

Cochrane Hill Gold Project Project Description Summary

Highway 7
Melrose, Nova Scotia

Atlantic Mining NS Corp.

Suite 3083, Three Bentall Centre
595 Burrard Street, P.O. Box 49298
Vancouver, British Columbia
Canada V7X 1L3

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ATLANTIC GOLD

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1.0 GENERAL INFORMATION

1.1 Project Name, Nature and Proposed Location

Name of the Designated Project

The designated project will be known as the “Cochrane Hill Gold Project” (the Project).

The Project Nature

The Cochrane Hill Gold Project (the Project) is contemplated to be developed in association with the currently operating Touquoy Mine. The Project is planned to be permitted and operated as a separate satellite surface mine operating at a production rate of approximately two million tonnes (Mt) of gold-bearing ore per year. Ore will be crushed and concentrated at the Project site to produce a gold concentrate which will be hauled by on-road highway trucks to the Touquoy Mine carbon-in-leach (CIL) processing facility for final processing into gold doré, a distance of just over 142 km on existing roads. This will eliminate the need for a separate CIL cyanide leach circuit at the Project site since the concentrate will be processed at the existing Touquoy Mine site. The Cochrane Hill concentrate will be processed at the Touquoy Mine in conjunction with ore supply from Touquoy, Beaver Dam and Fifteen Mile Stream surface mines.

The planned start date for construction for the Project is May 2021 with a scheduled start-up for 2022. The mine will operate for six years to 2027 and will employ up to 220 persons including both salaried and hourly personnel. At the cessation of mining activities, the site will be reclaimed.

Changes to the Touquoy Mine as a result of the Project are anticipated to be minimal. Only minor changes to the existing processing facility at the Touquoy Mine site will be required, including the addition of concentrate storage and the addition of a second gravity concentrate leach reactor and a gravity electrowinning cell. With the exception of the concentrate storage, the additions to the gravity circuit can be accommodated within the existing process building footprint. There will be a small increase in the volume of tailings deposition into the existing mined out Touquoy pit as a result of concentrate from the Project site. Source term estimates for Cochrane Hill tailings supernatant will be used to update the Touquoy water quality model to predict potential changes in water quality in the Touquoy open pit as a result of the addition of tailings from processing of Cochrane Hill concentrate at the Touquoy Mine. This information will be used in support of an application to amend to the Touquoy Industrial Approval (IA) to accept processing of Cochrane Hill concentrate and disposal of tailings from Cochrane Hill concentrate to the Touquoy open pit. All other aspects of the Touquoy Mine will remain the same as previously assessed including the disturbed footprint, tailings management aspects and the size and locations of waste rock and ore stockpiles.

Operations at the Project site will include mining, crushing, concentration and operation of a waste rock storage facility (WRSF), low grade ore (LGO) stockpiles and tailings management facility (TMF). A gold concentrate will be produced at site and transported by C-train configured highway dump trucks to the Touquoy processing facility for final processing into gold doré. Tailings will be generated from mill processing at the Project site and deposited into an above ground TMF. Infrastructure will include crushing facilities, fine ore stockpile and reclaim, concentrator facilities, maintenance facilities, fuel storage, office infrastructure and site haul roads.

An existing 25kV line is located approximately 13 km to the east of the site at Cross Roads Country Harbour. This line will supply power to the Project via a 4 km upgrade of an existing single phase line, and construction of an additional 9 km of three phase line to extend the 25kV line to the plant site sub-station. The power will be stepped down to 4.16kV and distributed throughout the site from the sub-station. It is anticipated that clearing for powerline corridors will be minimal as the majority of the line will be constructed within the existing Melrose Country Harbour Road right-of-way.

Two process concentrate streams will be produced at the Project site, a gravity concentrate and a float concentrate. Both will be transported from the Project site to the Touquoy Mine utilizing existing highways in conjunction with the Beaver Dam haul road thus requiring minimal upgrades to existing road infrastructure. Gold concentrate will be hauled south along Highway 7 (97 km), through Sherbrooke to Sheet Harbour, and onto Highway 224 from Sheet Harbour to the Beaver Dam Cross Road (21 km). From there, the Beaver Dam haul route will be utilized for the remainder of the haul to the Touquoy Mine (24 km). As a result of using existing road infrastructure, infrastructure previously upgraded for the Beaver Dam Project, and the very minor increase from Cochrane Hill haul truck traffic, impacts to plant, animal or Mi'kmaq land use and /or archaeological resources are not anticipated as a result of concentrate transport. The majority of tailings will be stored in an approved above ground TMF located at the site. The containment dams will be constructed with rock aggregate material sourced from mine waste rock or nearby quarries with upstream impermeable membrane and seepage cut off constructed using local till material.

Final processing of gold concentrate will be undertaken at the Touquoy processing facility resulting in a minor quantity of additional tailings being deposited into the mined out Touquoy open pit. This allows the Touquoy Mine footprint to be maintained as currently permitted. The approved reclamation plan for the Touquoy mine calls for the mined-out pit to be filled with water. At the end of processing at the Touquoy Mine, the remaining volume within the open pit would naturally fill with water and the deposited tailings will be stored under a water cap, creating a lake as per the approved plan for the reclaimed Touquoy pit, albeit slightly shallower. "Wet" disposal is recognized internationally as an accepted method of permanent tailings ARD management as opposed to "dry" storage. The Project will be reclaimed to a point that is safe, stable, consistent with the natural surroundings and in alignment with general community and Mi'kmaq wishes regarding final land use.

The Project Scope for the purposes of the assessment of potential environmental impacts of the Project includes the Project site, gold concentrate transportation route and the necessary components of the Touquoy Mine to process the gold concentrate and manage the associated additional tailings. This Project Scope is shown in Figure 1-1.

The total infrastructure footprint of the Project is approximately 241 hectares (ha). The Project Area (PA) for the purpose of the environmental assessment is the infrastructure footprint plus an associated buffer and is also shown on Figure 1-1.

Project Location

The Project is located within Guysborough County, in central Nova Scotia, approximately 145 km northeast of Halifax and 45 km to the northeast of Atlantic Mining's Fifteen Mile Stream Mine Project. The property covers the historic Cochrane Hill Gold District located on NTS sheets 11E01/D, 11E08/A and 11E05/B and is centered at 45° 14' 57" north latitude and 62° 00' 48" west longitude. The Touquoy Mine is located on the NTS sheet 11D15 and is centered at 44° 59' 09" north latitude and 62° 56' 16" west longitude.

1.2 Proponent Information

Atlantic Mining NS Corp.

Corporate Office

Suite 3083, Three Bentall Centre
595 Burrard Street, P.O. Box 49298
Vancouver, British Columbia
Canada V7X 1L3

Local Office

6749 Moose River Road,
Moose River Gold Mines,
RR2 Middle Musquodoboit, Nova Scotia
Canada B0N 1X0

Chairman and Chief Executive Officer

Steven Dean

Phone: (604) 689-5564

Email: sdean@atlanticgoldcorporation.com

Toll Free: 1-877-689-5599

President and Chief Operating Officer

Maryse Belanger

Phone: (604) 689-5564

Email: mbelanger@atlanticgoldcorporation.com

Toll Free: 1-877-689-5599

Project Description Contact

The Project Description was produced by McCallum Environmental Ltd. under contract to the Proponent.

McCallum Environmental Ltd.

115, 2 Bluewater Road

Bedford, Nova Scotia

Canada, B4B 1G7

Phone: (902) 446-8252

Meghan Milloy – Vice President

Email: meghan@mccallumenvironmental.com

1.3 Results of Consultation

Primarily, public engagement with stakeholders has consisted of discussion with the landowners on site access and regulators over the nature of scientific work being undertaken in relation to the environmental baseline studies during planning and design of the Project. Engagement with local stakeholder groups and the surrounding community members has also commenced. Regulatory consultation commenced in early 2017, and a public engagement program commenced in March 2018 for the Project.

The following jurisdictions and parties have been consulted during the preparation of this project description:

Government

The Government of Canada

- Environment and Climate Change Canada
- The Canadian Environmental Assessment Agency
- Fisheries and Oceans Canada
- Natural Resources Canada
- Transport Canada

The Province of Nova Scotia

- Premier's Office
- Environment (Environmental Assessment, Wetlands, Protected Areas)
- Lands and Forestry (Crown Lands, Wildlife, Forestry)
- Energy and Mines
- Labour and Advanced Education (Health and Safety - Technical Services)
- Transportation and Infrastructure Renewal
- Office of Aboriginal Affairs
- Finance (Statistics)

The Municipality of the District of St. Mary's

- Council

First Nations

Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO)
Assembly of Nova Scotia Mi'kmaq Chiefs
Sipekne'katik First Nation
Millbrook First Nation
Native Council of Nova Scotia

Consultation with Public

A public engagement program to provide project details to local communities and opportunities for public input to the proposed mine development commenced in March 2018. The first engagement activity consisted of meetings with the Municipality of the District of Saint Mary's Council and the Saint Mary's River Association to provide a brief overview of the project and answer any questions. The proponent also held a public open house in Sherbrooke in March 2018, and a second event is planned for Winter 2019 once more project details are available. The Sherbrooke Open House was well attended with approximately 115-120 people present. The event was advertised in the Chronicle Herald and Guysborough Journal and flyers were posted in local businesses and also sent through Canada Post to nearby residences (approximately 650 homes). The event was held at the Sherbrook Lion's Hall and consisted of a series of poster boards describing the general location and description of the project, identification of the EA process and opportunities for public input, preliminary Valued Components (VC) identified for the Project, details relating to reclamation and ore processing, and a poster outlining engagement methods and a request for people interested in participating in the planned Community Liaison Committee (CLC) for this project.

The open house was focused on sharing the general description of the Project and listening to the questions posed by members of the public, understanding any concerns they might have, and determining the best methods of engagement during the preparation of the Environmental Impact Statement (EIS). The attendees asked general questions about the proposed mining operation and details on operational considerations, as provided in this Project Description, were shared by the Proponent team with all attendees.

Since the Open Houses in March, the Proponent has continued to engage and communicate with the local community. The Proponent team has met with the Nova Scotia Nature Trust (NSNT), the executive director of Historic Sherbrooke Village, the board of the Saint Mary's River Association (SMRA) and provided regular updates to the Municipal District of Saint Mary's. A CLC has been formed and held its first meeting in early August 2018. The Proponent is working with individual landowners potentially impacted by the Project and will also be meeting with local community groups and interested parties as they are identified to discuss more individualized concerns. Project information will be communicated to the local residents using a variety of mediums including: a quarterly newsletter to provide overall project schedule and details; a community website with project details and contact information; and a dedicated community phonenumber that will respond to inquiries and concerns about the Project.

Consultation with Regulators

For the Project, regulatory consultation officially began on July 5th, 2017 with a Provincial "One Window Process: Mineral Development in Nova Scotia" meeting to present the planned project and to receive feedback on the regulatory regime and regional expertise. The purpose of the meeting was to provide guidance to the Proponent on the processes and timelines for regulatory approvals and other issues regarding development of the Fifteen Mile Stream and Cochrane Hill gold projects. A One Window update meeting was held February 21st, 2018 to allow the Proponent to introduce their new 'Life of Mine Plan' and for attendees to share information on the processes and timelines for regulatory approvals and to discuss any issues or concerns regarding the Proponent's plan. Informal regulatory consultation with relevant provincial and federal agencies to inform and support field programming has been on-going since Spring 2017.

Consultation with First Nations

Since the initiation of the Touquoy Mine, the proponent has engaged in a pro-active and mutually beneficial relationship with the Mi'kmaq of Nova Scotia. The relationship has been close to ten years in the making and continues to be of mutual benefit. An overview of more recent and relevant engagement is noted below.

The Made in Nova Scotia process establishes a mechanism for Mi'kmaq engagement in Nova Scotia that is unique in Canada. It is a three-government agreement between the federal, provincial and Mi'kmaq that outlines the responsibilities regardless if the Project is reviewed formally by the federal or provincial government. The Proponent has shown its commitment to this process and respect for their input by inviting representatives from the KMKNO, Millbrook and Sipekne'katik to the One Window meeting in February 2018, a meeting normally reserved for federal and provincial government officials.

