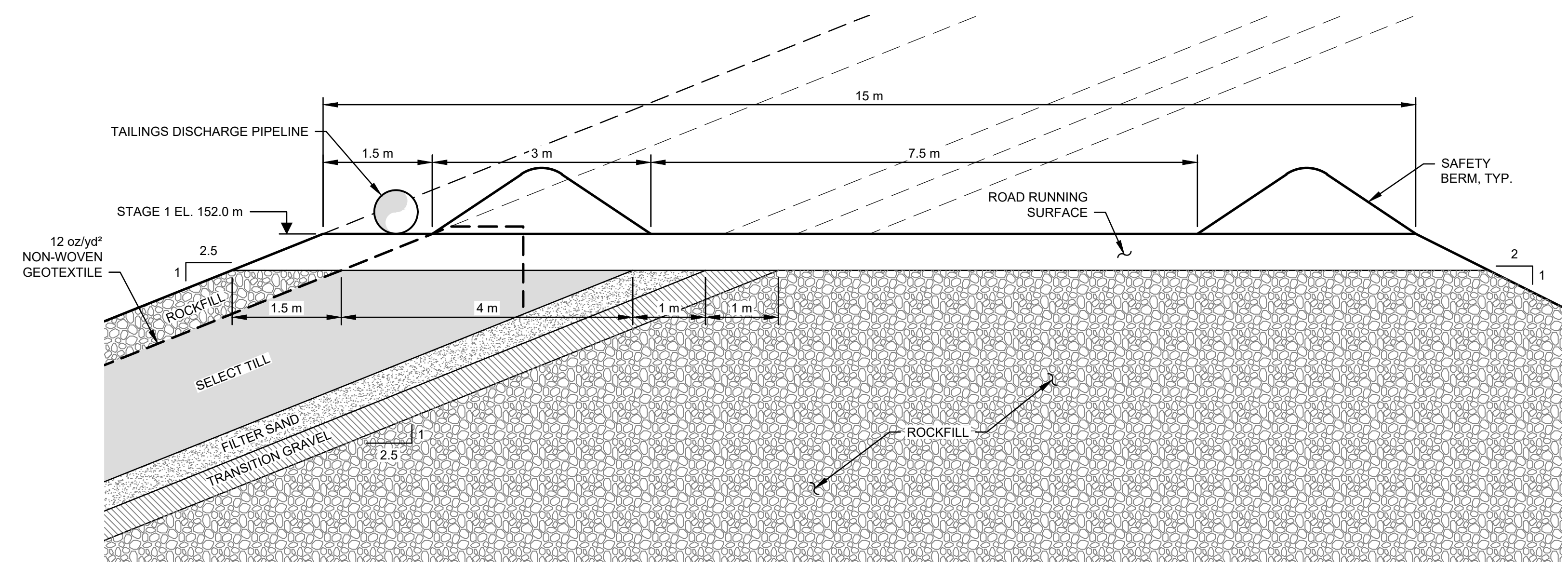
- Flood events will be managed through a combination of embankment freeboard (to contain the EDF event) and an emergency discharge spillway located in the southwestern abutment of the TMF embankment for larger flood events that exceed the EDF (up to the PMF).
- Seepage collection ponds located downstream of the embankment will collect seepage from the TMF embankment and collected seepage will be pumped back to the TMF.
- Tailings supernatant water will be reclaimed using a floating pump/barge and a single overland pipeline to the Process Plant.
- A process water tank located at the Process Plant will store reclaim water from the TMF for processing.
- A Surplus Water Management System (SWMS) will remove surplus water from the TMF supernatant pond.



1 SECTION
TYPICAL EMBANKMENT DESIGN SECTION
SCALE A



A DETAIL
TOE DRAIN
SCALE B



B DETAIL
STAGE 1 CREST
SCALE B

FOR INFORMATION ONLY

SCALE A: 5 2.5 0 5 10 15 20 25 m
SCALE B: 1 0.5 0 1 2 3 4 5 m

LEGEND:

- ROCKFILL
- SELECT TILL
- FILTER SAND
- TRANSITION GRAVEL

NOTES:

1. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

ATLANTIC MINING NS CORP.

FIFTEEN MILE STREAM PROJECT

TMF EMBANKMENT SECTION AND DETAILS

Knight Piésold CONSULTING

P/A NO.	REF NO.	
VA101-708/4	3	
FIGURE 2.3		REV 1

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	12JUN'20	ISSUED WITH REPORT	JEF	SC	DDF

SAVED: M:\1\01\00708\04\A\Acad\FIGS\B37, 6/11/2020 4:44:20 PM , SCAMMAYO PRINTED: 6/12/2020 10:48:27 AM, FIG 2.3, SCAMMAYO ACAD VERSION: 23.0S (LMS TECH)
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The water balance developed for the TMF has indicated that the TMF will operate in a net positive surplus throughout operations for all climatic conditions during the Construction and Operation Phases (Figure 2.4). The Surplus Water Management System (SWMS) allows for the removal of excess water from the TMF supernatant pond during operations to maintain target operating pond volumes, tailings beach length, and minimum freeboard requirements. Surplus water will be removed by pumping water to a Water Treatment Plant (WTP) located near the Plant Site, if required to meet discharge criteria, before being released to Anti-Dam Flowage. The Site Water Management Plan (SWMP) will describe the water management strategies as well as effluent monitoring that will be undertaken.

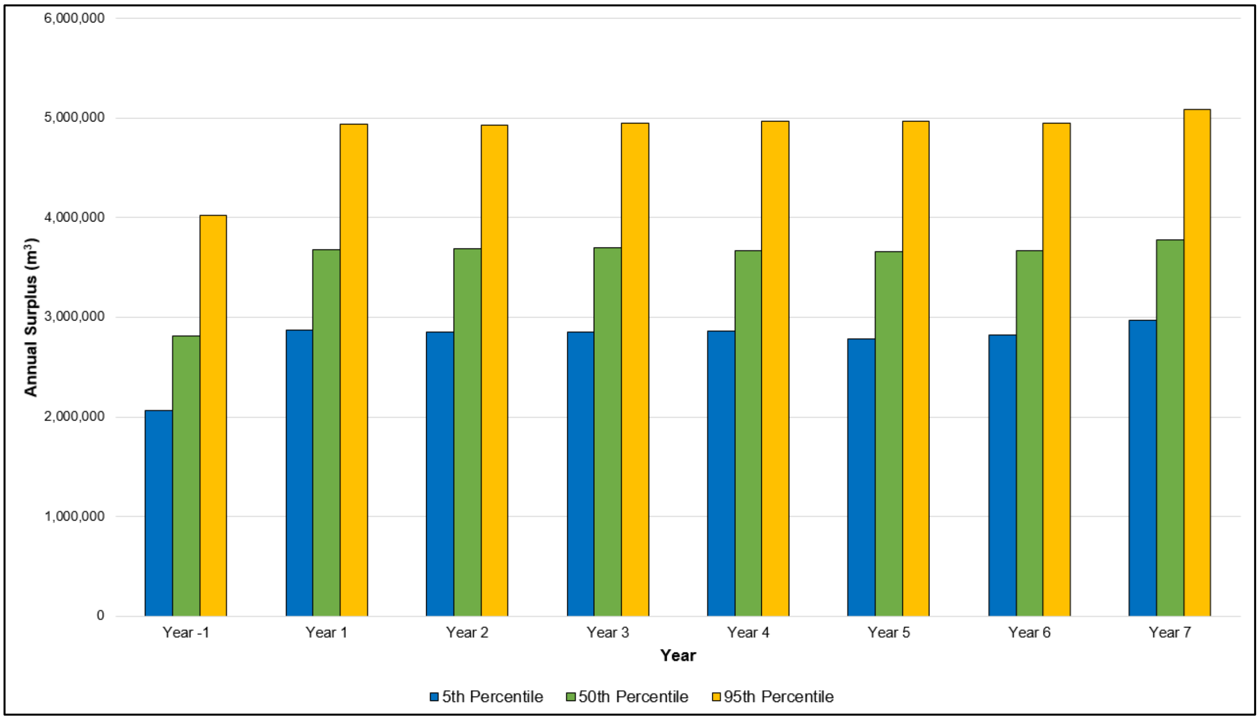

Figure 2.4 TMF Annual Surplus - Operations

3.0 ENVIRONMENTAL PROTECTION MEASURES

Measures will be taken to:

- Minimize exposure of the tailings to the atmosphere, to reduce ML/ARD, and also reduce potential dusting
- Prevent runoff and seepage from interacting with surface or groundwater
- Stabilize the TMF embankments
- Prevent harm to wildlife

These measures are described in more detail below.

3.1 MINIMIZE ML/ARD GENERATION

The potential for the tailings within the TMF to leach metals and generate acid will be minimized by reducing exposure of the tailings to atmospheric conditions. This will be accomplished by strategically depositing new tailings over the existing tailings and by maintaining a supernatant pond to maintain a degree of saturation within tailings stored in the TMF.

3.2 RUNOFF MANAGEMENT

Non-contact water will be diverted around the project site to the maximum practical extent. All non-contact water diversion structures are designed to divert runoff from a 1-in-200 year 24-hr precipitation event.

All direct precipitation on the TMF footprint, up to a volume from the EDF event, will be stored within the TMF. Flood events exceeding the EDF (up to the IDF) will be conveyed through an emergency discharge spillway in the southwest abutment of the TMF embankment.

Site contact water (including open pit dewatering flows) will be managed in a system of collection ditches and management ponds. Contact water collected in the management ponds will be pumped to the TMF supernatant pond.

3.3 SEEPAGE MANAGEMENT

Potential seepage from the TMF will be largely controlled by the low-permeability till liner and low permeability tailings mass. Two seepage collection ponds, the North Seepage Collection Pond, and the East Seepage Collection Pond, will be constructed at topographic low points downstream of the TMF embankment (Figure 2.1).

Seepage collected in the Seepage Collection Ditches, constructed along the toe of the embankment, will convey collected seepage and embankment runoff to the respective ponds. Water collected in the ponds will be continuously monitored and returned to the TMF to ensure it does not adversely affect the receiving environment.

3.4 DUST CONTROL

Selective tailings deposition and management of the operational supernatant pond volume will ensure that the beaches are saturated, thus reducing the potential for dust generation.

Dust generation at closure will be managed be encapsulating the consolidated tailings with an earth and rockfill closure cover, appropriately graded to shed runoff from the TMF.

3.5 SEDIMENT AND EROSION CONTROL

Sediment and erosion control will be a focus during construction of the TMF and subsequent embankment raises. The measures identified in the Sediment and Erosion Control Plan will be applied to facility construction and will minimize erosion and prevent sediment releases into the receiving environment.

3.6 SURPLUS WATER MANAGEMENT

The Surplus Water Management System (SWMS) allows for the removal of excess water from the TMF supernatant pond during operations to maintain target operating pond volumes, tailings beach length, and minimum freeboard requirements. Surplus water will be removed by pumping water to a Water Treatment Plant (WTP) located near the Plant Site, if required to meet discharge criteria. Water will be discharged to Anti-Dam Flowage from the WTP via a gravity discharge pipeline.

Monitoring plans will be implemented to monitor TMF supernatant water quality to determine if water treatment will be required to be acceptable for discharge to the receiving environment at Anti-Dam Flowage.

3.7 TMF CLOSURE

TMF closure and rehabilitation will be carried out progressively during the Operation Phase (where possible) and primarily at the end of economically viable mining. Closure and reclamation activities for the TMF are summarized below and are also discussed in Section 2 of the Project Description.

Opportunities for progressive reclamation of the TMF include reclaiming the downstream faces of the TMF embankments with topsoil cover and revegetation once the final Stage 4 embankments are constructed.

Closure and reclamation of the TMF will involve:

- Removal of supernatant pond water from the TMF to the open pit at closure to aid in the establishment of a pit lake.
- Containing and isolating the tailings and converting the TMF into a physically stable landform by constructing a revegetated closure cover on top of the consolidated tailings (after the pond has been removed) and establishing a permanent spillway and outlet channel to facilitate shedding of runoff from the surface of the reclaimed TMF to the open pit.

The following reclamation activities will be completed during TMF closure:

- Prior to closure, tailings will be selectively deposited around the TMF to establish a final tailings beach that will facilitate construction of the final closure cover.
- Tailings supernatant pond water will be removed and pumped to the open pit.
- Tailings and reclaim delivery systems and all pipelines, structures, and equipment not required beyond mine closure will be dismantled and removed.
- A permanent spillway will be developed by constructing a breach through the southwest abutment of the TMF embankment and establishing an outlet channel to the open pit.
- A combined rock and soil cover will be placed over the consolidated tailings mass in a manner that conveys runoff to the permanent spillway.

- All access roads, ponds, ditches, and borrow areas associated with the TMF that are not required beyond TMF closure will be removed and the areas re-graded.
- Disturbed areas will be revegetated consistent with the re-vegetation strategy.

The TMF embankment slopes are designed at 2H:1V downstream slopes, which are expected to be stable following closure and will not require further modification at closure other than surface preparation with topsoil and revegetation (may be completed concurrently during operations) unless monitoring information indicates otherwise.

Final reclamation of the TMF will be completed after the reclamation activities described above have been completed. The seepage collection system will continue to operate for several additional years past this point until seepage has diminished to negligible quantities and/or is suitable for direct discharge to the environment. The seepage collection systems will be dismantled and removed, and the seepage collection ponds regraded and reclaimed once this has been achieved.

4.0 MONITORING PROGRAM

4.1 MONITORING

Guidelines for monitoring, inspection and reporting on the performance of the TMF are outlined in the Canadian Dam Safety Guidelines (CDA, 2013) and the CDA Technical Bulletin on the Application of the Dam Safety Guidelines to Mining Dams (CDA, 2014).

These documents provide requirements for dam safety inspections and reviews, and the development of an Operations, Maintenance, and Surveillance (OMS) Manual as well as an Emergency Preparedness and Response Plan (EPRP) specific to the TMF. The OMS Manual and EPRP will be prepared as part of an Industrial Approval Application and will be reviewed and revised annually, and as each staged TMF expansion is constructed. Quantitative Performance Objectives (QPOs) for the management and operation of the TMF will be developed and summarized in the OMS Manual.

Geotechnical instrumentation will be installed in the TMF embankments and foundation during construction, and will be utilized during the Operation, Closure and Reclamation, and Post-Closure Phases of the Project.

Instrumentation will be provided during construction, operations, and closure to monitor the TMF and may include:

- Pond level indicator in TMF supernatant pond
- Water management pond inflow weirs
- Vibrating wire piezometers in the TMF embankment
- Survey and surface movement monitoring monuments
- Flow monitoring for seepage collection ditches

Groundwater monitoring wells and select geotechnical instrumentation will be retained post-closure for use as long-term dam safety and downstream groundwater quality monitoring devices. Post-closure monitoring will also include annual inspection of the former TMF and ongoing evaluation of water quality, flow rates, and instrumentation records to confirm design objective for closure have been met.

The instrumentation will be used to monitor and assess embankment performance and to identify any conditions different to those assumed during design and analysis. Amendments to the ongoing design and/or remediation work can be implemented to respond to the changed conditions, should the need arise. Key control and monitoring subject areas will include:

- Construction controls, including the use of a construction management program.
- Performance monitoring inspections of the TMF, including instability indicators, stability monitoring, tailings deposition, supernatant pond levels, water management and control, and quality of effluent.
- Monitoring of the flow rates and water quality in the Seepage Collection System.
- Monitoring of the flow rates and water quality in the Reclaim Water and Surplus Water Management Systems.
- Monitoring of water quality in the Water Treatment Plant (if required) and Surplus Water Discharge System.
- Monitoring of downstream groundwater quality including aquatic effects monitoring on the receiving environment.

- The adequacy of the supernatant pond and tailings deposition strategy as a dust control to minimize onset of ML/ARD, should the tailings be characterized as PAG.
- Quality assurance and quality control (QA/QC) measures for ongoing monitoring and inspections.

The future OMS Manual will clearly document the procedures for operating, maintaining, monitoring, and inspecting the TMF along with the roles and responsibilities of relevant staff. Inspections will include:

- Daily inspections by the Mine Supervisor
- Weekly, or after a major storm event, or change, by the Mine Supervisor
- Annual dam safety inspections will be undertaken by the Engineer of Record (EoR)

Environmental monitoring will consist of regular monitoring of the quality of tailings supernatant, collected seepage, and downstream groundwater as described in the SWMP. The downstream aquatic environment will also be monitored as described in the AEMRP.

4.2 ADAPTIVE MANAGEMENT

Adaptive management may be required if environmental performance monitoring indicates that adverse conditions are prevalent in the ongoing results. Examples of inspections or monitoring that may trigger adaptive monitoring programs to be implemented include:

- Adaptive Geotechnical Stability Management – If annual geotechnical inspections identify stability concerns with the facility.
- Adaptive Seepage Management – If groundwater monitoring suggests that seepage collection measures are inadequate (i.e., seepage flows exceeding design flows).
- Adaptive Reclaim Water / Surplus Water Discharge Quality Management – If monitoring as described in the Site Water Management Plan indicates that supernatant water quality or TSS exceed what is acceptable for recycling to the Process Plant.
- Adaptive Downstream Water Quality Management – If monitoring as part of the Aquatic Effects Management and Response Plan identifies aquatic effects that require further investigation.
- Adaptive Sediment and Erosion Control Management – If regular visual monitoring identifies sediment and erosion control or other issues.

The need for any corrective actions to on-site management of the TMF or installation of additional control measures will be determined on a case-by-case basis, based on monitoring conducted as described above.

4.3 REPORTING

Table 4.1 presents a proposed reporting schedule for relevant reports. The final schedule of reports will be outlined in the IA for the project.

Table 4.1 Reporting Requirements for Tailings Management

Project Phase	Monitoring, Inspection and Reporting Requirement	Frequency
Pre-Development	Dam Classification Study and Dam Break Inundation Study for Significant or higher consequence TMFs.	Prior to Construction
Construction	As-Built Reports	Within 90 days of completion of construction
Operation	As-Built Reports (embankment raises)	Within 90 days of completion of construction for each staged embankment expansion
	Annual Report (includes updates to the TMF Register, if applicable)	Annually
	Dam Safety Inspection Report	Semi-annually
	Independent Tailings Review Board (ITRB) Report	Annually
	OMS Manual Update	Annually
	EPRP Update and Testing	Annually
	Dam Safety Review including Dam Classification Review and Update	Min. 2 over LOM, or every 5 years
Closure	Closure Management Manual	Prior to end of operations
	OMS Manual Update	Annually
	EPRP Update and Testing	Annually
Post-Closure	Annual Report	Annually
	Dam Safety Inspection Report	Annually
	Dam Safety Review including Dam Classification Review and Update	Every 5 years

5.0 ROLES AND RESPONSIBILITIES

Roles and responsibilities with respect to tailings management will be developed and assigned as part of the preparation of the OMS Manual. Prior to conducting any work on the mine site, AMNS will designate a Mill Operations Manager who must be present onsite daily, and who is ultimately responsible for application of all requirements on the site. As such the Mill Operations Manager is ultimately responsible for the safety of the TMF. A proposed organizational structure proposed for the implementation of this Plan is presented in Table 5.1

Table 5.1 Roles and Responsibilities Organizational Chart

Position	Responsibilities
CEO/COO	The CEO or COO, as the lead representative of a Mine Owner, will designate a Mill Operations Manager who must be present onsite daily and who is ultimately responsible for application of all requirements of the Plan on the site. The CEO retains overall accountability for tailings management; responsible for putting an appropriate management structure in place, and for providing assurance to the Company and Communities of Interest that tailings are managed appropriately.
Manager Environment & Community	Responsible for the development and ongoing updates of this Plan, and for ensuring its implementation. The VP Environment and Community, with help from the Mill Operations Manager, will prepare and maintain the OMS Manual. He/she is also responsible for communication with government and community, including Aboriginal Groups, and for ensuring that the Plan reflects the results of these communications.
Mill Operations Manager	The Mill Operations Manager is the individual ultimately responsible for the mine, including the following aspects: • Accountable for all aspects of the performance and management of tailings and water retaining structures • Responsible for compliance with regulatory requirements and relevant guidelines • Responsible to submit all compliance reports to the required regulatory agencies by the due dates • Defines site roles and responsibilities, authority, and accountability • Allocates required human and financial resources • Reports dangerous occurrences including significant TMF or dam safety incidents to NSE The Mill Operations Manager is therefore accountable for the proper implementation and success of this Plan and the OMS Manual at the project site. The Mill Operations Manager will be also responsible for approving monitoring programs and SOPs with support from the Mine supervisor. All compliance reporting with respect to tailings management will be submitted to the Mill Operations Manager.
Engineer of Record (EoR)	An EoR will be designated once construction of the TMF is underway. The EoR must be an individual (not a firm) who is a qualified and competent engineer with experience commensurate with the consequence classification and complexity of the facility. The EoR will: • Hold the professional responsibility for the facility design, and is responsible for evaluating the adequacy of the as-built facility relative to the design as well as applicable standards, criteria, and guidelines • Report on annual Dam Safety Inspections • Participate in Dam Safety Reviews • Participate in risk assessments

Position	Responsibilities
	• Participate in ongoing construction quality assurance in accordance with AMNS's Quality Management Plan (QMP) • Provide QPOs and monitoring frequencies required to ensure the facility is functioning as designed for inclusion in the OMS • Participate in the implementation of a succession plan in the event of a change in the EoR
Independent Tailings Review Board (ITRB)	An ITRB will be established comprised of independent subject matter experts not currently involved in or responsible for the design, operation, or construction of the TMF. The size and make-up of the ITRB will be based on complexity of the tailings system in terms of risk, consequence, and disciplines of substance. AMNS's ITRB will be established to: • Provide an independent assessment to senior mine management and regulators whether the TMF is designed, constructed, and operated appropriately, safely and effectively • Provide the site team with practical guidance, perspective, experiences, and standard/best practices from other operations • Review and comment on the planning and design process, monitoring programs, data analysis methodology and work performed by site team and/or contract consultants • Provide non-binding advice and guidance The ITRB will not direct the work or perform the role of the Engineer of Record.
Mine Supervisor	The Mine Supervisor will have functional responsibility for the implementation of this Plan under the direction of the Mill Operations Manager. This includes communicating with relevant on-site personnel to ensure compliance with the Plan.
Environmental Superintendent	The Environmental Superintendent will direct personnel on site to fulfill environmental management responsibilities and tasks, and audit contractors for compliance with Plan requirements.
Environmental Monitors	Environmental monitor(s) will be responsible for implementing the monitoring measures for this Plan. This includes completing daily tasks such as sample collection, performance monitoring, and reporting.
Inspectorate	An independent inspector, external to AMNS, will review applications and compliance monitoring for completeness and technical reasonableness, and conduct mine inspections to assess and enforce the compliance with plan requirements. The inspectorate will be designated by NSE.

Refinement and confirmation of the organizational structure will continue as the permitting process progresses and AMNS eventually staffs the Project. Any changes to the above will be consistent with the requirements of relevant federal and provincial guidelines.

6.0 REVIEW OF PLAN EFFECTIVENESS

The Mill Operations Manager or designate will conduct regular evaluations of the monitoring activities as needed. This Plan may be updated if additional methods for monitoring are found to be more appropriate.

The QA/QC for relevant monitoring programs will include the preparation of a SOP for each of the activities within the tailings management system, and auditing operations against this plan and any relevant SOPs.

7.0 REFERENCES

Canadian Dam Association (CDA), 2013. *2007 Dam Safety Guidelines – 2013 Revision*.

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Stantec Consulting Ltd. (Stantec), 2018. *Operations, Maintenance and Surveillance Manual – Touqouy Gold Project – Tailings Management Facility.* Revision 2.

8.0 CERTIFICATION

This report was prepared and reviewed by the undersigned.

Prepared:

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Senior Engineer

Reviewed:

Daniel Fontaine, P.Eng.
Specialist Engineer | Associate

Reviewed:

Richard Cook, P.Geo. (Ltd.)
Specialist Environmental Scientist | Associate

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Approval that this document adheres to the Knight Piésold Quality System: DDF

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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 7

Touquoy Pit Integrated Water and Tailings Management Plan

Highway 374

Trafalgar, Nova Scotia

Version 001
February 8th, 2021

Atlantic Gold

Appendix

Touquoy Integrated Water and Tailings Management Plan
Fifteen Mile Stream Gold Project
Stantec Consulting Ltd.

TOUQUOY INTEGRATED WATER AND TAILINGS MANAGEMENT PLAN – FIFTEEN MILE STREAM GOLD PROJECT

FINAL REPORT

February 8, 2021

Prepared for:

Atlantic Mining NS Inc.
409 Billybell Way, Mooseland
Middle Musquodoboit, NS B0N 1X0

Prepared by:

Stantec Consulting Ltd.
845 Prospect Street
Fredericton, NB E3B 2T7

Job No.: 121619250

Sign-off Sheet

This document entitled TOUQUOY INTEGRATED WATER AND TAILINGS MANAGEMENT PLAN – FIFTEEN MILE STREAM GOLD PROJECT was prepared by Stantec Consulting Ltd. ("Stantec") for the account of Atlantic Mining NS Corp, a wholly owned subsidiary of St. Barbara Ltd. (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

This report was prepared by Rachel Jones, Water Resources Engineer and reviewed by Jonathan Keizer, M.Sc.E., P.Eng. If you required additional information, please do not hesitate to contact us.

Rachel Jones

Prepared by ____
(signature)

Rachel Jones, P.Eng.

Jonathan Keizer
2021.02.08
11:27:36 -04'00'

Reviewed by____
(signature)

Jonathan Keizer, M.Sc.E., P.Eng.

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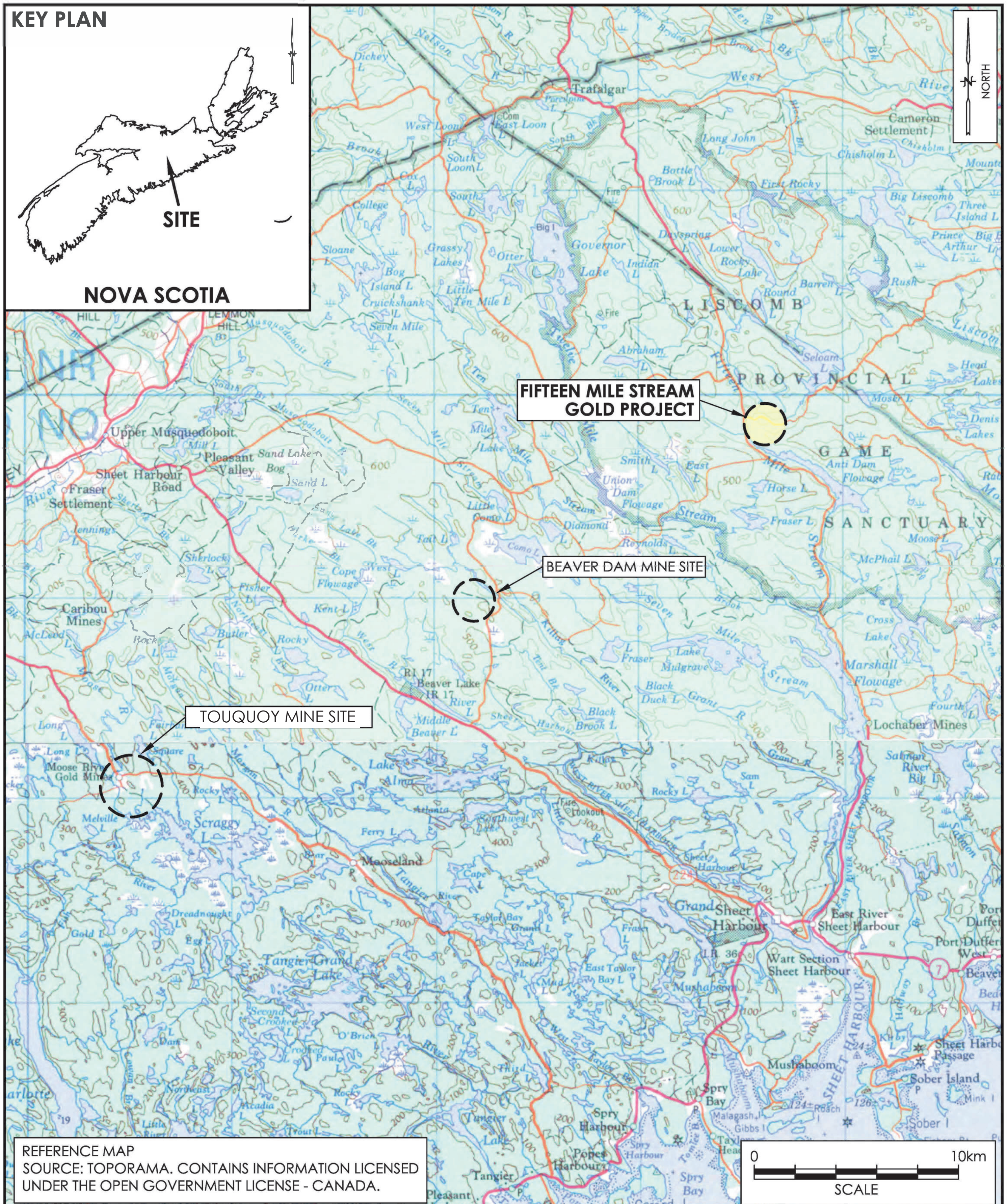
1.0 INTRODUCTION

The Fifteen Mile Stream (FMS) Gold Project is being developed as a satellite deposit to the Touquoy operation with haulage of concentrate ore 57 km by road to the Touquoy Mill for processing following completion of mining at Touquoy. FMS ore concentrate will be processed at the existing Touquoy mill site and will extend production at Touquoy by almost 7 years. FMS ore concentrate processing will commence in 2021, pending regulatory approval. Tailings generated by processing the FMS ore concentrate will be deposited in the exhausted Touquoy pit.

This report covers the FMS ore concentrate processing at Touquoy and does not cover the offsite open pit mines or associated haulage. The location of the FMS mine site in relation to the existing Touquoy mine site is depicted in Figure 1.1. This report summarizes the water and tailings management plan, including FMS tailings deposition and the integrated mine site water balance, in support of the environmental impact statement screening document for the FMS Gold Project.

This report is divided into four sections:

- **Section 2.0 Operational Water Management Plan** – outlines the sources of reclaim and make up water during the processing of FMS ore concentrate at the Touquoy mill site, manage site runoff, seepage and other flow components.
- **Section 3.0 Conceptual Tailings Deposition Plan** – outlines the tailings deposition methods based on subaqueous deposition, considering seasonality.
- **Section 4.0 Water Quantity Balance** – outlines the predictions of water volume discharged to the exhausted Touquoy pit, water volume available for reclaim in the Touquoy Tailings Management Facility (TMF), required freshwater make-up from Scraggy Lake, and the timing of when water could be reclaimed from the exhausted Touquoy pit rather the Touquoy TMF.
- **Section 5.0 Water Quality Balance -** outlines the predictions of water quality in the pit lake and effluent discharge to Moose River.



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SITE LOCATION PLAN

FIFTEEN MILE STREAM GOLD PROJECT

HALIFAX COUNTY, NOVA SCOTIA

Job No.:	121619250
Scale:	1 : 250,000
Date:	08-FEB-2021
Dwn. By:	JL
App'd By:	RJ
Dwg. No.:	1.1
Client:	ATLANTIC MINING NS INC

Stantec

V:\1216\active\121619250\1_geotechnical\3_drawings_logs\2500_TOUQUOY\4_Sheet_Files\121619250.2500._EIS_1.1.dwg

2.0 OPERATIONAL WATER MANAGEMENT PLAN

Figure 2.1 depicts components of the operational water management plan at the Touquoy mine site, including the existing mill site, Touquoy TMF, effluent treatment plant, and the ultimate extent of the exhausted Touquoy pit. Water management at Touquoy is described in more detail in the water management plan (Stantec 2017a) and the Water Balance Report (Stantec 2016), excluding integration of the use of the exhausted Touquoy pit for tailings deposition. Figure 2.1 also illustrates the direction of flow between components, effluent discharge locations, mine component drainage areas, and locations of MDMER final discharge point(s). The MDMER final discharge point for Touquoy operations is located at SW-14 at the outlet of the Touquoy TMF polishing pond. When the exhausted Touquoy pit fills and is allowed to spill, the Final Discharge point will be located approximately 70 metres (m) downstream from the SW-2 monitoring station on Moose River for the Touquoy pit closure (Figure 2.2). Roadway access to the existing road will be maintained following the construction of the spillway.

When the Touquoy pit is exhausted of ore and the Touquoy TMF has reached its tailings storage capacity, reclamation activities will commence for the Touquoy TMF including the associated polishing pond and constructed wetland. The polishing pond and wetland dams are planned to be breached, the ponds drained, and the entire area, contoured and revegetated in closure of the Touquoy TMF, retiring the final discharge point. Tailings from the processing of FMS ore concentration will be deposited into the existing Touquoy pit. Initially, water will be reclaimed from the Touquoy TMF until water storage is not adequate to meet process water demand. After which water will be reclaimed from the exhausted Touquoy pit as a closed loop. The exhausted Touquoy pit will not be allowed to spill until water in the pit lake meets MDMER discharge limits, until such time water will be treated in the pit or pumped and treated in the existing Touquoy effluent treatment plant. The water management plan is based on operation and reclamation/ closure.

An overview of key features of the Touquoy water management plan for the FMS project are provided in the sections below. Water management is presented by project phase (Operation, Reclamation, and Closure) as it pertains to FMS Project. The operational phase of the Project corresponds to the period when FMS ore concentrate is being processed at the Touquoy mill. Following ore processing, water will be treated during the reclamation phase. Once water quality meets regulatory reclamation criteria the water level in the pit lake will be allowed to spill from the exhausted Touquoy pit and discharge to Moose River during the closure phase. As per the MDMER, water quality monitoring will be conducted to inform water management at Touquoy.