Table 1 - Summary of First Nations Consultation for the Project

Date	Meeting Summary
February 20, 2018	Email correspondence from the proponent team to Millbrook, KMKNO and Sipekne'katik requesting a meeting with each group to introduce the project.
February 21, 2018	KMKNO and Sipekne'katik participated in One Window update meeting at NSDNR.
February 28, 2018	The Proponent and MEL met with KMKNO (Melissa Nevin) and introduced the Cochrane Hill Gold Project formally.
March 29, 2018	Sipekne'katik, Millbrook and the KMKNO were invited to attend the Open House in Sherbrooke.
April 12, 2018	Proponent completed a scheduled meeting with Millbrook to introduce the Cochrane Hill Gold Project.
July 9, 2018	Proponent completed scheduled meeting with Sipek'nekatik to introduce the Cochrane Hill Gold Project.

Formal consultation is expected to continue through 2018 and 2019 as part of the EA process with the Mi'kmaq of Nova Scotia according to the Made in Nova Scotia Process. The Mi'kmaq have a knowledge level of the Project which is significant and gained through the EA process for Touquoy Mine, the EA process for Beaver Dam, and through ongoing discussion as previously noted.

The Proponent will continue to engage with the KMKNO, Sipekne'katik First Nation, and Millbrook First Nation specific to the Project. To date, no specific comments or concerns have been received from the Mi'kmaq relating to the project. Questions asked to date have been focused on understanding project components, as described in this Project Description. The Proponent will look to find opportunities to engage with the communities to understand how the Project may overlap with traditional uses of the Mi'kmaq. Regular correspondence and face to face meetings will occur between the Proponent and KMKNO, Millbrook and Sipekne'katik to provide all parties ample opportunity to review and discuss the Project.

1.4 Applicable Regulatory Framework

The Project will require Environmental Assessment (EA) approval from CEAA and Nova Scotia. The government of Nova Scotia employs a "One Window" process for reviewing, permitting and monitoring mine development projects in the province. This approach formalizes how government departments (including federal authorities) involved with mine development activities act collectively to streamline the review process for both government and industry.

The Project mining infrastructure is expected to encroach on waters frequented by fish. In the presence of impacts to recognized fish or fish habitat, authorization may be required from Fisheries and Oceans Canada (DFO) under Paragraph 35(2)(b) of the *Fisheries Act*. The Environmental Impact Statement (EIS) will address potential effects of the proposed Project activities on fish and fish habitat.

Migratory birds will be assessed through Canadian Wildlife Service (CWS) protocols and breeding birds point count methodology during appropriate breeding windows in the PA of the proposed Project.

The potential effects of the construction and operation of the Project on vegetation, aquatic life and wildlife and their habitat will be assessed as they relate to the *Species at a Risk Act*. The Project design has considered minimization of the Project footprint based on the existing knowledge of the site.

The project is located with the Municipal District of Saint Mary's. The private property is zoned "Rural" and the Crown lands are zoned "Conservation". Extractive facilities are not listed a permitted use and a planning amendment is required to permit this use. An application to the municipality will be submitted in 2018 and is expected to take 6 months.

1.5 Other Environmental Studies

A review of CEAA and NS EA Projects database indicates that no regional environmental studies have been undertaken or are currently being conducted for the region or in the vicinity of the designated project within the spatial confines of the databases. The studies that have been completed for review closest to the proposed project site include: Touquoy Mine - 80 km (2008); Cooks Brook Sand and Gravel Pit – 106 km (2013), ScoZinc Operations Southwest Mine Expansion - 110 km (2011), Goldboro LNG Plant – 35 km (2014), Loch Katrine Quarry Expansion- 20 km (2016), and Beaver Dam Mine – 60 km (2017). Of these projects, only Beaver Dam Mine include the Project site in their regional context.

Beaver Dam Mine Project considers the Project in its cumulative effects assessment. No adverse cumulative effects were predicted.

No relevant regional studies of environmental effects from other projects are available.

2.0 PROJECT INFORMATION

2.1 Project Context and Objectives

The Project will comprise the development, operation, closure and reclamation of a surface gold mine near Melrose, Nova Scotia. This will consist of the development of an open pit mine, milling facilities (e.g. primary crusher and concentrator), WRSF, TMF, mine haul roads and associated mine infrastructure (e.g. maintenance facilities, local supply systems, explosive storage, fuel storage and mine offices). Associated with development of the Project will be additional gold production output from the existing processing facility at the Touquoy Mine which will process concentrate from the Project mine and include deposition of a minor amount of concentrate tails into the exhausted Touquoy pit.

The planned start date for construction for the Project is May 2021 with a scheduled start-up for 2022. The mine will operate for six years to 2027 and will employ up to 220 persons including both salaried and hourly personnel. At the cessation of mining activities, the site will be reclaimed.

2.2 Provisions to the CEAA Regulations Designating Physical Activities

The Project activity designated in the Schedule to the Regulations Designating Physical Activities (CEAA, 2012a) that may necessitate a federal environmental assessment for this Project is:

16(c) The construction, operation, decommissioning and abandonment of a new rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 t/day or more.

This Project Description provides information on the Project components and potential environmental effects as described in "Prescribed Information for a Description of a Designated Project Regulations" (CEAA, 2012b). Further, the content of this document conforms to the "Guide to Preparing a Description of a Designated Project under CEAA 2012" (CEAA, March 2015).

2.3 Description of Physical Works and Activities

The Project will comprise the development, operation, closure and reclamation of a surface gold mine near Melrose, Nova Scotia.

The main elements of the Project, as described in NI 43-101 Technical Report on Moose River Consolidated Phase 1 and Phase 2 Expansion, are as follows:

- An open-pit mine from which an estimated 43.1 Mt of rock will be excavated, comprising 11.2 Mt of ore at 1.10 g/t Au, 30.1 Mt of waste rock and 1.8 Mt of overburden. The pit will be 950 m long and 450 m wide and will have a maximum depth of 170 m based on the current mining scenario;
- Twelve month pre-production period, followed by five and a half years of production at an average extraction rate of 22,086 tpd, including ore production of 5,479 tpd;
- Water management works associated with the collection of contact water from the open pit, waste rock and low-grade stockpiles and the plant site. If unsuitable for discharge into the receiving environment, contact water will be directed to the TMF to supplement process water requirements;
- Crushing and Concentrator facilities to process 2.0 Mtpa of ore producing a gold concentrate for transport to the Touquoy processing facility;
- Transportation of gold concentrate via existing highways and Beaver Dam haul road of up to 175 tpd using a C Train truck configuration;
- Separate Run of Mine (ROM) and LGO stockpiles, for a total capacity of 0.1 Mt and 2.1 Mt respectively;
- A WRSF with a capacity of 11.6 Mt of waste rock. Additional waste rock will be used to build the TMF;
- Overburden piles which will contain 1.7 Mt of material;
- Top soil and organics storage piles that will contain 0.2 Mt of material;
- Tailings storage in an above ground TMF with a design storage capacity of 8.6 Mm³ of tailings solids;
- Discharge works associated with the removal of surplus water from the TMF. Initial water balance calculations indicate the TMF will operate under surplus water conditions and require a discharge. Further work will be undertaken to determine the need for and design of any treatment works to ensure such discharge meets environmental discharge requirements;
- Administrative, mine employee, and maintenance buildings and a petroleum product storage facility;
- Additional minor tailings storage in the mined out open pit as a result of final processing of gold concentrate with a water cover on reclamation; and
- On-site borrow and quarry development to support infrastructure requirements for aggregate and till/clay materials. Some or much of this material may be generated from waste rock and till recovered from the pit and vicinity, however, further quarrying/borrowing may be required in the event the pit material is insufficient in quantity or

quality. An aggregate/borrow investigation study will be conducted to assess these requirements during the IA application phase of the Project.

The total infrastructure footprint of the Project is approximately 241 hectares (ha) as detailed below. The PA for the purpose of the environmental assessment is the infrastructure footprint plus an associated buffer. Upgrades to existing on-site road infrastructure, such as minor widening, improving the road base, ditching and other potential improvements will also occur. Project components with respective areas are provided below:

- Ore extraction area (open pit) (28 ha);
- Materials storage (waste rock, till/overburden, low grade ore) (70 ha);
- Crusher and concentrator facilities (12 ha);
- Site infrastructure (6 ha);
- TMF (105 ha);
- Mine site haul roads (15 ha); and
- Access roads (5 ha).

At closure, all facilities will be removed, disturbed lands rehabilitated, and the property returned to otherwise functional use according to approved reclamation plans, accepted practices at the time of closure, and in accordance with the general wishes of the community and Mi'kmaq regarding final land use.

Operations at the Project will include mining, crushing, concentration and operation of a WRSF, LGO and TMF. A gold concentrate will be produced at site and transported to the Touquoy processing facility for final processing into gold doré. Tailings will be generated from mill processing at the Project and deposited into an above ground TMF. Infrastructure will include crushing facilities, fine ore stockpile and reclaim, concentrator facilities, maintenance facilities, fuel storage, office infrastructure and site haul roads.

An existing 25kV line is located approximately 13 km to the east of the site at Cross Roads Country Harbour. This line will supply power to the project via a 4 km upgrade of an existing single phase line to three phase and construction of an additional 9 km of three phase line to extend the existing 25kV line to the plant site sub-station. The incoming 25kV feed will be stepped down to 4.16V at the plant site substation.

Two concentrate streams will be produced at the Project, a gravity concentrate and a float concentrate. Both will be transported from the Project to the Touquoy Mine utilizing existing highways in conjunction with the Beaver Dam haul road. The gold concentrate will be hauled south along Highway 7 through Sherbrooke to Sheet Harbour to Highway 224 (97 km) and then north-west along Highway 224 to the Beaver Dam Cross Road (17 km) and the Beaver Dam haul route will be utilized for the remainder of the haul to the Touquoy Mine (24 km). As a result of using existing road infrastructure, infrastructure previously upgraded for the Beaver Dam Project, and the insignificant increase from CH haul truck traffic, impacts to plant, animal or Mi'kmaq and/or archaeological resources are not anticipated as a result of concentrate transport.

The majority of tailings will be stored in an approved above ground TMF located at the site. The containment dams will be constructed with rock aggregate sourced from mine waste rock or nearby quarries with upstream impermeable membrane and seepage cut off constructed using local till material.

Final processing of the gold concentrate from the Project site will be undertaken at the Touquoy processing facility. The small amount of additional tailings generated from this operation will be pumped to the mined out Touquoy pit for storage. Process water will be recycled from the Touquoy TMF. At some point, process water may be sourced from the exhausted Touquoy pit. This allows the Touquoy Mine footprint to be maintained as currently permitted. The approved reclamation plan for the Touquoy Mine calls for the mined-out pit to be allowed to fill with water. At the end of processing at the Touquoy Mine, the remaining volume within the

open pit would naturally fill with water and the deposited tailings will be stored under a water cap, creating a lake as per the approved plan for the reclaimed Touquoy pit, albeit slightly shallower. “Wet” disposal is accepted internationally as a superior method of permanent tailings ARD management as opposed to “dry” storage.

2.4 Description of Production Capacity and Processes

The surface mining operations are planned to be typical of similar small-scale operations in generally flat terrain. The mine operations at the Project are planned to commence in year 2022 with gold concentrate being transported to the Touquoy processing facility for final processing. The footprint of the surface mine development in relation to the environment is shown on Figure 2-1, attached to this summary document.

Mine Development

A twelve-month pre-production period is anticipated to supply material for construction including internal haul roads and TMF starter dams. The planned mine mobile equipment fleet will be utilized for pre-production prior to the commencement of operations.

The open pit footprint, mine infrastructure and waste rock storage areas will be cleared and grubbed in advance of operations with the timing informed by Environment and Climate Change Canada (ECCC) directives relative to migratory bird nesting. Topsoil will be salvaged to a nearby stockpile for later use in reclamation activities. Glacial till overburden within the open pit footprint will be salvaged to a till stockpile storage area for later use in reclamation activities.

To allow development of the proposed open pit, and to prevent the need to shut down the public highway during blasting operations, a 2.9 km section of Highway 7 will be relocated approximately 1 km to the west depending on the final design option selected. The diversion will be constructed outside of a 500 m diameter rock blasting disturbance zone and consist of single lane, two-way traffic, similar to the existing road section. This relocated section of road will meet the Nova Scotia Transportation and Infrastructure Renewal (NSTIR) Highway Design Guidelines for a Minor F Collector route. The mine site will use a 1 km portion of the existing Trunk 7 as the access road to the south of the site. Preliminary alignment options have been designed and discussions with Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) have been initiated. Further discussions with landowners and NSTIR will be required prior to mine development.