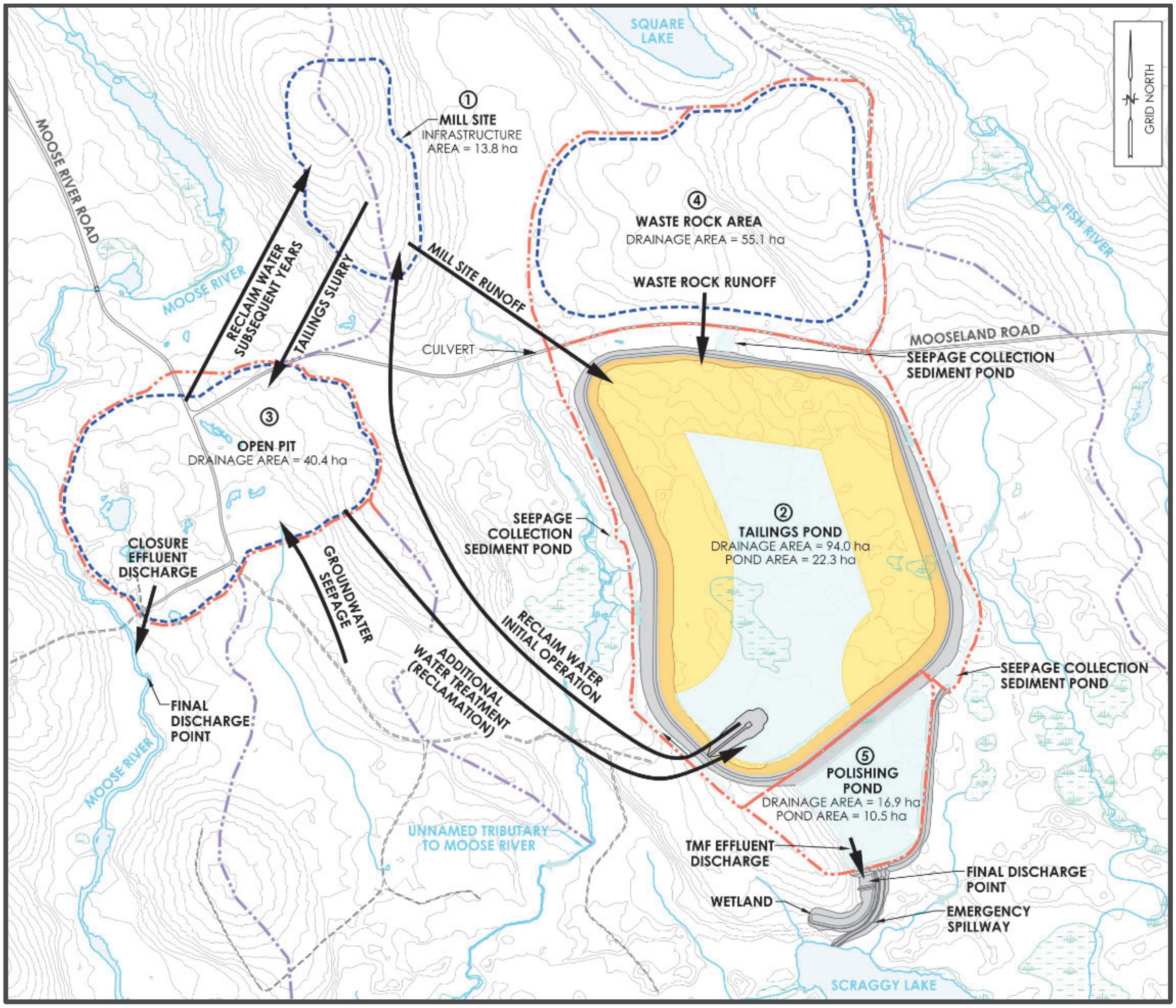

Figure 2.1 Major Mine Site Components at Touquoy

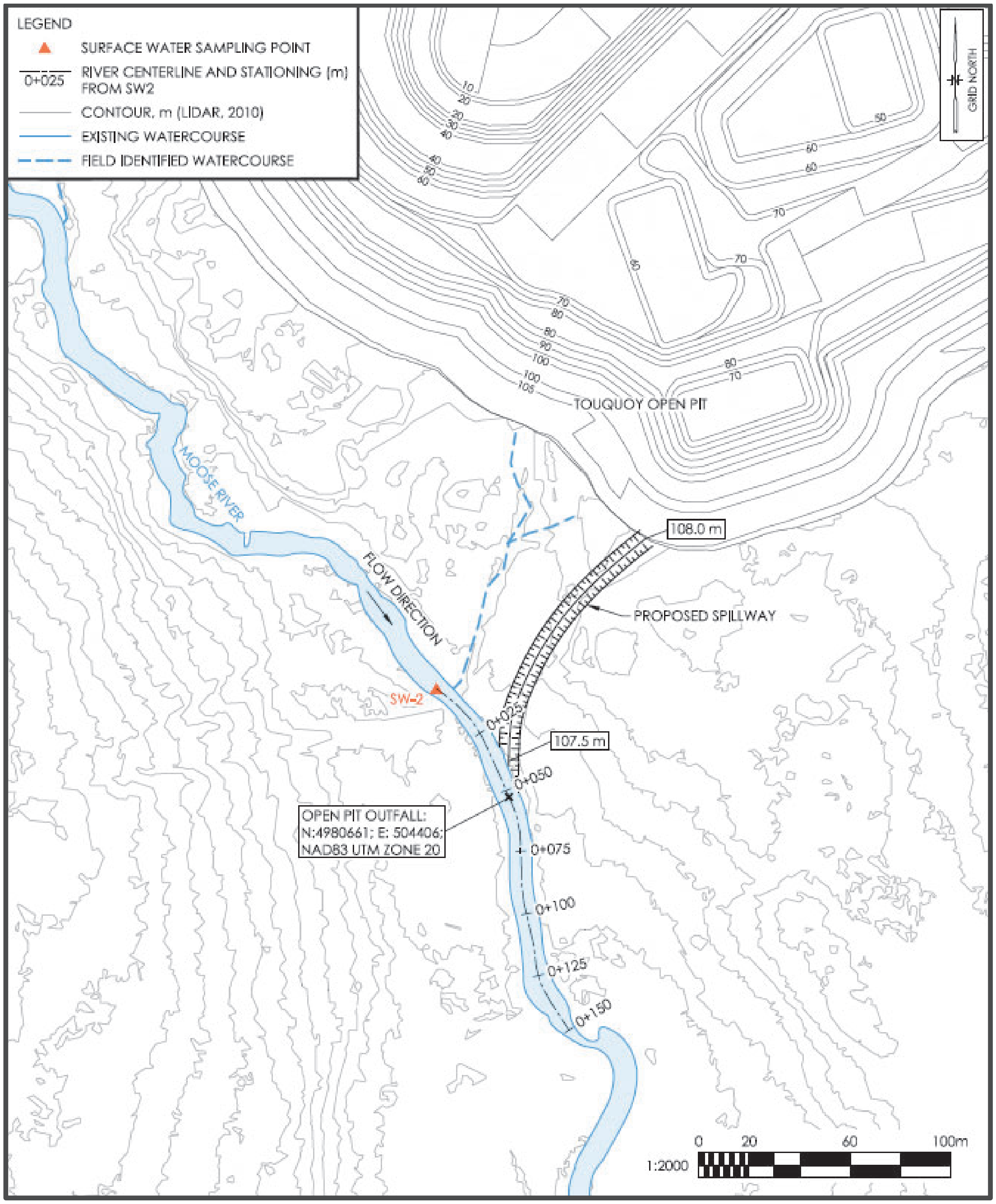

Figure 2.2 Location of Exhausted Touquoy Pit Outfall

2.1 WATER MANAGEMENT TO ACCOMMODATE FMS ORE CONCENTRATE PROCESSING

2.1.1 FMS Project Phase – Operation

Mill operation for FMS ore processing is planned to be consistent with Touquoy ore processing with respect to mill throughput, mill process flows, and tailings slurry density. Water Management at Touquoy to accommodate FMS concentrate ore processing during operation is described below.

- Processing of FMS ore concentrate at Touquoy involves the continued use of Touquoy water management facilities, including:
  - The TMF will continue to receive surface runoff from the waste rock pile, seepage collection ditches, and direct precipitation.
  - Seepage collection ditches will continue to collect tailings seepage around the perimeter of the Touquoy TMF and will continue to be pumped back into the TMF pond.
  - Perimeter ditches around the waste rock area will flow into three sedimentation ponds with the option to by-pass the TMF if water quality objectives are achieved.
  - Runoff from the mill site pond and run-of-mine (ROM) stockpile will continue to be included in the tailings slurry flow.
  - The TMF water surplus, that is water that is not reclaimed as process water, or lost to evaporation or seepage, will continue to discharge to the effluent treatment plant. Effluent from the treatment plant will continue to discharge to the polishing pond through geobags and subsequently to the constructed wetland and finally to the receiving environment, i.e., Scraggy Lake.
  - The effluent treatment plant and downstream discharge facilities will continue to be in operation at the TMF until surplus water meets reclamation regulatory water quality requirements as described in the reclamation plan for Touquoy (Stantec 2017b).
- Dewatering of the exhausted Touquoy pit to the TMF will cease at the end of exhausted Touquoy pit mine life. This will result in reduced water surplus from the TMF.
- FMS ore concentrate will be processed at the Touquoy mill.
- At initial stages of discharging tailings to the exhausted Touquoy pit when the TMF storage capacity is finally depleted, reclaim water will be directed to the mill from the Touquoy TMF through the existing decant tower or floating barge infrastructure for treatment and/or reuse for various mill processes. Water will continue to be reclaimed from the TMF until a water deficit is reached. Delay of water reclaim from the open pit will allow time for water inflows to collect in the pit as a start-up process water supply.
- When water is to be reclaimed from the Touquoy pit, the existing floating barge and associated infrastructure will be relocated from the TMF to the exhausted open pit. The barge will raise with the water and tailings elevation in the pit, decreasing pump head and associated pumping costs over time.
- Additional FMS ore concentrate processing start-up water supply will be sourced from Scraggy Lake, subject to NSE water withdrawal approval.
- Freshwater make-up for the process will continue to be sourced from Scraggy Lake. Additional make-up process water required in a dry year or to build a reservoir in case of a dry year will be sourced from effluent from the TMF treatment plant or Scraggy Lake, subject to NSE approval.
- FMS tailings will be deposited in the exhausted Touquoy pit. The existing tailings slurry pipeline from the mill will be redirected from the TMF to the exhausted Touquoy pit.

2.1.2 FMS Project Phase – Reclamation

The objective of Water Management at Touquoy to accommodate FMS ore concentrate processing during reclamation is for water in the pit lake to meet the reclamation regulatory water quality requirements or site-specific criteria. Key water management features are described below.

- The existing TMF effluent treatment plant and downstream discharge facilities will continue to be in operation to treat TMF water surplus
- Throughout reclamation as the exhausted Touquoy pit fills with water, the pit lake will be treated as a batch reactor with the objective of adjusting the pH to precipitate metals thus improving discharge quality.
- Surplus water in the exhausted Touquoy pit will be pumped to a treatment facility until such time as water quality monitoring indicates that water quality is suitable for direct discharge to the environment.
- Until water quality meets discharge criteria, the water level in the pit lake will be maintained at or below elevation 108 m (i.e., corresponding to the spillway elevation) thus reducing seepage to Moose River and normalizing treatment rates to the extent feasible.
  - A minimum of 1 m water cover will be maintained above the deposited tailings to facilitate pumping. The water cover depth will vary over the tailings depositional period.
  - The effluent treatment plant will operate intermittently during non-frozen periods (April – November, inclusive) to lower the pit lake to 103 m by the end of November thus providing storage over the period when the effluent treatment plant is shut down.
  - Assuming the existing effluent treatment rate of 300 cubic metres per hour (m^3/hr), the effluent treatment plant would be in operation for 6 months to pump and treat the annual climate normal surplus of the Touquoy pit watershed of 436,000 cubic metres (m^3).

2.1.3 FMS Project Phase – Closure

As described below, once water quality meets regulatory reclamation criteria the exhausted Touquoy pit can be prepared for closure, in accordance with the mine site closure plan.

- The effluent treatment plant and downstream discharge facilities are not required for the FMS Gold project during closure because effluent discharge will meet regulatory discharge criteria and will not require treatment.
- Surplus water in the exhausted Touquoy pit will be discharged via a constructed spillway/conveyance channel (see Figure 2.2) to Moose River, subject to meeting regulatory discharge criteria.
- The spillway and conveyance channel will be sized to accommodate the inflow design flood in accordance with the Canadian Dam Association (CDA) guidelines. The spillway invert is set at elevation 108 m, approximately 2 m below the lowest Touquoy pit elevation to prevent overtopping.

Similarly, TMF water surplus will continue to be treated in the existing effluent treatment plant to meet regulatory reclamation criteria at the existing Final Discharge Point (SW-14), as outlined in the Touquoy reclamation and closure plan.

3.0 CONCEPTUAL TAILINGS DEPOSITION PLAN

This section presents a conceptual plan for subaqueous deposition of conventional tailings slurry into the exhausted Touquoy pit from FMS ore concentrate processing. The total capacity of the exhausted Touquoy pit at the proposed spillway elevation of 108.0 m is of 8.962 million cubic metres (Mm^3) is sufficient to store tailings FMS ore processing using subaqueous (i.e., in water) deposition. Considering subaqueous deposition, the exhausted Touquoy pit can accommodate the estimated total deposited volume of 0.411 Mm^3 from FMS ore concentrate processing.

Subaqueous deposition is the most pragmatic way to deposit tailings in the confined exhausted Touquoy pit. Subaerial deposition (i.e., tailings beach) like at the Touquoy TMF was not considered for the Touquoy pit. Subaerial deposition would introduce complexities in design and operation due to the conical geometry of the pit (reducing in area over the 25 m depth), use of the pit as a process water supply, and maintaining access to the water surface. As the capacity of the pit is adequate for tailings depositions, tailings slurry alternatives such as high-density tailings and paste were not considered.

Quality of reclaim water will need to meet criteria for total suspended solids, residual reagents and other parameters to limit fouling or reduced recoveries in the mill. These criteria will need to be refined in subsequent phases of study to determine if additional treatment of reclaim water will be required.

In general, spring, summer and fall operation is more flexible than winter (frozen) operations, and appropriate planning and mitigation is required to prevent potential issues with respect to maintaining minimum capacities during frozen conditions.

3.1 NORMAL OPERATION (SPRING, SUMMER AND FALL)

Tailings will be transported to the Touquoy pit as thickened slurry via a tailings pipeline that runs from the mill to the exhausted pit. The existing tailings pipeline will be relocated to accommodate tailings deposition in the exhausted pit. Secondary containment is achieved by running the main tailings pipeline in a lined ditch. The tailings will be deposited into the pit by end-of-pipe discharge, beginning in the lower areas and moving radially around the exhausted Touquoy pit. The tailings discharge pipe will be suspended in the pond by floats or a floating barge. Initially, the pipe will likely discharge from surface at a lower bench as the bottom of the exhausted Touquoy pit has a deeper basin. Detailed procedures will be developed for tailings line relocation and corresponding plant shut downs to prevent plugging of the tailings pipeline.

Summer deposition will be carried out in shallower portions of the pit in preparation for the winter. Bathymetric surveys will be conducted at least once a year during the ice-free period to identify areas where tailings deposition should be concentrated and to create a tailings surface. From the tailings surface, design assumptions of tailings volume and average tailings deposited density can be checked. The tailings deposition plan should be updated routinely to check that capacity is available in deeper parts of the exhausted Touquoy pit to prepare for winter operation.

The existing TMF reclaim barge will be relocated from the tailings pond to the exhausted Touquoy pit for reclaim in ore processing for the Project. The reclaim barge will be placed in an area with the highest water depth. A floating baffle curtain will be installed around the barge should high suspended solids become an issue in processing.

Pertinent considerations and design criteria have been collated in Table 2.1. The assumptions presented in this water management plan should be updated with reported values when the final deposition plan is prepared. An average settled tailings density of 1.3 tonnes per cubic metre (t/m³) was assumed considering subaqueous tailing deposition, thus a lower average deposited tailings density than that of the Touquoy tailings pond of 1.44 t/m³ practicing sub-aerial deposition.

Table 3.1 Project Tailings Deposition Assumptions

Criteria	Value	Unit	Source
Tailings Characteristics			
Average settled tailings density	1.3	t/m³	
Slurry density (w/w) (% of tailings production (tonnes))	41	%	
Specific gravity	2.83	---	Stantec 2018a
Saturated water content (% of tailings production (tonnes))	36.1	%	Calculated parameter
Exhausted Touquoy Pit Characteristics			
Touquoy pit volume at spillway elev. (108.0 m)	8.962	Mm³	Ultimate Pit Design April 2017 (AMNS 2018)
Pit lake freezes over	December	month	
Pit lake ice melts	April	month	
Closure spillway elevation	108	m	
Minimum water depth - pump operation	**1**	**m**	
Minimum water cover - to reduce metal leaching	1	---	
Adjustment to mean tailings elev. (underwater cones)	8	m	
Assumed Freeboard Requirements of Touquoy pit	**1**	**m**	
Inflow Design Flood	143,000	m³	

Note: Blank fields indicate an estimate or assumption as part of this study

3.2 WINTER (FROZEN) OPERATION

Based on a review of climate normal temperatures, frozen conditions typically occur between January and April, although solid ice cover of the pond may occur as early as December. Subaqueous deposition employed in cold climates require mitigation strategies to continue deposition when the water surface is frozen. Bubbler systems can be installed around the discharge/reclaim barge and its pontoons to reduce ice formation. The discharge/reclaim barge will be placed over a deep portion of the pond to provide storage of tailings deposited throughout the ice-covered portion of the winter. Another option is to submerge the tailings slurry discharge line below the ice depth to discharge tailings to a single point, or over a linear array of discharge points within the pond during the winter period. It is not practical to access submerged tailings lines while the pond is frozen over.

4.0 WATER BALANCE MODEL

A preliminary water balance model was developed to simulate the overall operational water management of the Project in operation and reclamation. The water balance model was developed through multiple iteration and revisions simulating construction, commissioning, and operation of ore processing and tailings deposition at the Touquoy mine site to improve accuracy. Using the existing conditions water balance model at Touquoy, the model was extended to simulate the integrated water management of Project ore processing at Touquoy as part of a water and tailings management plan. Model inputs and outputs to the exhausted Touquoy pit accounted for groundwater inflows and seepage losses, surface runoff, direct precipitation, evaporation, process water, porewater lock up and reclaim to the Touquoy TMF and exhausted Touquoy pit. The objectives of the water balance model for the Project include to:

- Understand water management adjustments needed to accommodate the continued ore processing and tailings deposition
- Simulate the water and tailings volume in the exhausted Touquoy pit over the life of the Project
- Predict when it would be necessary to withdraw reclaim water from the Touquoy pit, as opposed to the TMF, under climate normal conditions

The model was run for the climate normal conditions in addition to the 1:100 Annual Exceedance Probability (AEP) wet conditions, and 1:100 AEP dry climate conditions (assuming groundwater inflow and storage in the Touquoy pit) for the during of operation, reclamation to closure. Only water elevation in the Touquoy pit is reported, as water management of the tailings pond is not changing from the Project. Considerations of flows in the TMF downstream facilities, such as the polishing pond and constructed wetland, were not incorporated into the model.

The model was run for the processing of FMS ore concentrate assumed to begin in November 2021. Water surplus in the existing Touquoy TMF will be reclaimed from the existing TMF for the FMS ore concentrate processing.

4.1 EXISTING CONDITIONS AND ASSUMPTIONS

Water balance assumptions for the FMS Project are listed below.

Mill Process Flows

- Start-up process water supply in Touquoy pit will be sourced from the following:
  - Reclaiming water from the TMF for the first five months of operation, assuming start-up in spring.
  - To offset anticipated start up reclaim deficit and build deposited tailings water cover, increase freshwater make-up from Scraggy Lake of 15,862 m³/month to the maximum monthly permitted rate of 21,900 m³/month for the first 7 months of reclaim in the Touquoy pit.
  - Stop pit dewatering five months prior to start-up of tailings deposition in the exhausted Touquoy pit. This will result in water collected in the pit for use as process supply in start-up.

    - Withdraw additional start-up volume from Scraggy Lake based on climate normal conditions (subject to a permitted water withdrawal approval from NSE).
- Freshwater make-up from Scraggy Lake of 5.8% of production is consistent with the Touquoy operations, following the initial start-up volume.
- Average tailings water discharged with tailings slurry of 9,417 m³/d
- Average reclaim water to mill of 8,977m³/d
- Moisture going into mill of 12% of tailings production (t) for FMS.
- Water lost to evaporation and spillage of 3.0% of tailings production (t).

TMF (Drainage area of 94 ha)

- TMF at high normal operating water level at commencement of tailings deposition in the exhausted Touquoy pit (approximately 1 Mm^3) to store water available for reclaim.
- TMF at ultimate spillway design elevation 128.5 m with a dam crest elevation of 130.0 m CGVD2013 assuming 7.36 million cubic meters (Mm³) of tailings storage volume and 1.30 Mm³ of water storage below the spillway invert elevation of 128.5 m.
- Minimum inactive storage in the tailings pond is 635,500 m³ in non-frozen months, and 825,500 m³ in frozen months.
- Surplus water discharge to the effluent treatment plant at a maximum rate of 300 m³/hr
- Seepage from the TMF at 1,336 m³/d, of that 200 m³/d is captured in polishing pond and 736 m³/d re-circulated to the TMF in non-frozen months and the remainder bypasses to groundwater.
- Accepts inputs from undiverted catchments (waste rock pile, mill pond runoff, and Touquoy pit dewatering).
- The elevation storage relationship for the TMF is illustrated in Figure 4.1

Waste Rock Storage Area (Drainage area of 55.1 ha)

- The waste rock storage area is not expanding over the life of FMS project.
- The runoff coefficient at the commencement of the Project is estimated at 28%. However, the runoff coefficient of the waste rock pile is expected to increase to 70% over 15 years as the waste rock pile starts to wet and the transmission of infiltration and recharge through the pile improves overtime.
- Runoff coefficient increases from 5 to 27% by the end of the Touquoy operation (e.g., from existing conditions in Touquoy operation to a model result from a reference waste rock site).

Exhausted Touquoy Pit (Drainage area of 40.4 ha)

- Touquoy pit receives 5 months of runoff (associated to remaining volume in TMF) upon commencement of FMS ore concentrate processing amounting to a water volume of 273,000 m³ with a bottom elevation from -25.0 m to 11.2 m CGVD2013
- Touquoy pit geometry as per the ultimate pit design of April 2017 at ultimate stage
- Model represents climate normal, 1:100 AEP and 1:100 AEP climate conditions, characterized by Environment Canada’s Middle Musquodoboit climate station (Station ID 8203535)
- Total storage capacity at the overflow elevation 108 m CGVD2013 of 8.962 Mm^3.
- Natural filling of the Touquoy pit over time to create a pit lake water cover over of the deposited tailings
- The pit lake amounts to a minimum of approximately 98 m of water cover above the tailings, assuming the spillway invert elevation of 108 m CGVD2013
- Net groundwater inflow to the pit consistent at 768 m³/day but decreasing to 373 m³/d as the water elevation rises to a maximum of 108 m CGVD2013 (Stantec 2021a), as illustrated on Figure 4.2
- An emergency spillway in the Touquoy pit with invert of 104 m, a Touquoy pit crest elevation of 108 m to prevent overtopping and a conveyance channel to Moose River
- The elevation storage relationship for the exhausted Touquoy pit is illustrated in Figure 4.3

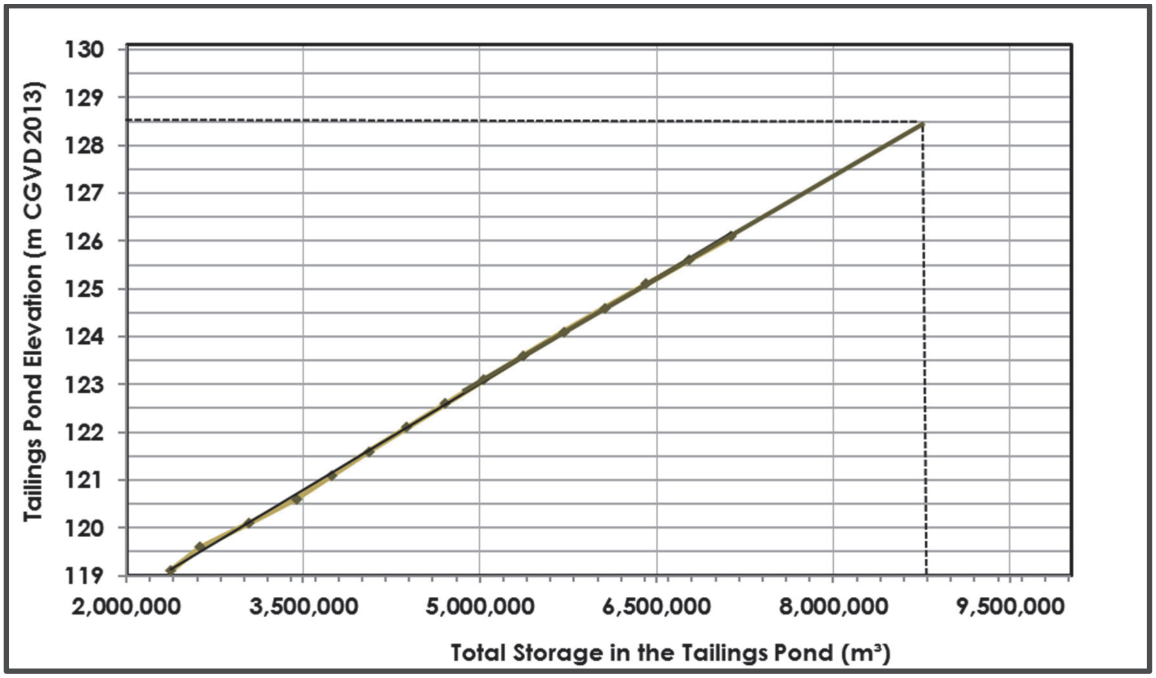

Figure 4.1 TMF Elevation Storage Relationship

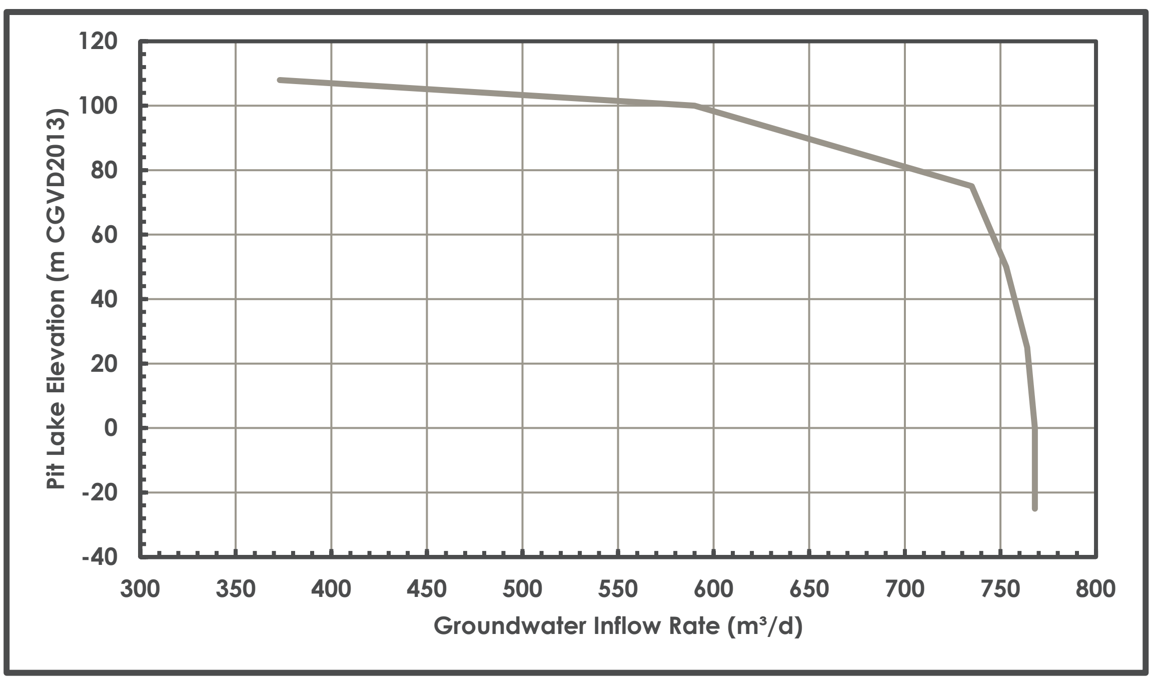

Figure 4.2 Groundwater Inflow Rates to Pit Based on Water Elevation in Touquoy Pit

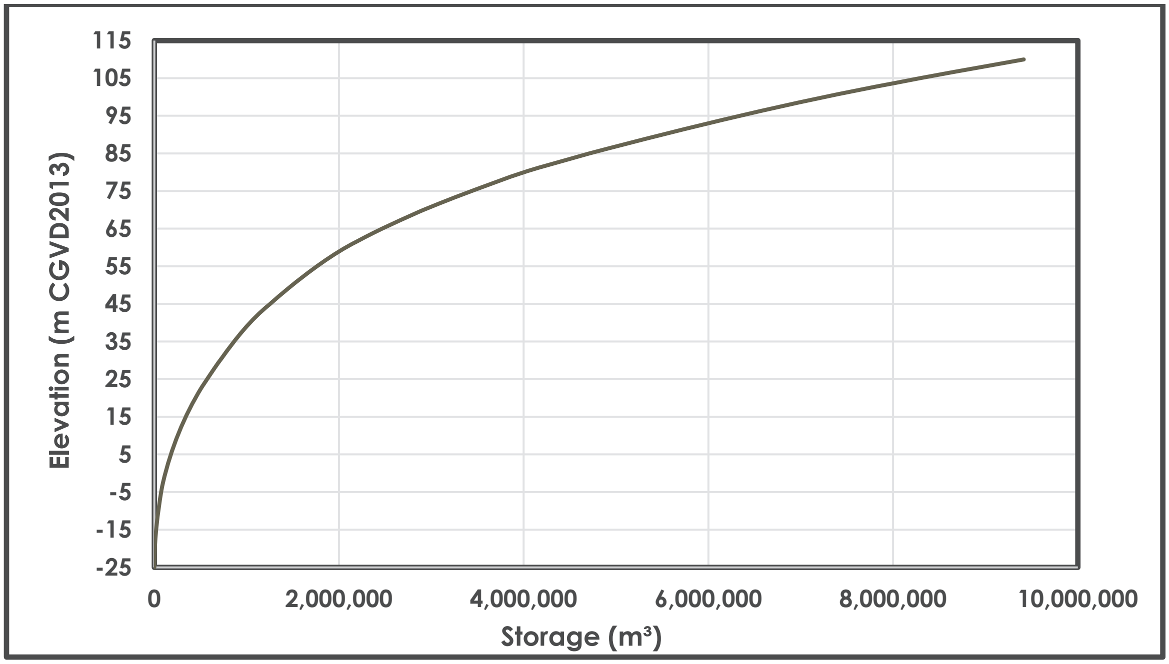

Figure 4.3 Elevation Storage Relationship in the Exhausted Touquoy Pit

4.2 MODEL RESULTS

The water balance model predicted the amount of water and tailings stored in the pit over the simulation period for FMS ore concentrate processing. Tailings will be deposited in the exhausted Touquoy pit for a total of 83 months including a five-month pre-processing period to allow the water level in the open pit to reach an elevation in the pit of 17.6 m CGVD2013. As originally planned in the approved Touquoy Gold Mine Project Reclamation Plan (Stantec 2017b), the inflow of groundwater, surface runoff and precipitation into the pit will naturally create a lake upon closure of the site. The water balance model simulated that it would take an additional 88 months or a total of 165 months from commencement of tailings deposition in the exhausted Touquoy pit to fill the pit to the spillway invert elevation. Figures 4.4 and 4.5 illustrate the predicted water and tailings elevation and storage volume in the exhausted Touquoy pit over a 20-year simulation period, respectively.

Based on results of the water balance model, process water can be reclaimed from the TMF for the duration of FMS ore concentrate processing for the modelled climatic conditions. Adequate water supply is available for start-up as the process water demand is low in comparison to Touquoy processing.

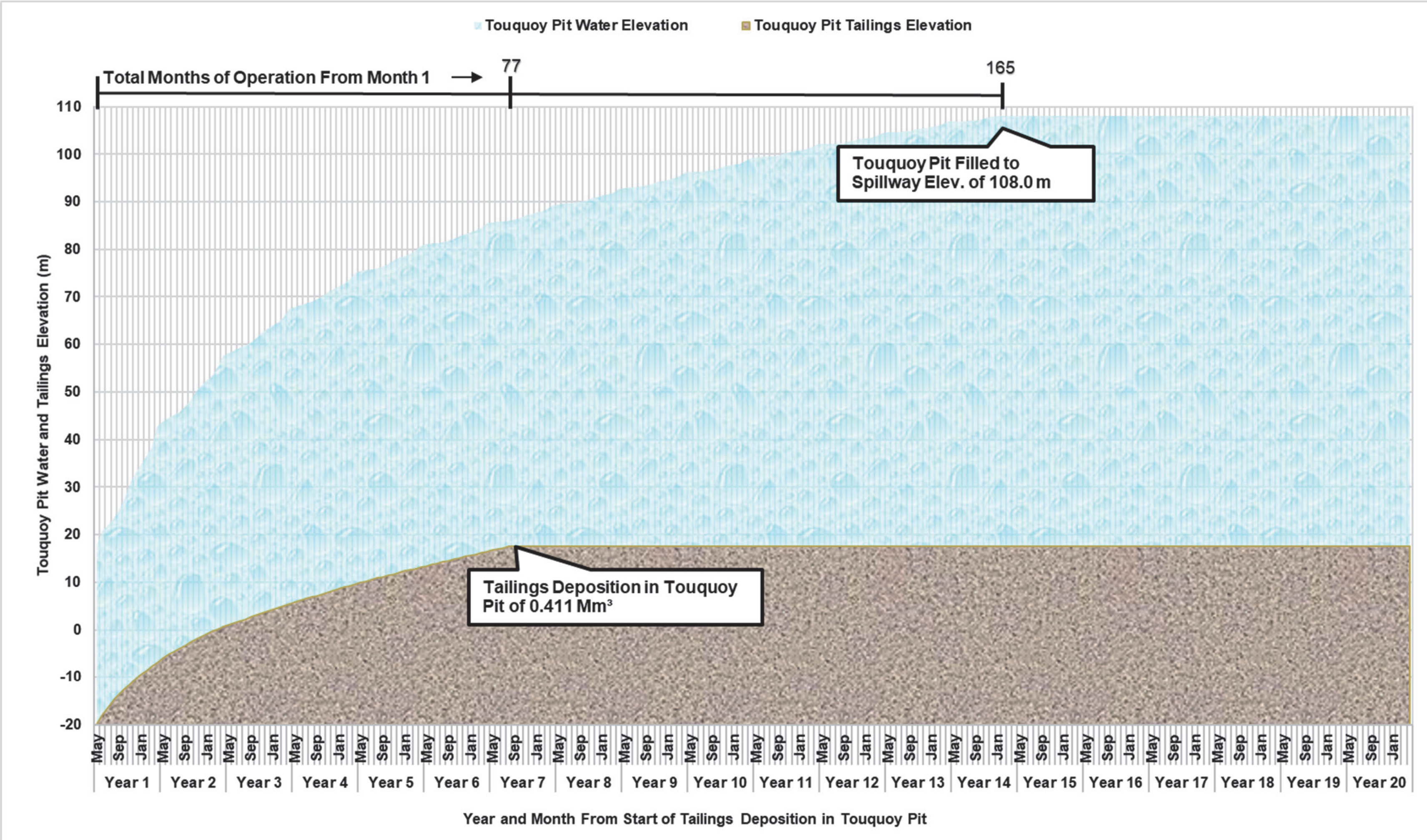

Figure 4.4 Tailings and Water Elevation in the Exhausted Touquoy Pit

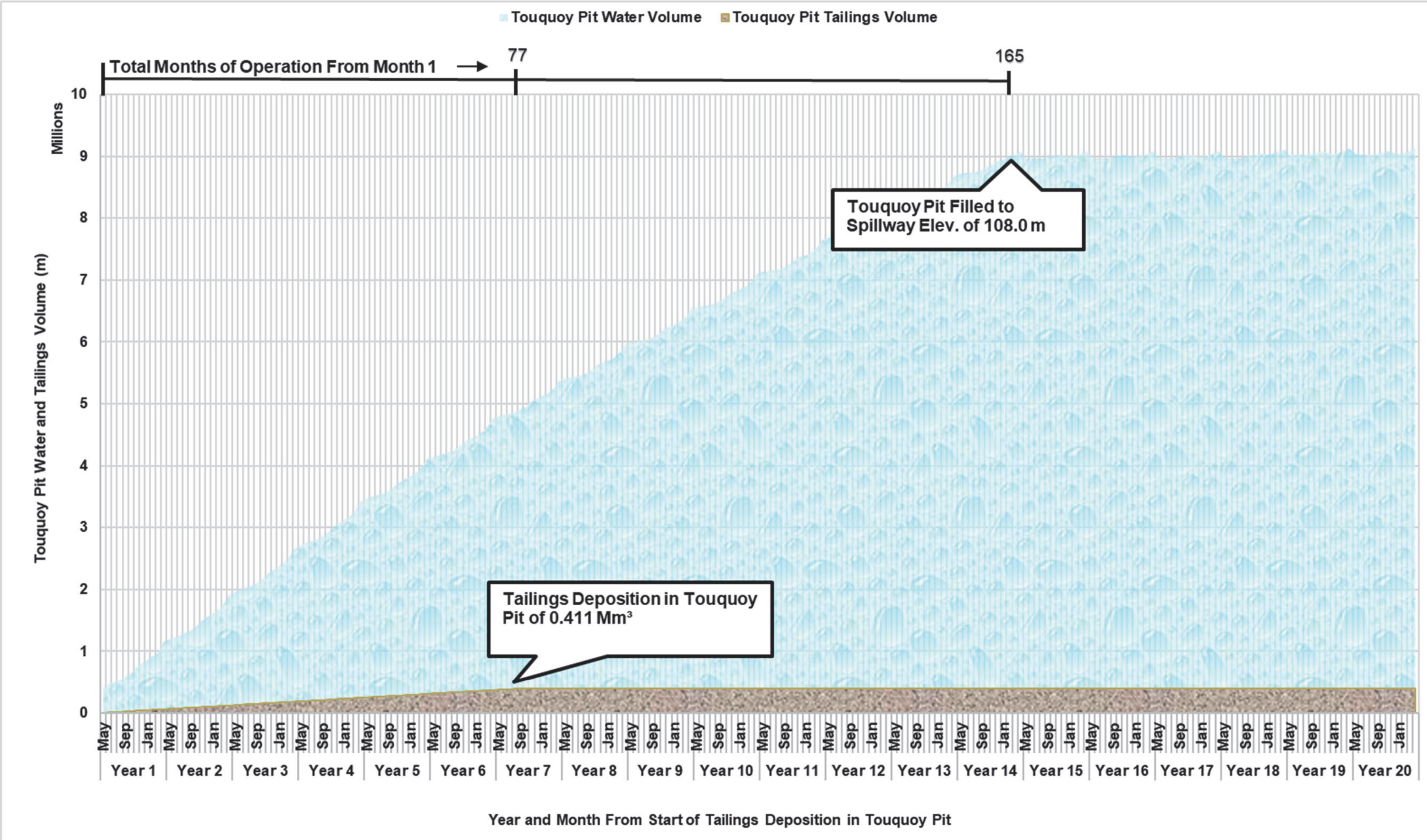

Figure 4.5 Tailings and Water Storage Volume in the Exhausted Touquoy Pit

5.0 WATER QUALITY MODEL

Deposition of tailings in the exhausted Touquoy pit will alter water quality in the pit compared to filling of the pit as per the Touquoy reclamation plan (Stantec 2017b). The monthly water quality model for the exhausted Touquoy pit was developed to simulate the overall water quality of metal parameters, cyanide, and nitrogen species (including ammonia, nitrate, and nitrite) during operation, reclamation, and closure of the Project. This model was run for the Base and Alternative Scenarios. The objectives of the Touquoy water quality model are to predict future water quality and inform water treatment required prior to the pit lake effluent discharge to Moose River, and the water quality of effluent discharge to Moose River at aquatic monitoring stations. The environmental effects of predicted discharge water quality in Moose River are assessed.

5.1 MODEL INPUTS AND ASSUMPTIONS

5.1.1 Geochemical Source Terms

Water quality modelling considered the pore water quality in the tailings, the groundwater inflow quality in the pit floor/ walls, surface runoff, direct precipitation, process water surplus, and the geochemistry of the individual water quality parameters. As discussed in the source terms memo (Lorax 2018), the pore water quality in the tailings and pit walls/floor was based on geochemical source term model predictions derived from upscaling of kinetic tests and Touquoy monitoring data. The geochemical model simulated the oxidation and reduction reactions to understand the water quality of the mixed pit lake quality based on the geochemistry of the individual water quality parameters during operation and reclamation. The kinetic testing and Touquoy monitoring data were considered representative for the Project as the ore bodies are from the same geologic formation as the Touquoy ore with similar marker parameter content.