Mine Operations

An open-pit mine will be developed, from which 43.1 Mt of material will be excavated, comprising 11.2 Mt of ore at 1.10 g/t Au, 30.1 Mt of waste rock and 1.8 Mt of overburden. The pit will be 950 m long and 450 m wide and will have a maximum depth of 170 m based on the current mining scenario. The pit will be developed as a series of pushbacks in order to minimize upfront stripping and maximize ore extraction. Access to active mine areas will be via a single ramp system designed to allow dual lane traffic flow. Pit walls will be developed based on independent geotechnical engineering recommendations to ensure stability and safety.

In the active mining area, in-situ rock is drilled and blasted on 5 m to 10 m bench heights. Diesel powered down-the-hole hammer drills will be used for production drilling and will also be used for horizontal highwall depressurization drilling on the ultimate pit walls. Blasting will occur approximately two to three times per week.

Additional grade control drilling will be undertaken in advance of mining to better delineate the ore and waste rock. Dedicated reverse circulation (RC) drilling will be used and the results from sampling will be used to define ore and waste rock within the blasted rock material. A fleet management system will keep track of each truck load including material type, tonnage and destination.

A contract explosives supplier will provide the blasting materials for the mine. Emulsion is the primary blasting agent as the majority of holes will be wet. Explosives and all accessories will be supplied on an as needed basis from the contractor's base location off-site and delivered to the Proponent using the contractor's equipment. All on and off-site permitting requirements for explosives handling and storage will be the responsibility of the contractor through Natural Resources Canada for this Project.

Diesel powered hydraulic excavators will load both ore and waste rock into haul trucks. These loading units will also function to re-handle low grade ore material from stockpile and load overburden and topsoil for transport to stockpile.

All ore will be loaded into off-highway rigid frame haul trucks and hauled to the ROM pad and primary crusher. All waste rock will be loaded into off-highway rigid frame haul trucks and hauled to the WRSF. If dust is generated from hauling in the warmer months of the year, it will be controlled by applying dust suppression measures that may include water and chemical dust suppressants to the haul roads utilizing specialized trucks.

At the WRSF, the haul trucks will dump waste rock in lifts.

A small support fleet will be utilized for mine operations support services. A fleet of diesel powered mobile equipment is specified to handle pit support activities and include a hydraulic excavator, wheeled loader, track dozers and motor grader.

Maintenance activities on the mine mobile fleet will be performed in a mine maintenance facility located near the primary crusher, as well as in the field. Fuel, lube and field maintenance will be performed with a mobile maintenance fleet of equipment by qualified staff.

Diesel fuel and lubricant storage will be located near the primary crusher, and a dedicated fuel and lube truck will deliver these materials to the mine and maintenance mobile fleet. Diesel will be supplied from local sources by road tankers and stored in approved, above ground double walled tanks. From there, fuel will be distributed to equipment consumers by means of a dedicated fuel truck or cardlock system located at the storage facility.

The fleet of road trucks required to transport the gold concentrate from the Project to the process plant at the Touquoy Mine will be refueled at the Project as needed using the cardlock system noted above.

The workforce at the Project will be approximately 220 persons working two shifts per day or approximately 50 persons per shift (personnel will work four days on and four days off), similar to that at the operating Touquoy Mine.

In addition, the trucking operation hauling concentrate from the Project to the Touquoy Mine will create approximately 10 jobs which will be contract positions to drive the highway trucks and conduct vehicle maintenance.

Waste Rock Management

All waste rock removed from the open pit will be placed in the WRSF, shown on Figure 2-1.

The WRSF will range in height from 10 m to 40 m above the existing ground surface and will contain waste rock excavated from the pit. This height generally conforms with local topographic variations. A haul ramp along the south-western limit of the WRSF will provide access to all lifts. Design capacity is approximately 11.6 Mt. A separate stockpile will be constructed to the north of the pit to contain unconsolidated overburden. This material will be utilized for reclamation of the WRSF.

The WRSF will be built bottom-up in small lifts, spread out and compacted by track type dozers. Haul trucks will deliver the waste rock to the WRSF, then dump out either as free dump piles, or off the edge of an established dump lift over a safety berm. Individual

lifts will be constructed to 10 m in height. At closure the face of the lift will be re-sloped to 2:1 for use in reclamation activities. Re-sloping will be done by track type dozers and small hydraulic excavators.

The waste rock will be placed according to standard practices and will ensure compliance with provincial regulations with respect to slopes, potentially acid generating material (if any), and surface water run-off.

Runoff from the WRSF will be collected in seepage ditches and/or ponds prior to release to the environment. If unsuitable for release to the environment, such seepage water will be directed to the TMF to supplement processing water requirements.

Low Grade Ore Stockpile

To ensure continuity of mill feed and allow initial processing of higher grade material, an LGO stockpile will be developed to the west of the plant (Figure 2-1). The north-western edge of the LGO stockpile will have a maximum height of 25 m while the south-eastern edge will be tied into natural topography. Total capacity of the LGO is approximately 2.1 Mt.

As with the WRSF, the LGO will be built bottom-up in lifts, spread out and compacted by track type dozers. Haul trucks will deliver the low-grade ore to the LGO, then dump out either as free dump piles, or off the edge of an established dump lift over a safety berm. Unlike the WRSF, this stockpile is planned to be progressively reclaimed for milling over the mine life. The remaining footprint will be reclaimed upon closure.

The LGO will be placed according to standard practices and will ensure compliance with provincial regulations with respect to slopes, potentially acid generating material (if any), and surface water run-off.

Runoff from the LGO stockpile will be collected in seepage ditches and/or ponds prior to release to the environment. If unsuitable for release to the environment such seepage water will be directed to the TMF to supplement processing water requirements.

Milling Operations

The mill is located east/north-east of the proposed pit area and south of the TMF. The approach by road to the plant will be from the west off of Highway 7.

The main plant building houses the grinding, gravity recovery, flotation, concentrate dewatering and reagent sections. The concentrate storage will be located in a separate building. The three-stage crushing circuit is based on modular mobile crushing equipment and will be located to the south of the main plant building. The fine ore stockpile is covered for snow protection and dust control.

Process water will be reclaimed from the TMF for re-use in the milling operations. Initial start-up water and ongoing make-up water is expected to be sourced from nearby Archibald Lake or the St Mary's River through application for a surface water withdrawal approval (NSE).

Tailings Management - Cochrane Hill

Several alternative TMF locations are currently being considered and are subject to ongoing environmental and geotechnical investigation, however, the principle design objectives and features detailed below are applicable to all options being considered. The principal design objectives for the TMF are to protect the regional groundwater and surface water resources during both operations and in the long term (after closure), and to achieve effective reclamation at mine closure. The design of the TMF considers the following requirements:

- minimizing impact and risks to the surrounding environment;
- permanent, secure, and total confinement of all solid tailings materials within engineered storage facilities;

- control, collection, and removal of free-draining liquids from the tailings during operations for recycling as process water to the maximum practical extent;
- discharge of surplus water collected in the TMF with treatment as necessary;
- the inclusion of monitoring features for the facility to demonstrate performance goals are achieved and design criteria and assumptions are met;
- staged development of the facility over the life of the proposed project to allow for efficient use of materials from pre-production and operational pit development as construction materials for the TMF; and,
- Some of the materials may be obtained from separate aggregate quarries and borrow pits based on volume and quality factors.

The preliminary TMF option selected for design purposes is located to the south of Melrose Country Harbour Road. The TMF positioned in this manner allows the planned mine facilities to be clustered near to the proposed open pit and simplifies water management requirements for the mine site. The TMF has been designed to permanently store tailings material generated by the ore milling process at the Project site. Specific features of the TMF are listed below:

- Zoned water-retaining earth-rockfill dam;
- Interior rockfill causeways located within the TMF;
- Diversion channels and dams that route water around the TMF during construction;
- Perimeter road and seepage collection ditches;
- Sediment ponds and seepage collection ponds;
- Surplus water pipelines, pump systems, and surplus water management pond;
- Tailings distribution system;
- Reclaim water system;
- Raw water intake and pipeline for initial filling of TMF and ongoing makeup water for the plant operations;
- Tailings beaches;
- Supernatant water pond; and
- Discharge works associated with the removal of surplus water from the TMF. Initial water balance calculations indicate the TMF will operate under surplus water conditions and require a discharge. Further work will be undertaken to determine the need for and design of any treatment works to ensure such discharge meets environmental requirements.

Water Management

The landscape in the PA is characterized by a gentle hillslope covered with areas of forest and some deforested areas. The Project is situated to the east of Highway 7, south of Melrose Country Harbour Road, and west of Indian River Road. The Project facilities are located entirely within the drainage area of McKean Brook and its tributaries, which wraps around the northern and eastern sides of the PA. The Project is confined by topography to the south with the proposed open pit, ore stockpile, and mill site occupying the higher ground near the catchment divide.

Runoff from the active mine areas will generally flow towards the north and be directed to a site water management pond. Active mine areas will include the open pit area, mill site, WRSF, till stockpile, LGO stockpile, and the TMF. Water from these areas will be directed to the supernatant pond within the TMF to be reused as a source of process water. As such, the TMF will act both as containment for tailings and site contact water unsuitable for discharge. Initial water balance calculations indicate the TMF will operate under surplus water conditions and require a discharge. Further work will be undertaken to determine the need for and design of any treatment works to ensure such discharge meets environmental requirements.

Water collection ditches will be established surrounding the bases of the WRSF and LGO stockpiles. Relief is designed into these facilities so that surface water that comes into contact with them will run to the surrounding collection ditches by gravity, wherever

possible. Runoff from these active mine areas will be collected in the site management pond and discharged to the receiving environment or conveyed to the TMF supernatant pond if unsuitable for discharge and used as process water.

A plant site water management pond will be located adjacent to the plant facilities. Water collection ditches will be established surrounding the facilities area, as well as the ROM ore stockpile, that will divert collected surface water to this water management pond. The earthworks for the facilities are designed with enough relief that contact surface water will run by gravity into these surrounding collection ditches, and into the plant site water management pond. Settled water will be released to the environment if of suitable quality or if unsuitable pumped to the TMF for use as process water.

An in-pit water diversion ditch will be established along the top bench of the open pit to intercept any surface water that makes it through the berm and comes into contact with the open pit. This ditch will direct water to in-pit sumps for collection, where it will be pumped out of the pit and to the TMF supernatant pond for use as process water. Where necessary, sub-horizontal drain holes will be established in the final open pit walls as they are exposed. On the active bench floor, the water that is collected from these drain holes, along with surface runoff, will be directed to a sump. All collected ground and surface water in the pit will be handled by high lift skid mounted pumps installed in each active pit bottom as part of the in-pit pumping system. The mine sump pumps will be connected to semi-permanent and permanent piping systems to convey water through a HDPE pipe directly to the TMF located east of the open pit. The in-pit sumps will be installed with each box cut as the benching is advanced.

Seepage from the TMF and runoff from the TMF embankment will be captured in the seepage collection ditches beyond the ultimate footprint of the embankment. Water will be conveyed to two seepage collection points downstream of the embankment and pumped back to the TMF supernatant pond during operations and closure until water quality is suitable for release to the downstream receiving environment. Water suitable for discharge from the TMF will be released through an engineered discharge to Archibald Lake and its downstream receiving environment or a location within the McKeen Brook system. Options for the final release point location are still being evaluated.

Concentrate Loading and Haulage to the Touquoy Mine

The gold concentrate produced at the Project will consist of a gravity concentrate and a float concentrate. The gravity concentrate represents a small portion of the gold concentrate produced and will be stored and transported in specialized hoppers. The hoppers will be transported on the back of a flatbed once a hopper has been filled [in the order of 1 hopper every 2 days]. The majority of concentrate to be hauled will be float concentrate. Up to 60,000 t will be hauled on an annual basis in purpose-built side dump highway haul trucks. The trucks will be loaded inside the concentrate loadout area by front-end loader. The concentrate will be covered to prevent any losses and the trucks weighed prior to leaving to ensure appropriate loading.

The concentrate from the Project site will then be transported to the Touquoy processing facility along a combination of existing public roads and a private road. The route proposed is south along Highway 7 through Sherbrooke to Sheet Harbour to Highway 224 and then north-west along Highway 224 connecting with the upgraded private Beaver Dam Haul Road to Mooseland Road.