Using the Touquoy TMF as a site analogue for saturation indices (Lorax 2018), solubility caps were predicted for iron (0.10 mg/L at end of mine and 0.039 mg/L at closure) and aluminum (0.178 mg/L at end of mine and 0.057 mg/L at closure). As recommended by Lorax (2018), a degradation rate for ammonia of $y = -0.0134x^2 + 0.4915x + 0.0676$ was applied, where x is the ammonia concentration in a given year. The degradation rate for ammonia was capped at 4.57 mg/L/yr for ammonia concentrations of 18.35 mg/L or above. Degraded ammonia was converted to nitrate and nitrite in operation and reclamation, at ratios provided by Lorax. During operation, a higher proportion of nitrite was predicted due to competing oxygen-consuming mechanisms where 25% as NO_3 and 75% as NO_2 (Lorax 2018). Within approximately 3 years following completion of tailings deposition, most of the nitrite was estimated to oxidize to nitrate with 98% as NO_3 and 2% as NO_2.

The water quality of the source terms are combined with the water balance model flows to predict monthly discharge water quality over 50 years beginning at the start of discharge into the exhausted Touquoy pit dis, simulating steady state conditions for all source terms provided by Lorax.

Process freshwater make-up water requirements of approximately 5.8% of production will be sourced from Scraggy Lake as per the existing NSE approval for Touquoy ore processing or other sources as directed in the NSE approval for FMS and Beaver Dam. Should additional process make-up water be required in a water reclaim deficit scenario, the Scraggy Lake supply will be supplemented with treated effluent from the existing Touquoy mine polishing pond.

Based on results of the groundwater flow model (Stantec 2021a), the Touquoy pit acts as a sink (i.e., gaining groundwater to the Touquoy pit) until the groundwater level reaches the shallow weathered bedrock layer. The interaction between the Touquoy pit lake and Moose River is limited to groundwater flow from Moose River to the pit during this period. Therefore, no water quality effects to Moose River are predicted during this period. When the pit lake level rises to the spillway elevation of 108 m, the groundwater flow gradients allow for seepage from the Touquoy pit will migrate towards the Moose River as baseflow at a rate of approximately 258 m^3/d. The flow rate in Moose River in April is 125 times this rate, and therefore represents a dilution ratio of approximately 125.

The water quality model predicts the effluent discharge quality from the Touquoy pit during reclamation and closure. Effluent discharge water quality from the pit lake to Moose River is required to meet MDMER discharge limits. Therefore, it was assumed that any effluent quality for any parameter that exceeds the MDMER limits will be treated to meet the MDMER limits. Discharge from the Touquoy pit is not anticipated until after 2021, therefore the MDMER discharge limits for an existing mine after June 1, 2021 were used as minimum treatment criteria for effluent discharges to Moose River. An assimilative capacity study of Moose River (Stantec 2021b) was completed to simulate the mixed water quality at the future MDMER biological monitoring stations located at 100 m, 200 m, and 1000 m downstream of the effluent discharge point.

5.1.2 Water Treatment

Similar to Touquoy ore processing, the tailings slurry from the processed ore will be subject to cyanide destruction at the process plant before flowing to the exhausted Touquoy pit. Based on water quality monitoring results at Touquoy for existing operation, cyanide destruction to cyanate is 99.5% effective (Lorax 2018). Cyanate readily complexes with metals and can precipitate under increased pH conditions. The majority of the residual cyanide reagent introduced to the tailings during ore processing will be degraded and hydrolyzed to carbon dioxide and ammonium during storage in the tailings pond. Similarly, this will be expected to occur for the FMS and Beaver Dam tailings being stored in the Touquoy pit. Potential failures related to cyanide recovery and proposed Touquoy pit disposal will be addressed in updates to the existing Touquoy groundwater contingency plan (Stantec 2019a), as required in the Industrial Approval for the Touquoy mine site.

Continued use of the existing effluent treatment plant located downstream of the tailings pond is planned to treat the pit lake until MDMER discharge limits are met. The water quality of the pit lake will be monitored during the pit filling and as the pit level approaches the spillway elevation. The water quality will be compared to the MDMER discharge limits and will be treated as required to meet these limits and any additional regulatory closure criteria or site-specific guidelines. The MDMER discharge limits will decrease from the existing limits to those presented in Table 5.1 effective June 1, 2021. The discharge from the Touquoy mine site is anticipated to occur after this period, and therefore the lower MDMER limits for an existing mine will apply.

Table 5.1 Schedule 4 Limits of the Metal and Diamond Mining Effluent Regulations

Deleterious Substance	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
Arsenic	0.30 mg/L	0.45 mg/L	0.6 mg/L
Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
Cyanide	0.5 mg/L	0.75 mg/L	1.00 mg/L
Lead	0.10 mg/L	0.15 mg/L	0.20 mg/L
Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
Total Suspended Solids	15.00 mg/L	22.50 mg/L	30.00 mg/L
Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L
Un-Ionized Ammonia	0.50 mg/L (as nitrogen)	Not applicable	1.00 mg/L (as nitrogen)

5.2 MODEL RESULTS

Water quality modelling considered the pore water quality in the tailings and the pit floor/ walls, the dilution from surface runoff, direct precipitation in the exhausted Touquoy pit and the water quality of the mixture based on the geochemistry of the individual water quality parameters. As presented by Lorax (2018), geochemical source term predictions of pore water quality of pit walls/floor had elevated metal (e.g., arsenic, cobalt, copper), ammonia, nitrate and cyanide concentrations thus reducing pit lake water quality at the time of discharge. In May of Year 18 at the commencement of discharge from the Touquoy pit when the pit lake is simulated to reach the spillway elevation, the water quality model predicted elevated concentrations of arsenic and nitrite as summarized in Table 5.2 not considering planned water treatment. Results of the water quality model in the exhausted Touquoy pit over time for metals, ammonia, and cyanide parameters are presented in Appendix A, not considering planned water treatment. These figures show the water quality trend over time and the outflow to Moose River.

Table 5.2 Predicted Water Quality Concentrations to Moose River, Not Considering Water Treatment

Parameter	Effluent Discharge Concentration (mg/L) in Year 14	Groundwater Seepage Concentration (mg/L) in Year 50	Schedule 4 Limits MDMER Monthly Mean Concentration (mg/L)
(SO_4) Sulphate	122	1.3×10^{-3}	
(Al) Aluminum	0.05	6.6×10^{-8}	
(As) Arsenic	**0.359**	4.3×10^{-6}	0.30
(Ca) Calcium	45.1	1.2×10^{-4}	
(Cd) Cadmium	0.000007	2.8×10^{-11}	
(Co) Cobalt	0.026	3.7×10^{-8}	
(Cr) Chromium	0.00029	2.8×10^{-10}	
(Cu) Copper	0.0146	1.3×10^{-8}	0.30
(Fe) Iron	0.038	4.6×10^{-8}	
(Hg) Mercury	0.000021	7.1×10^{-12}	

Table 5.2 Predicted Water Quality Concentrations to Moose River, Not Considering Water Treatment

Parameter	Effluent Discharge Concentration (mg/L) in Year 14	Groundwater Seepage Concentration (mg/L) in Year 50	Schedule 4 Limits MDMER Monthly Mean Concentration (mg/L)
(Mg) Magnesium	5.5	2.1×10^{-5}	
(Mn) Manganese	0.101	5.2×10^{-7}	
(Mo) Molybdenum	0.005	8.5×10^{-8}	
(Ni) Nickel	0.011	9.7×10^{-9}	0.50
(Pb) Lead	0.00017	3.5×10^{-11}	0.10
(Se) Selenium	0.00043	2.7×10^{-10}	
(Ag) Silver	0.00002	1.6×10^{-11}	
(U) Uranium	0.004	4×10^{-9}	
(Zn) Zinc	0.0016	3.2×10^{-9}	0.5
(WAD CN) Weak Acid Dissociable Cyanide	0.049	1.5×10^{-8}	0.5
(Total CN) Total Cyanide	0.141	8.0×10^{-9}	
(NO_3) Nitrate (as N)	0.99	1.4×10^{-7}	
(NO_2) Nitrite (as N)	0.714	8.5×10^{-8}	
(NH_3) Ammonia	0.0037	1.8×10^{-7}	0.50 (Unionized)

Note: **Bold numbers** indicates an exceedance of MDMER discharge limit

Water quality that is predicted to exceed the MDMER discharge limits will be treated prior to discharge. The pit lake will be treated to meet MDMER discharge limits for an existing mine prior to discharge to Moose River, as presented on Table 5.2. As the pit lake is simulated to take approximately 18 years to fill from commencement of depositing tailings in the exhausted pit, the final water treatment design will be fully developed during operation and pit filling. Based on results of the assimilative capacity model (Stantec 2021b), once mixed with the background water quality in Moose River, the concentration 100 m downstream of SW-2 is predicted to be 0.021 mg/L for arsenic and 0.183 mg/L for aluminum. Similar to the base case scenario, although the simulated arsenic concentration is above the NSE Tier 1 and CCME guidelines of 0.005 mg/L, the background levels at SW-2 also exceed the guidelines at 0.018 mg/L. The aluminum concentration is predicted below the 75th percentile receiver quality in Moose River. The potential environmental effects in Moose River from this predicted water quality are presented in the study by Intrinsik (2021).

Water quality that is predicted to exceed the MDMER discharge limits will be treated prior to discharge. The pit lake will be treated to meet MDMER discharge limits for an existing mine prior to discharge to Moose River, as presented on Table 5.2. As the pit lake is simulated to take almost 14 years to fill from commencement of tailings deposition in the exhausted pit, the final water treatment design will be fully developed during operation and pit filling. Proposed water treatment strategies include:

- Initial treatment of the pit as a batch reactor with the objective of adjusting the pH to precipitate metals to improve water quality in the pit lake as the pit is filling. As an additional benefit of the slow filling of the pit over time, the residence time and exposure to sunlight will increase, thus enhancing the natural UV degradation of cyanide and improving water quality in the pit lake.

- Should water treatment still be necessary, effluent from the pit will be pumped for treatment to the existing effluent treatment plant and discharged to the downstream polishing pond facilities and Scraggy lake receiving environment. Once water quality meets discharge criteria (i.e., representing closure conditions), surplus water in the pit will spill to a channel and discharge to Moose River. Discharge water quality will continue to be monitored against discharge criteria to identify if the pit should continue to be pumped and treated at the Touquoy effluent treatment plant.
- Pump and treat water in the Touquoy pit opportunistically, as the pit is filling and capacity is available in the existing effluent treatment plant.

As presented in the assimilative capacity study of Moose River by Stantec (2021b), the effluent concentrations under normal discharge from the filled Touquoy pit, combined with the groundwater seepage contributions in Moose River under the same climate conditions are predicted. Moose River will primarily be driven by climatic conditions, with April flows representing a worst-case dilution ratio between the effluent discharge from the Touquoy pit and Moose River. Based on results of the assimilative capacity model (Stantec 2021b), once mixed with the background water quality in Moose River, the concentration 100 m downstream of SW-2 is predicted to be 0.021 mg/L for arsenic and 0.183 for aluminum. Although the simulated arsenic concentration is above the NSE Tier 1 and CCME guidelines of 0.005 mg/L, the background levels at SW-2 also exceed the guidelines at 0.018 mg/L. The aluminum concentration is predicted below the 75th percentile receiver quality in Moose River. The potential environmental effects in Moose River from this predicted water quality are presented in the study by Intrinsik (2021).

Concentrations of cobalt, copper and nitrite in groundwater seepage discharging as baseflow to Moose River are predicted to be higher than the CCME FAL or NSE EQS guidelines (Stantec 2021b). The groundwater seepage quality is simulated based on the source terms pore water quality of the tailings, with an estimated average concentration of 0.002 mg/L of arsenic to Moose River. However, based on the assimilative capacity model results, the mass loading from groundwater to Moose River is very small, and these parameters will meet CCME FAL/NSE EQS after mixing with Moose River within 100 m of the discharge point.

6.0 MODEL SENSITIVITY AND LIMITATIONS

Results of the water balance and quality model are based on information available at the time of the study, as sections above. It is recommended that the existing conditions and assumptions be updated as information becomes available, such as further developed reclamation plan, updates of the water balance/water management plan, updates to the mine plan, testing to predict settled tailings density, and the results of operational monitoring.

The 1:100 AEP wet and the 1:100 AEP dry climate statistics are used to provide an upper and lower bound of predicted climate normal conditions. Assuming the model assumptions reflect future conditions, water levels in the TMF and exhausted Touquoy pit during the 77 months of processing of FMS and Beaver Dam ore, should fall within these bounds. Stochastic combinations of wet and dry years were not modelled.

Model sensitivity to predicted Touquoy pit groundwater inflows were conducted by adjusting the groundwater contribution of 768 m^3/d associated to a pit water elevation of -25.0 m (CGVD2013) to the groundwater contribution filled with water to elevation 108.0 m (CGVD2013) of 373 m^3/d. This change would delay the timing of when the process water reclaim is relocated from the TMF to the exhausted Touquoy pit by 1 day.

The variation in the initial pond water volume between low and high operating levels in the TMF on the available water reclaim at time of commencement of tailings deposition in the exhausted Touquoy pit was modelled. Should the pond at the time of start-up be at a low operating level opposed to a high operating level, than the relocation of process water reclaim from the TMF to the exhausted Touquoy pit would be initiated 3 months after start-up, approximately 2 months earlier than if the pond is at a high operating level at start-up. Under this scenario, additional start-up water supplied by Scraggy lake would be required.

Sensitivity on the deposited tailings density in the exhausted Touquoy pit was simulated. The average deposited tailings density of 1.3 t/m^3 is expected, with a lower tailings density at start-up and a higher density as tailings are deposited in the exhausted Touquoy pit due to the consolidation of the tailings from the tailings and water mass. Should we consider the lower tailings density in the first year from 1.3 t/m^3 to 1.2 t/m^3, this will result in approximately 13,000 m^3/month of additional pore water lock-up, reducing the water available for reclaim during start-up.

7.0 SUMMARY & RECOMMENDATIONS

7.1 WATER MANAGEMENT

Water management at Touquoy for the FMS ore concentrate processing was developed considering the existing process water requirements, existing water management infrastructure, the water inventory at the mine site, the available freshwater sources, and effluent water quality. Consistent with existing water management at the site, the TMF will receive runoff from the waste rock piles, and seepage collection ditches. Initially, process water will be reclaimed from the TMF until pond volumes are inadequate to meet process water requirements and reclaim will be taken from the exhausted Touquoy pit. Tailings slurry will be discharged to the exhausted Touquoy pit upon commencement of processing of the FMS ore concentrate. Additional freshwater may be required from Scraggy lake for start-up under dry conditions. Surplus water in the TMF will be managed through the existing downstream discharge facilities and to the receiving environment at Scraggy Lake. Surplus water in the exhausted Touquoy pit will be managed through a spillway/channel to Moose River.

The water management plan should be updated to reflect the next stage of design. The Touquoy Closure plan should be updated to reflect the FMS tailings deposition and the resultant accelerated filling of the exhausted Touquoy pit and the changes to water quality. A water withdrawal approval from Scraggy Lake will be required from NSE for start-up process water supply.

7.2 TAILINGS DEPOSITION

It is assumed that tailings deposition will be performed using subaqueous deposition of a conventional tailings slurry through a barge. Deposition strategies will require routine modification based on the season. An approximate volume of deposited tailings of 0.411 Mm^3 is required for processing of FMS ore concentrate, including the pore water lockup. The capacity of the exhausted Touquoy pit can manage both the tailings and water volume, accommodating flood storage and freeboard.

The tailings management plan should be updated to reflect the next stage of design. A tailings deposition plan should be developed to support operation to define the monthly deposition areas.

7.3 WATER BALANCE MODEL

The water balance model provides an understanding of the water and tailings management for processing of the FMS ore concentrate.

The exhausted Touquoy pit in combination with the TMF is predicted to have sufficient process water for the FMS mine life. However, additional process water may be required from Scraggy Lake for start-up under dry climate conditions. The source of process water reclaim is triggered by the water elevation in the exhausted Touquoy pit, as a water management strategy. For example, initially process water will be reclaimed to the mill from the TMF through the existing reclaim barge and related water piping infrastructure until pond volumes are no longer adequate for process water reclaim. In approximately 5 months, process water will be reclaimed from the exhausted Touquoy pit as a closed loop between the pit and mill. Reclaiming process water initially from the TMF will reduce the required capacity of booster pumps in the exhausted Touquoy pit, as a greater capacity is required with depth. The existing reclaim water lines and decant pump could be retrofitted to accommodate the change to the source of the process water reclaim supply.

The water balance should be updated to reflect the next stage of design.

7.4 WATER QUALITY MODEL

Water quality modelling considered the pore water quality in the tailings and the pit floor and walls, dilution from surface runoff, direct precipitation in the pit, and the water quality of the mixture based on the geochemistry of the individual water quality parameters. Water quality is simulated to include elevated metals (e.g., arsenic, cobalt, copper), ammonia, nitrate and cyanide concentrations thus reducing pit lake water quality at the time of pit overflow discharge. The pit lake will be treated to meet applicable MDMER discharge limits for an existing mine prior to discharge to Moose River. As the pit lake was simulated to take approximately 14 years to fill from commencement of FMS ore concentrate, the water treatment design will be fully developed during operation and pit filling.

Water quality predictions and assimilative capacity in Moose River should be updated following an update of source terms as a result of the on-going FMS geochemistry assessment. Following this study, a water treatment plan should be further developed for implementation in operation and reclamation of FMS project.

8.0 REFERENCES

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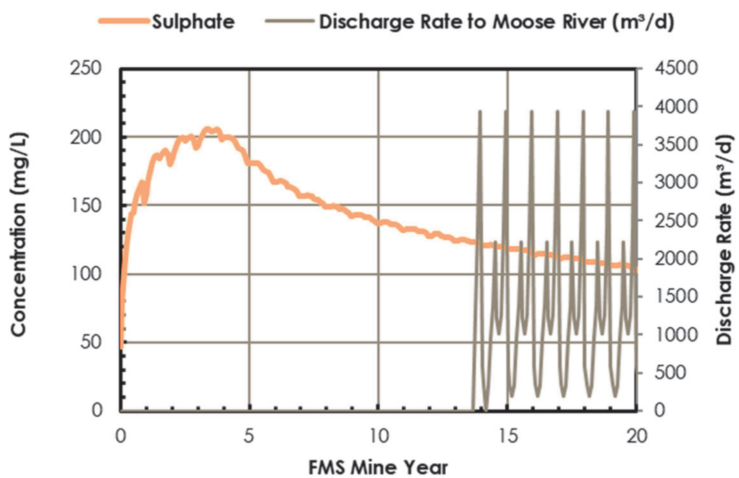
APPENDIX A

Water Quality Predictions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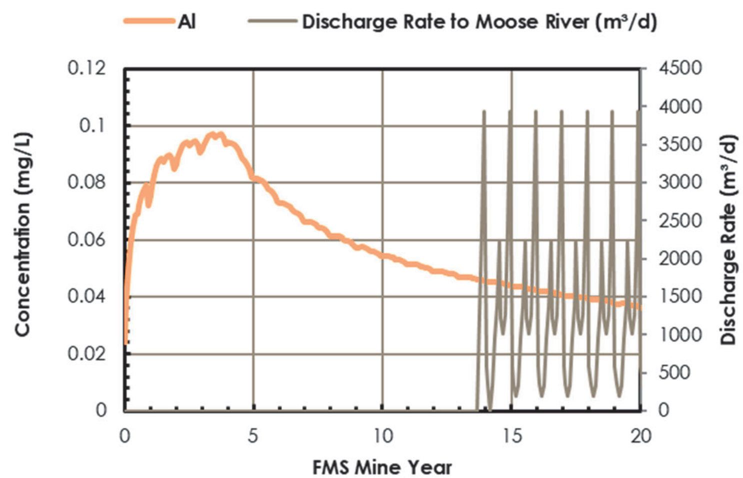
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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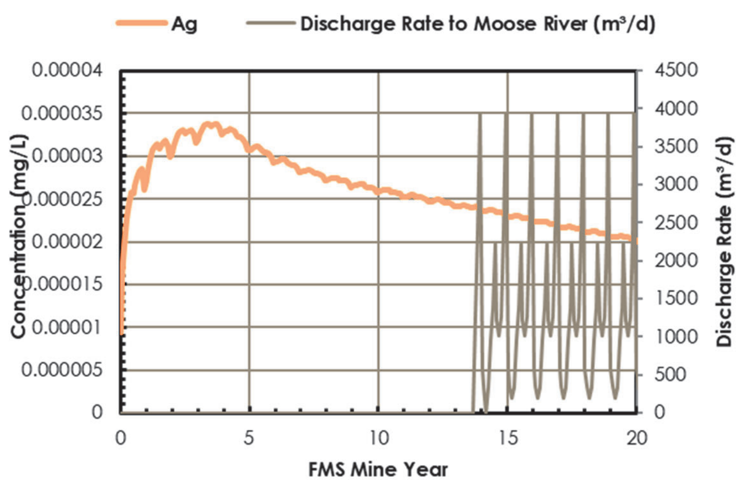
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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Concentration (mg/L)
Discharge Rate (m³/d)
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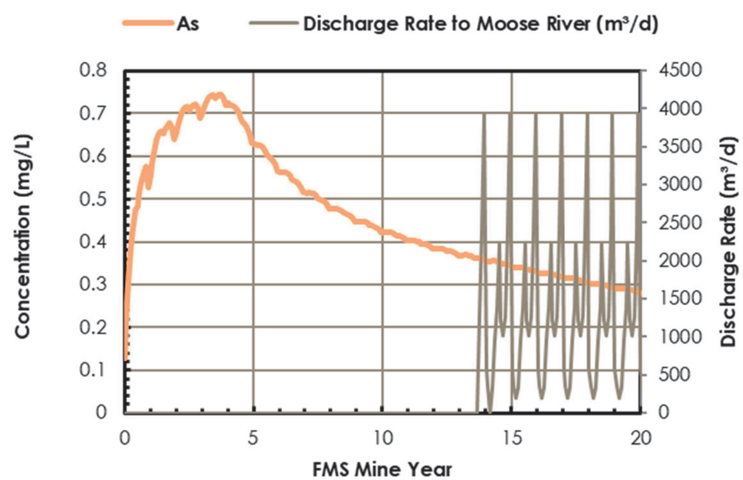
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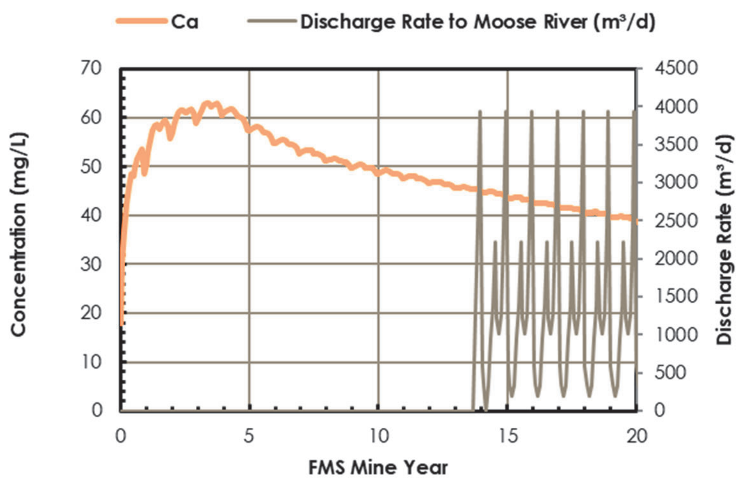
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



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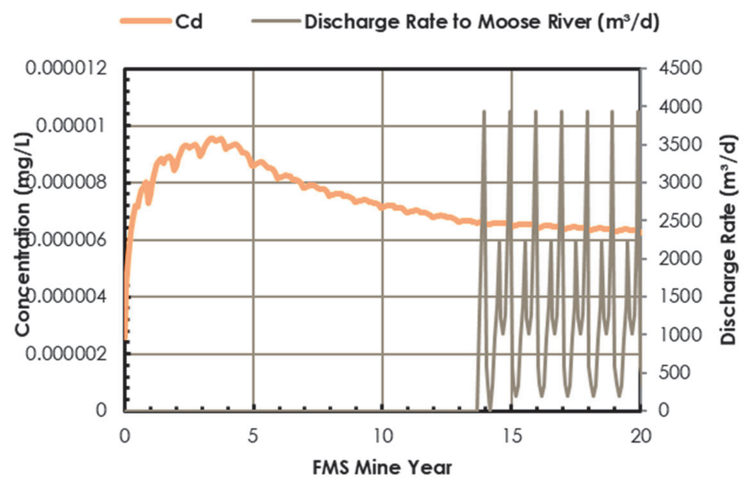
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



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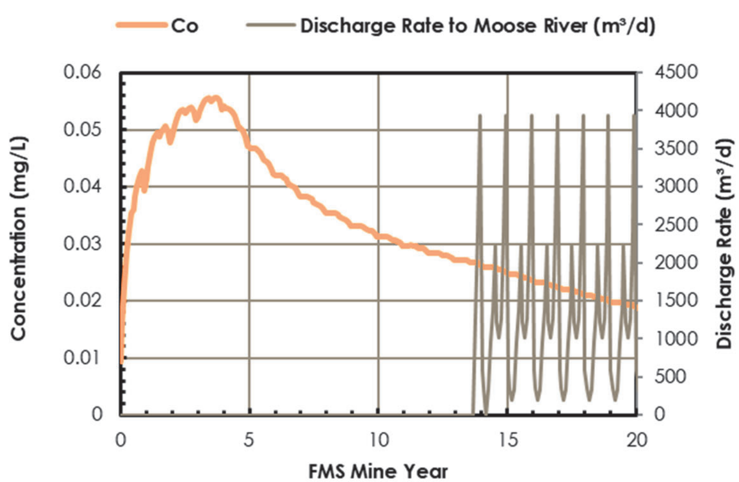
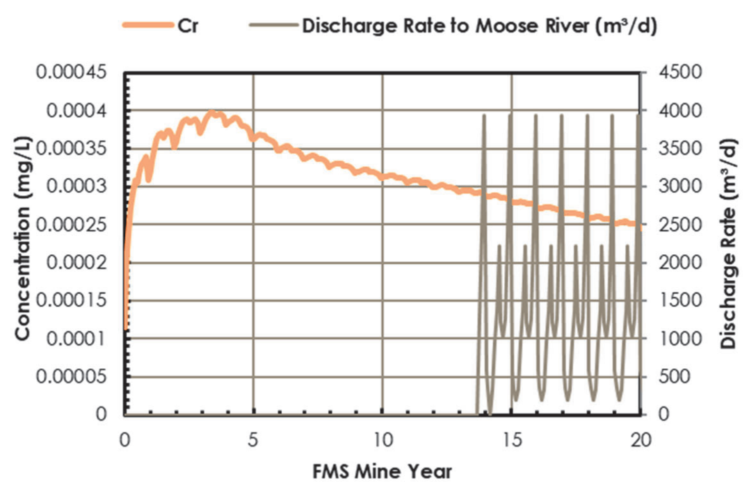
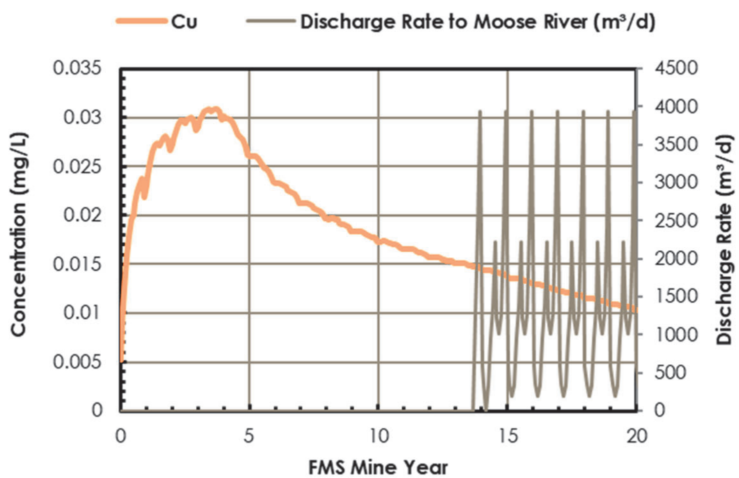
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



Co
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



Cr
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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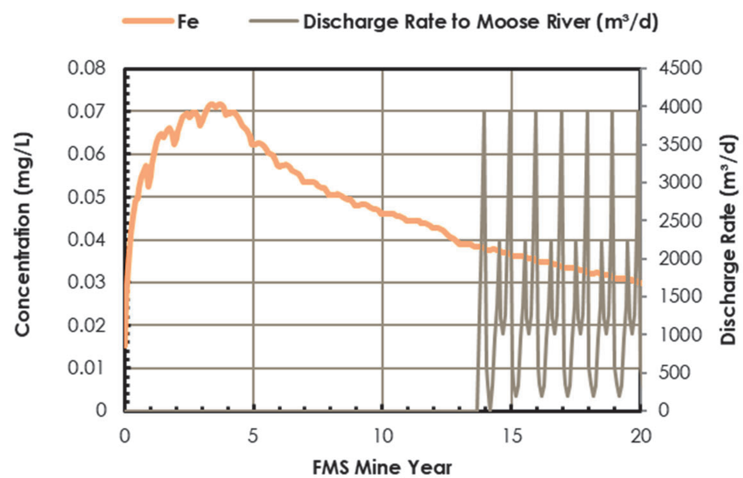
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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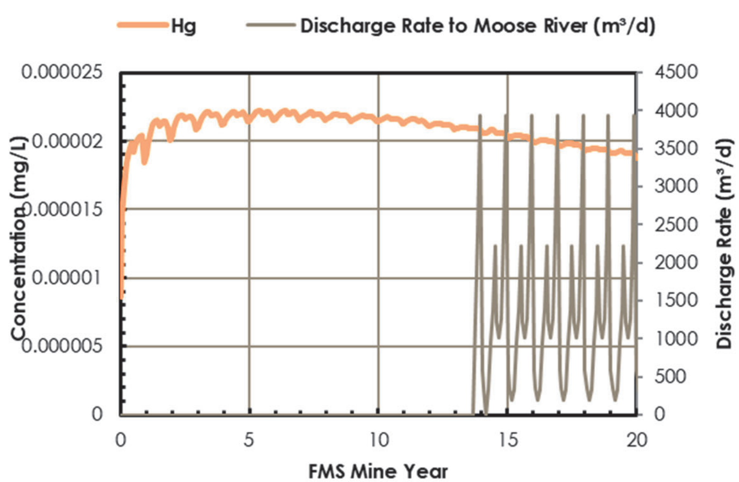
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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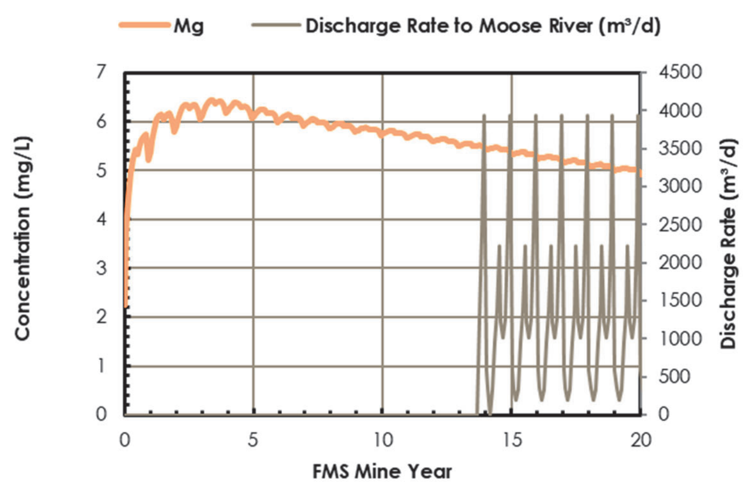
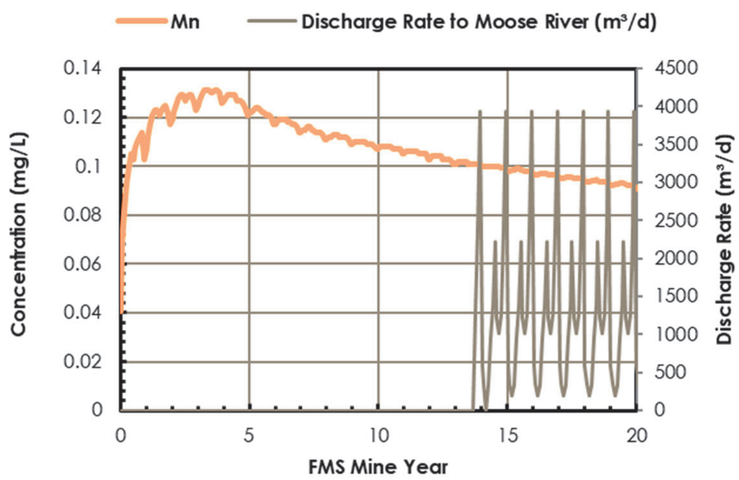
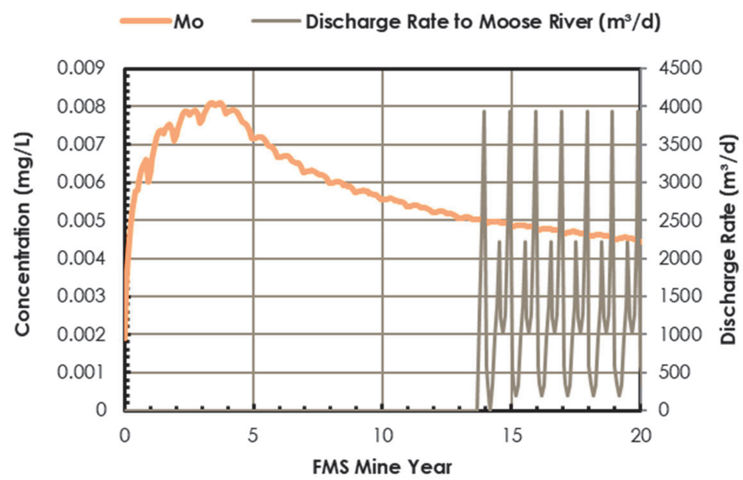
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year

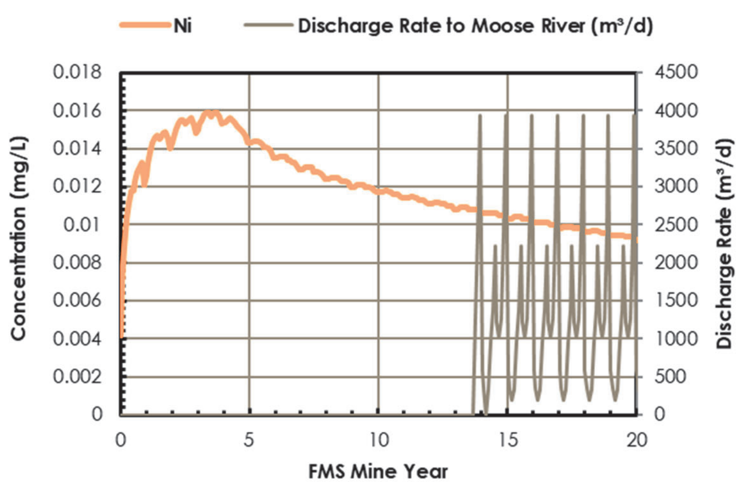

Mg
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



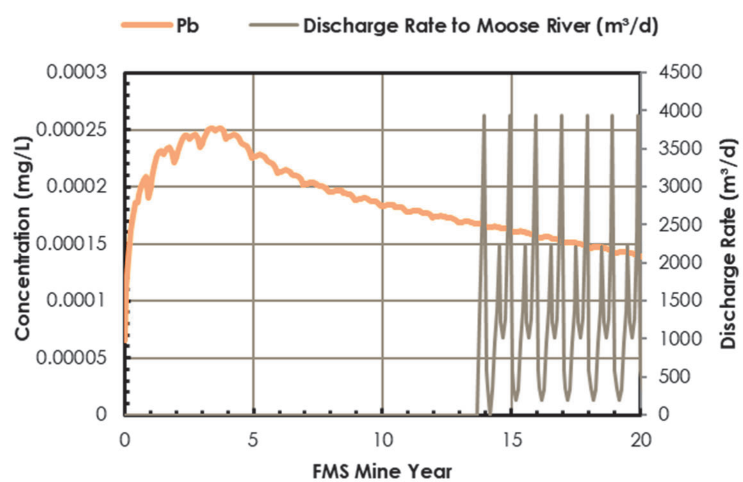
Mn
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



Mo
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



Ni
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



Pb
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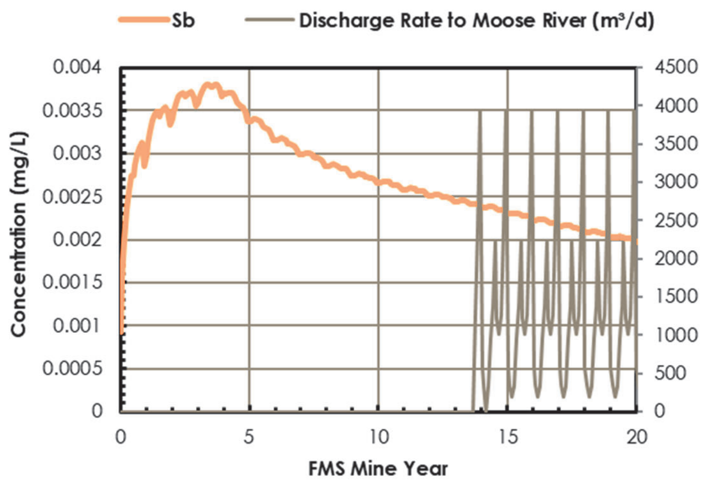
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year


Sb
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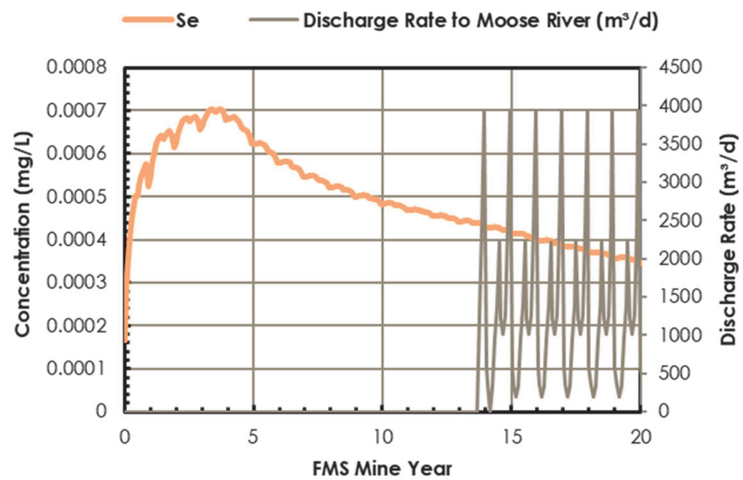
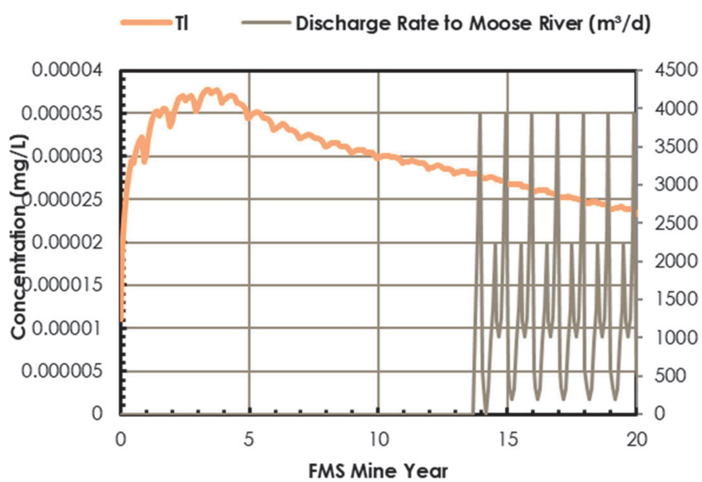
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year


Se
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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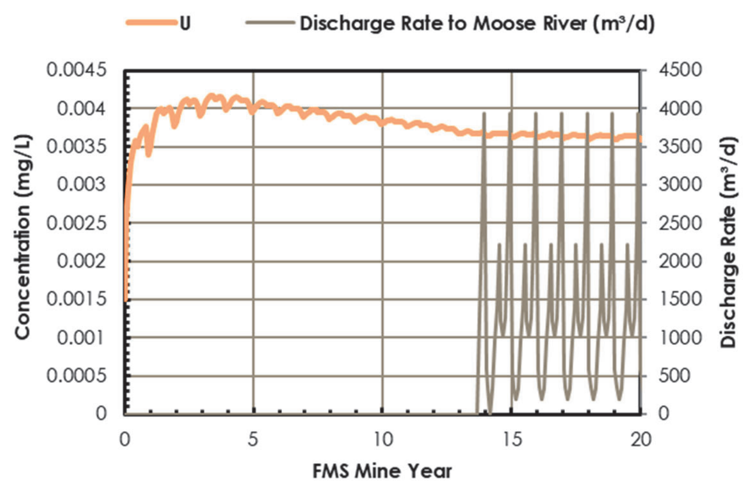
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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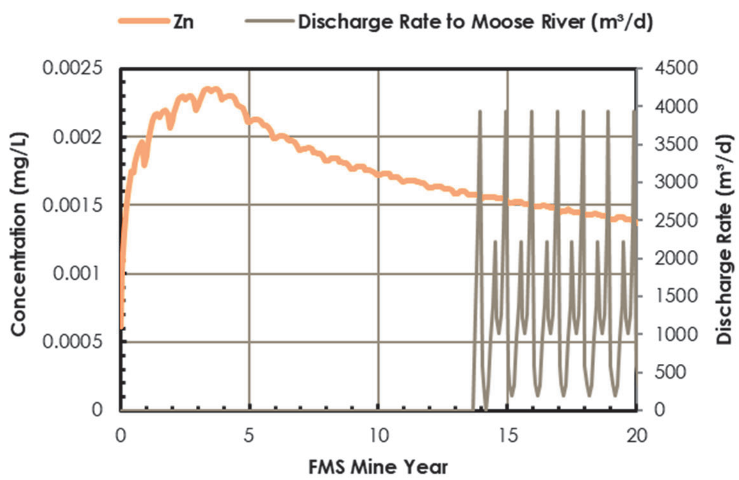
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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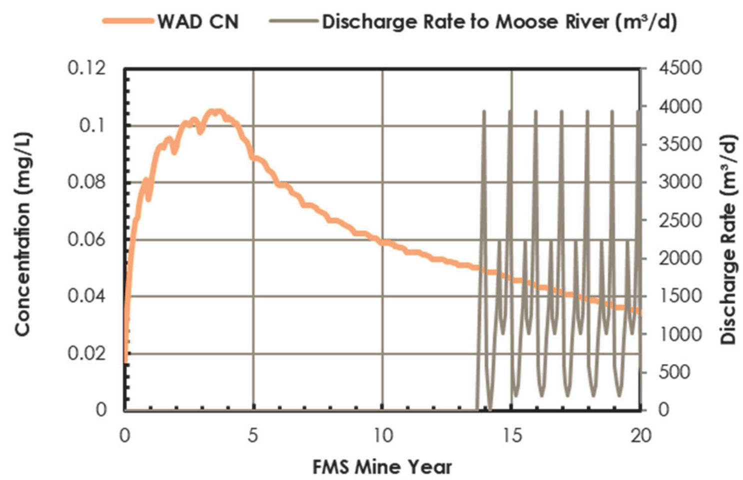
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year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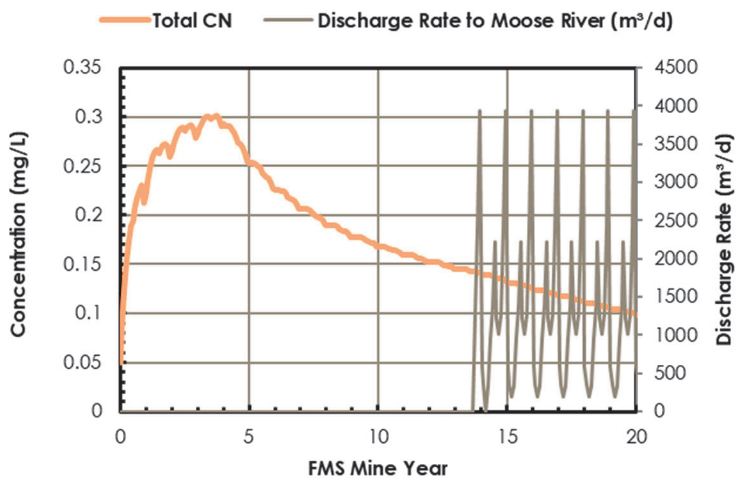
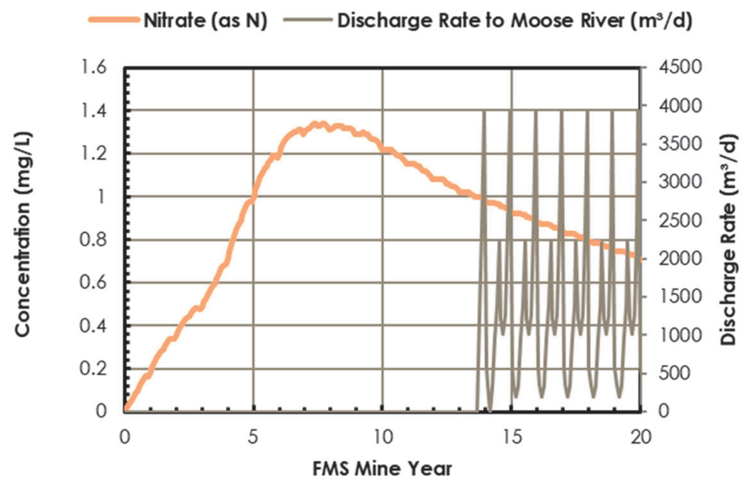
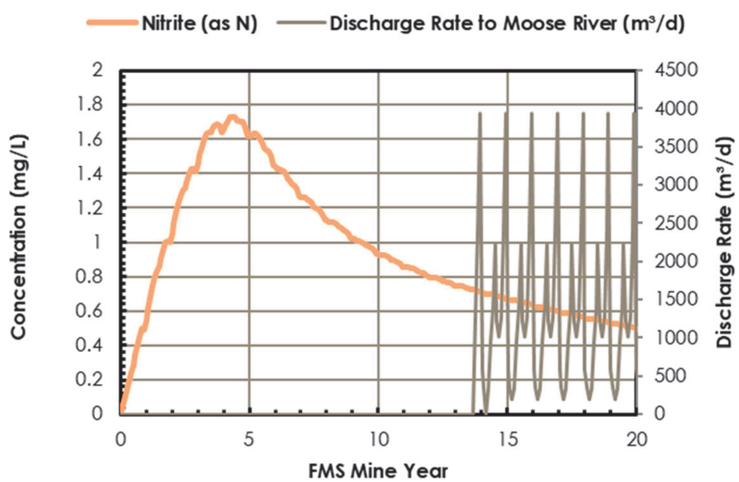
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



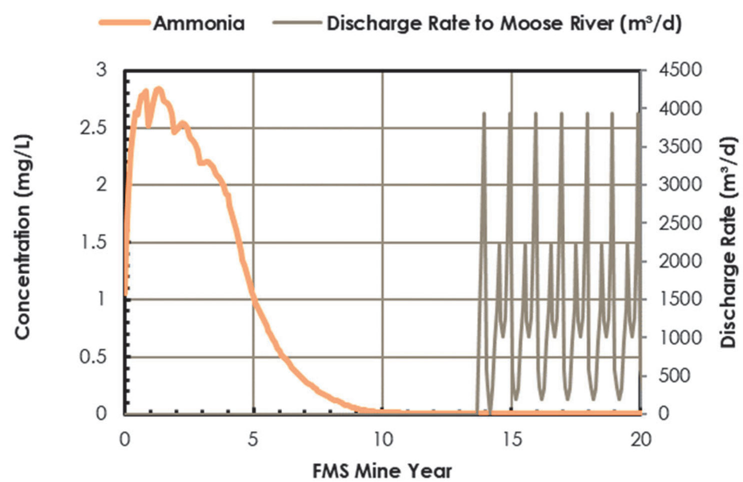
Total CN
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



Nitrate (as N)
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



Nitrite (as N)
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year



Ammonia
Discharge Rate to Moose River (m³/d)
Concentration (mg/L)
Discharge Rate (m³/d)
FMS Mine Year

Atlantic Mining NS Inc
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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 12

Wildlife Monitoring and Management Plan

Highway 374

Trafalgar, Nova Scotia

Version 001
February 8th, 2021

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1.0 INTRODUCTION

1.1 Overview

The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, (the Company) in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for a comprehensive Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during each phase of the Project minimize the effects of the mine and promote the protection of the environment and human health.

The Wildlife Monitoring and Management Plan (the Plan) is one component of the EMS for the Project and outlines the Company's strategies to responsibly manage and reduce interactions between the Project and wildlife, as well as protocols on monitoring Mainland Moose within and surrounding the Project Area.

Project activities can impact wild species in a number of ways:

- Development of infrastructure can cause direct impacts to habitat used by fauna, including upland forested habitat and wetlands.
- Sensory disturbance to fauna can result from rock blasting, clearing, grubbing, infrastructure construction, and overall increased traffic during the construction, operation and closure phases. This may result in localized avoidance of the Project by some wildlife species.
- Increased human activity could result in increased usage of the Project by opportunistic species such as Eastern Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), Striped Skunk (*Mephitis mephitis*) or American Black Bear (*Ursus americanus*). These opportunistic species generally have a higher risk of becoming habituated to human activity, which can lead to nuisance or aggressive behaviors, increasing risk to both wildlife and site personnel. As such, several of the protocols outlined herein are related to reducing the risk of wildlife habituation.
- Changes to ambient noise levels, possibly light levels and the presence of periodic vibrations from blasting have the potential to adversely affect fauna and birds by influencing migration and behavioral patterns. Noise and vibration are provincially regulated via the Workplace Health and Safety Regulations and the Pit and Quarry Guidelines, which protect the health of site workers and the public at Project boundaries, respectively.
- Direct mortality of fauna species could result from project activities, particularly due to the increase in traffic during construction and operation of the facility.

The primary goals of the Plan are to provide strategies to and reduce human-wildlife interactions, and to ensure safety of both wildlife and site personnel. The Plan has also been prepared to guide the construction, operation and decommissioning on the Project, while minimizing and monitoring the impacts on the Endangered Mainland Moose.

1.2 Scope and Objectives

The Plan documents the Company's approach to the management of Wildlife and Mainland Moose in and around the Fifteen Mile Stream (FMS) Mine Site in order to minimize interactions between wildlife and the Project activities. The Plan sets out practices and procedures to achieving the following objectives during all phases of the Project:

- To reduce human-wildlife interactions, to ensure safety of both wildlife and site personnel; and,
- To outline protocols and to monitor usage of the Project and surrounding landscape by Mainland Moose, minimization of Moose-Human interaction and support research, education and stewardship related to Mainland Moose Recovery.

1.3 Regulatory Context

The construction, operation and closure of the Project will be governed by a number of federal and provincial acts and regulations. These include:

- The Migratory Birds Convention Act, S.C. 1994, c.22.
- Wildlife Act; RSNS 1989, c. 504.;
- Species at Risk Act, S.C. 2002, c. 29; and,
- Nova Scotia Endangered Species Act, 2010, c.2, s. 99.

2.0 ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURES

The Company is committed to reducing human-wildlife interactions at the FMS Mine Site. The following strategies will help identify and track where wildlife is using the Project area and provide site management and personnel with strategies to help reduce interactions. Although the Company is not responsible for managing wildlife populations, the Company acknowledges their responsibility to conduct appropriate operations with consideration of wildlife and wildlife habitat, and to adhere to all applicable regulations. As such, the Company will work with the site personnel through the following actions and practices per each species group:

2.1 General Wildlife

- A wildlife sighting program has been developed and will be communicated with all site personnel during site orientation and/or toolbox talks. A wildlife sighting card has been developed to help facilitate communication of wildlife observations, particularly Species at Risk listed under provincial and federal legislation. Any sightings of Species at Risk will be reported immediately to the Company and added to the table found in Appendix B. The Wildlife Sighting Cards are attached (Appendix C) and will be made available to all site personnel.
- A pre-blast wildlife survey will be conducted 100 m surrounding the blast site to confirm the presence/absence of wildlife species. If wildlife is found within the blast area, blasting must be delayed until the wildlife naturally leave the blast area.
- Habitat connectivity will be maintained, and fragmentation reduced by limiting clearing and disturbance to the approved Project Area.
- Appropriate Erosion Prevention and Sediment Control measures will be implemented to protect aquatic habitat and aquatic species in the surrounding water features. Erosion Prevention and Sediment Controls will be properly installed, regularly inspected, and maintained as per the Erosion Prevention and Sediment Control Management Plan (EMP 2).
    - Surface water monitoring will be conducted to ensure the efficacy of Erosion Prevention and Sediment Controls as per the Surface Water Monitoring Program found in the Surface Water and Groundwater Management and Contingency Plans (EMP 9).

- Weather conditions including high humidity or cloud cover, can cause the levels of pressure and noise to appear more severe than on a day when the humidity is low and there is lack of cloud cover. When possible, the Company and its sub-contractors will avoid blasting when weather conditions include significant temperature inversions, strong winds, foggy, hazy or smoky conditions with little or no wind, or still, cloudy days with a low cloud ceiling.
- Vehicles will adhere to safe speed limits, particularly around blind corners.
- Vehicles will yield to wildlife on roads.
- Vehicle collisions with wildlife will be immediately reported to the Company.
- Access for wildlife to the work areas will be limited by installation of a pit perimeter berm and/or fence wherever practicable and necessary.
- Public access into the FMS Mine Site will be controlled by a gate monitored with a security camera at the entrance to the site.
- In the event of encounters with injured wildlife at the worksite, the local Provincial Conservation Officer will be contacted. No attempt will be made to move the animal, and no person at the worksite will come into direct contact with the animal.
- Dead animals will be reported, as soon as possible, to the Environment Manager. The location, date, time, state of decomposition, injury sustained (if identifiable), and species of the animal was found will recorded.
- Wildlife harassment within the Project Area will not be tolerated. Wildlife will not be chased, caught, diverted, followed or otherwise harassed by any site personnel. Any wildlife harassment shall be reported to the Environment Manager.
- Garbage disposal will occur at designated disposal locations throughout the project for removal. Garbage bin lids shall be closed at all times other than during loading or unloading. No garbage is to be kept in trucks or opened garbage bins to reduce accessibility to wildlife (including birds). Bear-proof bins may be used where deemed appropriate or necessary based on bear activity.
- Feeding of any wildlife by site personnel will not be permitted. Any wildlife feeding will be reported to the Environment Manager so disciplinary actions can be taken.
- All site personnel will be prohibited from engaging in fishing or hunting within the Project Area. Firearm possession by site personnel is prohibited within the Project area.
- An awareness campaign about wildlife poaching will be implemented. Report a Poacher signs will be posted and reviewed during site orientation. Any evidence of poaching will be reported immediately to the Company, who will ensure immediate reporting to NSL&F and the local RCMP. A sample ‘Report a Poacher’ sign is provided in Appendix A.
- Site personnel will be permitted to carry air horns and whistles to be used as wildlife deterrents. Where necessary based on remote work or based on the level of bear activity, bear bangers or bear spray may be permitted for use on site at the discretion of the Company’s Safety Manager. The risks and benefits of carrying wildlife deterrents, and their proper use, must be reviewed with Site Safety Personnel. All wildlife deterrent equipment shall be visually checked for defects. Equipment must be kept in an immediately available location, ready for use. Wildlife awareness and the use of wildlife deterrents must be considered during pre-job safety assessments or tail-gate meetings.

The Company will consult with NSL&F to determine appropriate actions for managing nuisance or aggressive wildlife on a case-by-case basis. The conditions outlined herein are focused on preventative measures, to reduce the likelihood of wildlife becoming nuisance or aggressive.

2.2 Birds

- All site workers shall comply with regulations outlined in the Migratory Bird Convention Act, which prohibits the disturbance of migratory birds, their nests and eggs. If any nest is identified, the Company must be notified immediately, so steps can be taken to identify the species and determine appropriate mitigation or avoidance if required. Several species of birds known to nest around active construction sites have been included in the Wildlife Sighting Card for this reason.
- Site personnel will be made aware of the identifying features of Bank Swallows (*Riparia riparia*), Barn Swallows (*Hirundo rustica*), and Belted Kingfishers (*Megaceryle alcyon*), with focus on understanding nesting behavior. Personnel will be made aware of the protections to these species and their nests under the Migratory Bird Convention Act through distribution of educational material in the scale house, and coverage of this material during site orientation (Refer to Appendix C for identification, behavior, and habitat information of these species).
- Bank Swallow, Barn Swallow, and Belted Kingfisher prefer cliff faces for nesting, therefore, gradual slopes will be maintained, where possible, to reduce the potential for these species to nest within the quarry. If nesting activity occurs, blasting will be postponed until The Company consults with NSL&F to determine appropriate mitigative measures on a case-by-case basis.
- Clearing and grubbing activities should be completed outside the accepted breeding bird window (to be determined) unless otherwise approved by ECCC.

2.3 Turtles

- Both Wood Turtles and Snapping Turtles are drawn to gravelly roadsides during nesting season to lay their eggs. During this time, if turtles are observed on roadsides, site personnel may carefully move them off the roadside in the direction they were facing, or towards the nearest watercourse, if it is safe to do so. If nesting has commenced, personnel must leave the turtle in place, and mark its location with flagging tape or pylons to reduce potential for vehicular collisions while egg-laying is occurring.
- Any turtle sighting must be immediately reported to the Company, for reporting to NSL&F and ECCC-CWS.
- If possible, personnel are encouraged to take a photo of the turtle if observed. Wood Turtles should be photographed to show the top (carapace) and bottom (plastron) if it is safe and possible to do so.

2.4 Bats

- There are no known bat hibernacula within 5 km of the Project according to the Atlantic Canadian Conservation Data Centre (ACCDC). Therefore, bats are not expected to be present within the Project Area. In the event that bats are found within the Project Area, they should be reported immediately to the Company as per the wildlife sighting program.

2.5 Mainland Moose

The Mainland Moose management and monitoring protocols have been designed to monitor the usage of the Project and surrounding landscape by Mainland Moose and to minimize the Moose-Human interaction and support research, education and stewardship related to Mainland Moose Recovery.

The NSL&F acknowledges the demand for proper management of Mainland Moose to maintain and/or enhance their population status. The NSL&F has proposed actions to be initiated including:

- Develop and implement a strategy to reduce poaching;
- Decrease the occurrence of Mainland Moose mortality;
- Determine the feasibility of translocating adult moose and/or orphans from New Brunswick; and,
- Review and adapt forest management practices in known moose habitat.

Although the Company is not responsible for managing Mainland Moose populations, the Company acknowledges their responsibility to conduct appropriate operations with consideration of moose and moose habitat. As such, the Company will work with site personnel to assist in reducing Mainland Moose mortality by:

1. Working to reduce poaching within the Project Area through an awareness campaign. Report a poacher signs will be posted in site offices and lunchrooms and reviewed during site orientation. Any evidence of Moose poaching will be reported immediately to the site supervisor, who will ensure immediate reporting to NSL&F and the local RCMP. A sample 'Report a poacher' sign is provided in Appendix A.
2. Reducing motor vehicle collision by limiting all mine vehicles to a 30km/hr speed limit within the FMS Mine Site.
3. Limiting access for moose to the pit areas using berms and fencing.
4. Limiting disturbance to the approved areas and maintain vegetative buffers wherever possible.
5. Limiting use of ATV's on site for all purposes except those required for mining related activities.
6. Controlling public access in the active mine and processing area.
7. Consult with NSL&F Wildlife Division during the development of the Reclamation Plan.
8. Enacting a no wildlife harassment policy.

2.5.1 Research

The NSL&F recognizes the need for research on Mainland Moose in Nova Scotia. NSL&F has proposed actions to be initiated including:

- Improving the understanding of the impact and interrelationship(s) of threats and limiting factors,
- Improving the understanding of habitat suitability, availability and selection, and improving efforts to provide insight into the structure and genetic profile of Mainland Moose; and,
- Investigating the cause of death/illness of all moose found dead and apparent sick moose.

Cumulative long-term habitat loss through development requires research to understand tolerance levels and carrying capacity for moose at the landscape level. The Company will work with NSL&F to provide information and assist in reducing knowledge gaps by:

1. Documenting moose sightings around the development area and providing reports to NSL&F to help establish trends in population dynamics provide critical information for the direction of the recovery plan. This includes provision of moose sighting data collected during specific Mainland Moose surveys and incidental observations of moose, or signs thereof, by any site personnel. A wildlife sighting card has been developed to help facilitate communication of wildlife observations, particularly Mainland Moose. The Wildlife Sighting Cards are attached (Appendix C) and will be made available to all site personnel.

2. Where Mainland Moose sightings occur (including tracks, pellets or browse), the Company will complete a microhabitat assessment, using the guidance provided in Appendix F. The habitat assessment will include a description of forest stand structure and vegetation community, based on guidance provided by the Forest Ecosystem Classification system.
3. Documenting accurate knowledge on the health, incidence of disease and mortality rates of moose and immediately providing all information to NSL&F for research purposes. Specifically, the Company will immediately report any observations of dead, injured or sick Moose to NSL&F. Parelophostronglyls tenuis is a neurotropic nematode that is parasitic and carried by White-tailed Deer. Since P. tenuis has been identified as a limiting factor in the maintenance of healthy Moose communities, observations of White-tailed Deer will be recorded during Mainland Moose Surveys.
4. Committing to maintaining habitat connectivity and reducing fragmentation for moose in the landscape by limiting clearing and disturbance to approved areas.
5. Partnering with Mi'kmaq and local community groups to build capacity by involving community members in the Mainland Moose monitoring programs, wherever possible.

2.5.2 Monitoring

In order to understand the population ecology of Nova Scotia Mainland Moose, the NSL&F has recognized the need for a more rigorous monitoring program. To properly manage Mainland Moose populations, the NSL&F has proposed actions including:

- Initiating a rigorous long-term monitoring program to provide reliable data on the distribution and demographics of moose on the mainland Nova Scotia; and,
- Establish means of monitoring the impact of severity of each factor (threat) known to inhibit growth of localized moose herds/groups.

At present, Pellet Group Inventory surveys and aerial surveys are the manner in which the distribution and population demographics of moose are evaluated; however, NSL&F recognizes the limitations of this existing strategy, given they are performed during the winter and provide little information on summer distributions and habitat use.
The Company will work with the NSL&F to provide information and assist in reducing existing knowledge gaps in monitoring by:

1. Implementing a Mainland Moose Monitoring Program to describe frequency of occurrence of moose around the Project.

   The transects are to be established through the diversity of habitat types present within the Project and surrounding landscape, including undisturbed habitat, trails, and site roads. Furthermore, transects have been placed in areas of higher elevation wherever possible, to identify any potential altitudinal separation between Mainland Moose habitat and White-tailed Deer habitat.

   Track surveys will be completed on foot by an observer trained in recognition of moose and deer tracks, scat and browse. Track surveys will be conducted twice annually, preferably prior to Feb 1st, in suitable weather conditions. Snow tracking results are best 3-7 days following a > 10 cm snow fall. Surveys should not be conducted during periods of rain, snowfall, or blowing snow. The winter track survey will be followed by one Pellet Group Inventory (PGI) survey, to be completed in the spring. The same transects established for the winter track survey will be used for the PGI survey. These monitoring surveys will be completed annually throughout the life of the Project.

   The transects will be provided to the surveyor on a handheld GPS device. UTM coordinates will be recorded using GPS wherever moose and deer track-ways cross survey trails or transects, occur within or adjacent to survey trails or transects, or localized activity occurs. Any unusual wildlife signs will be recorded on the GPS unit, and photographed. Any live moose encountered will not be disturbed.

Survey results will be presented to NSL&F in digital and hard copy report form annually by the years' end and will contain a map showing transects and observation points.

2. Providing site personnel with information pertaining to the identification of moose and their activities (e.g., age and sex identification, evidence of breeding behaviors) for the purpose of monitoring population demographics and informing wildlife sighting reports. The information card that will be made available to all site personnel is provided in Appendix C.
3. Collecting samples of any pellet piles which are encountered, for submission to NSL&F for genetic analysis, where feasible.
4. Observations of Mainland Moose by site personnel, as recorded using the Wildlife Sighting Report Form will be followed up with a microhabitat assessment, wherever possible.

2.5.3 Education and Stewardship

Providing education and awareness to the public and site personnel is paramount to the recovery plan for maintaining and enhancing Mainland Moose populations. The NSL&F has identified the demand for public education of Mainland Moose and the proposed actions to be initiated including raising public awareness of the Mainland Moose such as the threats to individuals and populations, and the active recovery efforts (NSDNR 2007). Furthermore, the NSL&F recognizes the need for stewardship to effectively manage mainland moose in Nova Scotia.

The NSL&F has proposed actions to the initiated including:

- Promote public reporting of poaching and moose observations;
- Engage partners in recovery efforts; and,
- Engage landowners in stewardship of mainland moose and their habitat.

In addition to the commitments by NSL&F on the recovery of the mainland moose, ongoing support by a wide variety of dedicated partners including foresters, First Nations, hunters, industry, landowners, universities and conservation organization is needed (NSDNR, 2007).

The Company acknowledges their responsibility to educate employees and the public in the local area of the mine on moose and their habitat associations. The Company will provide information and assist NSL&F in reducing existing knowledge gaps in education by:

1. Providing education and awareness to site staff and sub-contractors pertaining to the application of the moose management recovery plan. This will be completed during site safety orientation. A card providing details on identification of moose, their habitats and their behaviors will be made available to site personnel (attached).
2. Partnering with local environmental groups, Mi'Kmaq groups, and the Community Liaison Committee to communicate the goals of the recovery plan, and measures taken to manage and monitor impacts to the Mainland Moose through the monitoring plan. This partnership may involve training local community members to participate in Moose Monitoring events, wherever possible.

3.0 REFERENCES

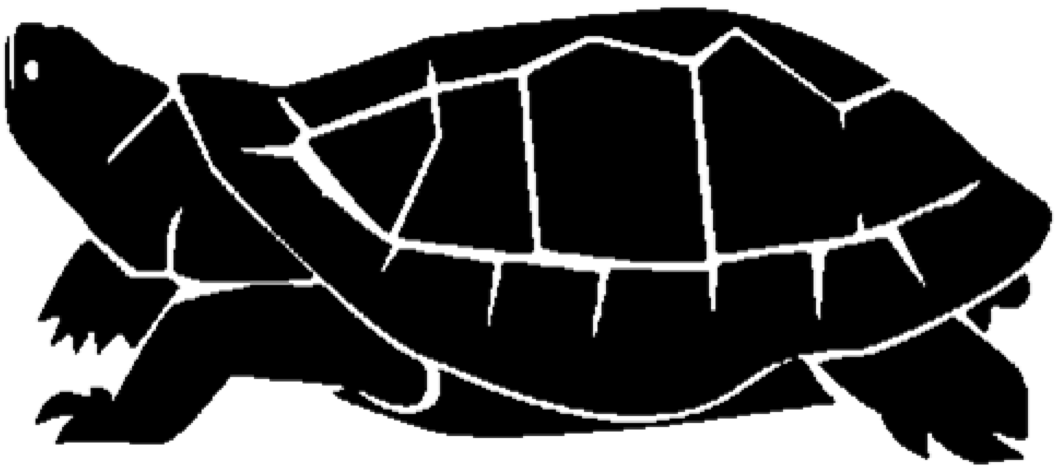
Nova Scotia Department of Natural Resources. 2007. Recovery Plan for Moose (*Alces alces Americana*) in Mainland Nova Scotia. Accessed Online, January 2017: https://www.novascotia.ca/natr/wildlife/large-mammals/pdf/MainlandMooseRecoveryPlan.pdf

Appendix A

REPORT A POACHER

Report Suspected Poaching Activity to Environmental Technician Immediately,

Or call 1-800-565-2224. For more information, visit: www.novascotia.ca/natr/enforcement/reportapoacher.asp



TURTLE CROSSING – MAY through OCTOBER

REDUCE SPEED

Report Turtle Sightings to Environmental Technician

Appendix B

Wildlife Observation Report

*To be completed and submitted to Environmental Technician within 2 days of sighting
Observation Date: DD/MONTH/YEAR **Report Date**: DD/MONTH/YEAR **Name**:______________________

Species: ☐ Mainland Moose ☐ White-tailed Deer ☐ Black Bear ☐Coyote
☐ Snapping Turtle ☐ Wood Turtle ☐ Other: ____________________________
☐ Raptor - Species :__________________ ☐ Owl - Species :_______________________
☐ Swallow - Species :_________________ ☐ Other Bird - Species :_________________
Observation type: ☐ Individual ☐ Tracks ☐ Scat ☐ Nest or Den
Location (be as specific as possible, waypoint if possible) _____________________________

____

Individual observation details:
Sex: ☐Male ☐ Female ☐ Unknown **Maturity**: ☐ Adult ☐ Juvenile ☐ Unknown
Behaviour: ____
☐ Individual injured? Describe ___________________ ☐ Individual deceased?

Report the following to Site Supervisor ASAP: Moose (or signs thereof), Snapping or Wood Turtles (or signs thereof), any bird nesting activity (i.e. agitated behavior, bird carrying nesting material, nest with young, bird carrying food), any deceased or injured wildlife, or any nuisance or aggressive behavior from any species (particularly Black Bear or Coyote).

Wildlife Observation Report

*To be completed and submitted to Environmental Technician within 2 days of sighting
Observation Date: DD/MONTH/YEAR **Report Date**: DD/MONTH/YEAR **Name**:______________________

Species: ☐ Mainland Moose ☐ White-tailed Deer ☐ Black Bear ☐Coyote
☐ Snapping Turtle ☐ Wood Turtle ☐ Other: ____________________________
☐ Raptor - Species :__________________ ☐ Owl - Species :_______________________
☐ Swallow - Species :_________________ ☐ Other Bird - Species :_________________
Observation type: ☐ Individual ☐ Tracks ☐ Scat ☐ Nest or Den
Location (be as specific as possible, waypoint if possible) _____________________________

____

Individual observation details:
Sex: ☐Male ☐ Female ☐ Unknown **Maturity**: ☐ Adult ☐ Juvenile ☐ Unknown
Behaviour: ____
☐ Individual injured? Describe ___________________ ☐ Individual deceased?

Report the following to Site Supervisor ASAP: Moose (or signs thereof), Snapping or Wood Turtles (or signs thereof), any bird nesting activity (i.e. agitated behavior, bird carrying nesting material, nest with young, bird carrying food), any deceased or injured wildlife, or any nuisance or aggressive behavior from any species (particularly Black Bear or Coyote).

Moose Sign Microhabitat Assessment

Fill out all information available
Site :_FMS Gold Project_______________ Date:________________________
Observer Name & Employer:____________________________

Observation Type:
☐ Winter Track Survey ☐ Pellet Group Inventory ☐ Incidental Observation

Weather (current)_________________________
Tracking Conditions: _______________________

Moose Sign Type: ☐ Tracks ☐ Pellets/Scat ☐ Browse ☐ Individual

Description of Habitat:
☐ Upland ☐ Wetland (Wetland type? ______________________)
Forest Type: ☐ Deciduous/Hardwood ☐ Coniferous/Softwood
☐ Mixed Stand ☐Other: __________________________
Stand Age:
☐Regenerating ☐ Immature ☐ Mature ☐ Over-mature

Dominant species (If known): ____

Forest Ecosystem Classification Vegetation Type & Ecosite (If known): _______________

Distance to Nearest Watercourse:_______ Distance to nearest Road:_____________

Other habitat notes:____
____

☐ Wildlife Sighting Card Attached ☐ Photos taken and attached

Appendix C

Bird Nesting Evidence:

PROBABLE

P	Pair observed in suitable nesting habitat in nesting season
T	Permanent territory presumed through registration of territorial song, or the occurrence of an adult bird, at the same place, in breeding habitat, on at least two days a week or more apart, during its breeding season. Use discretion when using this code. "T" is not to be used for colonial birds, or species that might forage or loaf a long distance from their nesting site e.g. Kingfisher, Turkey Vulture, and male waterfowl
D	Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation
V	Visiting probable nest site
A	Agitated behaviour or anxiety calls of an adult
B	Brood Patch on adult female or cloacal protuberance on adult male
N	Nest-building or excavation of nest hole by wrens and woodpeckers

CONFIRMED

NB	Nest building or carrying nest materials, for all species except wrens and woodpeckers
DD	Distraction display or injury feigning
NU	Used nest or eggshells found (occupied or laid within the period of the survey)
FY	Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight
AE	Adult leaving or entering nest sites in circumstances indicating occupied nest
FS	Adult carrying fecal sac
CF	Adult carrying food for young
NE	Nest containing eggs
NY	Nest with young seen or heard

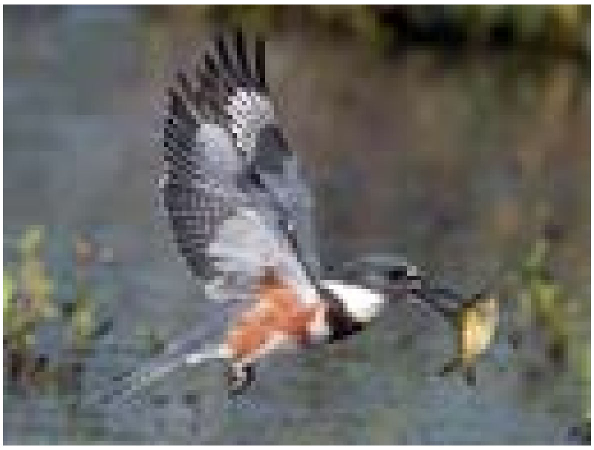
https://www.mba-aom.ca/jsp/codes.jsp?lang=en&pg=breeding

Species Profiles

Belted Kingfisher (*Megaceryle alcyon)*

Belted Kingfisher are stocky, large-headed birds with a shaggy blue crest and a thick, pointed bill. They have a blue breast band, short legs, and a medium length squared tail. Females can be distinguished from males by a rusty belly band (CLO 2017c).

CLO, 2017c



CLO, 2017c

Table 1: Belted Kingfisher Measurements

Common Name	Length (cm)	Wingspan (cm)	Weight (g)
Belted Kingfisher	28-35	48-58	140-170

Belted Kingfishers reside near watercourses and waterbodies. They nest in burrows dug from soft earthen banks, usually adjacent to or directly over water. Belted Kingfishers overwinter in areas where the waterbodies remain open to allow for access to their food source (CLO 2017c).