The route will use mainly public highways (Highway 7 – 97 km, Highway 224 – 17 km). The Beaver Dam Haul Road (12.7 km) is a private logging road that will be upgraded as a result of the development of the Beaver Dam project. This upgrading will involve widening to two lanes and improving alignment to provide better curves and gradients, where necessary, to achieve an operational design speed of approximately 70 km/h. The upgrade of the Beaver Dam Haul Road between Highway 224 and the Touquoy Mine will be completed separately, and in advance of, the Project, as part of the Beaver Dam Mine Project, as such, this project will not be considering this upgrade as a project activity. The final section of the proposed haul route will be along the Mooseland Road for approximately 11 km.

Truck payloads will be consistent with the limits applied by the Nova Scotia Highways department to comply with the proposed route segments. Trucks with trailers in a C Train configuration will be used to haul concentrate. The 8 axle, 58,500 kg C Train is a standard across Canada. Based on the requirement to haul 170 t/d and a maximum payload of 28.5 t, 6 return trips per day will be required. Assuming a single 12-hour shift, this would result in approximately 1 truck every two hours, however, the exact number will depend on the final hauling schedule, truck sizing and road restrictions. Approximately 3 trucks would be required necessitating the hiring of 6 drivers plus supporting personnel for truck maintenance and road maintenance. During construction and pre-production there will be no concentrate hauled. In addition to the main concentrate haul, proposed is a secondary haul of low tonnage (approximately 2 tonnes) gravity concentrate. This product will be delivered weekly by a flat deck, 5 tonne truck, with security.

The Spring Weight Restriction period in Halifax County, Nova Scotia is legislated from March 23 to May 18 of each year but is typically adjusted (shortened) due to yearly conditions and can be expected to be in place for approximately one month. Highway 7 and 224 in the area of interest are exempt from the Spring Weight Restrictions and the Beaver Dam Haul Road (including Moose River Cross Rd. between Highway 224 and Mooseland Road) is private and is therefore not subject to provincial restrictions. Mooseland Road is currently subject to spring weight restrictions. However, as the majority of the haul route is not subject to weight restrictions, an exemption will be applied for the Mooseland Road, if required. In addition, to spring weight restrictions, a 51km section of Highway 7 between New Chester Road and Port Dufferin is subject to a year-round weight restriction of 41,500 kg. The intention for this section of road is to apply for an exemption through NSTIR.

The majority of dwellings located along the proposed haul route are located in the communities of Sherbrooke and Sheet Harbour. A lower density of dwellings outside of these communities are spread along the highway from Stillwater on Highway 7 to Marinette on Highway 224. These dwellings are currently exposed to highway traffic which includes logging trucks and aggregate haulers. For the remainder of the haul route, there are a small number of houses that will be affected by these vehicles.

The proposed truck traffic associated with the Project is envisioned to have only a minor impact on the existing traffic volumes on the segment of Highway 7, Highway 224 and Mooseland Road.

Touquoy Processing

Final processing of gold concentrate will take place at the existing Touquoy facility currently operating at the Touquoy Mine. The Touquoy plant has the capacity and is designed to be able to treat Cochrane Hill concentrate with only minor modifications required including:

- Concentrate storage;
- Gravity concentrate leach reactor; and,
- Gravity electrowinning cell.

These changes can be accommodated in the existing plant site footprint.

Tailings Management – Touquoy

Final processing of the gold concentrate from the Project site will be undertaken at the Touquoy facility. The small volume of additional tailings generated from this operation will be pumped to the mined out Touquoy pit for storage. Process water will be recycled from the Touquoy TMF. At some point, process water may be sourced from the exhausted Touquoy pit.

It is anticipated that a total of approximately 350,000t of tailings from the Project will be deposited into the mined out Touquoy pit commencing in 2022, once Touquoy ore has been exhausted. Tailings from the Cochrane Hill concentrate will be deposited in the exhausted open pit in conjunction with tailings from Beaver Dam, and Fifteen Mile Stream concentrate. The Cochrane Hill tailings

deposited represents an increase of approximately 5% over and above the total Beaver Dam and Fifteen Mile Stream tailings that will be deposited into the pit.

Source term estimates for Cochrane Hill tailings supernatant will be used to update the Touquoy water quality model to predict potential changes in water quality in the Touquoy open pit as a result of the addition of tailings from processing of Cochrane Hill concentrate at the Touquoy Mine. This information will be used in support of an application to amendment to the Touquoy Mine Industrial Approval (IA) to accept processing of Cochrane Hill concentrate and disposal of tailings from Cochrane Hill concentrate to the Touquoy open pit.

The Touquoy pit is not expected to completely fill with water during the processing of the concentrate but if this does occur, surplus water will be pumped into the existing Touquoy TMF in order that it can pass through the water treatment system.

Reclamation

The goal of the reclamation plan is to return land and water disturbed by development to a safe and stable condition compatible with the surrounding landscape and final land use as determined by the appropriate level of community and regulatory consultation. The plan will employ recognized reclamation best practices, acknowledged principles of ecological restoration, and consultation with relevant stakeholders. The site has been used for past mining and exploration activities (decline installed, roads, exploration camps, water management pond system, and small waste piles of rock and overburden along with successive tree harvesting and silviculture activities) for the last 100 plus years. Evidence of limited recreational use of the land (hunting, fishing and off-road vehicles) at the site suggests that these activities could be re-instated after the mining operation ceases and reclamation activities completed. The majority of the lands proposed for the mining operation and infrastructure are owned by the Provincial Crown.

All marketable timber or biomass will be removed from the pit, crusher, plant site, TMF and waste rock disposal areas. Organic debris (roots, stumps, brush) will be stockpiled in conjunction with topsoil and used for reclamation at closure. All reclaimed areas will be covered with overburden and growing medium to a depth suitable to establish and support a self-sustaining vegetative cover.

At closure, all infrastructure will be removed except as required for long term maintenance and monitoring. The open pit at the Project site will be allowed to flood creating a lake. Re-contouring of the WRSF, carried out progressively throughout the Project life where practical, will be completed. The crusher site will be contoured to match the local topography.

The anticipated scenario for closure of the TMF is long term wet cover. Where practical, exposed tailings beaches will be covered and then re-vegetated. A spillway invert will be lowered within the tailings pond to allow free flow of runoff out of the facility once the contained water is deemed suitable for discharge to the receiving environment. Re-vegetation will employ hardy pioneer species and grasses to colonize disturbed areas and stabilize soil. Native species will be planted to hasten a return to a natural ecosystem reflecting the pre-development site.

All runoff associated with the site will be contained and directed to either the TMF or open pit until determined to be suitable for discharge. Runoff in the vicinity of the open pit will be directed as dispersed flow into the open pit to speed filling. The flooded pit will have shallow margins along the pit perimeter and will sustain a seasonal flow channel downstream of the pit. Runoff from stockpiles will be directed to stable channels and released to the natural drainages.

Decommissioning of the site will require approximately three to five years after cessation of operations. Two years will be needed to complete regrade and re-vegetation of the site, after which monitoring will continue until deemed no longer necessary – typically two to three years post-reclamation. The reclamation measures are designed to enable eventual walk away from the site, leaving the site in a safe and stable state. The self-sustaining site will be compatible with the surrounding environment and future land use.

The Project site is intended to be returned to its previous land use after mining: recreation and forestry. Other opportunities may exist for the site. The final disposition of the site will come from consultation with all stakeholders throughout the course of the Project life and adherence to applicable legislation.

2.5 Emissions, Discharges and Waste

Dust emissions resulting from mine construction and operation will be controlled with the application of water obtained from Archibald Lake or the St Mary's River via a stand pipe on the raw water line, or wet/chemical suppressants. Stockpiled soils and tills will be revegetated as piles become stabilized. With a relatively short mine life, the majority of reclamation activities will be commencing at the end of the mining operation. However, where possible, inactive disturbed areas including stockpiles and roads will be reclaimed upon cessation of activity.

Combustion emissions, including nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO₂), sulphur dioxide (SO₂), and particulate matter (PM), will be generated from the operation of Project equipment and vehicles. Emissions will be reduced by proper equipment selection, maintenance and inspection. Modern diesel engines utilizing low sulfur diesel fuels have reduced particulate and sulfur dioxide emissions compared to similar engines used in the past. Air quality monitoring will be conducted as per the conditions of an IA, Nova Scotia Air Quality Regulations and the National Ambient Air Quality Objectives. Predictive modelling relating to dust deposition is planned as part of the environmental assessment.

Noise and vibration from blasting and equipment will be controlled by attenuation (the distance between a noise source and a receptor), vertical separation, and equipment design. Predictive noise modelling is also planned to support the environmental assessment process.

Sediment and erosion control measures will be in place throughout all phases of the Project to ensure that surface runoff generated during operations is appropriately managed. Surface runoff will be collected in ditches and/or ponds and if of suitable quality discharged to the receiving environment. Groundwater and precipitation in the open pit, will be directed or pumped to the TMF for use as process water. Water from the water management pond(s) may be used in for dust suppression, to the extent feasible. Water management pond development will be staged with the overall development and needs of the Project. Details regarding the water management pond volumes required for the proposed mine will be defined during the detailed design and reported in the EIS. Final design details will be a requirement of the provincial IA application.

Water discharges will be monitored and sampled in accordance with the terms and conditions of the provincial IA. Monitoring will ensure that total suspended solids (TSS) levels do not exceed the approved final discharge limits. The Proponent is aware of the requirements of the Metal and Diamond Mining Effluent Regulations (MDMER) and will comply with said requirements as applicable to the site. Since this is a satellite mine operation with no cyanide processing on-site, effluent will generally be tested for TSS, metals and pH and any other requirements stemming from Environment Canada or the Province through the IA process.

Solid and hazardous waste generated onsite will be minimal and limited to office and domestic refuse and oily waste. Waste streams will be managed by accredited waste collection contractors who will regularly pick up waste for transport to authorized/approved off-site disposal or recycling facilities utilizing legislated or approved methods. If a spill occurs, contaminated material will be removed from the site for disposal and recycling to an approved facility. An on-site septic system will be designed and built for sewage and greywater disposal.

2.6 Project Phases and Scheduling

The construction of the Project will be timed so that the concentrate supply to the Touquoy processing facility will begin as the Touquoy deposit is exhausted and concurrently with both the Beaver Dam mining operation and Fifteen Mile Stream mining operation (four to five years overlap of each). The Touquoy facility will undergo routine maintenance and minor upgrades in preparation to receive concentrate which will be processed at the Touquoy processing plant.

Removal of topsoil, overburden and waste rock from the top benches of the open pit will begin one and a half years prior to the crusher installation. Timing of clearing activities will be informed by nesting bird directives or as approved subject to pre-construction nesting bird surveys. During this time, stockpiles for the topsoil and overburden will be built, and the initial lift of the WRSF will be constructed. Also, surface and ground water management facilities, including monitoring wells, ditches and berms will be constructed.

All other development work on the plant site and TMF including construction and commissioning of the support infrastructure will be completed in the twelve months prior to commencement of operation.

Supply of power to the site and placement of the fuel storage facility and support facilities will be linked to the start of early mining pre-strip operations.

2.7 Opportunities for Mine Life Extension

The proposed development plan and current mine life for the Project as described in the foregoing section is based upon extraction of the proven and probable reserves of 11.2 Mt of ore grading 1.10 g/t.

As with most mining properties, however, mineralization extends beyond the current open pit limits and the resource at the Project remains open at depth and to the east. As further exploration and infill drilling is undertaken, and resource estimates upgraded, any decision to expand the pit will be preceded by contact with regulatory authorities and applications to amend the appropriate operating permits and approvals.

3.0 PROJECT LOCATION INFORMATION

The Project is located within Guysborough County, in central Nova Scotia, approximately 145 km northeast of Halifax and 45 km to the northeast of Atlantic Mining's Fifteen Mile Stream Mine Project. The property covers the historic Cochrane Hill Gold District located on NTS sheets 11E01/D, 11E08/A and 11E05/B and is centred at 45° 14' 57" north latitude and 62° 00' 48" west longitude. The Touquoy Mine is located on the NTS sheet 11D15 and is centred at 44° 59' 09" north latitude and 62° 56' 16" west longitude.

3.1 Legal Description and Ownership

A large proportion of the surface rights in the PA is held by the Crown (administered by the Province of Nova Scotia). Approximately 777 ha or 65% of the area of the main Exploration Licence (51477) is held as ungranted Crown lands by the Province of Nova Scotia and the remaining peripheral 35% area is held by nine different parties. The Cochrane Hill deposit is located entirely within the Crown lands.