Belted Kingfishers often perch along the edges of watercourses and waterbodies in search of small fish. They can often be identified by quickly flying along water features giving a loud rattling call. They capture their prey by either plunging directly from a perch, or by hovering over the water, before diving (CLO 2017c).

Bank Swallow (Riparia riparia)

Bank Swallow are sleek brown songbirds with a small head and tiny bill. They with a pale belly with a brown breast band, and long notched tail. They fly with quick, fluttery wingbeats (CLO 2017a). This species is listed as threatened under federal legislation and endangered under provincial legislation.

CLO 2017a

CLO 2017a

Table 2: Bank Swallow Measurements

Common Name	Length (cm)	Wingspan (cm)	Weight (g)
Bank Swallow	12-14	25-29	10-19

Bank Swallows live in low areas along watercourses and their territory usually includes vertical cliffs or banks. They nest in burrows along the banks and bluffs of watercourses (loose soil). They can also be found in anthropogenic made sites such as gravel quarries and roadcuts (CLO 2017a).

Barn Swallow (Hirundo rustica)

Barn Swallows are small songbirds that have broad shoulders, a flattened head, long pointed wings, and a forked tail. They have a blue back, wings, and tail. Their crown is also blue and contrasts a cinnamon-colored forehead and throat as well as a rufous breast and belly (CLO 2017b). This species is listed as special concern under federal legislation and endangered under provincial legislation.

Table 3: Barn Swallow

CLO 2017b

CLO 2017b

Measurements

Common Name	Length (cm)	Wingspan (cm)	Weight (g)
Barn Swallow	15-19	17-20	29-32

Barn Swallows are aerial acrobats that feed on airborne insects in open habitats (e.g. fields, parks, roadways, wetlands, waterbodies). They prefer to nest in barns and sheds as well as the undersides of bridges and wharfs (CLO 2017b).

Common Nighthawk (Chordeiles minor)

Common Nighthawks are medium-sized mottled birds with very long pointed wings. Their flight pattern resembles that of a bat, though it is noticeably larger than any native bats (CLO 2017d). This species is listed as threatened under provincial and federal legislation.


CLO 2017d


CLO 2017d

Table 4: Common Nighthawk Measurements

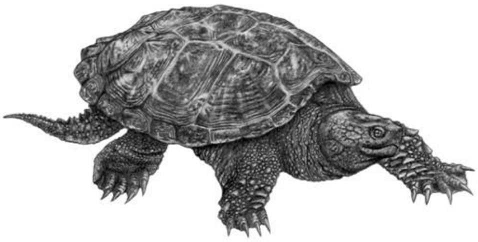
Common Name	Length (cm)	Wingspan (cm)	Weight (g)
Common Nighthawk	22-24	53-57	65-98

Common Nighthawk require open ground or clearings for nesting. The species breeds in a wide range of open habitats including sandy areas (e.g. dunes, eskers, and beaches), open forests (e.g., mixed wood and coniferous stands, burns, and clear-cuts), grasslands (e.g., short-grass prairies, pastures, and grassy plains), wetlands (e.g., bogs, marshes, lakeshores, and riverbanks), gravelly or rocky areas (e.g., outcrops, barrens, gravel roads, gravel rooftops, railway beds, mines, quarries, and bare mountain tops and ridges), and some cultivated or landscaped areas (e.g., parks, military bases, airports, blueberry fields, orchards, cultivated fields) (Hunt, 2005; Campbell et al., 2006; and COSEWIC, 2007a; as cited in Environment Canada, 2015).

Common Snapping Turtle

The Common Snapping Turtle is considered SARA Special Concern, NSESA Vulnerable, ACCDC S3. These turtles are the largest freshwater turtles in Canada. They have a brown, black or olive colored carapace with deeply serrated scutes and noticeably exposed limbs (ECCC 2016, COSEWIC 2008).


ECCC 2016

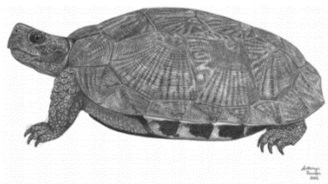

COSEWIC 2008

Preferred habitat for the Common Snapping Turtle includes ponds, lakes, slow-moving streams with soft mud bottoms and abundant aquatic vegetation (ECCC 2016). Hibernation occurs in freshwater systems deep enough to prevent freezing through during the winter, with a mucky or muddy substrate. Snapping Turtles travel through upland habitat and use gravelly areas to nest but they require wetland habitat as part of their life cycle activities (ECCC 2016, COSEWIC 2008).

Wood Turtle

The Wood Turtle is listed as threatened by COSEWIC, NSESA and SARA and S2 by the ACCDC. It is a medium sized turtle with a broad, low carapace ranging from grayish-brown to yellow in color. The carapace is covered in pyramidal scutes. The legs and neck of Wood Turtle are often orange, yellow, or reddish in color.


Environment Canada 2016


COSEWIC 2007b

This species prefers clear rivers, streams or creeks with moderate current and their associated flood plains. Wood Turtles nest in open, sunny areas with sandy or gravelly material (Environment Canada, 2016, COSEWIC 2007b).

Canada Lynx

Canada Lynx (*Lynx canadensis*) are listed as Endangered by NSESA and S1 by the ACCDC. Canada Lynx are medium sized cats with long legs, large paws, a short tail with a black tip, and long black-tipped ear tufts. Their coat varies seasonally; in the winter it is mottled grey and, in the summer, it is reddish brown (SARNS 2017).

(SARNS 2017)

(SARNS 2017)

Populations of Canada Lynx are restricted to Cape Breton Island in Nova Scotia. They are typically found at high elevations (e.g. Cape Breton Highlands, North Mountain, Keppoch Highlands, and Boisdale Hills). Canada Lynx occupy a large diversity of habitats but generally utilize coniferous forest because of an abundance of their main prey species, Snowshoe Hare (SARNS 2017).

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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 14

Hazardous Materials Management Plan

Highway 374

Trafalgar, Nova Scotia

Version 001

February 8th, 2021

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1.0 INTRODUCTION

1.1 Overview

The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, (the Company) in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for a comprehensive Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during each phase of the Project minimize the effects of the mine and promote the protection of the environment and human health.

The Hazardous Materials Management Plan (the Plan) is one component of the EMS for the Project and outlines the management of hazardous materials and waste generated from theses products while on site in compliance with regulatory requirements.

A variety of potentially hazardous supplies and materials will be required throughout the life of the Project. These products will be transported to the mine site by licenced contractor in compliance with Transportation of Dangerous Goods (TDG) and Workplace Hazardous Materials Information System (WHMIS) legislation and handled by personnel with TDG and WHMIS training. WHMIS Material Safety Data Sheets (MSDS) will be provided for each product and made available to all employees working with or in the vicinity of such products.

Any hazardous materials will be handled and stored in accordance with applicable environmental legislation, and transported from the Fifteen Mile Stream (FMS) Mine Site by a licensed contractor and disposed of in accordance with applicable environmental legislation.

The information contained in this plan is at an appropriate level of detail given the current state of the Project and for submission in support the Environmental Impact Statement (EIS). As a “living document”, the Plan will be updated as more detailed information on hazardous materials storage and handling is developed in conjunction with engineering design. The Plan will be updated and implemented prior to the commencement of construction to protect workers and the environment, by minimizing the risk of contamination from hazardous materials and waste generated from mine construction and operation activities.

1.2 Purpose

The purpose of the Plan is to outline practices and procedures for the storage and handling of chemicals and substances that are classified as or are deemed to be potentially hazardous that are planned for use during the life of the Project. Transportation, storage, use, and disposal are considered in terms of both protection of the environment and the health and safety of the workers and surrounding communities during all stages of the Project.

The Plan includes activities during operations, maintenance, shipping/receiving, and purchasing by mine employees and contractors during all stages of the Project life. The Plan briefly describes the storage and handling of the identified chemicals and substances. WHMIS and MSDS systems will be used to screen and classify materials.

The Plan does not cover practices and procedures for the safe storage and handling of petroleum fuel products and explosives which are covered separately under the Petroleum Management Plan (EMP 16) and Explosives Management Plan (EMP 18), respectively.

1.3 Scope and Objectives

Hazardous materials are defined as those with properties such as flammability, corrosiveness, or inherent toxicity (Canadian Environmental Protection Act 1999), while dangerous goods are a schedule designation under the Transportation of Dangerous Goods Act (1992) under Classes 2 to 6, and 8 to 9, that are no longer used for its original purpose and are intended for storage, treatment, recycling, or disposal. Both definitions overlap in the types of substances. The applicable classifications under the Transportation of Dangerous Goods Act (1992) which are included in this plan are:

- Class 2 – Gases;
- Class 3 – Flammable liquids;
- Class 4 – Flammable solids;
- Class 5 – Oxidizing substances and organic products;
- Class 6 – Poisonous (toxic) and infectious substances;
- Class 8 – Corrosives; and
- Class 9 – Miscellaneous products or substances.

A hazardous materials waste does not include materials that are household in origin, Class 7, radioactive materials, or material intended for disposal in a sewage system or landfilling.

The WHMIS is Canada's national hazard communication standard (Health Canada 2015). The three key elements of WHMIS are:

- Cautionary labelling of containers of WHMIS "controlled products";
- The provision of MSDSs; and
- Worker education and training programs.

MSDS provide basic information on materials or chemical products. They contain information on the properties and potential hazards of a material, how to use it safely, and any emergency procedures related to the material. The *Hazardous Products Act* (HPA) and the *Controlled Products Regulation* (CPR) place the following legal requirements on Canadian suppliers and importers of controlled products:

- The Canadian supplier of a WHMIS controlled product "intended for use in a work place in Canada" is to transmit an MSDS disclosing prescribed information as a condition of sale (HPA Section 13);
- The Canadian importer of a controlled product is to obtain or prepare an MSDS as a condition of importation (HPA Section 14);
- The Canadian importer who imports a controlled product must obtain or prepare an MSDS before the controlled product is used or sold in Canada (CPR Subsection 23(1));
- The supplier must provide certain ingredients on an MSDS form (CPR Section 12 Schedule 1);
- An MSDS must disclose certain ingredients (HPA paragraph 13(a)) (Subject to the trade secret provision under the *Hazardous Materials Information Review Act);* and
- An MSDS must disclose certain ingredients of a specified concentration (CPR Section 4).

A product, material, or substance is a controlled product if it falls within any of the hazard criteria specified in Part IV of the CPR. Section 33 of the CPR sets out the procedures for a supplier to establish whether or not a substance is a controlled product and does not apply to the determination of the information that must be disclosed on the MSDS.

Provincial and federal WHMIS regulations required employers to ensure that:

- Controlled products used, stored, handled, or disposed of in the workplace are properly labelled;
- MSDS are made available to workers; and
- Workers receive education and training to ensure that the safe storage, handling, and use of controlled products in the workplace (Health Canada 2015).

The objectives for the Plan are to:

- Outline storage and handling procedures for hazardous materials used at the site to prevent harm to personnel and the environment;
- Outline storage and handling procedures for hazardous waste generated at the site to prevent harm to personnel and the environment;
- Outline methods to reduce the amount of hazardous waste generated by recycling and re-using materials, and/or using less toxic or non-toxic alternatives when possible;
- Provide management strategies to reduce disposal requirements; and
- Ensure that site personnel and sub-contractors are aware of the Project waste management obligations and procedures in accordance with the Waste Management Hierarchy.

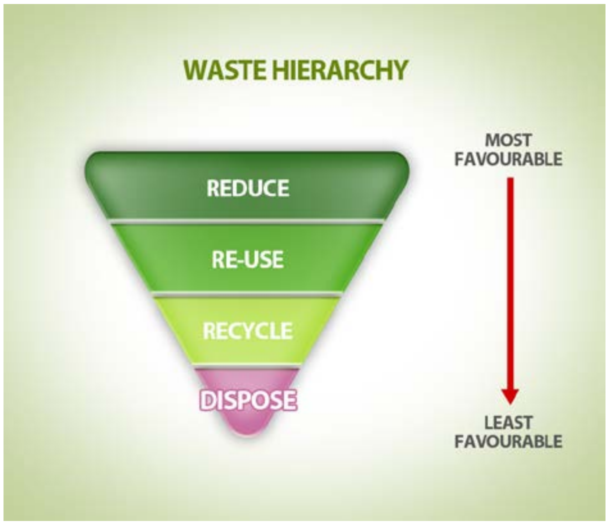

Figure 1: Waste Management Hierarchy

The Plan includes the handling, storage, treatment and disposal of these materials and of potentially hazardous waste generated from these products. For information on spill response refer to the Spill Contingency Plan (EMP 17); for information on petroleum-based fuel management please refer to the Petroleum Management Plan (EMP 16); and for information on explosives please refer to the Explosives Management Plan (EMP 18).

2.0 REGULATORY CONTEXT

The construction, operation and reclamation of the Project, including those aspects covered under the Plan, will be governed by a number of federal and provincial acts and regulations. The development and implementation of this Plan will be also be directed by a variety guidelines, policies, and best management practices (BMPs).

For reference to those which may potentially be applicable to the Project and the Plan please refer to the EMS Framework Document.

3.0 ENVIRONMENTAL MANAGEMENT MEASURES

3.1 Materials Inventory

The Company will develop and regularly update an inventory of types and quantities of all chemicals used at the FMS Mine Site. All materials will be clearly labelled according to WHMIS and be accompanied by applicable MSDS.

Hazardous materials waste will be handled, stored, transported, and disposed of in accordance with the Hazardous Waste Regulations.

Hazardous materials that will be transported to and stored at the FMS Mine Site are expected to include but are not necessarily limited to the following:

- Petroleum products (diesel fuel, gasoline, lubricants, hydraulic fluids, oil and solvents);
- Propane;
- Explosives;
- Batteries;
- Mill reagents;
- Antifreeze;
- Solvents;
- Grease; and
- Glycol coolant.

Hazardous waste materials that will be stored at and transported from the FMS Mine Site may include but are not necessarily limited to the following:

- Batteries;
- Waste oil;
- Oil filters;
- Solvents;
- Oily rags and absorbent material; and
- Empty petroleum and reagent drums, and pails.

Other hazardous material waste that will be stored at the FMS Mine Site in relatively small quantities may include but are not necessarily limited to the following:

- Fluorescent mercury and sodium lights;
- Laboratory reagents;
- Scraps of treated lumber;
- Bottled gases (acetylene and oxygen); and
- Solvents.

3.2 Transportation

The transport of hazardous material off-site for recycling or disposal will be handled by licenced contractors. The contractors will be responsible for the development of a hazardous materials handling plan, including spill contingency and emergency response plans, and which, at the very least will comply with relevant legislation including but not necessarily limited to the *Transportation of Dangerous Goods Act.*

The following BMPs should be adhered to by contractors during the transportation of hazardous materials:

- Non-compatible materials will be transported by separate shipment;
- Containers will be appropriate for the material being shipped;
- Containers will be properly secured;
- Containers and trucks will be properly marked, labelled, and placarded;
- Manifests will be maintained according to regulations;
- Spill response materials will be adequate and appropriate for materials being transported;
- Driver teams will be adequately trained and equipped for spill response, containment, and communication; and,
- Fire extinguisher and fire prevention materials will be adequate and appropriate for the material being transported.

3.3 Storage

Hazardous materials will be sorted and stored according to accepted management practices including the following:

- The storage areas will be designed to adequately and safely store the required quantity over a prescribed period;
- Sufficient storage space between containers will be allowed for safe access and handling in containers;
- Storage areas will be properly designed to contain and prevent contamination of the environment;
- Spill kits, protective equipment, and/or other necessary equipment necessary to contain, clean and mitigate effects of spills will be maintained on site;
- Only containers that are in good condition will be used;
- Secondary containment, appropriate signage and fencing will be used as necessary;

- Hazardous liquids such as solvents, mill reagents, and lab chemicals will be stored within secondary containment to comply with relevant legal requirements;
- Fire prevention systems appropriate and adequate for the materials being stored will be designed and used;
- Where appropriate, containers will be kept closed, except when they are being filled or emptied;
- Containers or liners will be compatible with the waste being stored;
- Incompatible materials (ex. bases and acids) will not be stored in the same container and will be stored safely and sufficiently far apart to prevent accidents;
- To provide a safe work area, incompatible wastes will be separated by walls, dykes, or stored in separate facilities; and
- Drums, containers, and storage areas will be properly labelled, marked, placarded, and secured.

Containers or liners that previously held hazardous material will be subject to hazardous waste disposal, unless the containers are classified as empty. To be classified as empty the containers or liners must:

- Have all waste removed by typical methods including pouring, pumping, or aspiring; and
- Have less than 2.5 cm of residue in the bottom; or
- Contain less than 3% of the residue by weight if the container has a volume of less than 400 L; or
- Contains less than 0.3% of the residue by weight if the container is greater than 400 L in volume.

Containers that previously held acutely hazardous materials are classified as empty when:

- Triple rinsed using a solvent capable of removing the hazardous material; or
- Cleaned by another method that achieves equivalent removal with scientific or testing bases; or
- A liner has been used to prevent contact between the container and the waste.

3.4 Classification of Hazardous Waste

Waste streams will be identified by reviewing facility designs and processes. Operations, maintenance, shipping/receiving, purchasing, and contractors will be included in the discussion and review.

Waste streams will be identified and classified using the MSDS and WHMIS systems. Confirmation of proper classification and handling will be completed by testing the waste streams when and if necessary. The Plan will be updated periodically to ensure that all operations and processes are included within the Plan.

3.5 Hazardous Waste Minimization

The following procedures will be followed to minimize wastes during the life of the Project:

- Using non-hazardous materials instead of hazardous materials whenever practical;
- Keeping inventories of products to a workable minimum to prevent expiration of dated products and the generation of waste;
- Exploring alternative methods or processes to reduce generation of high volume waste, whenever practical;
- Properly segregating and handling waste streams to minimize cross contamination of hazardous and non-hazardous waste;

- Developing, implementing, and tracking training programs and housekeeping standards to reduce waste; and,
- Making waste minimization procedures part of employee training programs.

3.6 Hazardous Waste Treatment

Hazardous material waste will be re-used, recycled, or disposed of in accordance with the Waste Management Hierarchy.

The following wastes will be re-used when practical:

- Paint;
- Paper and corrugated cardboard;
- Plastics;
- Tires and conveyor belts;
- Vehicles; and
- Electrical equipment.

During operations and closure, all waste oils and oil filters will be collected and recycled off-site with records being kept of all waste oil removal and recycling. Additionally, the following wastes will be stored in their respective areas, and transported for off-site recycling:

- Used oil;
- Oil and fuel filters;
- Hydraulic fluid;
- Glycol;
- Acids;
- Antifreeze and solvents;
- Batteries;
- Paint;
- Paper and corrugated cardboard;
- Plastics;
- Scrap metals; and
- Waste lumber.

The following wastes will be stored in their respective areas on site and disposed of off-site in accordance with regulatory requirements:

- Aerosol cans;
- Laboratory chemical waste;
- Plastics;
- Tires and conveyor belts; and

- Electrical equipment.

The majority of the hazardous materials waste produced by the Project will be disposed of off-site. During operations many chemicals and reagents will be used for the FMS Mine during daily mining and milling activities. The supply and demand of these chemicals will be monitored closely during the final months of operations to ensure that over-ordering does not occur. Any residual products will be appropriately packaged and shipped back to the supplier.

4.0 IMPLEMENTATION

4.1 Training

Hazardous Materials Handling Training (TDG and/or WHMIS) will be completed by all employees who receive, handle, and store potentially hazardous materials or are involved in the storage and shipment off-site of hazardous material waste. This training will focus on how hazardous materials are packaged, handled, and labelled during transportation and storage. This training will ensure that employees know how to appropriately package, label, and ship hazardous material waste, including proper record keeping and manifesting. Review of the plan and training will be conducted on a regular basis to ensure that any new hazardous materials coming to site and new handling techniques are reflected. MSDS will be kept on-site for all relevant hazardous materials.

Employees will be trained in WHMIS upon arrival on-site and will take an annual refresher course, to ensure:

- Identification of hazardous materials;
- The ability to obtain appropriate information on special handling procedures required;
- Proper precautions and protective equipment are used;
- Proper labeling and packaging of hazardous materials and waste,
- Proper storage of hazardous material and waste; and
- Proper disposal requirements.

Records will be kept on site of all employees who have completed WHMIS training.

4.2 Record Keeping and Monitoring

The following systems will be put in place for the tracking and inventory of hazardous materials and wastes.

4.2.1 Construction

During the construction phase of the Project, the Environment Manager in conjunction with the Construction Manager will be responsible for ensuring that all contractors:

- Use properly located and secured storage areas and secondary containment,
- Maintain an updated inventory of hazardous substances; and
- Follow all applicable federal and provincial procedures and BMPs.

4.2.2 Operations

During the operations phase of the Project, monitoring by the Environment Department and/or Safety Department under the Plan will include:

- Ensuring labelling and signage on containers are legible and in good condition;
- Routine inspection of storage areas, secondary containment, and condition of containers.

4.2.3 Inspections and Record Keeping

The following inspection and record keeping procedures will be followed:

- FMS Mine Site hazardous materials storage facilities will be inspected routinely by operations personnel, dependent upon volume and risk, to ensure compliance with relevant regulations and BMPs
- Disposal of hazardous materials waste will be documented by inventory tracking of waste type, volume, method of disposal, and location;
- Training of employees will be documented;
- Site hazardous materials and waste storage facilities will be inspected by the Environment Department, Safety Department and/or Occupation Health and Safety Committee on at least a semi-annual basis. The inspection program will include:
    - Inspection of mine and mill facilities for proper receiving, storage, handling and labelling of hazardous materials;
    - Inspection of waste storage sites for proper storage, handling and labelling of hazardous waste materials;
    - Verification of the volume and type of waste stored and storage facility conditions;
    - Inspection of spill kits and protective equipment, and re-order and replace as necessary;
    - Allow for periodic review of emergency response and spill contingency plans, training, equipment, spill kits, records, and employee awareness;
    - Review results of routine operations inspections;
    - Review of employee training procedures; and,
    - Review inspection findings with operations personnel and contractors to correct deficiencies, maintain awareness and communication, and to recognize negative or positive performance.

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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 15

Solid Waste Management Plan

Highway 374

Trafalgar, Nova Scotia

Version 001
February 8th, 2021

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1.0 INTRODUCTION

1.1 Overview

The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, (the Company) in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for a comprehensive Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during each phase of the Project minimize the effects of the mine and promote the protection of the environment and human health.

The Solid Waste Management Plan (the Plan) is one component of the EMS for the Project and outlines general practices and procedures to be followed in the handling of non-hazardous solid waste materials in order to meet regulatory requirements and the Company's goals for good corporate stewardship of the environment and resources.

Provisions for the handling of hazardous waste are discussed under the Hazardous Material Management Plan (EMP 14), and in the case of petroleum product waste and explosives waste in the Petroleum Management Plan (EMP 16) and Explosives Management Plan (EMP 18), respectively. Similarly, the Plan does not consider the handling of mined materials such as waste rock, overburden, or tailings produced from mill processing, as these materials are addressed under the mine plan, which will be approved and regulated under the Industrial Approval. For additional information on the overall EMS structure, please refer to the EMS Framework Document.

A material is generally considered to be waste once it can no longer be used for its original purpose. Non-hazardous solid waste will be generated during each of the construction, operation, and closure phases of the Project. The following types of non-hazardous solid waste are expected to be produced at the Project site, but are not necessarily limited to:

- Domestic Type Non-Hazardous Waste:
    - Aluminum, plastic, glass and jars;
    - General Office waste;
    - Paper and cardboard materials; and
    - Food waste.
- Commercial/Industrial Type Non-Hazardous Waste:
    - Aerosol spray cans;
    - Batteries (dry);
    - Building materials and bulk debris;
    - Cement;
    - Glass;
    - Paint and paint cans;
    - Rebar;

- Scrap metal;
- Wood;
- Steel balls;
- Vehicle parts;
- Tires; and,
- Wiring.

The four main principles of waste management to be followed in order of hierarchy include reduce, reuse, recycle and dispose.

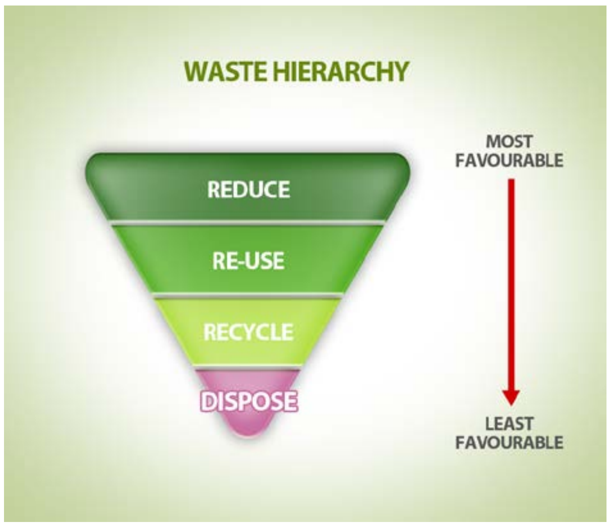

Figure 1: Waste Management Hierarchy

The Waste Management Hierarchy will form the overarching framework for the Plan and will be implemented throughout the Project life. Once reduce, reuse, and recycle have been implemented the remaining waste will be responsibly handled, stored, and disposed of in accordance with regulatory requirements.

The information contained in this plan is at an appropriate level of detail given the current state of the Project and for submission in support of the Project Environmental Impact Statement (EIS). As a "living document", the Plan will be updated as project development progresses and will be implemented prior to the commencement of construction.

1.2 Purpose

The purpose of the Plan is to document and describe a set of practical and achievable measures pertaining to the reduction, reuse and recycling of non-hazardous industrial and domestic type solid waste expected to be generated during the life of the Project in order to reduce requirements for waste disposal.

By providing clear direction on the effective and organized management strategies that will be implemented to reduce, re-use, recycle and manage non-hazardous wastes for the life of the Project, the Company hopes to instill a culture of waste minimization that will have the combined benefit of reducing both the environmental impacts of the mine operation and the costs associated with waste handling and disposal.

1.3 Scope and Objectives

The Plan documents the Company's approach to the management of non-hazardous waste materials and outlines strategies that will be used to process the various waste streams to ensure environmental protection. In order for the Plan and associated procedures to work to their full extent, everyone at the Fifteen Mile Stream (FMS) Mine Site must be made aware of the Plan and their corresponding responsibilities. All FMS Mine Site personnel, including contractors, need to be active participants.

The objectives for this plan are to:

- Investigate and implement product and materials substitutions where practical to reduce the amount of waste generated during the mine life and provide management strategies to reduce waste disposal requirements;
- Promote sustainable resource use by maximising the recycling and reusing of waste materials on-site to the extent practical;
- Ensure that all waste material generated on site is handled in a responsible manner, and in accordance with legislative and permit requirements in order to prevent harm the environment; and,
- Ensure that site personnel and contractors are aware of the Project waste management policies practices and procedures in accordance with the Waste Management Hierarchy.

For information on spill response refer to the Spill Contingency Plan (EMP 17); for information on hazardous material waste please refer to the Hazardous Material Management Plan (EMP 14); for information on petroleum based waste please refer to the Petroleum Management Plan (EMP 16); and for information on explosives please refer to the Explosives Management Plan (EMP 18).

2.0 REGULATORY CONTEXT

The construction, operation and reclamation of the Project, including those aspects covered under this Plan, will be governed by a number of federal and provincial acts and regulations. The development and implementation of this Plan will be also be directed by a variety guidelines, policies, and best management practices (BMPs).

For reference to those which may potentially be applicable to the Project and the Plan please refer to the EMS Framework Document.

3.0 ENVIRONMENTAL MANAGEMENT MEASURES

The Company's operating principle will be to recycle wherever economically and technically feasible and to use proven management practices to reduce waste at the project site to the extent feasible.

Environmental Management measures to be implemented throughout the Project life will follow the Waste Management Hierarchy: reduce, reuse and recycle. Non-hazardous waste materials remaining after these options have been implemented will be stored, handled, and disposed of responsibly in accordance with applicable legislation and permit requirements.

3.1 Reduction

Proper management of materials consumed through effective procurement and inventory control practices is one of the most effective ways of reducing the amount of waste that is generated. Consumption will be assessed by evaluating procedures, processes, and consumed material quantities for possible reductions in material usage, as well as possible reductions in generated waste volumes.

Typical examples of waste reduction measures include:

- Employing inventory control and procurement measures to accurately determine requirements before purchasing materials;
- Keeping a workable minimum inventory to prevent expiration of dated products, resulting in the generation of waste;
- Purchasing materials in bulk where practical to minimize packaging and avoid excess volume of containers and packages;
- Exploring alternatives in the case of high-volume wastes;
- Properly segregating and handling waste streams to minimize cross contamination of hazardous and non-hazardous wastes;
- Decreasing the amount of packaging on supplies by requesting that suppliers provide less packaging materials on over-packaged products where practical;
- Decreasing the amount of solid waste by reducing the use of disposable items;
- Product review, selection, and substitution - using recyclable/reusable and non-hazardous materials instead of non-recyclable/non-reusable and hazardous materials where practical;
- Encouraging waste avoidance through training of staff and contractors on waste minimization and reuse; and,
- Developing, implementing, and tracking training programs and housekeeping standards to reduce wastes.

3.2 Reuse

Waste that is produced during construction, operations, and reclamation phases of the Project will be reused whenever possible. BMPs for the re-use of materials will include but are not necessarily limited to:

- Where excess material remains, determine why the resource became a waste product and determine whether excess material can be used elsewhere in the project;
- Salvage soils, logs, and vegetation removed during clearing, where practical, for reuse during restoration activities;
- Worn haul truck tires will be used on site to act as berms, vehicle protection barriers, and material storage platforms, when possible; and,
- Bulk containers will be returned to the supplier for refill.

3.3 Recycling

Waste that can neither be reduced nor reused will be recycled to the extent practical. Example materials to be recycled include:

- Glass;
- Plastic materials;
- Aluminum;
- Scrap metals;
- Wood and Wooden pallets;
- Wire;
- Paper and cardboard;
- Light bulbs
- Batteries;
- Auto parts that are not reusable;
- Paint;

The waste streams will be identified and organized in a manner to avoid mixing and minimize the improper recycling or disposal:

- Separate barrels or bins labelled for non-hazardous wastes and recyclables will be located throughout the FMS Mine Site, allowing immediate sorting of solid wastes;
- Larger bins and/or dumpsters will be located at each major facility for the collection and separation of non-hazardous materials and recyclable waste such as scrap metal and wood; and
- Clearly labelled and covered receptacles will be located in office, lunch, and workshop areas for collection of recyclable and non-recyclable materials.

3.4 Storage and Handling

Non-hazardous waste will be produced widely at a variety of locations throughout FMS Mine Site. As part of the measures to be implemented, the reuse and recycle of non-hazardous material such as equipment parts, wood and metal components that are not yet designated as waste or garbage and that may be used as spare parts or general reuse will be stored in a laydown area. The laydown area will be located in close proximity to the Plant site for ease of access. Typically, materials will be stored on wooden beams and/or pallets set atop used tires in order to keep them off the ground and to provide easier access particularly during winter. Materials remaining stored in this area at closure will be evaluated and either shipped off-site for recycling or disposed as non-hazardous waste.

3.5 Disposal

Once options for reuse and recycle have all been evaluated and it has been determined that disposal of non-hazardous waste material is necessary, the following BMPs will be considered and implemented as appropriate:

- All non-hazardous waste will be removed from site for disposal in an appropriate manner in accordance with relevant approvals and permits;
- Waste transport offsite will be conducted in safe and appropriately equipped and labelled trucks to approved disposal and recycling facilities;
- Transportation contractors will have appropriate training, and hauling will be undertaken in a way that prevents inadvertent release of wastes or recyclables on route; and,
- Employee induction and training will include general education on waste handling and clear restrictions to avoid disposal of wastes in unauthorized locations or facilities.

3.6 Specific Waste Material Handling Practices and Procedures

Examples of handling and recycling practices for non-hazardous waste materials produced at the site include the following:

Paper

Paper waste consists of office paper, newspaper, and general packaging. Paper waste will be reduced in a number of ways, such as reducing the use of paper, reusing, and recycling. Minimizing the use of paper may be achieved by using telephone, emails, along with printing and photocopying on both sides of the paper. Reusing paper waste may be achieved by such approaches as using shredded paper as packaging material and reusing paper from the recycling bins for notepads. Recycling may be achieved by placing paper recycling bins in all the buildings where paper will be used. The recycling bins will be removed from site to a paper recycling facility.

Corrugated cardboard

Corrugated cardboard waste will be generated mainly from packaging of materials. Cardboard will be collected along with the paper for recycling and will be stored in a crate in a dry location in the waste collection areas to be shipped off site to a paper recycling facility.

Plastics

Plastic waste will mainly be generated from packaging and containers for cleaning products, and other liquids. To reduce the amount of plastic waste produced, the maximum practical package size will be purchased for products, and single-use disposable plastics such as dishes and utensils will be avoided. Some of the plastics, such as pails and barrels, will be reused. Plastic waste will be collected at waste collection areas for off-site recycling. Plastics that contained non-hazardous materials and that cannot be recycled will be sent to an off-site for disposal.

Tires and Conveyor Belts

Haul truck and large equipment tires will be re-treaded and repaired as many times as safe and feasible. When they are no longer safe to use, they will be reused for different purposes such as for storing material in the parts laydown area, or as berms or impact barriers at road intersections. Small vehicle tires that are not reused in some way will be sent to a recycling facility or returned to the vendor.

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Conveyor belts have a finite life. When they can no longer be used, the belts, along with other large rubber items from the mine operation, will be assessed for other uses such as floor pads and protective material in loading docks, etc. Rubber that cannot be reused will be sent to a recycling facility or sent offsite for disposal.

Vehicles

Regular maintenance will prolong the life of vehicles and equipment. When they are no longer usable for the Project, they will be driven or shipped off site to be reused or recycled. The unusable vehicles and equipment will be stored in a laydown area until they are shipped off site.

Air Filters

Air filters will be collected in bins in the truck shops and sent offsite for disposal.

Scrap Metal

Scrap metal will be generated during the construction and maintenance processes and will contain ferrous and nonferrous types. Scrap metal will be minimized by prompt maintenance of equipment, and will be reused wherever possible for on-site needs and projects. The scrap metal will be segregated and placed in designated laydown areas and bins for reuse or salvage. The unused scraps will be shipped off site to a licensed facility for recycling or sent offsite for disposal.

Waste Lumber

Waste lumber will be generated during construction and throughout the Project life from building and maintenance by-products. Waste lumber will be reused as much as possible at the FMS Mine Site. Waste lumber not immediately reused will be placed in designated bins in the waste collection areas for removal offsite for proper disposal. Pressure-treated lumber will be removed by a licenced waste management company to a permitted landfill.

Electrical Equipment

Waste electrical equipment will consist of generators, transformers, and distribution lines that have reached the end of their service. When they are no longer functional or re-buildable, usable parts will be salvaged for reuse and the rest of the parts will be shipped off site to a facility for recycling.

Solid Domestic Waste

Domestic waste will include putrescible food waste, recyclable containers (cans and bottles), packaging, inert non-combustible domestic waste, and paper products. Food waste will be collected in clearly labelled compost bins for removal offsite for proper facility for composting.

4.0 IMPLEMENTATION

4.1 Training

All employees will receive general training on environmental and waste management, including the importance and practical implementation of the Waste Management Hierarchy (reduce, reuse and recycle), and how and where to recycle materials at the Project site. Each worker will be expected and responsible of disposing waste according to the Plan.

Specific workers employed to manage the waste collection, handling storage and transportation facilities will be further trained in more detail and in accordance with the applicable regulations and guidelines. This includes training in the safe work and sorting procedures and proper procedures in the identification and action plan of any potential waste improperly sorted. These workers will also receive Workplace Hazardous Materials Information System (WHMIS) and Transportation of Dangerous Goods training in the event that their duties expose them to potentially hazardous materials. Information about training for workers handling hazardous materials is provided in the Hazardous Material Management Plan (EMP 14).

4.2 Roles and Responsibilities

The Environmental Manager will be responsible for the implementation of the Plan. The Environmental Manager will inform and report to the General Manager. All employees, contractors, and contractor employees are responsible for complying with the intent of this Plan.

Certain components of the Plan may need to be modified based on site experience or changes in legislation or BMPs. All aspects of the plan shall be audited or reviewed for effectiveness and to identify components needing correction, adjustment, or upgrading. Formal evaluations of the Plan will be documented, with deficiencies noted and corresponding 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.

All reports will be reviewed internally by the responsible manager and the Environmental Manager, in order to identify necessary improvements in the monitoring system. Where required, reports will be forwarded to relevant government agencies as stipulated by regulations and licences.

4.3 Monitoring and Record Keeping

Operating personnel will be responsible for routine monitoring of their respective non-hazardous waste handling and storage areas. Oversight by the Environmental Manager or designate will include:

- Inspections of non-hazardous materials waste and recycling bins to ensure that labelling and signage is legible and in good condition;

- Inspections of non-hazardous materials storage areas and recycling sites to ensure that materials are correctly sorted and segregated;

- Inspect waste disposal sites for proper waste segregation, storage and disposal practices;

- Periodic reviews of the waste disposal practices including procedures, training, equipment, records, and employee awareness; and,

- Review the inspection findings with area supervisors, operation personnel, transporters, and contractors to correct deficiencies, improve procedures, maintain awareness and communication, and recognize positive or negative performance.

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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 16

Petroleum Management Plan

Highway 374

Trafalgar, Nova Scotia

Version 001
February 8th, 2021

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1.0 INTRODUCTION

1.1 Overview

The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, (the Company) in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for a comprehensive Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during each phase of the Project minimize the effects of the mine and promote the protection of the environment and human health.

The general purpose for a Petroleum Management Plan (the Plan) is to provide a single document outlining the systems and procedures for minimizing risks and environmental impacts associated with the transportation, transfer, dispensing, and storage of petroleum-based fuel products during construction, operation, decommissioning, and closure phases of the Project.

Petroleum based fuel products in the form of diesel, gasoline and propane will be used throughout the life of the Project and stored in various locations within the Project area. The majority of the large mobile equipment (haul trucks, front-end loaders, dozers, graders, etc.) will consume diesel. Gasoline powered vehicles will largely be restricted to smaller vehicles (pickups, vans, etc.). Propane will be used for temporary and permanent facilities for space heating. Limited quantities of propane and gasoline will be used in maintenance facilities for smaller motorized equipment and machinery.

A diesel storage and distribution facility (50,000 - 75,000 L) will be located adjacent to the workshop/warehouse. Diesel will be delivered to site in tanker trucks and will be available for use by vehicles using a bowser arrangement with cardlock. There may be a smaller diesel tank (5,000 L) at the TMF for use by contractors during construction. Gasoline usage is expected to be minor, as required for light vehicles use only, and will be satisfied by one gasoline tank (5,000 L) located in the ancillary building area. The road trucks required to transport Fifteen Mile Stream (FMS) concentrate to the Touquoy Mine Site will be refueled at FMS Mine Site or at Touquoy Mine Site as needed. A propane storage facility will be located near the process building. The major propane use will be for space heating.

The containment area will be designed to contain a minimum of 110% of the volume of the largest tank and will be equipped with an oil/water separator to handle draining of stormwater runoff from within the containment. Any bulk storage tank proposed to be located outside an appropriately bermed area will be of the double-walled (“Envirotank”) variety with appropriate barricades. No underground fuel storage tanks will be used at the Project.

The delivery of diesel fuel, gasoline, and propane will be conducted by tanker trucks from suppliers who routinely transport and distribute petroleum products. Transfer of these products from the tanker truck to double-walled tanks with bollards will be constantly supervised by the delivery person to ensure constant observation and immediate response should a spill occur. Based on anticipated equipment, associated efficiency ratings, and hours of operation, diesel fuel consumption by operational equipment and haul trucks has been estimated to be approximately 6 million litres of diesel fuel per year during full scale operations. Final fuel storage configuration will be determined based on final equipment selection.

As well, during each of the construction, operations and closure phases, smaller fuel storage tanks may be in use at various locations throughout the property in support of specific activities and/or facilities. Such tankage may take the form of:

- Stationary fuel supply “day” tanks;
- Mobile vehicle fuel supply tanks (“Tidy” tanks);
- Mobile bulk fuel service truck;
- Mobile equipment fuel tanks; and,
- Propane in both portable and fixed tankage.

Petroleum based fuel products will be delivered to the Project by road by licence commercial suppliers using tanker trucks and transferred to above ground bulk storage tanks at the site. Access to the FMS Mine Site will be via the Provincial Highway #374 to a mine access road which will utilize the existing Seloam Lake Road for approximately 1 kilometer at which point a dedicated 4 kilometer mine access road will be constructed.

Surface mobile equipment will fuel-up at a dispensing station at the main fuel storage tank farm. Diesel and gasoline will be available for use using a cardlock system for dispensing. The fuel dispensing station will be constructed within a lined and graded or bermed area to contain minor spills or leaks during refuelling. The liner (e.g., 40 mm High-density polyethylene (HDPE) liner or equivalent) will be protected by aggregate bedding. Vehicles and mobile equipment will drive onto this bedding for refuelling. Fixed equipment will be supplied by the fuel service truck.

Fuel storage areas will be equipped with standard instrumentation and controls to monitor and safely manage the inventory in the tanks. Fuel storage areas and fuel service vehicles will be equipped with spill kits for emergency response. Each spill kit contains the appropriate type, size, and quantity of equipment for the volume/type of product present in the storage.

The information contained in this plan is at a level of detail appropriate for an Environmental Impact Statement (EIS) submission. The Plan is a "living document" and will be further developed by the Company into a more detailed plan prior to commencement of the construction phase of the Project.

1.2 Purpose

The purpose of the Plan for the Project is to protect the environment, as well as employee and public health and safety, from possible deleterious effects associated with the transport, storage, and handling of petroleum fuel products throughout the life of the mine.

This Plan outlines practices and procedures for minimizing the risks and environmental impacts associated with the handling transportation, storage and handling of petroleum-based fuel products during construction, operation, decommissioning, and closure phases of the Project.

The Company will implement the management practices and procedures outlined here in the Plan to minimize the potential for spills and the mishandling of fuel products at the mine. Spill response procedures for petroleum-based fuel products are described in more detail in the Spill Contingency Plan (EMP 17).

1.3 Scope and Objectives

The intent of the Plan is to ensure petroleum-based fuel products are transported, stored and handled in a safe and secure manner so as not to cause unintended negative effects. The objective of the Plan is to have no accidental release to the environment and cause no accidental harm to the environment, property or persons.

Accordingly, the Plan is designed to meet the following objectives:

- To address all applicable regulatory requirements and standards with regards to fuel transportation, storage and handling at the mine site;
- To outline operating practices and procedures designed for safe transportation, storage and handling of fuel products during the life of mine (including the construction period);
- To maintain an effective inspection procedure that confirms the effectiveness of the transportation, storage and handling of petroleum-based fuel products that ensures compliance with established systems throughout the life of the Project;
- To minimize the potential for unintended property damage, injury to persons or significant environmental effects related to the transportation, storage, and handling of petroleum-based fuel products; and,
- To have a Workplace Hazardous Materials Information System (WHMIS) in place prior to commencement of construction of the Project. The WHMIS will meet the intent of the Hazardous Products Act (1985b) and the Controlled Products Regulations (SOR/88-66) , and will continue for the life of the Project with adjustments as required to reflect changing types and levels of activities and the knowledge gained over time.

The Plan will be integrated with the Company's EMS, including but not necessarily limited to the Spill Contingency Plan (EMP 17).

The information contained in this Plan is at an appropriate level of detail given the current state of the Project and for submission in support of the Project EIS. As a "living document", the Plan will be updated prior to the commencement of construction as more detailed information on petroleum-based fuel products storage and handling needs are developed in conjunction with Project design. Updates to the Plan will include additional details such as those relating to transportation, storage locations, contractor certifications, petroleum-based fuel products handling, employee training programs, work instructions, inspections, reporting, documentation, and details of continual improvement initiatives.

2.0 REGULATORY CONTEXT

The construction, operation and reclamation of the Project, including those aspects covered under this Plan, will be governed by a number of federal and provincial acts and regulations. The development and implementation of this Plan will be also be directed by a variety guidelines, policies, and best management practices.

For reference to those which may potentially be applicable to the Project and this Plan please refer to the EMS Framework document.

3.0 SAFETY AND ENVIRONMENTAL MANAGEMENT MEASURES

Petroleum based fuel products will be required at the site during the Construction and Operation phases of the Project. The following measures will be implemented to address the safe and proper transportation, storage and handling of petroleum-based fuel products to protect the health and safety employees, to cause no accidental harm to property or the public, and to protect the environment from deleterious effects associated with the accidental release of these products.

3.1 Transportation

Petroleum based fuel products will be delivered to the Project by road using tanker trucks under contract to third party licence commercial suppliers with proper certification and training in fuel transport. Fuel suppliers will be required to provide proper documentation supporting their authority to transport fuel and present their procedures and measures to minimize the risk of and to respond to the accidental release of fuel. The third-party supplier will be responsible for the fuels during transport to the FMS Mine Site and transfer to above ground bulk storage tanks at the site, at which point the Company will take possession of and responsibility for the fuel.

Fuel is expected to be delivered by tanker trucks from the selected fuel contractor. Access to the FMS Mine Site will be via the Provincial Highway #374 to a mine access road which will utilize the existing Seloam Lake Road for approximately 1 kilometer at which point a dedicated 4 kilometer mine access road will be constructed.

All Petroleum products will be transported to the FMS Mine Site by licenced contractor in compliance with Transportation of Dangerous Goods (TDG) and WHMIS legislation and handled by personnel with TDG and WHMIS training. All necessary documentation, including manifests and WHMIS Materials Safety Data Sheets (MSDS) will be required to accompany each product. Fuels will be properly secured and labelled during transport.

Drivers will be required to complete a site orientation prior to or upon arrival to site. Planning of delivery timing will consider weather and road conditions and availability of appropriate transportation equipment and personnel.

The transport of petroleum-based fuel products will include the following requirements:

- Trucks and containers will be properly marked, labelled, and placarded;
- Containers will be appropriate for the material being shipped and properly secured;
- Manifests will be maintained in accordance with federal and provincial regulations;
- MSDS will accompany all shipments and will be made available to all employees working with or in the vicinity of such products;
- Smoking will be prohibited while transporting, transferring or otherwise handling fuel products;
- Fire extinguishers and fire prevention materials will be adequate and appropriate for the material being transported;
- Spill response materials will be adequate and appropriate for the materials being transported; and
- Drivers will be adequately trained and equipped for spill first response, containment, and communication.

Best Management Practices (BMPs) related to tank trucks and transportation include the following:

- It is expected that all bulk fuel tank trucks will be certified as required to the current CSA standard and all fuel transport conducted in accordance with TDG Regulations;
- All bulk fuel tank trucks will be inspected as per Transport Canada current requirements:
    - Inspection by a facility that is registered by Transport Canada;
    - Visual inspections and a leak test every year and an internal inspection and pressure testing every five years;
- All large TDG tanks greater than 454 L will meet current standards for flammable or combustible liquids;
- All tank trucks, trailers, and semi-trailers used to transport fuel tanks will meet commercial vehicle inspection requirements; and,
- No person will drive or operate on a highway a vehicle carrying a load unless the load is secured in a manner which ensures that:
    - The load will not escape from the vehicle;
    - The load will not shift or sway in a manner that may affect the operation of the vehicle.

3.2 Delivery

Bulk fuel storage tanks at the Project site will be filled from the fuel transport tanker truck by the contract supplier. The Company will take possession of the fuel once it has been transferred to the bulk storage tank. As a result, fuel delivery will be the contractor's responsibility up to that point. All fuel deliveries will be supervised by an employee of the Company.

Transfer from tanker trucks to tanks at the fuel storage facilities will be done using enclosed lines, hoses, and pumps. Diesel and gas will be delivered to larger storage tanks on site by commercial purpose designed tanker trucks equipped with the necessary instrumentation to ensure no spills.

Fuel will be transferred as per the established procedures of the fuelling contractor. Before fuel transfer, it is important to ensure that:

- All fuel transfer hoses have been connected properly and couplings are tight;
- Transfer hoses are not obviously damaged;
- Fuel transfer personnel are familiar with procedures;

- For fuelling stations, personnel are located at both the fuel truck and fuel transfer tank(s) and have the ability to shut off fuel flow manually;
- A means of communication has been established between the two people transferring fuel;
- A high liquid level shutoff device can be substituted for the person at the delivery tank, in which case operation of the shutoff should be verified each time it is used; and,
- Prevention of the overfilling storage tanks will be provided by one or both of the following:
    - Continuous supervision of the filling operations by personnel qualified to supervise such operations;
    - An overfill protection device that meets the current standard for Flammable Liquid Storage Tanks.

The contractor (or mine employee) will report any accidents or spills during delivery immediately as per the Spill Contingency Plan (EMP 17).

3.3 Storage

Fuel will be stored away from ignition sources and environmentally sensitive areas, with consideration of site drainage and surface flows and pathways to the nearest waterbody. These storage sites will be well ventilated, and the areas will be designated as non-smoking. Sites will be equipped with fire extinguishers and spill kits and anti-spill devises like drip pans, interceptor drains, high level sensors, and one-way valves. Signage will be posted at all fuel storage areas for the purpose of controlling and/or restricting access to the area.

BMPs related to bulk fuel storage include the following:

- Storage tanks for combustible and flammable liquids will be built and maintained in accordance with current standards (eg. Underwriters Laboratories of Canada (ULC) tank specifications, and bear a current ULC certification plate or label);
- Aboveground storage tanks will be installed on firm foundations designed to minimize uneven settling and corrosion, and to prevent the design stress of the tank from being exceeded;
- Aboveground storage tanks, which will be out of service for a period not exceeding 180 days, will be isolated by closing and securely locking the necessary valves, or by capping the piping from the tank;
- Tanks will have a minimum 1 m separation between them;
- Current certification plates or labels will be checked to ensure that all tanks meet a specified engineering standard;
- Tanks will be filled to an acceptable safe filling level corresponding to approximately 90% of capacity; and,
- Valves at the storage tank must be constructed of steel according to the Fire Code.

3.4 Dispensing

Fuel dispensing personnel will receive training and must demonstrate an understanding of the procedures and work instructions.

Key components to be included in the fuel handling procedures include:

- Fuel dispensing system will meet applicable regulations and codes;
- Fuelling to be conducted outdoors;
- Dispensing fuel with approved hose-reel and automatic closing nozzles;
- An automatic shut-off nozzle must be used when using an integral hold-open device;
- Tanks must not be filled beyond their safe filling level;
- Measures to ensure no overfilling of tanks;
- Operators will always stay with the nozzle during refuelling;
- Precipitation will not be allowed to accumulate within containment area;
- Monitoring and reporting of any release (reportable or not) should they occur; and,
- Oil/water separators installed where necessary.

3.5 Handling and Use

- WHMIS MSDS will accompany all petroleum-based fuel products and will be made available to all employees working with or in the vicinity of such products;
- All petroleum based fuel products will only be handled by personnel with TDG and WHMIS training and the appropriate certifications for handling explosives;
- Appropriate placards will be visible on all four sides of any fuel truck or mobile refuelling trailer that is greater than 2,000 L whether filled or empty and all fuel handling procedures will be posted;
- All vehicles used to transport fuel and all fuel system locations must have spill response kit, capable of containing and absorbing fuel spills;
- Legible operating instructions will be clearly posted at card or key activated dispensers and emergency instructions will be conspicuously posted;
- Refueling equipment from a tank vehicle will be permitted if the following conditions are met:
    - The fuelling is conducted in connection with commercial or industrial operations;
    - The fueling is conducted outdoors on commercial or industrial establishments;
    - The fuelling is conducted using approved hose-reel and automatic closing nozzles; and
    - Appropriate draining and equipment are supplied to deal with any incidental spillage.

- Fueling and servicing of equipment will not occur within a riparian management area of a stream or wetland, or within 30 m of a lakeshore, unless:
    - The equipment is hand held; or
    - The fuelling or servicing is required for carrying out fire fighting activities, required to move broken down equipment, or authorized by the Environmental Manager.

3.5.1 Safety Considerations

- Sites will be selected that are easily visible and that are located away from high traffic areas;
- Fuel storage areas will be physically protected from collisions with vehicles either by moving the tank vehicle or mobile skid or by placing a barrier between traffic areas and tanks. Fixed dispensers will be protected against collisions by either a concrete island not less than 100 mm high, or guard rails;
- MSDS will be made available at all locations where fuel products are stored and used;
- Signs indicating that ignition must be turned off, smoking is prohibited, and any other fuelling procedures will be visible to all drivers approaching the dispenser; and,
- Two portable fire extinguishers will be available within 9 m of the fuel area and proper bonding, grounding, and isolation components will be established for protection against static charges.

When working with diesel products, the following handling procedures will be followed:

- Do not get in eyes, on skin, or on clothing;
- Avoid breathing vapours, mist, and fumes;
- Do not swallow;
- Wear protective equipment and/or garments if exposure conditions warrant;
- Wash thoroughly after handling;
- Launder contaminated clothing before reuse;
- Use in areas with adequate ventilation;
- Keep away from heat, sparks, and flames;
- Store in a closed container in a well-ventilated area; and,
- Bond and ground during transfer.

When working with unleaded gasoline, the following handling procedures will be followed:

- Avoid skin contact;
- Avoid breathing vapours, mist, or fumes;
- Launder contaminated clothing before reuse;
- Store flammable liquids area away from heat, ignition sources, and open flames; and,
- Bond and ground during transfer.

3.5.2 Spill Response

The Company will implement the management practices and procedures outlined here in the Plan to minimize the potential for spills and the mishandling of fuel products at the mine.

The Plan will be integrated with the Company's EMS, including but not necessarily limited to the Spill Contingency Plan (EMP 17).

Spill response procedures for petroleum-based fuel products are described in more detail in the Spill Contingency Plan (EMP 17). The Plan and Spill Contingency Plan will be updated prior to the commencement of construction as more detailed information on petroleum-based fuel products storage and handling needs are developed in conjunction with Project design. Updates to the Plan will include additional details such as those relating to transportation, storage locations, contractor certifications, petroleum-based fuel products handling, employee training programs, work instructions, inspections, reporting, documentation, and details of continual improvement initiatives.

3.6 Environmental Measures

The environmental protection measures relating to fuel management include reasonable practices and procedures aimed at minimizing the risk of a negative environmental effect (i.e., release to ground or water) and equipment and storage facilities designed with best available technology to minimize the risk of the release of fuel to the environment.

Environmental protection measures are incorporated into the transportation, storage and handling measures for petroleum fuel products as described above and in other EMP's as or in addition to those as summarized below:

- The Project facilities will be sited and designed to minimize the risk of accidents and/or malfunctions from occurring and to minimize the potential impact from a release of a deleterious substance from an accident and/or malfunction;

- Fuel will be stored away from ignition sources and environmentally sensitive areas, with consideration of site drainage and surface flows and pathways to the nearest waterbody;

- The Company will maintain a supply of spill response and clean up equipment on site throughout the various construction sites;

- The Company will employ a site based Environmental Manager in advance of the commencement of construction to ensure that suitable environmental precautions and standards are being employed;

- The mine access road will be constructed to accommodate safe passage of trucks hauling potentially hazardous commodities to and from the FMS Mine Site including petroleum products. The road will be closed to public access and speed limits will be established and enforced to prevent accidents. The road will be maintained by site-based personnel or a contractor to ensure that trucks are travelling on a safe road surface during both summer and winter conditions;

- A containment area will be designed to contain a minimum of 110% of the volume of the largest tank. If small fuel tanks (not including 205 L barrels) are required for refuelling they will either be double-walled "Envirotanks" or will also have either a containment berm or a sealed concrete containment area. All areas where petroleum products are stored or handled will have fire extinguishers and spill kits in clearly visible areas;

- Site wide procedures will be developed and employed to regulate where and how field refuelling and servicing activities are to occur. These procedures will be a term of contract for all site construction contractors. Such procedures will dictate that re-fuelling and servicing cannot take place in close proximity to water bodies or into areas where spills can easily reach watercourses; for example,

  - Refuelling and servicing of mining equipment will take place either within the boundaries of the open pit or at designated sites where spills relating to accidents and malfunctions can be contained;

  - Equipment will not be serviced, refuelled, or washed within 100 m of the watercourse or in areas that may receive runoff that could potentially enter the watercourse;

  - All hydraulic, fuel, and lubrication systems of equipment working in the vicinity of a watercourse will be in good repair to prevent leakage and deposition of deleterious substances into the water.

- All petroleum products no longer required will be removed from the site once mining cease;

- Petroleum waste products will be handled in accordance with the Hazardous Material Management Plan (EMP 11) and all relevant legislation. Spills will be recovered and contaminated soil will be treated or removed from the site.; and,

- The Plan and Spill Contingency Plan will be updated prior to the commencement of construction as more detailed information on petroleum-based fuel products storage and handling needs are developed in conjunction with Project design. Updates to the Plan will include additional details such as those relating to transportation, storage locations, contractor certifications, petroleum-based fuel products handling, employee training programs, work instructions, inspections, reporting, documentation, and details of continual improvement initiatives.

4.0 IMPLEMENTATION

All Petroleum products will be transported to the FMS Mine Site and transferred to bulk storage tanks by a licenced contractor in compliance with TDG and WHMIS legislation, and handled by the Company employees and contractor personnel with TDG and WHMIS training. All necessary documentation, including manifests and WHMIS MSDS will be required to accompany each product and will be made available to all employees working with or in the vicinity of such products.

4.1 Roles and Responsibilities

The Company will be responsible for ensuring that overall site performance objectives and protection measures are achieved under the Plan.

4.1.1 General Manager

- The General Manager has overall responsibility for ensuring compliance with all regulatory requirements on the FMS Mine Site, and with meeting corporate standards and policies including those of the Company's EMS;
- Routine monitoring and maintenance of fuel storage facilities will be the responsibility of the operations personnel responsible for the area in question; and

- Operating personnel will record and report to their respective supervisors and superintendents on any incidents within the purview of this Plan, who will then inform and report to the Mine Manager; who will then inform and report to the General Manager.

4.1.2 Environmental Manager

- The Environmental Manager will be responsible for the oversight of the Plan. The Environmental Manager will inform and report to the General Manager; and,
- All employees, contractors, and contractor employees are responsible for complying with the intent of this plan.

4.1.3 Safety Manager

- The Safety Manager will be responsible for the oversight of the Health and Safety Plan (EMP 10), which includes the implementation of practices and procedures and training in respect of the safe handling of fuel products;
- The Safety Manager will coordinate with the Environmental Manager in all matters pertaining to compliance with the intent of this plan; and,
- The Safety Manager along with the Occupational Health and Safety Committee (OHSC) will participate in inspections and reporting pursuant to the Plan as it pertains to their responsibilities under the Health and Safety Plan (EMP 7).

4.2 Training

Qualified personnel will be employed throughout the life of the Project to supervise, direct, monitor, and implement the management actions required by this Petroleum Management Plan.

Personnel requiring specific training will be identified by the Company and will receive such training prior to assuming any related responsibility. All employees will be made aware of the general issues and concerns surrounding the use of petroleum-based fuel products as part of their routine health and safety induction and training.

Details on spill response training are provided in the Spill Contingency Plan (EMP 17). Spill response training needs will be assessed and implemented annually as provided for in the Spill Contingency Plan (EMP 17).

The following is a summary of recommended training BMPs to be considered and implemented as required and/or appropriate throughout the life of the Project.

4.2.1 Fuel Dispensing Attendants

Fuel dispensing attendants will be trained in procedures for:

- Supervising the dispensing of flammable and combustible liquids;
- Taking appropriate measures to prevent sources of ignition from creating a hazard at the dispensers;
- Taking appropriate action in the event of a spill to reduce the risk of fire; and,
- Shutting off the power to all dispensers in the event of a spill or fire.

4.2.2 Drivers

- Only experienced drivers with a TDG certificate and Emergency Response Training will transport bulk fuel.
- Drivers who transport bulk fuel may also receive training through the Canadian Petroleum Producers Institute (CPPI).

4.3 Inspections, Record Keeping and Reporting

Routine monitoring of fuel storage facilities will be the responsibility of the operations personnel responsible for the area in question. Bulk storage fuel tank will be inspected and maintained by the Site Services Department. The Environmental Manager and/or Safety Manager will ensure that inspections of the fuel storage facilities are conducted and records of inspection maintained. The Environmental Manager or Safety Manager will coordinate with the Mine and Mill superintendents with respect to any fuels used in their areas of responsibility.

Designated staff will supervise and report on all fuel product transfers from delivery vehicles to site storage tanks.

Storage facilities will be inspected regularly for leaks or non-compliance with policies, plans, and procedures. Inspections will include tanks, pipelines, connections, valves, gauges and meters, sumps and separators, and inventory records. Inspections will be recorded in a systematic manner and such records will be maintained.

The following is a proposed inspection schedule for fuel storage facilities.

- Fuel tanks should be inspected monthly by the responsible departments and annually by the Environmental Supervisor and Safety Manager and/or OHSC. The inspection of on-site fuel tanks will involve:
    - Examination of all tanks and pipelines and connections for evidence of leaks and proper fitting;
    - Examination of bunded area for evidence of leaks;
    - Examination of fill records;
    - A record of all volumes before and after deliveries will be kept;
    - Inspection of quantity gauges and meters;
    - Inspection of oil water separator sump for proper operation;
    - If the tank is on a cradle, so that the bottom of the tank is exposed, the bottom of the tank will be visually inspected; and,
    - Reporting and filing of inspection results with the Mine and Mill Superintendents.
- Diesel gensets will be inspected monthly by the responsible department. The inspection of the diesel gensets will include:
    - Examination of holding tanks and pipelines and connections for evidence of leaks;
    - Examination of fill records;

    - A record of all volumes before and after deliveries will be kept;
    - Determination of volume of contents and verification against records; and
    - Reporting and filing of inspection results with the responsible Superintendent.
- Other fuelling stations will be inspected weekly by the responsible departments. The inspection of the other fuelling stations will include:
    - Examination of tanks and pipelines and connections for evidence of leaks and proper fittings;
    - Examination of bunded area for evidence of leaks;
    - Examination of fill and dispensing records;
    - A record of all volumes before and after deliveries will be kept;
    - Inspection of quantity gauges and meters;
    - Inspection of oil water separator sump for proper operation; and
    - Reporting and filing of inspection results with the Mine and Mill Superintendents.

Any containment structures that are subject to accidental damage will be inspected immediately and appropriate repairs will be undertaken. Results of the inspection and the repairs will be reported to the Mine, Mill, Environmental, and Safety and Security Managers or designates. The report will include information on the extent of damage, as well as remedial repairs, date of repairs, and any follow-up inspections. Any sites that require cleanup of contaminated soil will be undertaken in compliance with applicable requirements.

Regular inspections will be conducted and documented to ensure that fuel trucks and mobile refuelling tanks meet all safety specifications. Visual inspections of the piping system, pumps and ancillary equipment for leaks, spills, and obvious abnormal conditions will be made by the operator prior to use and/or at the start of each shift. Any leakage will be repaired immediately.

Where a fuel-related emergency or spill incidents occur, these will be reported per the requirements of the Spill Contingency Plan (EMP 17).

- Where required, reports will be forwarded to relevant government agencies as stipulated by regulations and licences.

4.4 Coordination with other Management Plans

The Plan will be integrated with the Company's EMS to be implemented throughout the mine life. The Plan along with the Spill Contingency Plan have been designed to ensure that practices employed during the each of the construction, operation and closure phases of the Project minimize the effects of the mine and promote the protection of the environment and human health.

In the event of upset conditions related to fuel the Environment Department, as described in the Spill Contingency Plan will launch an investigation of the incident. Together with the Environment Department, the Company's management team, and relevant health and safety personnel (as appropriate), a joint incident investigation and root cause analysis will be undertaken. The findings of the investigation will serve to modify the Plan if the investigation shows that shortcomings pertained.

4.5 Adaptive Management and Continual Improvement

Certain components of the Plan may need to be modified based on site experience and conditions. The Plan will be reviewed on a regular basis. The procedures will be compared to revised regulations and/or guidelines to ensure they are up to date. Inspections and audits will help identify opportunities for improvement and overall effectiveness of the Plan, and to identify components needing correction, adjustment, or upgrading. A reportable release of fuel to ground or water will trigger a full review of the Plan.

Formal evaluations of the Plan shall be documented, with deficiencies noted and corresponding 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.

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Fifteen Mile Stream Gold Project

Environmental Management System

EMP 17

Spill Contingency Plan

Highway 374

Trafalgar, Nova Scotia

DRAFT
Version 001
February 8th, 2021

Atlantic Gold

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The Fifteen Mile Stream Gold Project (the Project) is an open pit gold mining and milling operation being developed by Atlantic Mining NS Inc, a wholly owned subsidiary of St Barbara Limited, ('the Company") in Nova Scotia, Canada. The Company has designed and will implement a series of management procedures and monitoring programs that integrate engineering design and environmental planning to maximize the mitigation of potential impacts of the mine on the environment.

The individual plans together with supporting documentation form the basis for a comprehensive Environmental Management System (EMS) to be implemented throughout the mine life. The plans have been designed to ensure that practices employed during each phase of the Project minimize the effects of the mine and promote the protection of the environment and human health.

The Spill Contingency Plan is an important component of this system, and it will be designed to coordinate and effectively respond to any and all spill of potentially deleterious substances. The goal of the Spill Contingency Plan is:

- To ensure and maintain a high standard of spill response training for mine personnel;
- To identify and ensure adequate resources are available on-site and off-site in order to facilitate effective spill response, and ensure adequate worker training has been undertaken; and
- Provide a clear of understanding of the external and internal response structure, including the required notifications to the Company and other regulators and stakeholders.

To provide regulators and stakeholders context for evaluation of this future plan in relation to the Environmental Impact Statement, the Touqouy Mine Spill Contingency Plan has been attached to this document for reference. The Spill Contingency Plan for the Fifteen Mile Stream Mine Site is to have a similar approach, format and content, with the notable exception that the plan will be fully directed to the specifics of the Project. The EMS framework document provides additional discussion and objectives for this plan within Section 3.17.

Atlantic Gold

ATLANTIC GOLD

Spill Contingency Plan

AGC-PLN-ENV-001

RELEASE DATE

August 26, 2020

DOCUMENT REVISION RECORD

Pages affected by the current revision are listed in the table below and are identified by hash marks (lines) on the right side of the affected pages.

Table to be completed by AG GM (or Assistant) Only					
Revision Level	**Revised By**	**Date MM/DD/YYYY**	**DC Approved**	**DC Release Date**	**Pages Affected**
01	Danielle Finlayson-Bourque	08/08/2017			
02	RK/BB/JA	03/01/2019			All
03	JA/MN/LS/BM	08/24/2020			All

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1. INTRODUCTION

1.1 Purpose

This Spill Contingency Plan (SCP) provides a plan of action for prevention, response to, and recovery of the uncontrolled release of hazardous material to the environment. This Plan is intended to supplement all site Emergency Response Plans (ERP) and should be read in conjunction with the ERP.

1.2 Scope

This Plan applies to Atlantic Mining NS Corporation's (AMNS's) Moose River Consolidated Project at the Touquoy Mine. AMNS is a wholly owned subsidiary of St Barbara Limited.

The SCP identifies potential spill scenarios that could occur during the operation of the Moose River Consolidated Project and establishes the framework for response and recovery from such an event. This framework includes personnel responsibilities, training, spill response/containment/cleanup procedures, notification and reporting requirements. All AMNS employees and contractors are required to comply with both the ERP and SCP.

1.3 Health, Safety and Environment Policies

AMNS is committed to providing a healthy and safe work environment for its employees and integrating that commitment into our everyday activities. We believe all accidental loss of resources, including employee and physical assets, is preventable.

As a company, we acknowledge our responsibility to the environment and to local communities in which we work and do business. AMNS actively encourages its staff to recognize these responsibilities and behave in a positive manner toward the society in which we function.

2. PROJECT DESCRIPTION

2.1 Location

The Touquoy Mine is located at 409 Billybell Way, Mooseland, Halifax Regional Municipality, Nova Scotia, approximately 110 km northeast of Halifax, NS (Figure 2.1.1). The Touquoy Mine comprises a total area of approximately 1760 hectares, encompassing 70 parcels of land. The major Project components include the Plant Site, Open Pit Mine, Tailings Management Facility (TMF), Waste Rock Storage Area (WRSA), and ancillary features including topsoil, organics and till stockpiles, and haul roads.

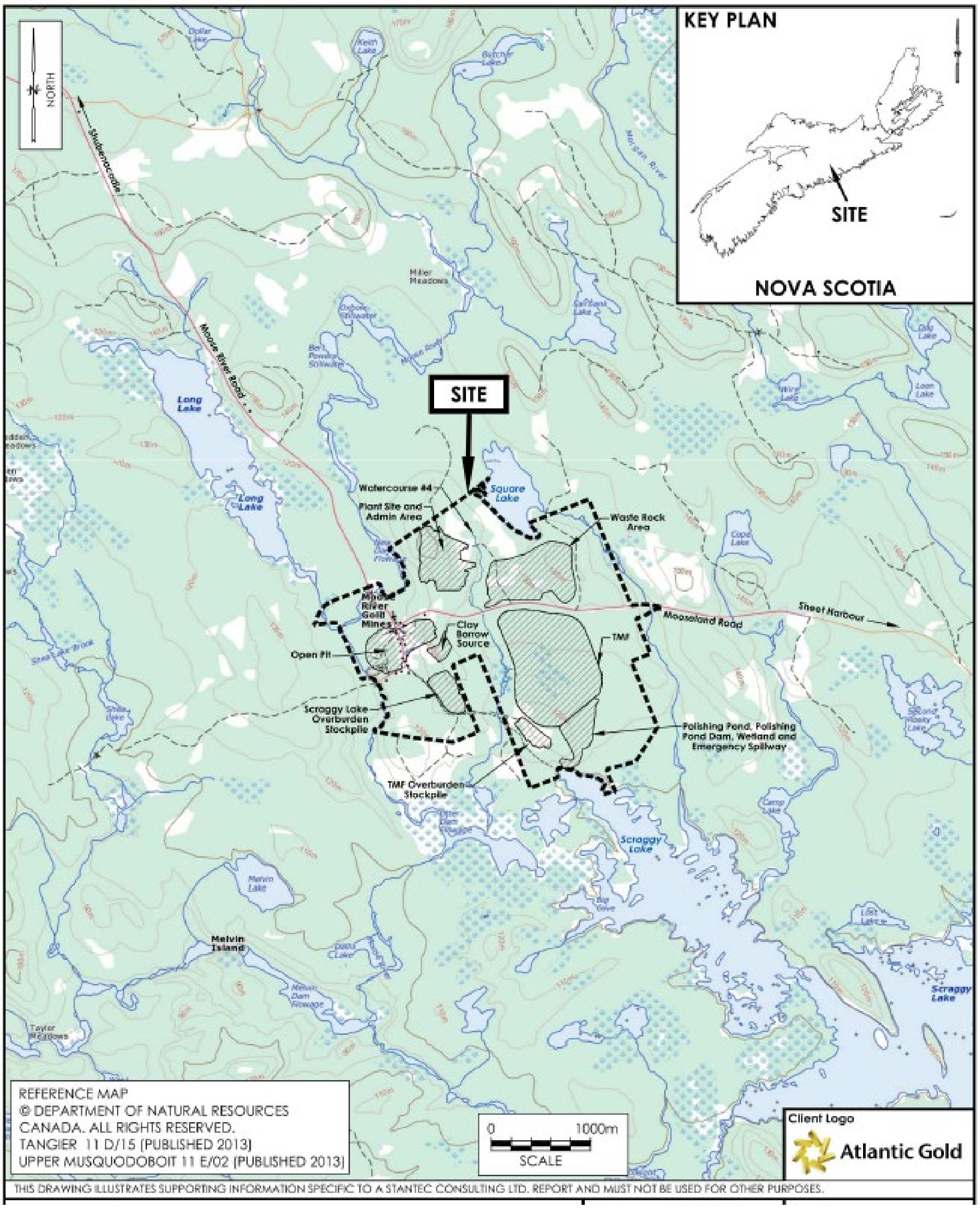


Figure 2.1.1 General Site Location

2.2 Nature of Activities

The Touquoy Mine, part of the Moose River Consolidated Project, is a fully permitted gold mine that began construction in 2016. Full operation of the site commenced in fall 2017. Site areas associated with major project components include the Mill Site, Open Pit Mine, Tailings Management Facility, Waste Rock Area, and ancillary facilities. Drawing-1 of Appendix A shows major project components and storage areas of bulk hazardous material located on the project site. Hazardous material is used and stored on-site for mill processing, equipment operation, and blasting activities. A list of hazardous material can be found in Appendix I.

3. DEFINITIONS

Term	
Ammonium Nitrate (AN)	The most commonly used oxidizer in explosives and blasting agents.
Corrosive Agent	A substance that has the power to cause irreversible damage or destroy another substance by contact.
Emergency	A serious unplanned event that poses potential harm to health, safety, production, equipment or environment that requires immediate action.
Emergency Response Coordinator (ERC)	Person responsible for the management of incident activities at the site of the emergency.
Emergency Response Plan (ERP)	A course of action developed to mitigate the potential damage of serious sudden or unplanned events that have the potential to endanger health, safety or business continuity.
Emergency Response Team (ERT)	A group of employees trained in emergency response and rescue that provide the field response activities to an emergency.
Emulsion	An explosives material containing substantial amounts of oxidizers suspended in water droplets surrounded by an immiscible fuel.
Hazardous Material	An item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.
Haze(ing)	Hazing is a process where you disturb the animal's sense of security to such an extent that it decides to leave and move on.
Hydrocarbon	A compound of hydrogen and carbon, such as any of those that are the chief components of petroleum and natural gas.
NSE	Nova Scotia Department of Environment. Environmental regulatory body.
Process Water	Water which is used in connection with mining operational processes.
Rehabilitation	The action of restoring something that has been damaged to its former condition.
Senior Management Response Team (SMRT)	A group consisting of department managers and/or supervisors that provide internal resources (people, equipment, materials) to support the emergency response activities. An authority structure in which the role of the incident commander is shared.
Spill	A release of a hazardous product out of its containment and into the environment.
Spill Contingency Plan	A comprehensive plan of action for spill prevention, response to, and recovery of hazardous material released (spill) to the environment (land or fresh water). The plan also identifies the resources and their locations that are needed to implement spill response.
Tailings Management Facility (TMF)	The Tailings Management Facility (TMF) receives process water and tailings from the mill via tailings slurry. Additional water is pumped to

Term	
	the TMF from stormwater discharge, seepage collection ditches, and open pit dewatering. Discharge from the TMF flows through an effluent treatment plant (ETP) to a polishing pond, then to a constructed wetland, before being released to Scraggy Lake.
Tailings Slurry	Tailings are the ore waste from mining processes. These wastes are mixed with water, creating a slurry.