Mineral tenure consists of one Exploration License EL51477 comprising 76 contiguous "map-staked" mineral claims for a total area of 1134 ha. The Property claims are held by Atlantic Mining NS Corp. (a wholly-owned subsidiary of Atlantic Gold Corporation).

A Mining Lease will be sought once the Project receives Environmental Assessment Approval.

3.2 Proximity to Residences, Reserves, and Federal Lands

There are several population centres within a short driving distance of the Cochrane Hill area, including the town of Sherbrooke, 13 km to the south, which has a population of 1,700 and provides a number of services including secondary schooling and a hospital. The town of Antigonish, some 40 km to the north, has a population of 14,600 and provides a greater range of services. The Project is located within central Nova Scotia, a distance of over 180 km from the nearest provincial boundary - New Brunswick. The site is over 400 km from the United States (Maine border). All distances referenced in this section are based on straight line measurements.

Cape Breton Highlands National Park is the closest national park approximately 170 km from the Project site. The closest national historic site is the Grassy Island Fort National Historic Site which is located approximately 77 km from the Project site. The two closest Mi'kmaq communities are the satellite community to the Millbrook First Nation of Sheet Harbour and the Paqtnkek First Nation of Paqtnkek-niktuek. These two Indian Reserves (Sheet Harbour IR 36, Paqtnkek-niktuek IR 23) are located approximately 54 km and 39 km (straight line measurement) respectively from the Project site.

3.3 Current Land Use

The principal economic activity in the PA is forestry. Coastal settlements to the south support a long-standing lobster and fishing industry and there is some farming on terraces along the valleys of the St. Mary's River and its tributaries. Streams and waterways in the area support trout fishing and other recreational uses.

The PA has had previous exploration and mining activity. A series of historical and abandoned mine openings are present across the PA. Between 1982 and 1983, 13,106 tons of material were excavated from an open pit and processed in a test mill with the subsequent tailings being deposited on site. There is a road network on the site to support previous exploration and mining activity, as well as forestry activity on provincially owned land within the PA. Access roads have been in place for decades for forestry and mining activities; others may use the roads from time to time for seasonal activities on the crown land. The use of the land by First Nations communities at this point has not yet been fully revealed and is currently being evaluated. The roads present opportunities for recreational vehicle use and foot traffic but the degree of use of the private and crown roads is not well documented.

4.0 FEDERAL INVOLVEMENT

4.1 Financial Support

No federal funding will be sought or has been received for this Project.

4.2 Description of Federal Land Used

No federal lands will be used to undertake this project.

4.3 List of Permits, Licenses and other Authorizations

Federal and provincial environmental acts and regulations apply to the Proponent regarding the design, site preparation, construction, operation, and rehabilitation of the proposed mine. In addition to the environmental legislation, other acts and regulations relating to labour standards, mining practices, and other phases are applicable to the Project. The Proponent is aware of the applicable acts and regulations that pertain to the proposed undertaking and the Proponent's project team have the demonstrated experience and ability to prepare the necessary information and design plans to obtain the required permits and approvals, as well as having shown the ability to operate within the requirements of such acts and regulations at the Touquoy Mine and other previously completed surface mining projects in other first world jurisdictions. The following provides a listing of some pertinent acts that may be applicable for the undertaking and/or were considered in the preparation of Project Description. Further reference will be made to specific legislation in the EIS.

Federal Legislation

- *Canada Wildlife Act* and Regulations
- *Canadian Environmental Assessment Act* and Regulations
- *Canadian Environmental Protection Act* and Regulations
- *Fisheries Act* and Regulations, including the Metal and Diamond Mining Effluent Regulation (MDMER)
- *Migratory Birds Convention Act* and Regulations
- *Transportation of Dangerous Goods Act* and Regulations
- *Species at Risk Act*
- *General Nuclear Safety and Control Act* and Regulations

Based upon the absence of any designations of local waterways, the requirement of permits for navigable waters is not anticipated for the Project under the current Navigation Protection Act. The federal government recently proposed changes to these regulations and a Proposed *Canadian Navigable Waters Act* that would replace the *Navigation Protection Act* is under review and is expected to come into effect as early as June 2019. There is potential that, under this new regulation, waterways within the PA could require permitting. Further consultation with Transport Canada will be required as more information on the new act becomes available.

Explosives will be supplied by a blasting contractor and all permits related to the storage and use of explosives related to the Project will be obtained by the selected contractor through Natural Resources Canada. Blasting operations will be undertaken by qualified blasters and the supply and delivery of explosives by a contract explosives supplier. The requirement to store explosives on-site will depend upon the selected supplier, quantities and transport distance. Should the decision be made to store explosives on-site then the appropriate permitting through Natural Resources Canada will be undertaken for the Project. Nuclear density gauges will be used in the mill and therefore a license will be required under the *General Nuclear Safety and Control Act* and Regulations.

Provincial Legislation

- *Environment Act* and Regulations
- *Dangerous Goods Transportation Act* and Regulations
- *Endangered Species Act* and Regulations
- Labour Standards Code
- *Mineral Resources Act* and Regulations
- *Crown Lands Act* and Regulations
- *Occupational Health and Safety Act* and Regulations
- *Wildlife Act* and Regulations

The Proponent will follow provincial processes for watercourse and wetland permitting and standard mitigation methods (both NSE and DFO) will be adhered to for watercourse alteration, culvert installation and wetland alteration. Culvert installations will be completed in accordance with Nova Scotia Watercourse Alteration Standard (NSE 2015) and DFO guidelines for the design of fish passage for culverts in Nova Scotia (DFO February 2015). Should internal mine site road re-alignment be required to ensure safe passage for truck traffic, the new road sections will be aligned at 90 degrees to the watercourse channel at the crossing location wherever practical.

During the design process, the Proponent will work to avoid wetland habitat where practical across the Project. Where avoidance is not feasible, wetland alteration permitting will be completed to support the mine development.

NSE will require an Industrial Approval (IA) to construct, operate, reclaim and abandon the mine; a Water Approval to withdraw surface and/or groundwater for mining operations; and a Wetlands or Watercourse Alteration Approval to alter waterbodies and/or wetlands within the mine development. All approvals are as described under the Activities Designation Regulations (*Nova Scotia Environment Act*, 2014) as follows:

Industrial Approval: An IA defines specific operational conditions and limitations, including dust, noise, surface water and groundwater discharge criteria and monitoring plans. An IA application will be made by the Proponent when EA approval is received. An application for an amendment to the Touquoy Mine IA will also be made to allow for the acceptance and processing of Cochrane Hill concentrate and disposal of the associated minor volumes of tailings in the Touquoy open pit.

Water Withdrawal Approval: This approval will be required prior to withdrawing groundwater or surface water to support mine development at a rate greater than 23,000L/day.

Wetlands Alteration Approval: This approval will be required prior to altering any wetlands in the PA. The approval application will include a functional assessment of the wetlands in question and a compensation plan.

Watercourse Alteration Approval: This approval will be required prior to altering any watercourse in the Project. The approval application will include a detailed assessment of the watercourses in question and a description of fish habitat and a fisheries off-setting plan should one be required.

5.0 ENVIRONMENTAL EFFECTS

5.1 Spatial Boundaries

The PA is defined as the current design layout for infrastructure plus an appropriate buffer setback to evaluate direct impacts. It is important to note that additional engineering and technical studies are still required to finalize site infrastructure.

The EIS Local Assessment Areas (LAA) for each VC have been drafted and will be discussed in detail in the EIS document. EIS Regional Assessment Areas (RAA) for each VC (as determined to be required for analysis) have also been drafted.

5.2 Biological Environment

The proposed Project straddles the eastern and Nova Scotia uplands ecoregions and is further subdivided into the eastern interior and St. Mary's River ecodistrict. The eastern interior ecoregion is underlain by quartzite and slate of the Meguma Group, with granitic intrusives. A variety of landforms are found in the eastern interior ecoregion, which include rolling till plains, drumlin fields,

extensive rockland, and wetlands. The bedrock is highly visible in those areas where the glacial till is very thin, exposing the ridge topography. Where the till is thicker, the ridged topography is masked and thick softwood forests occur. There are a few drumlins and hills scattered throughout the ecodistrict with fine textured soils derived from slates. The St. Mary's River ecoregion is underlain by siltstones and sandstones of the Horton Group. Topography of the ecodistrict is largely hummocky; where the land is level, wetlands and drumlins exist. Soils are primarily well drained, composed of stony to gravelly sandy loams that developed on till veneers derived from the underlying parent material.

The composition of the forests in the eastern interior ecodistrict strongly reflects the depth of the soil profile. Thus, many climax compositions can be found throughout. On the shallow soils, repeated fires have reduced forest cover to scrub hardwoods such as red maple and white birch, with scattered white pine and black spruce underlain by a dense layer of ericaceous vegetation. However, on the deeper, well drained soils stands of red spruce will be found. On the crests and upper slopes of hills, drumlins, and some hummocks, stands of tolerant hardwood occur. Both beech and hemlock occur on these deeper, well drained soils, but their presence is usually individual and seldom of a high percentage in any stand. On the imperfectly and poorly drained soils, black spruce will dominate the stand composition (Neily et al. 2005).

Forest composition within the St. Mary's River ecodistrict is also a reflection of the soil profiles: the shallow coarse soils support black spruce and white pine. Red spruce and tolerant hardwoods can be found on the upper slopes and drumlins. The abundance of black spruce and other fire species has resulted from historical burnings that also caused the extensive barrens within this ecodistrict. Fires on the shallow, sandy soil may have contributed to the lowered soil fertility (Neily et al. 2005).

The closest wilderness area is The Big Bog Wilderness Area which is 7 km southwest of the PA. There are two areas pending protection as wilderness areas near the PA: Nine Mile Woods Wilderness Area (900m north of the PA) and Indian River Wilderness Area (5 km southeast from the PA). The closest nature reserve is Indian Man Lake Nature Reserve 25 km west of the PA. There is an area pending protection as a nature reserve 25 km to the west – northwest as well: Sutherlands Lake Nature Reserve. The closest Provincial Park is Sherbrooke Lake Provincial Park 9.2km south of the PA. The PA intersects the northeastern edge of a parcel of land proposed to be included in the St. Mary's Corridor Lands.

Geology

Nova Scotia can be divided into two distinct metallogenic terranes; the Avalon Terrane to the north and the Meguma Terrane to the south. These two terranes developed independently until they were juxtaposed along the Cobequid-Chedabucto Fault Zone during the mid-Devonian Acadian Orogeny.

The gold deposits in Nova Scotia are contained within the Meguma Supergroup which is divided into, the basal greywacke dominated Goldenville Group (5,600 m thick) and the overlying, finer grained, argillite dominated Halifax Group (4,400 m). These sediments were uplifted and deformed into a series of tightly folded subparallel northeast trending anticlines and synclines during the Acadian Orogeny. The Cochrane Hill property encompasses a section of the northeast-trending Cochrane Hill anticline which can be traced for at least 28 km from a position approximately 14 km west of the Cochrane Hill deposit, to approximately 12 km east of the Cochrane Hill deposit. The Cochrane Hill anticline is a tight to isoclinal fold in the vicinity of the Cochrane Hill deposit, overturned with both limbs dipping to the north at between 55° and 80°.

The Goldenville Group comprises, from oldest to youngest:

- Moose River Formation;
- Tangier Formation; and
- Taylors Head Formation.

The deposit is hosted in an interbedded argillite and greywacke sequence which may either represent sediments of the Moose River Formation or the Tangier Formation of the Goldenville Group.

Lithologies in the area have been metamorphosed to amphibolite (staurolite) metamorphic grade, coinciding with the development of biotite schists from argillite protoliths and the formation of porphyroblastic textures. Mineralization is in the form of a tabular zone of parallel, planar quartz veins in a well-bedded argillite and greywacke protolith. The mineralization dips steeply to the north at approximately 70° and is parallel to bedding in the southern limb of the Cochrane Hill anticline.

Gold mineralization occurs over true widths of up to 60 m to 70 m, within which, higher grade material (e.g., >0.8 g/t Au) is persistent over true widths varying from 5 m to 30 m. The foot wall contact with respect to gold mineralization is relatively sharp in terms of grade cut-off but the hanging wall contact is less defined, with an erratic distribution of weakly anomalous grades and occasional >1 g/t Au grades. The mineralization has been defined over a strike length of 1,500 m and down to a vertical depth of 250 m.