4. ROLES AND RESPONSIBILITIES

The general responsibilities of both internal and external responders during an emergency are outlined in the site ERP and presented in the table below:

General Manager	• Ensure appropriate resource availability for ERT and SMRT • Responsible for timely and effective communication of events as per reporting and notification structure • Liaise with regulatory agencies when required (incl. NSE, LAE NS OHS Division, DNR, etc.)
Department Manager	• Provide timely and effective communication of ERP to department personnel • Participate in timely and effective communication during an event as per reporting and notification structure and procedures
Emergency Response Coordinator (ERC)	• Act as liaison between ERT and H&S Manager • Provide scene control and direction in the event of an emergency
Emergency Response Team (ERT)	• Act as first responders in the event of an emergency • Provide area control in specific emergency circumstances • Work under the direction and oversight of the ERC
Health and Safety Department	• Act as liaison between ERC and site management; chiefly the site General Manager • Provide situational updates to the SMRT as necessary and as per notification and reporting procedures • Liaise with external OHS regulators
Environmental Department	• Act as liaison between ERC and site management as required in any type of environmental event • Provide situational updates to the SMRT as necessary and as per notification and reporting procedures related to environmental events • Liaise with external environmental regulators • Provide secondary assistance to ERC in regards to scene control and ERT direction as necessary during environmental events • Assist as subject matter experts related to spills and remediation
Human Resources Department	• Provide personnel information to emergency services if necessary
Superintendent / Supervisor	• Provide area subject matter expertise as requested during an emergency event; provide direct support if requested
Employees / Business Partners	• Review and acknowledge requirements and procedures outlined in SCP
Technical Consultants (Including Engineer of Record)	• Provide technical input in the case of an emergency or potential emergency.

5. REGULATORY FRAMEWORK

The SCP has been developed and implemented to ensure that AMNS respects all applicable laws, regulations, and requirements from federal and provincial regulatory bodies.

As required by AMNS's Industrial Approval (2012-084244-06 Condition 23), the contingency plan is developed in accordance with Nova Scotia Environment's (NSE) *Contingency Planning Guidelines* (NSE 2016).

The following federal and provincial statutes and regulations also apply to spill contingency planning, response and reporting.

Canadian regulatory agencies administering explosives:

- Transportation of Dangerous Goods (TDG)
- Natural Resource Canada (NRC)

Nova Scotia *Environment Act:*

- *Dangerous Goods Management Regulations*
    - *Environment Act, Section 84 - Dangerous Goods Management Regulations (amended to N.S. Reg. 57/2016)*
- *Environmental Emergency Regulations*
    - *Environment Act, Sections 74, 136 and 171 and subsection 122A (3) - Environmental Emergency Regulations (N.S. Reg. 16/2013)*
- *Contaminated Sites Regulations*
    - *Environment Act, Clause 25(1)(g) and Section 91 - Contaminated Sites Regulations (amended to N.S Reg. 36/2020)*
- *Petroleum Management Regulations*
    - *Environment Act, Sections 25 and 84 - Petroleum Management Regulations (N.S. Reg. 44/2002)*
- *Approval and Notification Procedures Regulations*
    - *Environment Act, Section 66 - Approval and Notification Procedures Regulations (amended to N.S. Reg. 8/2017)*

Nova Scotia *Occupational Health and Safety Act:*

- *Workers' Compensation General Regulations, Section 184 – Workers Compensation Act (amended to N.S. Reg. 183/2018)*
- *Workplace Hazardous Materials Information System (WHMIS) Regulations*

Occupational Health and Safety Act, Section 82 - Workplace Hazardous Materials Information System (WHMIS) Regulations (amended to N.S. Reg. 143/2014)

Contaminated Sites Regulations

Spills that occur may be subject to the *Contaminated Sites Regulations* and the following protocol:

> "The *Notification of Contamination Protocol* provides requirements for notification when required under Section 8 and Section 9 of the Contaminated Sites Regulations. The protocol addresses two contamination situations: a) free product presence in soil or groundwater; and b) soil, sediment, surface water or groundwater contamination." (NSE 2013)

Remediation of the spill site may proceed as prescribed by the *Contaminated Sites Regulations* under the direction of a qualified site professional.

6. APPROACH TO SPILL RESPONSE

A spill is defined as the uncontrolled release of a hazardous product out of its containment and into the environment. Such releases may result in potential hazards to humans, vegetation, water resources, fish and wildlife which vary in severity, depending on several factors including the nature of the spilled material, quantity spilled, location and season.

There are generally two types of spills that could occur:

Operational Spills

Spills of this nature result from the mine or mill operations. The area of concern in this context is the immediate vicinity of the Touquoy Mine site. Spilled material could include reagents, diesel fuel, gasoline, tailings slurry and/or process water to on-site land, waterbodies, watercourses, or wetlands.

Carrier Spills

These are spills which could result from an isolated incident. Spills of this nature normally involve an independent carrier or a site vehicle and would occur on the site access/haul roads or on the public roads. Most spills would likely be on land, however since roads do cross watercourses there is potential danger of these spills entering a water system.

AMNS requires all site personnel to be trained on the specific procedures required for spill response initiation and reporting. All site personnel must comply with the following procedure upon initiation of a spill involving a regulated substance:

- Immediately warn other personnel working near the spill area;
- Evacuate the area if the health and safety of personnel is threatened;
- In the absence of danger, and before the ERT arrives at the scene, take any safe and reasonable measure to stop, contain and identify the nature of the spill;
- Notify the Environmental Department, who will aid in spill response operations as required. Notification of the area Supervisor is also required; and
- Complete necessary reporting documentation

6.1 Response Process

Upon initiation of spill response, the following procedure shall be completed by site personnel:

Source Control – If safe to do so, reduce or stop the flow of product. This may include actions such as turning off a pump, closing a valve, sealing a puncture, raising a leaking or discharging hose to a level higher than the material inside the tank, or transferring the material to a secondary container.

Contain and Control the Free Product – If safe to do so, prevent or minimize the spread of 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 (socks), dykes, berms, or trenches.

Protection – Evaluate the risk of the impacted area to the surrounding environment. If safe to do so, protect sensitive ecosystems and natural resources at risk by isolating the area and/or diverting the spilled material away from sensitive receptors such as watercourses, water bodies and wetlands.

Report the Spill – Provide basic information such as location, date and time of the spill, type and an estimate of material discharged, cause, photographic records, location, personnel involved, actions already taken to stop and contain the spill, meteorological conditions and any perceived threat to human health or environment.

An accurate record of the time and type of action taken, and people contacted, must be maintained by the on-scene Supervisor or respondent.

Reports shall be completed as per AMNS's Spill Report Incident Heads Up Form or Environmental Incident Report Form (see Appendix B) and emailed to: environmental.incident@atlanticgold.ca

Spill Clean-up – Recover and contain as much free material as possible. Ensure proper clean-up and spill controls are in place.

6.2 Levels of Emergency Spill Response

To effectively manage emergency response, a tiered emergency classification scheme is implemented. Each level of emergency, based on the significance of the event, requires varying degrees of response, effort and support. The impact on normal business operations will also differ as will the requirements for investigation and reporting. The emergency spill response classifications are defined by the following three emergency levels:

Level 1 Emergency (Low Risk) – Minor accidental release of a hazardous substance with;

- No threat to public safety; and/or
- Negligible environment impact to receiving environment

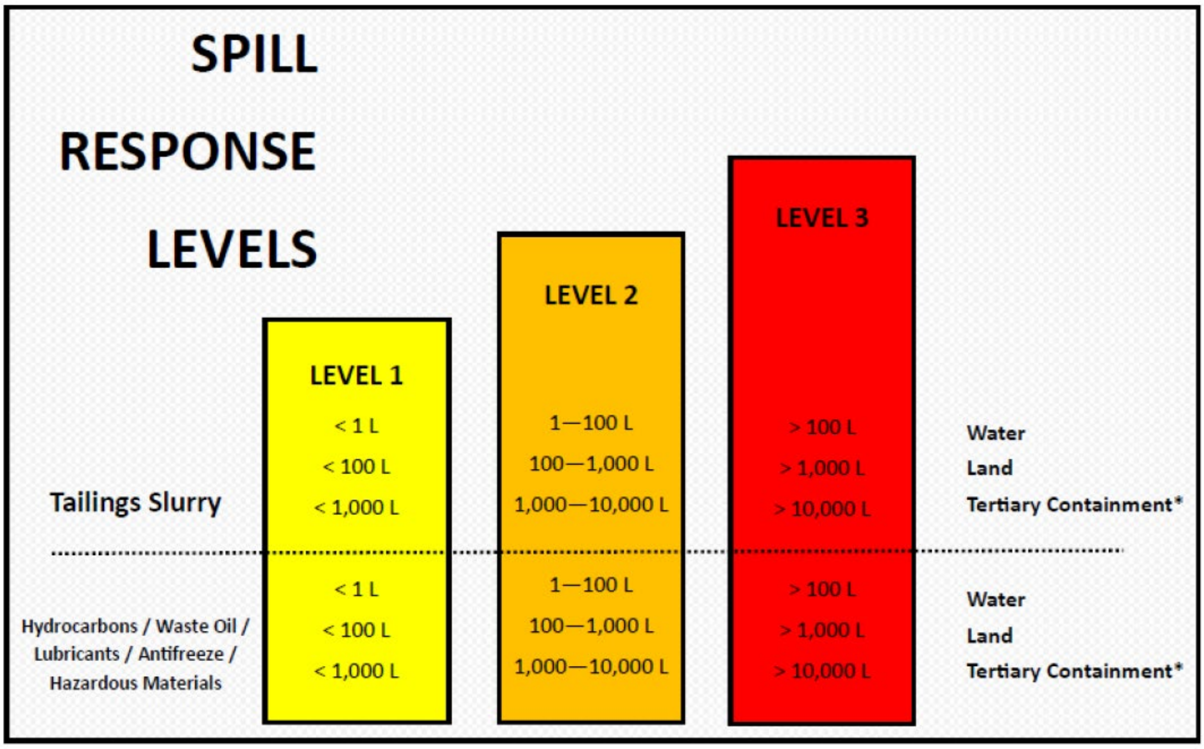
Level 2 Emergency (Medium Risk) – Moderate accidental release of a hazardous substance with;

- Some threat to public safety and threat to project personnel safety; and/or
- Moderate environmental impacts to receiving environment

Level 3 Emergency (High/Extreme Risk) – Major accidental release of a hazardous substance with;

- A threat to public safety and jeopardizes project personnel safety; and/or
- Significant environmental impacts to receiving environment

Emergency response levels are determined by the potential impact to human and environmental health. The potential impact is based on substance released, quantity spilled, and receiving environment. This includes specific consideration given to spills occurring within engineered secondary containment. In general, a level 1 (low risk) incident would be a spill of any hazardous product that the discoverer, or other personnel within close proximity of the incident can competently, safely, and efficiently manage in terms of assessment, prevention, containment and clean-up. In general, A level 2 or 3 emergency spill response classification is a release of a hazardous product where there is potential for that product to enter a watercourse, wetland, or waterbody, and/or cause significant danger to life, health or environment. Consultation with the Environmental Department and SMRT may be needed to correctly classify emergency level.



*Engineered containment ditches or collection ponds

ANY accidental release of a deleterious substance into a fish habitat is reportable to regulatory authorities

Figure 6.2.1: Spill Response Levels

6.3 Reporting

6.3.1 Internal Reporting Requirements

All spills (whether reportable externally or not) must be reported by the first responder to their immediate supervisor and then to the Environmental Department following assessment of the scene.

Responsible department supervisors are required to document the spill and provide notice to the Environmental Department within 4 hours of the spill occurrence. Documentation should be completed via the AMNS Spill Report Incident Heads Up Form (ENV FRM-001), provided in Appendix B. The Heads-Up form requires an initial assessment of the spill including spilled material, quantity, location, description of receiving environment, immediate actions taken, and immediate cause. The spill can be reported via the environmental.incident@atlanticgold.ca email address or via phone, depending on the severity. Moderate to high level spills (such as spills of hazardous material over 100L on land or over 10L to water) are to be reported as soon as reasonably practical and safe.

The level of investigation is based on the risk level as determined by consideration of the worst-case realistic scenario (actual and potential consequence). If further investigation is required, the Environmental Incident Report (ENV-FRM-002) provided in Appendix B must be initiated within a reasonable timeframe (72 hours). This report requires inclusion of photos, a description of clean-up activities, subsequent actions, identifies root cause and determines any required corrective actions. This form may not be required for some low-level incidents (i.e., small “routine” spills to land under 30 L).

All external reporting requirements for regulatory agencies shall be completed by the AMNS Environmental Department

6.3.2 Regulatory Reporting Requirements

Under federal and provincial regulations, the Environmental Superintendent or designate will call the 24-hour Nova Scotia Spill Report line should a spill of a reportable quantity occur as per the reportable quantities in Appendix C. Several government agencies at the federal and municipal levels may ultimately be informed through the 24-Hour Spill Report line. The Environmental Superintendent or designate will ensure that the appropriate information is collected before reporting to the Spill Report line. Any reportable spill that occurs on or affects a third party (including leased crow property) must also be reported to the property owner.

Any spill of an amount greater than those listed in Appendix C is a “reportable spill”.

The following information should be provided to the 24-Hour Spill Report line:

- Name
- Distance to drinking water wells
- Phone number
- What happened
- Product spilled
- Responsible party
- Quantity spilled
- Actions to contain the spill
- Quality of product (thin, viscous etc.)
- Location of spill
- Distance to water

Most reportable spills are formally reported to NSE by the Environmental Department using regulatory approved templates. Depending on the nature of the spill, NSE and/or Environment Canada may require the spill clean-up efforts and reporting be completed by an independent contaminated sites professional.

6.4 Public Relations

In the case of a large environmental release occurring, it should be expected that local, regional and national media may reach out to employees or stakeholders of the organization in an attempt to receive information or to attempt to confirm information that may have already been received. As employees of Atlantic Gold, it is vitally important to remember a few points when approached with these types of questions:

- The Chief Executive Officer is responsible for speaking externally on Atlantic Gold's behalf. Others can be designated to speak, however that designation is on a case-by-case basis and needs approval by the individual above.
- If you receive a media request, please ask the member of the media to identify themselves and the media outlet they represent. At that point, you are asked to direct them to make their inquiry to Atlantic Gold's Communications Manager.
- Employees who receive outreach from media sources are also asked to report those interactions to the Communications Manager themselves to ensure all information requests are followed up on.

The full copy of the Atlantic Gold Communication Policy can be found in Appendix E.

7.0. EMERGENCY SPILL RESPONSE PROCEDURES

7.1 General Spill Procedures

The following general emergency response procedures should be followed as soon as a spill occurs or is detected by site personnel. This procedure may differ on a case-by-case basis, specific spill scenarios and response are discussed further detail in Appendix H.

- Ensure your personal safety and the safety of personnel in the vicinity
- Contact your immediate Supervisor
- If required based on the nature of the event as specified by the site ERP, contact ERT. Remove personnel from spill site.
- Don additional protective clothing (respirator, Tyvek, etc.) if appropriate to deal with the spill as per SDS.
- Absorb any liquids with appropriate absorbents from a spill kit.
- Prevent liquids or spill material from entering watercourses, streams, etc. by diking or by digging ditches to contain the spill.
- Take other actions as directed by the Emergency Response Coordinator (ERC).
- Delineate the spill area.
- Remove contaminated clothing/PPE, place in plastic bag and seal for disposal at an approved location.

The general investigative actions for a spill should include the following:

- Estimate quantity spilled.
- Delineate the area of contamination through visual identification. Sampling and analytical testing of spilled material, soil and/or water may be required with support from the Environmental Department.
- Evaluate available clean-up technologies (excavation, skimmers, vacuum trucks, booms, absorbent pads, etc.).
- Assess impact of clean-up on environment.
- Continuously evaluate worker safety.
- Evaluate treatment and/or disposal options.
- Assess root cause and develop corrective actions to prevent future occurrences.

7.2 Spills on Land

For small spills, a spill kit should be deployed to control the migration of the spill and to facilitate the cleanup.

For larger spills, the main spill control techniques involve the use of two types of barriers: dykes and trenches. These barriers should only be constructed if it is deemed safe to do so. Barriers should be placed down gradient from the source of the spill. Barriers slow the progression of the spill and also serve as containment to allow recovery of the spill.

Depending on the volume spilled, the site of the spill, as well as available material, a dyke may be built with soil, booms, lumber, snow, etc. A plastic liner should be placed at the foot and over the dykes to protect the underlying soil or other material and to facilitate recovery of the spill. Construct dykes in such a way as to accumulate a thick layer of free material in a single arc (V shape or U shape).

Trenches are useful in the presence of permeable soil and when the spilled material is migrating below the ground surface. A plastic liner should be placed on the down-gradient edge of the trench to protect the underlying soil. Liners should not be placed at the bottom of the trench to allow water to continue flowing underneath the layer of floating contaminant if applicable.

The use of large quantities of absorbent materials to recover large volumes of spilled fluids should be avoided. Large volumes of free-material should be recovered and containerized, as much as possible, by using vacuums and pumps appropriate for the material. Mixtures of fuel and water may be processed through an oil-water separator in the event of a hydrocarbon spill. Absorbent sheets should be used to soak up residual fuel on water, on the ground, and on vegetation.

Hazardous material is collected using techniques mentioned above and stored within appropriate containers. The hazardous material is then transported off-site by an approved contractor for disposal at an appropriate facility.

7.3 Spills on Water

Responses to spills on water include the general procedures previously detailed. Various containment, diversion and recovery techniques are discussed in the following sections. The following elements must be considered when conducting response operations:

- Type of water body or water course (lake, stream, river);
- Water depth and surface area;
- Wind speed and direction;
- Type of shoreline;
- Seasonal considerations (open-water, frozen); and
- Behavior of spilled product when mixed with water (i.e. hydrocarbons will float on water surface).

Containment of hydrocarbons (fuel, gas, oil) on water requires the deployment of mobile floating booms to intercept, control, contain and concentrate the floating oil. For a large lake (such as Scraggy Lake), typically, one end of the boom is anchored to shore for recovery using a skimmer. Reducing the surface area of the slick will consequently increase the oil thickness and increase recovery. Mechanical recovery equipment (i.e. skimmers and oil/water separators) will need to be mobilized to site if required.

If hydrocarbons are spilled in a water body such as Scraggy Lake, it may not be possible to deploy booms using a boat. In this case, measures are taken to protect sensitive (wetlands) and accessible shoreline. The fuel slick is monitored to determine the direction of migration. In the absence of strong winds the oil will likely flow south towards the discharge of the lake; however, given the narrowness of the north end of the lake, a spill could be captured within 500 m of the TMF with only 200-300 m of boom to prevent flow to the south and protect critical shoreline habitat in this area. In fact, several strings of boom of this length could be used across the north end of the Lake to reduce the movement of oils and to protect shorelines. Measures will be taken to block and concentrate the oil slick on the lake using booms where it will sequentially be recovered using a portable skimmer, a vacuum, or sorbent materials.

In small slowly-flowing streams, channels, inlets or ditches, inverted weirs (i.e. syphon dams) are used to stop and concentrate moving fuel spills for collection while allowing water to continue to flow unimpeded. In both cases fuel will then be recovered using a portable skimmer, vacuum, or sorbent material.

In the unlikely case of a spill in Moose River, diversion booming is used to direct the oil slick ashore for recovery. Single or multiple booms (i.e. cascading) may be used for diversion. Typically, the booms are anchored across the river at an angle. The angle will depend on the current velocity. Choosing a section of a river that is both wider and shallower makes boom deployment easier. Diversion booming may also be used to direct oil slick away from a sensitive area to be protected.

Hazardous material is collected using techniques mentioned above and stored within appropriate containers. The hazardous material is then transported off-site by an approved contractor for disposal.

In the event of a process water or tailings slurry spill near a watercourse, depending on the volume spilled, the site of the spill, as well as available material, a dyke or trench may be built to divert and/or capture the spilled material prior to the watercourse. The material can then be disposed of within the TMF or processed through the Mill process dependent on cyanide concentrations. This can be done with the use of a hydrovac or by portable pumps.

7.4 Spills on Snow and Ice

In general, snow and ice will slow movement of spilled substances. The presence of snow may also hide the spill and make it more difficult to follow its progression. Snow is generally a good natural sorbent, most spills tend to be soaked up by snow through capillary action.

However, the use of snow as absorbent material is to be limited as reasonably practical. Snow and frozen ground also prevent spills from migrating down into soil or at least slow the process. Ice prevents seepage of spilled substance into the underlying water body.

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 ice) slow the progression of the spill and serve as containment to allow recovery.

Free-material is recovered by using a vacuum, a pump, or sorbent materials. Contaminated snow and ice are scraped up manually or using heavy equipment depending on volumes. The contaminated snow and ice are placed in containers or within lined berms on land. The contaminated material may be managed in the TMF (in the case of a tailings slurry or process water spill) or shipped off-site for treatment/disposal.

Hazardous material is collected using techniques mentioned above and stored within appropriate containers. The hazardous material is then transported off-site by an approved contractor for disposal.

7.5 Wildlife Protection Procedures

When required, the following audible and visual techniques shall be used to prevent wildlife from interacting with spilled product or a contaminated area(s) following a spill;

- Visual scare tactics, i.e. emergency response vehicles or personnel;
- Broadcast sounds, i.e. horns, shouting, hazing equipment;
- Exclusion, i.e. netting or sheeting applied in smaller spill areas.

To minimize environmental impact, these devices are most effective when initiated immediately.

The size of the spill and location in relation to sensitive wildlife areas must be assessed at the time of the event as to correctly apply the appropriate level of deterrence. Only workers trained in the safe and proper use of certain hazing equipment will be permitted to haze wildlife. Personal protective equipment (PPE) will be worn by all personnel using deterrent equipment, as per manufacturer's instructions, with minimum PPE consisting of eye and ear protection.

Hazing should be administered in such a way as to prevent wildlife from entering an area where they may become endangered. It is also important to ensure that hazing efforts do not cause already contaminated animals to scatter away before they are able to receive treatment. Techniques should be applied as soon as possible to prevent wildlife from interacting with spilled product or contaminated areas and becoming oiled or contaminated.

In the event of a spill occurring, the affected areas will be inspected for contaminated or dead wildlife. The collection of said wildlife will be done under the direction of applicable wildlife agencies, Table 7.5.1. Canadian Wildlife Services is required to be consulted and approval shall be obtained prior to disposing of any dead wildlife.

Table 7.5.1 Emergency Contacts in Case of Spills Affecting Wildlife

Name	Location	Phone Number	Purpose
Nova Scotia Department of Lands and Forestry – Wildlife Division	136 Exhibition St Kentville NS B4N 4E5	During work hours 902-679-6091	Wildlife interactions, effects on plants and other species.
Environment and Climate Change Canada - Canadian Wildlife Service - Atlantic Region	17 Waterfowl Lane, P.O. Box 6227 Sackville NB E4L 1G6	Direct: 506-364-5044 Toll Free: 1-800-668-6767	For information on incidental take of migratory birds, their nests and eggs.
Nova Scotia Environment (NSE)	30 Damascus Road, Suite 115 Bedford Commons, Bedford NS B4A 0C1	During work hours Phone: 902-424-7773 Fax: 902-424-0597 After hours 1-800-565-1633	NSE emergency phone line. Can be consulted in case of emergency. After hours is through the Canadian Coast Guard.
International Bird Rescue	International	707-207-0380	Wildlife rehabilitation specialists, that manage various aspects of wildlife response.

7.6 Disposal/Remediation of Contaminated Materials

Appropriate containers as approved by NSE can be used to contain and transport contaminated soil for treatment. In general, metal barrels should be used for any material containing hydrocarbons and plastic barrels for any corrosive agents. Depending on the nature of the spilled contaminant, the soil may be disposed of in the on-site TMF. Table 7.6.1 provides disposal/remediation methods for hazardous material found on-site.

Table 7.6.1 Disposal/Remediation Methods

Hazardous Substance	Disposal/Remediation Method
Hydrocarbons	Remediation to be completed off-site at an approved facility
Reagent Contaminated Soil (small quantity)	Remediation to be completed through the Mill process
Tailings Slurry or Process Water	Disposed of within the TMF or processed through the Mill process dependent on cyanide concentrations.
Other Hazardous Substances	Disposal/Remediation to be completed off-site at an approved facility

7.7 Facilities and Contractors

See Appendix D for key contractor response contacts.

7.8 Equipment and Supplies

Equipment and supplies are necessary for conducting countermeasure activities in the event of a spill. Sources for equipment and supplies is included in Appendix F. A spill kit supply list is included in Appendix G. The location of all spill kits is indicated on the site plan in Appendix A.

7.9 Rehabilitation Procedures

The goal of rehabilitation is to restore the site so that it can be safely used for the same purposes as it was prior to the occurrence. Rehabilitation may involve replacing contaminated soil with clean fill or routing watercourses away from the contaminated site until it can be cleaned up.

Rehabilitation procedures specific to spill type and location will be reviewed with NSE as required. Rehabilitation should commence immediately following spill clean-up as appropriate.

Monitoring should continue for a reasonable amount of time following rehabilitation to ensure that that clean-up and restoration activities were successful.

8. TRAINING REQUIREMENTS

Emergency spill response training subject to the requirements of this plan shall be completed in conjunction with AMNS's ERP, whereby the ERC, with support from the Manager, Environment and Community, will identify project training needs and the resources required to provide the necessary skills to personnel tasked with duties in emergency and spill response. Circumstantially, emergency spill response often occurs in parallel with other emergency responses (i.e. an overturned fuel tanker accident along the road not only causes imminent hazards to site personnel, but also to the surrounding environment). To facilitate efficient response to overall emergency response and preparedness, project personnel trained to respond to Health and Safety emergencies (ERT) shall also receive sufficient training to effectively respond to accidental releases of hazardous materials. Emergency and spill response training shall be developed and implemented throughout the lifecycle of the project to ensure the following requirements are fulfilled:

- Training meets or exceeds the requirements of Nova Scotia Health and Safety regulations
- Training enables responders to competently operate the equipment employed for emergencies and spill response purposes; and
- Training includes practices, drills and full-scale exercises for responding to the types of emergencies that are reasonably predictable for the operation

8.1 Training Objectives

The training objectives are to prepare site personnel in response procedures. The procedures that need to be reviewed include most topics described in this contingency plan:

- Notification Procedures
- Health and Safety Procedures
- Hazard Analysis
- Response Command System
- Reporting Requirements
- Equipment Inventories and Operation

8.2 Drills and Exercises

While drills and exercises can be used for training purposes, their primary function for this Plan is to provide the means of testing the adequacy of the plan's provisions and the level of readiness of response personnel. The ERC with support from the Environmental Department are responsible for coordinating the development of and assisting in conducting drills and exercises. The drills and exercises will include table top, functional drills and full-scale exercises. Refer to the ERP for further descriptions.

8.3 Training Preparation

Preparation for emergency and spill response exercises will vary depending on the type and scope involved; however, planning for these events shall include:

- Plan review and identification of possible problem areas;
- Establishing objectives;
- Identifying resources to be involved, including personnel;
- Develop exercise scenarios, a major sequence of events list, and expected action checklists; and
- Assigning and training controllers and evacuators.

AMNS will engage the appropriate regulators, contractors and consultants to conduct the training drills and exercises. All scenarios shall be realistic and based upon current operating conditions. The primary event (i.e. spill) shall be determined based on the objective of the exercise and completed in accordance with the prescribed regulatory requirements.

9. POTENTIAL SPILL ANALYSIS

To prepare for emergency spill response, potential spill analysis was conducted on various worst-case spill scenarios. The exercise serves to identify potential risk areas, as well as to determine the fate of spilled products and their environmental effects. This analysis examines spill scenarios as they relate to the types of project activities.

Several types of materials have been identified as capable of causing environmental, health, and safety concerns should a spill occur while being transported, used, stored and/or handled. These include: fuel, explosives (emulsion), lubricants, oils, tailings slurry and process water. These materials are typically utilized daily during project operations, often in sufficiently large quantities, warranting the evaluation of potential spill scenarios. All other hazardous materials, chemicals or wastes are handled/used/stored in smaller quantities and packaged/transported in small containers that limit the magnitude of the spills that can occur.

Refer to Appendix H for spill analysis details for the following scenarios:

- Fuel spills on land
- Explosives transport and handling spills
- Tailings slurry transfer spills
- Process water transfer spills
- Lubricants and oils transfer and transport spills

10. REVIEW AND CONTINUOUS IMPROVEMENT

The plan will be reviewed annually but also following drills, exercises and spill responses. Updates will consider the accuracy and currency of the information included in the plan and changes to equipment, personnel and the site/risk. Records such as equipment inventory and maintenance, personnel training, drills and exercises, and updates of plans will be maintained.

The controlled copy of this document will be updated, and copies made as required. It is the responsibility of all employees to refer to the most current version of the plan. Copies or extracts of this document, which have been printed, are uncontrolled copies and cannot be guaranteed to be the latest version.

11. REFERENCES

Atlantic Gold Corporation. 2020. Emergency Response Plan AMNS-PLN-HS-001, Amended: August 1, 2020

Atlantic Gold Corporation. 2020. Touquoy Mine Tailings Management Facility Emergency Preparedness and Response Plan AMNS-PLN-ENV-001, Effective Date: August 21, 2020

Conestoga-Rovers and Associates (CRA). 2012. Spill Contingency Plan Reference Industrial Approval Application and Supporting Documentation, Touquoy Gold Project, Moose River Gold Mines, NS. Submitted November 2012.

Nova Scotia Environment (NSE). 2013. Notification of Contamination Protocol. Effective Date Jul 6, 2013

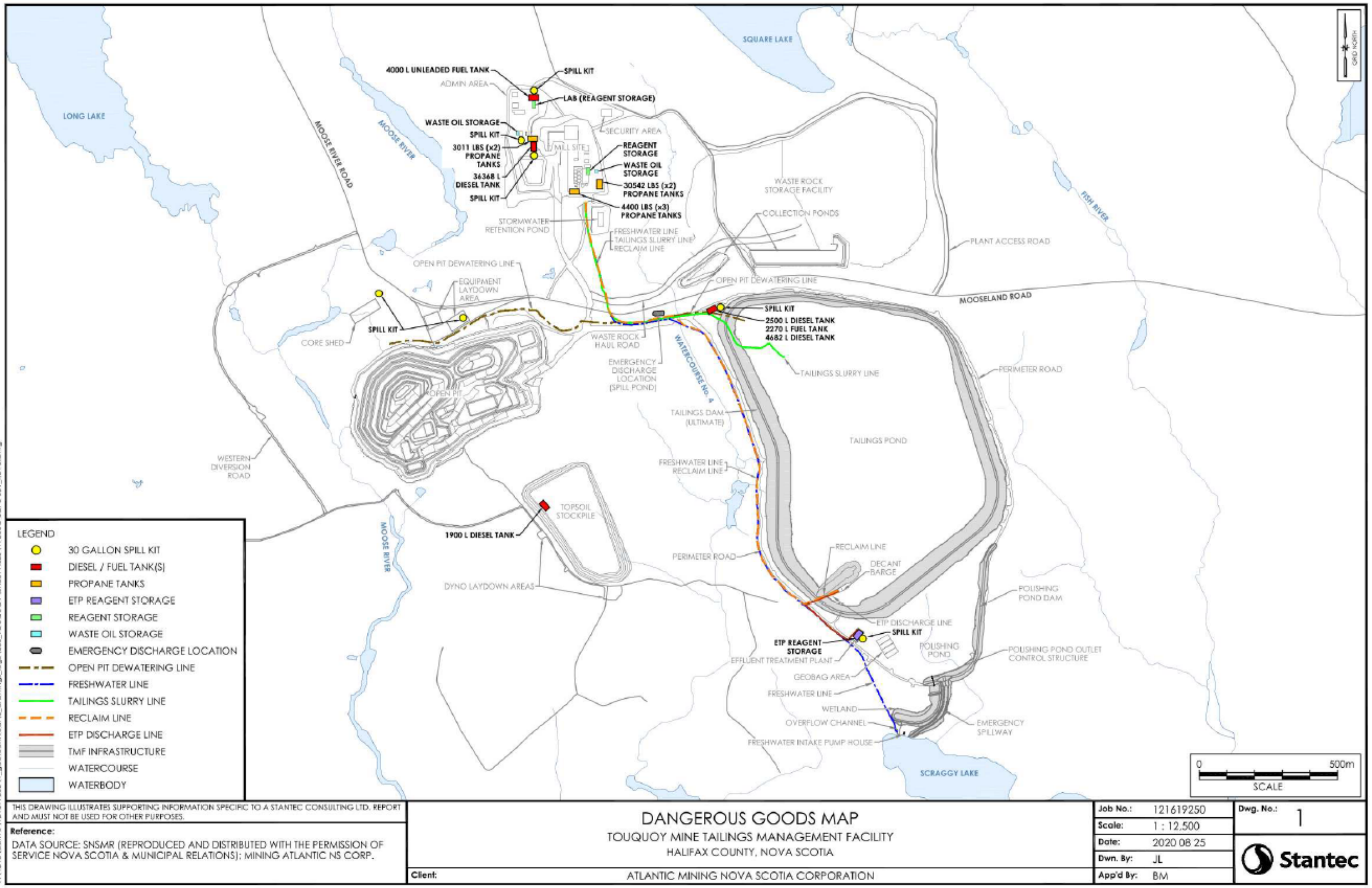
Nova Scotia Environment (NSE). 2016. Contingency Planning Guidelines. Effective Date: May 10, 2016

Nova Scotia Environment (NSE). 2020. Industrial Approval 2012-084244-06. Atlantic Mining NS Corp. Effective Date: April 9, 2020.

Nova Scotia Environment (NSE). 1994-95, c. 1, s. 1. Nova Scotia Environment Act.

Prospectors and Developers Association of Canada (201 e3 Plus: A Framework for Responsible Exploration, Excellence in Environmental Stewardship e-toolkit (EES) Version 01 Chapter 11 Spill Management ES-SM-v1.0

APPENDIX A FIGURES



APPENDIX B SPILL REPORTING FORMS

Atlantic Gold

SPILL REPORT
INCIDENT HEADS UP FORM

AGC ENV FRM 001 REV 2

NOTIFY: environmental.incident@atlanticgold.ca

INITIAL REPORT OF THE INCIDENT (Supervisor)

Date of Event	Time of Event	Date Reported	Time Reported	Main Person Involved	Reported By

Employer
❑ Atlantic Gold
❑ Contractor

Contractor (If Applicable) ____

Department ____

Location ____

UTM Coordinates	Northing		Easting	
Geographic Coordinates	Latitude		Longitude	

Spill / Release

Substance Spilled ____

Quantity (Estimate Acceptable) ____

Receiving Environment (i.e. Where did the spill go?) ____

Is the spill controlled/contained? Yes ❑ No ❑

Is the spill into a watercourse or wetland? Yes ❑ No ❑

Does the spill have potential to travel off-site? Yes ❑ No ❑

Initiating Event ____

Method of Cleanup ____

Spill Waste (i.e. contaminated soil, oil-soaked pads, etc.) Storage Location ____

Detailed Description

Immediate Actions Taken to Secure Scene, Protect Peoples or Environmental and Equipment

Immediate Cause of the Incident

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Atlantic Gold

SPILL REPORT
INCIDENT HEADS UP FORM

AGC ENV FRM 001 REV 2

FOR ENVIRONMENTAL DEPARTMENT TO COMPLETE

Further Investigation Required? ❑ Yes ❑ No

If Yes - Use Environmental Incident Report Form
AGC ENV FRM 002 Rev 3

Reportable? ❑ Yes ❑ No

Regulator Notified? ❑ Yes ❑ No

Regulator Name

Date Reported

Reference Number

Contact Name

Environment Department Comments

Atlantic Gold

ENVIRONMENTAL INCIDENT REPORT FORM

AGC ENV FRM 002 REV 3

NOTIFY: environmental.incident@atlanticgold.ca

STEP 1. INITIAL REPORT OF THE INCIDENT (Supervisor)

Date of Event	Time of Event	Date Reported	Time Reported	Main Person Involved	Reported By

Employer	Contractor (If Applicable)	Department	Location
❑ Atlantic Gold ❑ Contractor			

UTM Coordinates	Northing		Easting	
Geographic Coordinates	Latitude		Longitude	

Environment

❑ Spill/Release ❑ Wildlife Interaction ❑ Other: ________________

Spill / Release

	Quantity (Estimate Acceptable)	Receiving Environment (i.e. Where did the spill go?)

Is the spill controlled/contained? Yes ❑ No ❑

Is the spill into a watercourse or wetland? Yes ❑ No ❑

Does the spill have potential to travel off-site? Yes ❑ No ❑

Initiating Event	Method of Cleanup

Spill Waste (i.e. contaminated soil, oil-soaked pads, etc.) Storage Location

Detailed Description

Page 1 of 4

Atlantic Gold

ENVIRONMENTAL INCIDENT REPORT FORM

AGC ENV FRM 002 REV 3

Immediate Actions Taken to Secure Scene, Protect Peoples or Environmental and Equipment

Immediate Cause of the Incident

Using the Incident Classification, the **Actual** Consequence of this incident was ________

Using the Incident Classification, the **Reasonable** Potential Consequence of this incident was ________

Consequences	Insignificant	Minor	Moderate	Major	Catastrophic
Environment	Non-reportable event No impact	Reportable Event No Impact	Reportable Event Reversible Impact	Reportable Event Long-Term Impact	Reportable Event Irreversible Impact

STEP 2. INFORMATION GATHERING (Investigator)

Investigator (s)

Lead Investigator

Others

❑ Witnesses Present ❑ Photos available of the Incident?