Gold mineralization occurs within quartz veins and within biotite schist (after argillite) and metagreywacke host rock. Mineralization is associated with sulphides, including arsenopyrite, pyrite and pyrrhotite and lesser galena and sphalerite. There appears to be very little disruption of the mineralised zone by post-mineralization faulting.

Acid Rock Drainage/Metals Leaching

Acid rock drainage (ARD) that is caused by human activity refers to the outflow of acidic water from metal mines, coal mines or disturbance from construction (highways, housing, commercial developments) where, due to blasting or excavation of geologic materials, iron sulphide minerals become exposed to the atmosphere. When these environments are disturbed and come into contact with water, oxygen, and certain bacteria, the sulphide minerals may oxidize and generate acid in the process.

The acid production potential (AP) of a material, based upon its sulphide content, may be offset by its neutralization potential (NP), which is most commonly afforded by carbonate minerals such as calcite and dolomite. The balance between these two factors (NP/AP) determines the likelihood of an exposed material type to generate net acidic drainage. However, besides the relative quantities, the reaction kinetics of acid-generating and acid-buffering phases also play an important role. The rate at which mineral-dissolution reactions occur is largely driven by the grain size, texture, mineral chemistry and ambient conditions (e.g., pH, temperature, etc.) under which the material is stored.

Metal leaching (ML) is a common phenomenon at mine sites and the relationship between ARD and ML is twofold. First, many sulphide minerals commonly host base metals (e.g., Cu, Cd, Zn, Pb) and metalloids in their crystal lattice, which will be released upon oxidation of the sulphide phase. Second, most metals that are commonly considered of environmental concern in tailings porewaters are more soluble under acidic condition, although several elements that exist as oxyanions under aerobic aqueous conditions may be mobile in a pH-neutral regime (e.g., As, Se).

In the absence of mitigation, ARD/ML can lead to contamination of natural waterways with elevated levels of metals and other elements as well as low pH conditions unsuitable for aquatic life. Potential current effects of ARD/ML will be studied via hydrogeological and surface water sampling programs that are underway and will continue through 2018.

A Phase I geochemical assessment study will be completed in 2018 including a static test program. As part of this program, drill core samples will be collected for geochemical testing (acid-base-accounting and metals) which will inform geochemical trends and recommendations with respect to material handling and storage. A Phase II geochemical assessment may follow that would include more detailed mineralogical work and kinetic testing to better understand elemental speciation as well as acid and metal release rates.

Groundwater

The PA is in a low density rural area of Guysborough County. The nearest domestic well, as recorded in a provincial well log database, is 550m away from the proposed pit, in a southerly direction at a residence along Highway 7. Site surveys indicate no other wells in closer proximity. Domestic wells are a mix of drilled and dug wells in the area based on a review of the Nova Scotia Well Log Database (NSE 2013).

The site hydrogeology consists of a shallow fractured top-of-bedrock aquifer system which extends into the lower portion of the overburden. Most of the overburden appears to be low permeability, acting as a confining layer for the underlying fractured top-of-bedrock aquifer system. Based on previous studies of the hydrogeology in the area, the degree of hydraulic connection between the shallow bedrock fracture systems is likely poor to moderate, and the main zones that are capable of storing and transmitting relatively large volumes of groundwater are the larger scale fault systems. The water table is close to the surface across the PA, reflecting low permeability bedrock and an excess of annual rainfall over evaporation. Thus, the bedrock sequence and part of the overlying tills will be saturated with groundwater under ambient conditions.

The Touquoy Mine was subjected to a hydrogeological investigation that consisted of a series of geotechnical/hydrogeological drill holes that were monitored for groundwater quality. Given that the geology at the PA is similar to that at the Touquoy Mine, it is anticipated that similar hydrogeological conditions exist. Results from the Touquoy Mine indicate that groundwater is slightly basic (pH from 7.02 to 8.08) with elevated hardness (45- 160 mg/L). Certain metals such as aluminum, arsenic, manganese, strontium and zinc are elevated relative to guidelines for drinking water in Canada but within ranges found in groundwater in Nova Scotia.

The actual volume of groundwater stored in the bedrock aquifer is small, and this reflects the relatively small primary porosity of these rocks. In the absence of low permeability till and lake sediments that act as barriers, some of the larger bedrock structures may be hydraulically connected to surface water bodies which may become sources of aquifer recharge under a mine dewatering scenario. Some higher hydraulic conductivity structures have been intercepted at depth in bedrock. The degree to which they are connected to surface water bodies has yet to be determined. An ongoing predictive modelling and testing program at the Project is expected to confirm earlier investigations that indicated the future mine operation will not negatively affect flow in McKeen Brook and tributaries.

Surface Water

The Project is located in the St. Mary's River Secondary Watershed (1EO-1) which measures 133,682 hectares. It is one of the larger sized watersheds in the Province. The site straddles the eastern and Nova Scotia uplands ecoregions and is further subdivided into the eastern interior and St. Mary's River ecodistrict. This area is located in a region of the province characterized by rolling till plains, drumlin fields, extensive rockland, and numerous freshwater lakes, streams, bogs and wetlands. The bedrock is highly visible in those areas where the glacial till is very thin, exposing the ridge topography. Where the till is thicker, the ridged topography is masked and thick softwood forests occur. There are a few drumlins and hills scattered throughout the ecodistrict with fine textured soils derived from slates. The St. Mary's River ecoregion is largely hummocky; where the land is level, wetlands and drumlins exist. This inland area is somewhat removed from the immediate climatic influence of the Atlantic Ocean and is characterized by warmer summers and cooler winters.

The St. Mary's River drainage basin is drained by the St. Mary's River and its tributaries, from west and north to south. This watershed has three lobes with headwaters commencing near Trafalgar in the west, Eden Lake in the west-central and Lochaber Lake in the north. Elevation range within the catchment is 0 to 270 masl (metres above sea level), which varies from approximately 160 to 270 masl in the headwater areas and gradually decreases to sea level at the final outlet at Sherbrooke. In the vicinity of the site, the St. Mary's River is the main mapped watercourse approximately 4km to the west with McKeen Brook, a tributary of the St. Mary's running north of the site, along with Cumminger Lake to the northwest and Cargill Lake to the south as the major mapped waterbodies. The proposed project infrastructure lies within the McKeen Brook tertiary watershed (1EO-1-D). This tertiary

watershed drains through the Project from south to north-northwest initiating in Cargill Lake and the tributaries of McKeen Brook that drains to McKeen Brook and eventually meeting up with St. Mary's River at McKeen's Pool just north of Glenelg Lake. The watershed is characterized by a system of lakes connected by small to medium sized streams and wet areas. This complex system of streams, lakes, bogs and wetlands is a direct result of the underlying bedrock geology found in the region. The basin ultimately drains to the south via the St. Mary's River to the Atlantic Ocean at Sherbrooke.

Quarterly surface water quality samples are currently being collected (started June 2017) and analyzed for general chemistry and metals to establish a water quality baseline for comparison of water quality before and after site activities commence. Additional locations and parameters have been added to the water quality baseline program in September 2018.

The current suite of parameters are being sampled at twenty one stations and include:

- Total metals – (RCAP-MS)
- Total dissolved metals – (Dissolved RCAP-MS)
- Total mercury
- Total dissolved mercury
- Methyl mercury
- Dissolved Organic Carbon
- Dissolved Fluoride
- Total Chemical Oxygen Demand
- Chlorophyll a
- Salinity
- Total Suspended Solids

Six hydrometric stations have been established (staff gauge and level logger), and monthly discharge volume sampling commenced in August 2018 and will continue until June 2019.

A site hydrological study is being completed to evaluate potential effects on water quality and quantity, including from storm water discharge. Groundwater to surface water interaction will be evaluated as part of the planned 3D groundwater modelling. During final design, water management ponds will be engineered to accept site runoff for storm events. The Touquoy groundwater model will be updated as necessary to evaluate potential impact to surface water receptors from the Project concentrate tailings in the exhausted Touquoy pit to support an application for amendment to the IA.

Wetlands

Wetland locations are determined by a combination of available information derived from the Nova Scotia Topographic Database, Nova Scotia Wetland Database, Nova Scotia Wet Areas Mapping, and aerial photo interpretation. If identified using the above noted data sources, the wetlands are considered "mapped wetlands". There are several mapped wetlands within or surrounding the PA. This information was used to assist wetland specialists to identify the potential locations of wetlands for further field surveys and assessments. Wetland surveys commenced in 2017 within the PA and will continue through 2018.

Habitat and Flora

Within the PA, there are a number of ecosites each within a variety of moisture regimes including fresh, moist and wet with poor to very rich nutrient regimes. These ecosites primarily support vegetation types from the tolerant hardwood forest group with the mixedwood forest group being the second most abundant. Generally, tolerant hardwood groups represent mid to late successional tolerant hardwood vegetation types and are usually dominated by sugar maple, beech, yellow birch and red maple. Most sites are non-rocky and soils are mainly derived from glacial till or colluvium deposits. Habitat assessments were completed in October 2014 and additional habitat assessments were conducted in June 2018.

Botanical surveys were completed throughout the PA primarily in wetlands, and intact and disturbed upland habitats during baseline assessments in 2015, 2017 and continue in 2018. No SARA listed vascular plant species have been identified to date within the PA.

Lichen surveys were completed throughout the PA during 2017 and continue in 2018. Lichen surveys to date have not identified any Boreal Felt Lichen (*Erioderma pedicellatum*) (SARA endangered, NSESA endangered) within the PA. Frosted Glass Whiskers (*Schlerophora peronella*) (SARA Special Concern) and Blue Felt Lichen (*Degelia plumbea*) (SARA special concern, NSESA vulnerable) were identified within the PA. No other SARA listed lichen species have been identified to date.

Overall, the PA is comprised of patches of intact forest interspersed with disturbed areas from clear cutting and historical mining activities. The disturbed areas typically consist of immature canopies that lack appropriate conditions for many of the SAR lichen species in Nova Scotia (SAR lichen species are typically associated with mature canopy types). However, some areas of the PA, particularly in the east, as well as in close proximity to Cargill Lake and Archibald Lake, consist of scattered old mature Balsam Fir swamps which supported lichen species that are usually associated with Boreal Felt Lichen (*Erioderma pedicellatum*) habitat such as salted shell lichen (*Coccocarpia palmicola*).

Birds

Targeted spring migration, breeding season, fall migration, nocturnal owl and Common Nighthawk surveys were completed in 2014, 2015, 2017 and continue in 2018. Opportunistic sightings of birds identified in wetland habitats were also recorded as part of an ongoing avian use assessment within and surrounding the PA. Sixty-eight species in 2014/2015 and 54 species in 2017 have been identified, including 17 species of conservation interest or species at risk which have been classified as priority bird species for the purposes of the effects assessment.

Bird surveys have continued in 2018 within the PA with additional spring migration surveys, nocturnal owl surveys, breeding bird surveys and fall migration surveys. Published and collected data and consultation with regulators will be used to further assess potential impacts to birds, including breeding birds.

Watercourses and Aquatic Habitat

The PA is located within the St. Mary's Secondary Watershed, which is accessible to anadromous fish including Atlantic Salmon and American Eel. The PA is centered around Cochrane Hill, with tributaries of McKeen Brook flowing from Cochrane Hill east or north to join the main channel north of the PA before draining northwest into the St. Mary's River.

Country Harbour Rd flanking the PA on the north side has surface water flow interrupted by ditching and culverts along Country Harbour Rd which were placed to prevent or reduce erosion and the undermining of road integrity. All of the culverts assessed along the northern edge of the PA are hung and impeding fish passage to the southern upper reaches of these watercourses.

McKeen Brook, its tributaries, Archibald Lake and other unnamed watercourses within and surrounding the PA have been determined through site investigations to provide fish habitat by supporting foraging, passage, overwintering, spawning and/or rearing habitat. The following fish species were recorded during electrofishing in 2017/2018 within the PA and surrounding area: American Eel, Atlantic Salmon, Banded Killifish, Brown Bullhead, Brook Trout, Creek Chub, Common Shiner, Lake Chub, Threespine Stickleback, White Sucker, Northern Redbelly Dace, and Yellow Perch.

Fauna

Targeted field surveys and incidental observations on various fauna species were completed throughout the field season in 2015, 2017 and winter 2018 within and surrounding the PA. Targeted surveys were completed for bats, mainland moose, wood turtles and lepidopterans. Incidental observations were recorded for all other fauna species including other mammals, reptiles and

amphibians, and invertebrates (including freshwater molluscs, lepidopterans, and odonates). The goal of both targeted surveys and incidental observations was to understand which species are present within the PA and how they are using the area to allow for an evaluation of Project interactions and mitigation measures.

Incidental observations of mammals and various signs of mammals within the PA were documented and photographed during all field surveys. Signs included features such as dens and nests, scat, tracks, and forage evidence. Incidental observations for priority invertebrates occurred during all field programs, particularly wetland and watercourse delineation, and fish habitat surveys. Signs of odonates and lepidopterans included live adults, larvae, or cast skins. Signs of molluscs included live or dead individuals, or shells.

Nine mammal species were observed within the PA during the 2015, 2017 and 2018 field surveys.

Snapping turtles (*Chelydra serpentina*) and wood turtles (*Glyptemys insculpta*) were not observed within the PA incidentally or during dedicated surveys and only low-quality habitat was identified within the PA. Wood turtles, however, are known to the St. Mary's River and its tributaries and a single wood turtle was observed along the shores of McKeen Brook, north of the PA in June 2017. McKeen Brook and some of its tributaries have been identified as critical habitat for wood turtle by NSE. The Atlantic Canada Conservation Data Centre (ACCDC) have recorded observations of wood turtle within 5 km of the PA, however, since wood turtles are listed as location sensitive species, the specific location of the species was not identified. According to the ACCDC, one snapping turtle was identified slightly beyond a 5 km radius of the PA. No SARA listed mammals, amphibians or reptiles were observed within the PA.

SARA Listed Species

SARA listed species identified within the PA during 2015 and 2017 assessments include: SARA threatened - Canada warbler and common nighthawk; and SARA Special Concern - Blue Felt Lichen, Eastern wood-pewee, and Frosted Glass-whiskers.

No SARA listed species of vascular plants have been identified to date within the PA. No SARA listed mammals have been identified to date within the PA. No SARA listed amphibians have been identified to date within the PA. No SARA listed fish have been identified to date within the PA.

5.3 Physical Environment

Air Quality

Mining activities such as blasting, on site vehicle operations, crushing, and wind erosion from waste rock piles all can contribute to increased particulate levels. Based on Nova Scotia Air Quality Regulations; a significant adverse environmental effect with respect to total suspended particulate is one that would reduce air quality, such that the level of total suspended particulate matter exceeds 120 ug/m³ over a 24-hour averaging period or 70 ug/m³ over an annual averaging period.

Modelling is currently underway to report on expected values in comparison to the maximum permissible ground level concentration of 120 ug/m³ as outlined in Schedule A of the Nova Scotia Air Quality Regulations.

Noise

Baseline noise monitoring was completed at the Project in 2017 and modelling is underway. Noise is defined as any unwanted sound which may be hazardous to health, interfere with speech and verbal communications or is otherwise disturbing, irritating or annoying. Blasting, on site vehicle operations and crushing can contribute to an increase in noise levels. As specified in the Noise Measurement and Assessment Guidelines, Leq values should be within the following limits:

1. ≤ 65 dBA between the hours of 0700 and 1900 hours;

2. ≤ 60 dBA between the hours 1900 and 2300 hours; and
3. ≤ 55 dBA between the hours of 2300 and 0700 hours.

Modelling will determine the predicted levels at the receptors and if those predictions are within the above guidelines.

Light

The Project is in a rural location. Ambient night time light conditions would be minimal and typical of rural residential area. There are no perennial artificial light sources in the PA and any artificial light would be from occasional sources like an all-terrain vehicle or highway traffic. Baseline light monitoring will be completed at the Project during baseline studies. Hauling of concentrate will not occur overnight. Light modelling will be completed. Additional light monitoring may be undertaken as a condition of IA. Mitigation strategies will be developed for dealing with any unacceptable light results identified through modelling or operational monitoring.

Greenhouse Gases

The total estimated predicted GHG emissions for the Project operation for one year is presented in Table 2. The estimate only includes primary sources and not support or indirect sources. The primary sources include diesel hydraulic DTH drills, diesel hydraulic RC drill, hydraulic excavators, wheel loaders and haul trucks. This estimate is has been calculated conservatively, and will be refined during the EA.

Table 2: Predicted GHG Emissions for Cochrane Hill

Onsite Mobile Sources	Total CO ₂ e (kt/year)
Cochrane Hill Primary Sources	23.9

The predicted total GHG emissions for Five Mile Stream represent approximately 0.15% of the total Nova Scotia GHGs (based 2015 data from the NPRI).

5.4 Human Environment

There are several population centres within a short driving distance of the Cochrane Hill area, including the town of Sherbrooke, 13 km to the south, which has a population of 1,700 and provides a number of services including secondary schooling and a hospital. The town of Antigonish, some 40 km to the north, has a population of 14,600 and provides a greater range of services. The proposed mine is located approximately 550m north of the nearest residence along Highway 7 and 39 km from the nearest federal Mi'kmaq community (Paqtnkek-niktuek IR and Welnek IR). This area has a rural population of permanent homes and seasonal cottages.

Socio-economic Setting

Primary industries such as fishing, hunting and forestry, and to a lesser extent mining and quarrying, are significant employers in the area. As with many parts of Nova Scotia, employment is higher in the combined service industries, such as health care, education, retail, accommodation and food services, although construction, manufacturing, and the transportation industries represent important sectors. The mining industry represents a significant potential source of employment in this region. Due to the strong dependence on the resource sector, the economy is typified by "boom and bust" patterns. These key activities are anticipated to continue to form the basis of the regional economy.

The socio-economic effects of the Project can potentially be beneficial for the region, as it would provide employment and taxes locally and regionally. It could potentially reduce and possibly reverse an outward migration trend of people moving to larger

centres. The Proponent intends to work with local communities to maximize benefits through employment, business opportunities, training, and skills development.

Archaeological and Heritage Resources

In 2014, Atlantic Gold Corporation undertook an archaeological screening and reconnaissance program at Cochrane Hill across a proposed layout including the current pit, waste rock storage, and plant location, along with two options for tailings management (no longer proposed locations for tailings disposal). The reconnaissance noted three features, all believed to be associated with past mining operations. One feature is located north of the current decline location and the other two features are located on the western side of Hwy 7. The archaeologist (CRM Group) recommended that the three features be subject to shovel testing. Additionally, it is recommended that, in conjunction with the shovel testing, more intensive reconnaissance be conducted within the Open Pit area.

CRM Group was again retained on behalf of the Proponent to conduct a site visit in the PA in September 2017. Building upon the research and reconnaissance undertaken on the property in 2014, CRM Group revisited the sites previously noted to confirm their presence and implement a buffer zone for avoidance during exploratory drilling. CRM Group recommended that any development around the identified features (3 in total) would require shovel testing and intensified historical research. In addition, any development planned outside of their original study area from 2014 should be subject to a larger search.

The broader archeological field program across the PA and confirmed infrastructure layout was undertaken in Summer 2018 to allow for further archaeological investigation encompassing the proposed infrastructure and development footprint.

Traditional Use by First Nations People

A Mi'kmaq Ecological Knowledge Study (MEKS) has been initiated for the Project and will be completed according to the Mi'kmaq Ecological Knowledge Study Protocol (ANSMC 2007). Engagement with Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), Millbrook First Nation, and Sipekne'katik First Nation has also commenced to support identification of current uses of the land in close proximity to planned Project infrastructure. To date, no specific information relating to the current use of the land by the Mi'kmaq within and surrounding the PA has been revealed. There is no present indication of expected elevated current use within the PA based on distance to the nearest Mi'kmaq community – Paqtnek First Nation (39 km) and no observations of unique ecological features or species of elevated interest to the Mi'kmaq during baseline surveys to date. Additionally, the 2015 archaeological report completed for the Project did identify several archaeological features, but all features were associated with historical mining activities, not Mi'kmaq resources.

Existing information relating to the baseline health and socio-economic conditions of the nearest Mi'kmaq community is limited. Interactions between the Mi'kmaq and the Project are anticipated to be low, for the reasons identified above. The expected interaction with the Mi'kmaq relates to potential use of the land for traditional hunting, plant gathering, and fishing. If the current use of the area is limited, then the need for data relating to baseline health and socio-economic conditions is low, given limited additional potential interaction with the Mi'kmaq. Collection of baseline health and socio-economic will be completed as is possible and available, and evaluation of the effects of the Project on the health and socio-economic condition of the Mi'kmaq will be completed in the EIS.

The Project lies within Eskikewa'kik or the "skin dressing territory". This particular district spans from Halifax County across to Guysborough County. Various authors and historians have differed in their description of how far this territory expands, but all have agreed that the PA lies within this district. The rivers in the area would have been important transportation routes and a resource base for the Mi'kmaq and their ancestors for millennia prior to the arrival of European settlers. In particular, the significance of the St. Mary's River as a salmon river would have provided a very important food resource for Native groups.

Paqtnkek Mi'kmaw Nation was established on March 3, 1820 in Antigonish County and is located 24km east of Antigonish, Nova Scotia (Paqtnkek-niktuek IR23, Welnek IR 38). Paqtnkek, meaning "by the bay", emphasizes the importance of the local bay and its resources to the Mi'kmaw people (Paqtnkek, 2018). Paqtnkek is located approximately 39 km as the crow flies (65 km via provincial highway) from the Project. Paqtnkek Mi'kmaw Nation is approximately 271 ha in size. There are 134 homes located on the reserve with an estimated population on reserve of 353 persons (Statistics Canada, 2016 Census of Population). Lands surrounding the Reserve are used for traditional hunting and gathering. The proposed transportation route for concentrate will not travel past this reserve.

There is no land claim registered with the Specific Claims Branch of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) in Ottawa for any of the Mi'kmaw communities in Nova Scotia within the PA. However, that does not suggest that any other Mi'kmaw claimants for this area may not submit land claims in the future.

In the event that Mi'kmaw archaeological deposits are encountered during construction or operation of the Project, work will be halted in the vicinity of the discovery and immediate contact will be made with the Nova Scotia Museum and The Confederacy of Mainland Mi'kmaw. Should the proposed PA change or expand, additional research will be conducted. The Proponent will continue to communicate with the Mi'kmaw on a mutual benefits agreement and Memorandum of Understanding for its Nova Scotia mining interests.

5.5 Effects of the Project on the Environment

The *Fisheries Act* protects the sustainability and productivity of recreational, commercial and Aboriginal fisheries. The likelihood of residual effects to fish, fish habitat, and aquatic resources from the Project will be based upon impacts of the Project to surface water quantity and quality. The Project mining infrastructure is expected to encroach on waters frequented by fish. In the presence of impacts to recognized fish or fish habitat, authorization may be required from Fisheries and Oceans Canada (DFO) under Paragraph 35(2)(b) of the *Fisheries Act*. The Environmental Impact Statement (EIS) will address potential effects of the proposed Project activities on fish and fish habitat.

The *Migratory Birds Convention Act* protects migratory bird species. The potential effects related to migratory birds and that are associated with the construction and operation phases of the Project are as follows:

- Direct temporary and long-term loss of habitat for birds due to clearing and grubbing of the open pit, waste rock storage areas and tailings management area;
- Destruction or displacement of birds in areas of excavation and piling of mine wastes;
- Increase in dust levels from heavy machinery operation and a general increase in vehicular activity, amongst other things, may affect vegetative growth and indirectly cause a decrease in prey populations;
- Bird injury and mortality from vehicle collisions and entrapment (i.e. in the open pit);
- Disturbance resulting from reduced habitat, anthropogenic noise and vibrations;
- Attraction and disorientation resulting from night-lighting; and,
- Other effects.

The *Species at Risk Act* protects wildlife species from becoming extinct through prohibitions against killing, harming, harassing, capturing or taking species-at-risk, and against destroying their critical habitats. Surveys are on-going to identify the presence of species at risk within the PA.