Witness Statements (Attach as Appendix)

1	
2	
3	

FOR ENVIRONMENTAL DEPARTMENT TO COMPLETE

Reportable? ❑ Yes ❑ No Regulator Notified? ❑ Yes ❑ No

Regulator Name

Date Reported

Reference Number

Contact Name

STEP 3. CAUSAL ANALYSIS (Investigator)

At least one must be selected (two or three are typical).

Atlantic Gold

ENVIRONMENTAL INCIDENT REPORT FORM

AGC ENV FRM 002 REV 3

Contact Environmental Department for guidance, if necessary.

Equipment Failure Issues	Procedural Issues	Communication Issues	Engineering Issues
☐ 1.1 Defective Parts/Tools/ Equipment	☐ 3.1 No Procedure	☐ 5.1 Shift Change Impact	☐ 7.1 Workplace/ Roadway Layout/ Design/ Conditions
☐ 1.2 Design Issue	☐ 3.2 Error in Procedure	☐ 5.2 Failure to Agree on how task to be Performed	☐ 7.2 Congested Work Area/ Restricted Action
☐ 1.3 Preventative Maintenance Issue	☐ 3.3 Procedure too Complex	☐ 5.3 Failure to Understand Communication	☐ 7.3 Inadequate display, signs, labels, alarms, warnings
☐ 1.4 Repeat Failure	☐ 3.4 Procedure not Followed	☐ 5.4 Inadequate Communication	☐ 7.4 Inadequate Guards of Barriers
☐ 1.5 Tolerable Failure		☐ 5.5 Cross-Department Communication Issue	☐ 7.5 Noise/ Vibration/ Light
			☐ 7.6 Poor Body Mechanics, Body Placement, Positioning, Repetitive
Natural Elements Issue	**Training Issue**	**Work Direction Issue**	**Quality Control Issue**
☐ 2.1 Temperature Extremes	☐ 4.1 No Training	☐ 6.1 No Direction Provided	☐ 8.1 No Quality Controls
☐ 2.2 Weather Conditions	☐ 4.2 Training not Followed, Unintentional	☐ 6.2 Inadequate Direction Provided	☐ 8.2 Inadequate Quality Controls
☐ 2.3 Ground Movement	☐ 4.3 Trained but Inexperienced	☐ 6.3 Failure to Follow Work Direction	**Other**
☐ 2.4 Flooding		☐ 6.5 Fatigue	☐ 9.1 Other (explain below)
		☐ 6.6 Impairment	

Cause Explanation (For Each Cause Identified in Casual Analysis - Provide a Brief Explanation of Why)

Code	Explanation

Corrective Actions:

No.	Description	Issued To (Name)	Due Date

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Atlantic Gold

ENVIRONMENTAL INCIDENT REPORT FORM

AGC ENV FRM 002 REV 3

Investigation Team and Factors Limiting		
Name	Position	Signature
		❑ Investigation Accepted
		❑ Investigation Accepted
		❑ Investigation Accepted

STEP 4. FINAL COMMENTS BY INVESTIGATORS OR MANAGEMENT		
Name	Comment	Date

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APPENDIX C REPORTABLE RELEASE AMOUNTS

	TDGA Class*	Description of Substance	Reportable Release Amount
1	All Class 1	explosive	any amount
2	2.1	compressed gas (flammable)	100 L or more
3	2.2	compressed gas (non-corrosive, non-flammable)	100L or more
4	2.3	compressed gas (toxic)	any amount
5	3	flammable liquid	100 L or more
6	4.1	flammable solid	25 kg or more
7	4.2	spontaneously combustible solid	25 kg or more
8	4.3	water reactant solid	25 kg or more
9	5.1	oxidizing substance	50 L or more –or– 50 kg or more
10	5.2	organic peroxide	1 L or more –or– 1 kg or more
11	6.1	poisonous substance	5 L or more –or– 5 kg or more
12	6.2	infectious substance	any amount
13	7	radioactive substance	any amount
14	8	corrosive substance	5 L or more –or– 5 kg or more
15	9 (in part)	miscellaneous product or substance, excluding PCB mixtures and environmentally hazardous substances	25 L or more –or– 25 kg or more
16	9 (in part)	PCB mixture of 50 or more parts per million	0.5 L or more –or– 0.5 kg or more
17	9 (in part)	environmentally hazardous substance	1 L or more –or– 1 kg or more
18	n/a	asbestos waste as defined in the *Asbestos Waste Management Regulations* made under the Act	50 kg or more

	TDGA Class*	Description of Substance	Reportable Release Amount
19	n/a	used oil as defined in the *Used Oil Regulations* made under the Act	100 L or more
20	n/a	contaminated used oil as defined in the *Used Oil Regulations* made under the Act	5 L or more
21	n/a	pesticide in concentrated form	5 L or more –or– 5 kg or more
22	n/a	pesticide in diluted form	70 L or more
23	n/a	unauthorized sewage discharge into fresh water or sensitive marine water	100 L or more
24	n/a	ozone-depleting substance as defined in the *Ozone Layer Protection Regulations* made under the Act	25 kg or more

(*"TDGA Class", in relation to a substance, refers to the class of that substance as listed in the Schedule to the *Transportation of Dangerous Goods Act* (Canada).)

Nova Scotia Environment (NSE). 1994-95, c. 1, s. 1. Nova Scotia Environment Act.

APPENDIX D KEY CONTRACTOR RESPONSE CONTACTS

Company	Contact	Phone	Email
Alva Construction	Colin Maas	(902) 870-2087	Colin@alva.ns.ca
Clean Earth Technologies	Russel Campbell	(902) 835-9095	rcampbell@cleanearthtechnologies.ca
GHD - FIRST	Murray Vidito	1-800-679-9082	Murray.Vidito@ghd.com
McCallum Environmental	Meghan Milloy	(902) 443-8252	Meghan@mccallumenvironmental.com
AECOM	Rory McNeil	(902) 428-2055	rory.mcneil@aecom.com
Stantec	Mark Flinn	1-866-569-6577	
Emergency Response Consultant	**Service**		**Telephone Number**
Stantec Consulting Ltd, Dartmouth.	24-hour Emergency Spill Response Services		(866) 569-6577 (902) 468-7777 (Daytime)
GHD – Emergency Response, Dartmouth	Emergency Spill Response Services		24-hour Hotline: 1-800-679-9082 Dartmouth Office:(902) 468-1248
Intrinsik Consulting, Halifax	Toxicology		(902) 429-0278
McCallum Environmental Ltd., Bedford	Biology/Wetlands		(902) 446-8252
Emergency Service Providers	**Service**		**Telephone Number**
Canadian Helicopters (Goffs, NS)	Emergency Helicopter Access		(902) 873-0015
Cougar Helicopters (Goffs, NS)	Emergency Helicopter Access		(902) 873-8346
Vision Air Helicopters (Goffs, NS)	Emergency Helicopter Access		(902) 873-3488
Battlefield – Cat Rentals - Ken Totten	Pump Supplier		(902) 292-1715
External Contractor - Colin Mass (Alva) or Allan MacDonald	Contractors/Heavy Equipment Fleet		Radio Channel 3 (902) 870-2087
United Rentals - Tyler Arnone	Pump Supplier		(905) 643-0999 or (289) 439-8318
Sansom Equipment Ltd. -Duane Webber	Pump Supplier		(902) 895-2885
Clean Earth Technologies	Hydro Vac / Soil Remediation		(902) 835-9095
Northeast Equipment Ltd. - Gord Skinner	Pipelines		(902) 468-7473, Gords.northeast.ns.ca
Engineered Pipe Group -Brian Parker	Pipelines/pumps/flanges		(902) 465-2200
Can-Am Instruments Ltd - Lou Dinato -	Metering Equipment		(905) 829-0030
MacGregors Industrial	Metering Equipment		(902) 759-7410

APPENDIX E COMMUNICATIONS POLICY

Atlantic Gold

TO: ALL EMPLOYEES OF ATLANTIC GOLD CORPORATION
FROM: ATLANTIC GOLD CORPORATION
SUBJECT: ATLANTIC GOLD CORPORATION COMMUNICATIONS POLICY

PLEASE READ THIS DOCUMENT IN ITS ENTIRETY AND SIGN AND DATE BELOW AS ACKNOWLEDGEMENT THAT YOU HAVE READ AND FULLY UNDERSTAND THIS COMMUNICATIONS POLICY.

ATLANTIC GOLD CORPORATION COMMUNICATIONS POLICY

DESIGNATED SPOKESPERSONS

The Company designates a limited number of Spokespersons responsible for communication with the investment community and media. The CEO and the COO will be the official spokespersons for the Company. Individuals holding these offices may, from time to time, designate others within the Company to speak on behalf of the Company as backups or to respond to specific inquiries.

CONTACTS WITH ANALYSTS, INVESTORS AND THE MEDIA

Employees who are not Authorized Spokespersons must not respond under any circumstances to inquiries from the investment community or the media, or from other parties, unless specifically asked to do so by an Authorized Spokesperson. Any such request for information about the Company should, in all cases, be directed promptly to the **CEO** or, in his absence, the **COO.**

The Company will provide only non-material information through individual and group meetings, in addition to publicly disclosed information, recognizing that an analyst or investor may construct this information into a mosaic that could result in material information. The Company cannot alter the materiality of information by breaking down the information into smaller, non-material components. In the event you have been asked to engage with analysts, investors or the media by an authorized Spokesperson, and are unsure as to whether your proposed response is appropriate for disclosure, please confirm with an Authorized Spokesperson before replying. Again, such responses should be limited to non-material information and publicly disclosed material information.

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Atlantic Gold

RUMOURS

The Company's policy is to not comment, affirmatively or negatively, on rumours. The Company's Spokespersons shall respond consistently to rumours by stating: "It is our policy not to comment on market rumours or speculation." Should any stock exchange on which the Company's securities are listed request that the Company make a definitive statement in response to a market rumour that may be causing significant volatility in the Company's listed securities, the Company's Disclosure Committee shall consider the matter and decide whether to make a statement regarding the rumour.

INCIDENTS

Any incidents involving the Company or you in your capacity as an employee of the Company must be reported to the COO immediately. In the event of an emergency situation, you are required to do all things possible to ensure that the relevant emergency response team has been contacted before contacting the COO. Incidents include, but are not limited to, serious injuries and fatalities, blasting related incidents, regulatory or environmental incidents, unauthorized activities, conflicts, fire and natural disasters at site, serious (major) equipment damage, etc.

We need to always be prepared to handle a crisis in a manner that is aligned to our principles of transparency and open communication. Our actions and reputation as a responsible mining company allow us to attract investors and gain support of the communities in which we operate. We are all responsible for Atlantic's reputation through our actions.

I ACKNOWLEDGE THAT I HAVE READ AND FULLY UNDERSTAND THIS COMMUNICATIONS POLICY IN ITS ENTIRETY.

Print ______________________________ Signature ______________________________

Date ______________________________
YYYY - MM - DD

APPENDIX F SPILL RESPONSE EQUIPMENT LOCATION

Atlantic Gold Emergency Supplies		
Equipment Description	**Quantity/Length**	**Location**
Pumping Equipment		
Generator (Mill Backup) - CAT	(1)	Mill
HDPE fusion welder	(1)	TMF – Sea-can adjacent to ETP
6 x 6 inch (152mm x 152 mm) diesel pumps	(2)	Stormwater Collection ponds
4x4 inch 100 mm x 100mm) diesel pump	(6)	TMF Seepage Ponds/Waste Rock Pond
8 x 6 inch (203 mm x 152 mm) high lift pump on skid - max capacity 760 m^3/hr	(1)	Open Pit
14 inch (356 mm) reclaim pump: Vertical turbine 450 m3/hr	(2)	Decant Barge
12 inch (305 mm) diameter HDPE Pipeline	1500 m	From Open Pit to TMF
14 inch (356 mm) diameter HDPE Pipeline	2000 m	From Decant Tower to Mill
4 inch (100 mm) diameter HDPE Pipeline	2500 m	From Scraggy Lake to Mill
6 inch (152 mm) diameter HDPE Pipeline	2500 m	From Scraggy Lake to Mill & seepage ponds to TMF
8 inch (203 mm) diameter HDPE Pipeline	250 m	From Decant to ETP
Extra 6 inch (152 mm) diameter lay flat Pipeline	200 m	Mine Ops Laydown
Extra 6 inch (152 mm) diameter HDPE Pipeline	800 m	TMF
Extra 12 inch diameter HDPE pipeline (For tailings line moves)	225 m	TMF
Extra 14 inch diameter HDPE pipeline (For decant to Pit Contingency)	225 m	TMF
Flanges/connections/gaskets/fittings	Assorted	Mill Maintenance & Mine Operations & TMF
8 inch (203 mm) suction hose	10 m	Open Pit
Metering equipment for water pumped from Polishing Pond to Scraggy Lake	(2)	Environmental Department
Spill Containment Equipment		
30 Gallon Spill Kit – Oil Only	(7)	Warehouse (S10FULLPAL)
30 Gallon Universal Spill Kit Refill	(5)	Warehouse (F7A)
30 Gallon Universal Spill Kit	(4)	Warehouse (S10FULLPAL)
Oil Dry Sorbent	12 bags	Warehouse (TS2D)
Spill Pads – Oil Only	5 bags	Warehouse (S1R2D)
Spill Pads - Universal	5 bags	Warehouse (D2C)
Silt Curtain	(2)	Scraggy Lake Pumphouse
Silt Fence 100’ Bundle	(20)	Warehouse (3LD1)
Hay Bales	(40)	Behind Environmental Sea-can

Spill Containment Equipment (continued)		
1000 L plastic holding tank	Variable	Geobag Laydown
170 L (45 gallon) Metal drums	(8)	Warehouse (Mill1A)
Assorted hand tools – long handed spade shovels, pick axe, etc.	Assorted	Site Services
Generator - CAT 6500 W	(1)	Site Services
Inverter Generator - CAT 1800 W	(1)	Site Services
3” Gas Pumps	3	Mine Ops
6” Diesel Pumps	2	Mine Ops
8” Diesel Pumps	2	Mine Ops
Heavy Equipment		
Lighting – Diesel Portable Light Stand	(12)	Mine Ops
Backhoe – CAT	(1)	Site Services
Crane - Terex	(1)	Mine Ops
Dump Truck – CAT	(1)	Site Services
Dozer – CAT	(3)	Mine Ops
Excavator – CAT	(4)	Mine Ops
Grader – CAT	(1)	Mine Ops
Haul Truck – CAT	(6)	Mine Ops
Articulated Truck – CAT	(2)	Mine Ops
Loader – CAT	(3)	Mine Ops
Roller – CAT	(1)	Mine Ops
Skid Steer - Bobcat	(1)	Mill Ops
Telehander – CAT	(1)	Mill Ops

APPENDIX G SPILL KIT SUPPLY LIST & LOCATION PLAN

There are several spill kits available on-site (see Appendix A). The kits are packed inside marked yellow drums. Each kit contains personal protective equipment and spill containment materials. All light vehicles contain a smaller, portable spill kit. Spill Kit contents are listed below. New spill kits can be found in the warehouse.

Every light vehicle on site contains a universal, portable spill kit, containing the following items:

Item	Quantity
Absorbent pads (15" x 19")	10
Absorbent socks (3" x 4')	2
Disposal Bag	1
Instruction Sheet	1
Pair Nitrile Gloves	1

The 30-gallon spill kits contain the following materials:

Item	Quantity
Spill pads (15" x 19")	25
Spill socks (3" x 4')	4
Spill pillows (18" x 24")	4
Disposable Bags w/ Ties	3
Emergency Response Guide Book	1
Pair Nitrile Gloves	1

APPENDIX H HAZARD ASSESSMENT AND POTENTIAL SPILL ANALYSIS

Appendix H.1 Fuel Spills on Land

Fuel represents a relatively small amount of hazardous material located on site. All tanks are double walled providing secondary containment sized to contain 110% of the volume. All tanks are labelled and have a spill kit readily available. For locations of the fuel tanks, temporary fuel areas and approximate spill kit locations, refer to the figures in Appendix A.

Table H.1 provides the maximum fuel storage capacities of permanent fuel storage infrastructure (i.e. tanks) at the Touquoy site.

Table H.1: Maximum Fuel Storage Capacities at Touquoy

Location	Fuel Type	Tank Capacity
Truck Shop	Diesel	36,368 L
Administration Area	Unleaded	4,000 L
North end of TMF (Temporary)	Diesel	2,500 L
North end of TMF (Temporary)	Unleaded	2,270 L
Brewster's Laydown (Temporary)	Diesel	1900 L

Appendix H.1.1 Potential Fuel Spill Scenarios and Response

All fuel tanks onsite are double walled. The tanks will be contained in a restricted area to avoid collision from mobile equipment and placed to avoid damage from impact. Detailed procedures (site-wide application) and work instructions (task-specific) are in place, along with the SOP for Refueling Mobile Equipment and Light Vehicles (AGC-PRO-ENV-013) that directs refueling operations.

SCENARIO 1: PERMANENT TANK AREA SPILL

Description of Incident	Rupture or spill from 36000 L tank
Potential Causes	Tank or associated equipment failure. This may include failure as a result of human error, mechanical failure, inadequate maintenance, geotechnical issues, sabotage, etc.
Product Spilled	Diesel
Maximum Volume Spilled	36,368 L
Estimated Time to Spill Entire Volume	Variable depending on leak or rupture size < 1 hour
Immediate Receiving Medium	Ground, streams, lakes, wetlands
Most Probable Direction of Spill Migration	The ground surface around the tank and site runoff ditches that ultimately report to the Mill storm water pond.
Distance and Direction to Closest Body of Water	Moose River – 300m West
Resources to Protect	Migration to groundwater table
Emergency Response Level	Level 2 (medium) or 3 (high) – Refer to ERP (depends on quantity)
Estimated Emergency Spill Response Time	20 minutes

Spill Response Procedures	If the spill is still occurring the hole/breach will be plugged or stopped if possible. The secondary containment will be inspected to ensure that it is safely containing the spill; if not the area will be reinforced with temporary berms. The spill will be collected via a vacuum truck and deposited in a suitable location – either an intact fuel tank or, if necessary, sent to an off-site oily water treatment facility. Any contaminated soil will be excavated and disposed of accordingly.

SCENARIO 2: MOBILE TANK/TEMPORARY STORAGE AREA SPILL

Description of Incident	**Puncture or rupture of tank**
Potential Causes	Equipment failure due to faulty manufacturing or collision with mobile equipment.
Product Spilled	Diesel fuel.
Maximum Volume Spilled	4, 000 L
Estimated Time to Spill Entire Volume	Variable depending on leak or rupture size approx. 10 min
Immediate Receiving Medium	Ground
Most Probable Direction of Spill Migration	Tanks are utilized around site; the direction of spill migration will depend on the specific location. Tanks will be placed on relatively flat laydown areas, where the potential flow of spills will be more readily managed.
Distance and Direction to Closest Body of Water	Varies – TMF laydown approx. 140 m from watercourse #4
Resources to Protect	Migration to groundwater table, Scraggy Lake, Square Lake, Site streams, Moose River, and wetlands
Emergency Response Level	Level 2 (medium) or 3 (high) – Refer to ERP (depends on quantity and whether there is a potential to impact nearby water bodies and/or public safety)
Estimated Emergency Spill Response Time	20 minutes
Spill Response Procedures	If the spill is still occurring the hole/breach will be plugged or stopped if possible. A temporary berm can be constructed to reduce the migration of the spill. The spill will be collected via a vacuum truck and deposited in a suitable location – either an intact fuel tank or, if necessary, sent to an off-site oily water treatment facility. Any contaminated soil will be excavated and disposed of accordingly.

SCENARIO 3: ROAD ACCIDENT TANKER TRUCK SPILL

Description of Incident	**Spill of the contents of a tanker truck or fuel re-supply truck to ground or stream. Spill occurs in an isolated area with drainage close to a waterbody such as Moose River, Watercourse 4, Scraggy Lake**
Potential Causes	Human error, vehicle mechanical failure, traffic accident, poor weather or visibility.
Product Spilled	Diesel fuel
Maximum Volume Spilled	20,000 to 50,000 L (contents of a tanker truck) This would require the rupture of the tanker.
Estimated Time to Spill Entire Volume	Spillage can be limited depending on severity of incident/accident 10 minutes to 48 hours – depending on severity of rupture or piping/valves associated with the tanker truck.
Immediate Receiving Medium	Ground, streams, lakes, wetlands
Most Probable Direction of Spill Migration	Varies with specific location of spill
Distance and Direction to Closest Body of Water	Varies – in close proximity

Resources to Protect	Scraggy Lake, Square Lake, Site streams, Moose River
Emergency Response Level	Level 2 (medium) or 3 (high) – Refer to ERP (depends on quantity and whether there is potential for impact to nearby water bodies and to public safety)
Estimated Emergency Spill Response Time	60 minutes after spill is reported to site personnel (assuming worst case scenario where the truck driver is injured and cannot commence spill response procedures).
Spill Response Procedures	1. Contain and recover diesel slick downriver and protect shorelines using sorbent booms. Collect free-product for temporary storage. Clean-up soiled shorelines. If the response crew arrives before the tanker/fuel truck has released all its contents, seal the leak where feasible, contain and recover oil spill on ground using dykes, trenches and spill berms. If the truck driver is not injured, he will act as a first responder and immediately initiate the Spill Contingency Plan. 2. Once the initial cleanup is completed, free product captured during response, as well as product still contained within the tanker/fuel truck bulk tank(s) is pumped using a vacuum truck to be discharged at an approved facility/containment berm. Oily water captured during the response would be pumped into a vacuum truck and transported to a containment facility for treatment using the oily-water separator unit. Impacted soils (if any) would be excavated and disposed of accordingly.

Appendix H.2 Explosives Transport

Emulsion is trucked to the site as needed by a licensed contractor. Explosives (emulsion) are only used in the open pit and trucks bearing emulsion follow a defined route to the site from the supplier. The AMNS Emergency Response Plan identifies threat and response for an explosion in Appendix A2.11.

Appendix H.2.1 Emulsion Handling

A Dyno Nobel storage tanker carries 40,000 kg of bulk explosives (emulsion). The emulsion truck which travels from the tanker to each blast to deposit explosives in the drill holes has a maximum capacity of 12,500 kg. Under normal operation, the total quantity of emulsion on site would not exceed 41,000 kg.

Emulsion materials are acutely toxic to aquatic life and therefore could have adverse impacts on fish and other aquatic life if released to surrounding water bodies and streams. Small spills shall be scooped up with non-sparking shovels, placed in bags and stored in a secure location until the spilled emulsion can be disposed of in blast holes. Large spills will be dealt with on an individual basis depending upon the size of the spill. Efforts shall be made to contain spills and secure the surrounding area before clean-up begins. The clean-up of large spills may involve pumping spilled emulsion into tanks or totes and/or scooping up product with shovels and storing it approved containers/bags.

Potential spills would be cleaned up by employees and contractors licensed to handle explosives. Clean-up materials will be segregated in an appropriate area; incompatible materials will not be stored together, pursuant to material Safety Data Sheets (SDS) and Worker's Compensation General Regulations.

In addition, smaller quantities of AN emulsion pre-packaged explosives will be used to begin development of the quarry sites. Pre-packaged Ammonia Nitrate (AN) emulsions pose minimal risk to the environment given the hydrophobic nature of the emulsion explosives.

SCENARIO 1: SPILL OF EMULSION

Description of Incident	**Emulsion spilled while loading emulsion in blast holes.**
Potential Causes	operator error, mechanical failure or malfunction
Product Spilled	Emulsion
Maximum Volume Spilled	12,500 kg
Estimated Time to Spill Entire Volume	Instantaneous
Immediate Receiving Medium	Ground
Most Probable Direction of Spill Migration	Not expected to migrate due to its high viscosity
Distance and Direction to Closest Body of Water	Varies
Resources to Protect	Nearby water bodies
Emergency Response Level	Level 3 (High) – Refer to ERP (depends on quantity)
Estimated Emergency Spill Response Time	5 minutes
Spill Response Procedures	In the event that a spill occurs, the blasting technician will respond. The spilled emulsion will immediately be cleaned up and stored in a dedicated contaminated explosives area until it can safely used or be shipped off site.

Appendix H.3 Tailings Slurry Transfer

The TMF EPRP should be used in conjunction with the Spill Contingency Plan if a rupture does occur in the tailing's slurry or process water lines. The TMF EPRP outlines the specific response for this type of release. A generalized spill response approach is provided below.

The tailings pipeline carries tailings slurry approximately 1 km from the Mill to the TMF. The pipeline is placed alongside roadways at the site, running from the Mill site to the northwest segment of the TMF. The Tailings Line has an average flowrate of 550 m^3/hr.

The double walled HDPE tailings pipeline consists of 355 mm carrier pipe inside a 450 mm outer containment pipe. The tailings lines are moved manually around the TMF dam to facilitate tailings deposition.

The tailings discharge system involves the following components:

- Tailings pipeline from the Mill to the TMF
- Pumping capacity at the Mill suitable for continuous delivery of tailings to the TMF;
- A flush system at the tailings box to clear the tailings line at times of shut down, power loss, leak detection or pipeline movement;
- An emergency discharge location of the pipeline in case of power loss, or leak detection, both along the line and in the tailings pond;
- Leak detection system (pressure gauges on outer HDPE pipe) on the tailings pipeline to be inspected every 4 hours;
- Sufficient pipe, spigots, valves and joint sections to change the flow direction and location as necessary to build tailings beach against the dams;
- Suitable equipment to move and fasten pipe sections when required.

The carrier pipe is supported in the containment pipe by centralizers spaced at approximately 50 m. The centralizers do not allow flow between sections of the pipe. Measuring pressure increases in each segment via pressure gauges facilitates leak detection. Rupture of both pipes would result in a tailings release to site ditches or ponds. A lined emergency containment pond (emergency discharge point) is located at the low point in the pipe which will also serve to drain the pipeline during controlled or uncontrolled shutdowns. If used, the emergency containment pond will be emptied using a vacuum truck or excavator in frozen conditions and disposed into the tailings pond. Operation of the tailings pipeline will only resume once the necessary repairs are completed. Pipelines in use at the site are shown on the drawing in Appendix A.

Appendix H.3.1 Potential Spill Scenarios related to Tailings Slurry Pipeline

SCENARIO 1: LEAK OR RUPTURE OF TAILINGS SLURRY PIPELINE

Description of Incident	Tailings Slurry Pipeline Leak or Rupture
Potential Causes	Mechanical failure or malfunction; Joint failure; Accident (vehicle strike)
Product Spilled	Tailings slurry
Maximum Volume Spilled	2,200 m^3 (assumes 4 hours at 550 m^3/hr)
Estimated Time to Spill Entire Volume	Depends on the size of the leak
Immediate Receiving Medium	Ground
Most Probable Direction of Spill Migration	Contained within ditching to TMF emergency dump pond
Distance and Direction to Closest Body of Water	Watercourse #4 – 200m East
Resources to Protect	Watercourse #4
Emergency Response Level	Level 3 (High) – Refer to ERP (depends on quantity)
Estimated Emergency Spill Response Time	20 min
Spill Response Procedures	In the event a tailings line spill occurs the following actions will be taken: • The tailings line will be shut down and drained into the emergency discharge location. • The entirety of the pipeline will be inspected, any damaged components will be replaced or repaired. • Report as required. • Excavate contained tailings slurry from site ditches or containment ponds and transfer to the TMF. • Pump contained process water from site ditches or containment ponds into the TMF. • Collect released tailings and deposit in tailings pond • Repair collateral damage caused by a leak or break; and, reclaim disturbed areas.

Appendix H.4 Process Water Transfer

The TMF EPRP should be used in conjunction with the Spill Contingency Plan if a rupture does occur in the tailing's slurry or process water lines. The TMF EPRP outlines the specific response for this type of release. A generalized spill response approach is provided below.

The TMF barge is located at the southeast end of the tailings pond. The TMF barge houses the pumps to convey process water to the Mill. The process water pipeline (decant line) runs approximately 2 km from the TMF to the Mill along roadsides at the site. This is a single wall, 14" HDPE pipe. This water is used as the primary water in the process plant, to minimize the use of fresh water make-up. The decant line has an average flowrate of 365 m^3/hr.

The decant line has an interlock shutdown of the pumps if a loss of flow is detected in the flow meter to minimize any possible release. Also, the elbow located on the pipeline near watercourse #4 (Culvert B) has a clay corridor which is sloped away from the watercourse to the existing emergency containment pond.

Appendix H.4.1 Potential Spill Scenarios related to Process Water Pipeline

SCENARIO 1: LEAK OR RUPTURE OF PROCESS WATER PIPELINE

Description of Incident	Process Water Pipeline Leak or Rupture
Potential Causes	Mechanical failure or malfunction; Joint failure; Accident (vehicle strike)
Product Spilled	Process Water
Maximum Volume Spilled	15,000 L
Estimated Time to Spill Entire Volume	The automatic shutoff for the decant is based on the receiving flowmeter at the plant. If the decant pump is operating and the plant flowmeter reads 0 m^3/hr, the pump shuts down. There is a delay of 120 seconds between no flow and shutting down the pump. Therefore, 120 s x 125L/s = 15,000L Max potential spill if there was a failure.
Immediate Receiving Medium	Varies
Most Probable Direction of Spill Migration	Emergency spill pond, haul roads, surrounding areas
Distance and Direction to Closest Body of Water	Varies
Resources to Protect	Watercourse #4 and Wetland #6
Emergency Response Level	Level 2 (moderate) or Level 3 (High)
Estimated Emergency Spill Response Time	20 min
Spill Response Procedures	In the event a process line release occurs the following actions will be taken: • The process line will be shut down and drained into the emergency discharge location if needed. • The entirety of the pipeline will be inspected, any damaged components will be replaced or repaired. • Ensure the pipeline is not syphoning water from the intake. • Report as required. • Pump contained process water from site ditches or containment ponds into the TMF. • Repair collateral damage caused by a leak or break; and, reclaim disturbed areas.

Appendix H.5 Lubricants and Oils Transport and Handling

Lubricants and machinery oils will be used on site throughout the life of operation. Lubricants and oils have the ability to contaminate waterways and soils if exposed to the environment. However, the risk of a lubricant or oil spill on site is expected to be minimal. Small amounts are stored on site and are present in Site vehicles (e.g. hydraulic fluid). Lubricants and oils shall be handled by trained staff following proper procedures and guidelines. Lubricants are stored and transported in small quantities. In the event of a spill, appropriate spill response equipment and procedures, as outlined in this plan, will be readily available and utilized to minimize the impact of the spill.

Appendix H.5.1 Potential Spill Scenarios related to Lubricant and Oils

SCENARIO 1: CONTAINMENT PUNCTURE DURING TRANSPORT

The most likely spill scenarios to occur with regards to lubricants and oils is a puncture of an individual storage units during transport. Lubricants and oils are typically stored in 208 L barrels within a sea can container. In the event that the container is punctured by the forklift a maximum spill volume of 208 L could potentially occur. All equipment operators will be trained in proper lubricant and oil transfer procedures (i.e. use of spotter). In the event that a barrel is punctured, the operator will identify the puncture and will immediately proceed to contain the spill and implement mitigation procedures.

Description of Incident	Lubricant or oil container is punctured by a forklift during transport
Potential Causes	Operator error. Equipment failure.
Product Spilled	Lubricant or oil.
Maximum Volume Spilled	208 L
Estimated Time to Spill Entire Volume	Varies
Immediate Receiving Medium	Ground
Most Probable Direction of Spill Migration	Towards Mill containment ditches
Distance and Direction to Closest Body of Water	Watercourse #4 – 300m East
Resources to Protect	Migration to water table, nearby water bodies.
Emergency Response Level	Level 1 (low)– Refer to ERP
Estimated Emergency Spill Response Time	Approx. 5 minutes
Spill Response Procedures	If the forklift driver is not injured, he will act as a first responder and immediately initiate the spill response utilizing the spill kit kept in the work area. The spill will be contained through the use of temporary berms and ditches until it can be vacuumed up and transported to an approved facility for remediation.

SCENARIO 2: SPILLS DURING TRANSFER/HANDLING

It is possible that a minor spill may occur during the transfer of lubricants or oil to equipment. This will most likely be the result of equipment failure, such as pumps or hoses, or operator error.

Proper maintenance procedures are in place to reduce the chance of equipment malfunctions, along with proper training procedures. The use of spill trays is mandatory during all oil and lubricant transfers.

Description of Incident	Spill during transfer
Potential Causes	Operator error. Pump failure. Hose failure.
Product Spilled	Lubricant or oil.
Maximum Volume Spilled	500 L
Estimated Time to Spill Entire Volume	Varies
Immediate Receiving Medium	Ground
Most Probable Direction of Spill Migration	Depends on location
Distance and Direction to Closest Body of Water	Depends on location
Resources to Protect	Nearby water bodies.
Emergency Response Level	Level 1 (low) or 2 (medium) – Refer to ERP (depends on quantity and whether there is potential for impact to water body)
Estimated Emergency Spill Response Time	Approx. 5 min
Spill Response Procedures	If the spill occurs in a building it will be contained as all buildings are fully lined or equipped with concrete floors, preventing any contaminants from reaching the natural environment. The spill will be cleaned up by qualified personnel and disposed of as a hazardous material. If a spill occurs during transfer all transfer activities will be halted immediately and clean-up of the spill with the available spill kit will commence. The spill will be contained using berms, ditches, sumps and booms where necessary. The downstream wall of trenches will be lined with plastic material to ensure unexposed soil does not come in contact with the lubricant or oils. Absorbent material will be utilized where required. Once the spill has been contained it will be removed by a vacuum truck and brought to an appropriate storage/treatment facility. If necessary contaminated soil will be removed and brought to an approved facility for disposal. New soil will be laid down in the exposed area.

APPENDIX I HAZARDOUS MATERIALS LIST & SAFETY DATA SHEETS

Table I.1 Potentially Hazardous Material - Mill

Material	Storage Location	State	Purpose
Activated Carbon (Coconut shells)	Reagents Building	Solids	Carbon Adsorption
Anti-Scalant	Mill Building	Liquid Solution	Anti-Scaling
Borax	Metallurgy Sea Container	Solids	Flux (Gold Room)
Copper Sulfate	Reagents Building	Solids	Cyanide Detox
DT9040	Crushing Area	Liquid Solution	Dust Suppression
Ferric Sulfate	Mill (Detox Area)	Liquid Solution	Effluent treatment
Flourspar	Metallurgy Sea Container	Solids	Flux (Gold Room)
Hydrated Lime	Lime Silo	Solids	pH Control
Hydrochloric Acid	Mill	Liquid Solution	Acid Wash
Hydrogen Peroxide	Mill	Liquid Solution	Oxygen Source for Intensive Leaching
Potassium Nitrate	Metallurgy Sea Container	Solids	Flux (Gold Room)
Silica Sand	Metallurgy Sea Container	Solids	Flux (Gold Room)
Sodium Carbonate	Metallurgy Sea Container	Solids	Flux (Gold Room)
Sodium Cyanide	Reagents Building	Solids	Leaching
Sodium Hydroxide	Reagents Building	Liquid Solution	Cyanide mixing, pH conditioning, strip solution
Sodium Metabisulfite	Reagents Building	Solids	Cyanide Detox

Note: SDS can be found at: *S:\PoliciesProcedures\Safety Data Sheets (SDS)*

Table I.2 Potentially Hazardous Material – Assay Lab

Material	Storage Location	Purpose
Assay Tabs (Sodium Cyanide)	PAL room & Seacan	Leaching of gold from ore
Hydrochloric Acid	MET Lab & Wet Lab	Digestion of Fire Assay Samples for gold
LeachWELL 60X	MET Lab	To speed up the leaching of samples
Nitric Acid	MET Lab & Wet Lab	Digestion of Fire Assay Samples for gold
Rhodanine	MET Lab	Cyanide Titrations
Silver nitrate	MET Lab	Fire Assaying & Cyanide Titrations
Sodium hydroxide	MET Lab	Neutralize acid solutions
Sodium hypochlorite (Bleach)	PAL Room & Seacan	Detoxify PAL waste residue
Tetraethylenepentamine (TEPA)	MET Lab	Cyanide determination
Phenolphthalein	MET Lab	Indicator for chemical determination
Bone Ash (Calcium phosphate)	Fire Assay	Fire Assaying of ore samples
Flux (Lead oxide, Sodium carbonate, sodium borate, Silica flour)	Fire Assay	Fire Assaying of ore samples
Litharge (Lead oxide)	Fire Assay	Fire Assaying of ore samples
Sodium carbonate	MET Lab	Fire Assaying of ore samples
Potassium nitrate	Fire Assay	Fire Assaying of ore samples
Borax	Fire Assay	Fire Assaying of ore samples
Silica Flour	Fire Assay	Fire Assaying of ore samples
Gold Standard Solution	AAS Room	Calibration standard for the AAS
2,6 -Dimethyl – 4-heptanone	MET Lab	Met tests
Aliquat 336	MET Lab	Met tests
Calcium peroxide	MET Lab	Met tests
Magnesium perchlorate	MET Lab	Met tests
Nitrogen	Storage Room	Calibration of fixed CN monitor
Lead nitrate	MET Lab	Met tests
Picric Acid	MET Lab	Met tests

Note: SDS can be found at: *S:\PoliciesProcedures\Safety Data Sheets (SDS)*