An overview of potential effects of the project on the environment are as follows:

- At this time, the potential for acid generation and metal leaching in mine materials from the Cochrane Hill deposit is unknown, however static and kinetic geochemical test work is underway to constrain these parameters;

- The physical nature and extent of interaction between the groundwater and surface water and how they might be affected by mining is not yet known. Further investigation is currently underway;
- Discharges from the Project will include surface water runoff from the pit and stockpiles, and discharge from the TMF. All water will be captured in water management ponds to reduce total suspended solids (TSS) and to ensure water meets regulatory requirements for quality prior to release to the environment;
- Potential exists for a total loss of species and habitat during construction and operational activities within the operational footprint. Introduction and spread of invasive and exotic species during operations and associated maintenance may be of concern, but weed management programs will minimize the associated impacts;
- Potential impacts to the wetland systems may correlate to construction, operation and maintenance of project infrastructure within wetlands. Loss of wetlands in the proposed project facilities footprint is expected to be the main effect to wetlands. Changes in surface water drainage patterns could result in indirect impacts to wetlands outside of the PA, however, monitoring programs will act as early warning systems to reduce these indirect impacts to wetlands from occurring;
- Wildlife Species listed under the Species at Risk Act, COSEWIC, NSESA, or NS *Wildlife Act* have the potential to occur, within the PA. The Project has the potential to affect wildlife through the loss of habitat because of site clearing activities and disturbance from noise and project-related traffic and habitat fragmentation. The potential exists for increased mortality risk through clearing activities. Sensory disturbance can occur primarily through Project generated noise, as well as ingestion of contaminants directly or indirectly and dermal absorption. Studies indicate that wildlife populations may be expected to disperse from the area during periods of construction and/or operation. Assuming wildlife species are displaced from the PA, this will reduce the available habitat. However, this displacement is generally of short temporal disturbance as most cases reveal that wildlife returned after human activity has ceased;
- Air-borne particulate matter will be generated during construction and operation phases of the Project. The control of fugitive dust from the mining operations will center on provision of moisture control measures, such as spraying with water as required, or other methods of dust control. During construction, water from water management ponds and the ground water in-flow to the pit may be used for dust suppression, along with chemical dust suppressants, as required. In-pit operations will not generally have much direct offsite impact, but could contribute to general dust levels if not controlled;
- Noise generated throughout the mining development and operation will originate from drilling and blasting, crushing, milling and transport of ore which may affect behaviours of birds and mammals. The noise from mining will be generally contained to the PA;
- The Project would provide many opportunities for employment in this part of Guysborough County. The area has a rich natural resource history including mining and forestry. Mining jobs pay a premium over many other occupations;
- The loss or destruction of heritage or archaeological resource material is a potential environmental effect of the Project. Based on the existing knowledge there is potential for the Project to interact with identified heritage resources that have been associated with historic mining at or near the site.

Changes to the environment are not expected to occur on federal lands, in a province other than the province in which the project is proposed to be carried out or outside of Canada.

5.6 Effects on Aboriginal Peoples

It has not been confirmed at this point whether the Project will use lands and resources that are used for traditional purposes by First Nations peoples. The Mi'kmaq Ecological Knowledge Study (MEKS) is on-going and to date, conclusions have not been formulated relating to current use of the PA and surrounding lands by First Nations communities. An understanding of current use

will also be further examined during engagement efforts with KMKNO, Paqntkek First Nation, Pictou Landing First Nation, Millbrook First Nation and Sipekne'katik First Nation, and other Mi'kmaq community members who may utilize the PA and surrounding areas. Once this current use is revealed, interactions and potential effects to the Mi'kmaq First Nations peoples will be evaluated as part of the development of the Environmental Impact Statement (EIS).

The Project has the potential to bring positive socioeconomic change in the form of well-paying jobs for members of nearby First Nation Communities, that is in keeping with the Memorandum of Understanding currently in place with the Proponent and any future Mutual Benefits Agreement that is negotiated.

6.0 REFERENCES

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ATTACHMENTS

Figure 1.1: Project Scope

Figure 2.1: Project Infrastructure

Figure 1.1: Project Scope

Prepared For:



FIGURE 1-1

Cochrane Hill Project Scope

Guysborough County

-  Cochrane Hill PA
-  Touquoy Mine Site
-  Haul route



Coordinate System: NAD 1983 CSRS UTM Zone 20N
 Projection: Transverse Mercator
 Datum: North American 1983 CSRS
 Units: Meter



0 2.5 5 10 Kilometers

1:275,000 Scale when printed @ 11" x 17"

Drawn By: LP Date: 2018-09-10



McCallum Environmental Ltd.

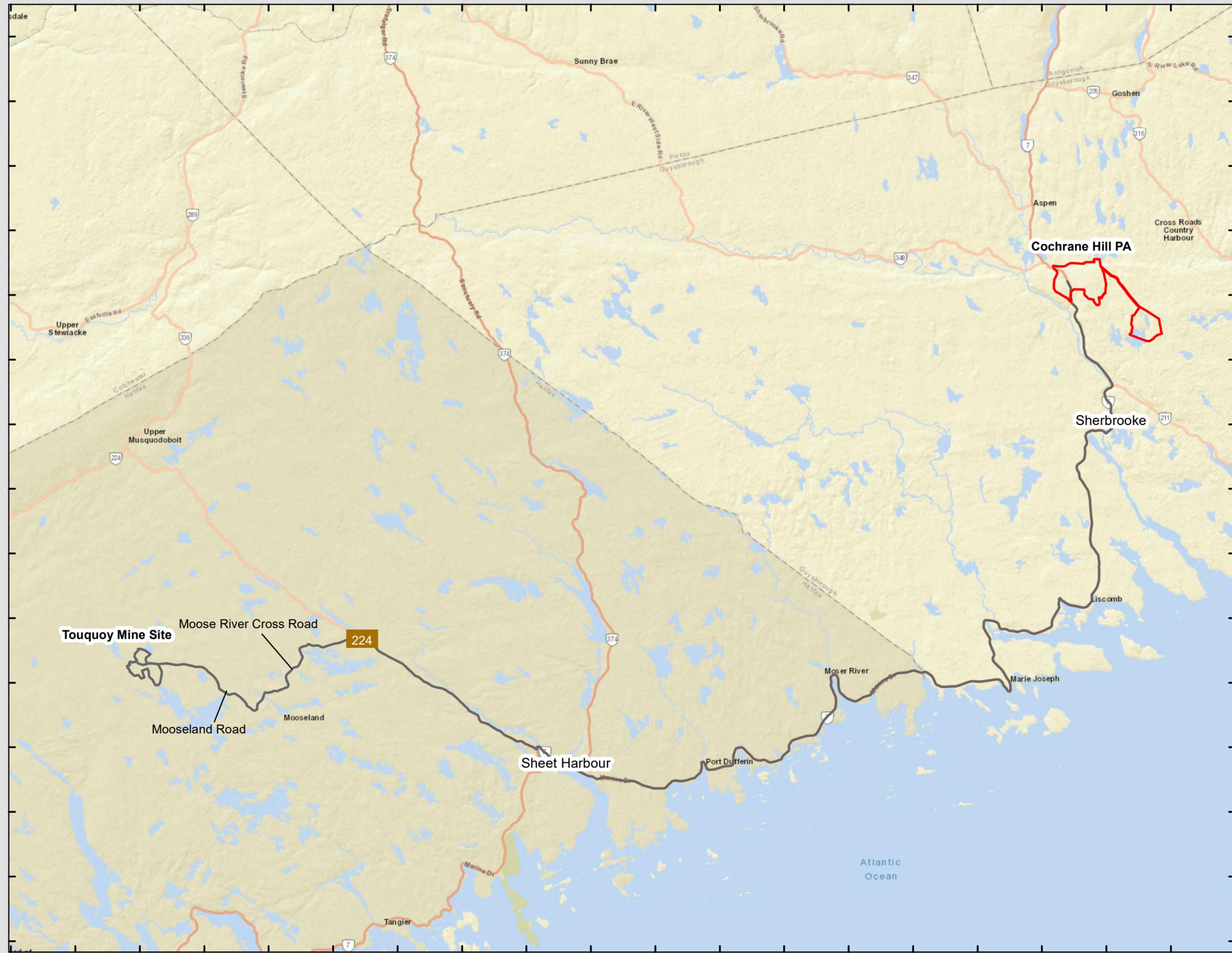
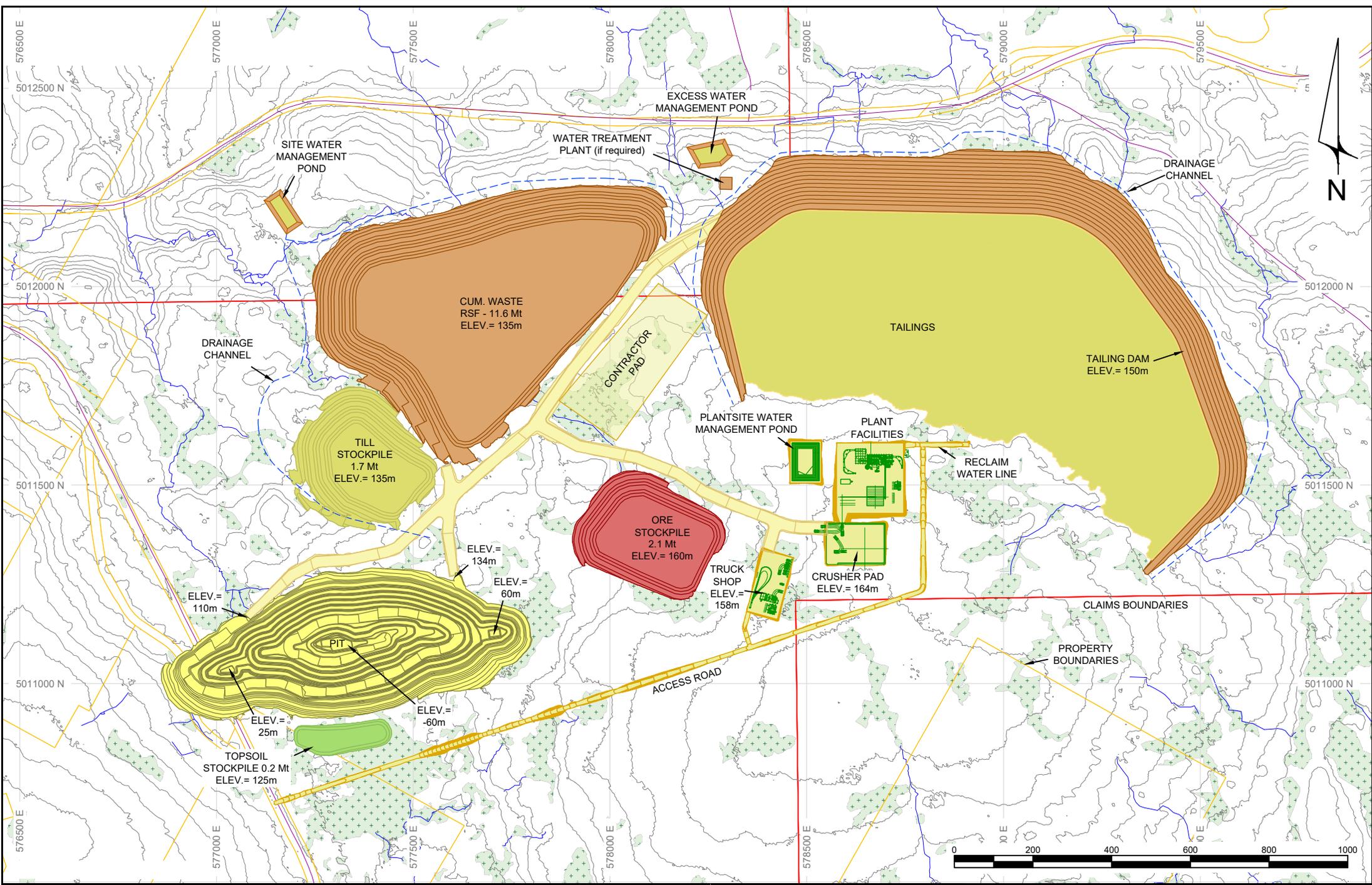


Figure 2.1: Project Infrastructure



ATLANTIC GOLD CORP. - PREFEASIBILITY STUDY
END OF PERIOD - YEAR 5 - COCHRANE HILLS

DATE:	2018/08/27	APPROVED BY:	MS
DRAWN BY:	DH	FILE:	CH Y5 (180827)
PROJECT:	AGC_CHS_2017		



LEGEND

PROPOSED PITS	HAUL ROAD	EXISTING ROADS	PROPERTY BOUNDARY
NEW WASTE RSF	MINE FACILITIES PAD	SITE INFRASTRUCTURE	WETLANDS
PREVIOUS WASTE RSF	ORE STOCKPILES	WATERCOURSE	DRAINAGE CHANNEL
TAILINGS INFRASTRUCTURE	TOPSOIL STOCKPILE	TOPOGRAPHY	MINERAL CLAIMS
TAILINGS	TILL STOCKPILE		

CONTOURS AT 5m INTERVALS

