



## **Appendix I.2**

Revised Phase 1 Environmental Site Assessment  
- Fifteen Mile Stream Project,  
Stantec Consulting Ltd.

**FINAL -  
Revised Phase I Environmental Site Assessment**

Fifteen Mile Stream  
Route 374, Trafalgar, NS



Prepared for: Prepared for:  
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**Job No.: 121619250.2500.905**

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# **Executive Summary**

## Executive Summary

### Site Description and Current Operations

Stantec Consulting Ltd. (Stantec) conducted a Phase I Environmental Site Assessment (Phase I ESA) of the historical tailings areas located at the Atlantic Gold Fifteen Mile Stream Project property located in Trafalgar, Nova Scotia, herein referred to as the "Site". The Phase I ESA was conducted as part of project feasibility due diligence underway for the potential re-development of the gold mine at this location. The purpose of the Phase I ESA was to assess if evidence of potential or actual environmental contamination exists in connection with the Site, as a result of current or past activities on the Site or neighbouring properties.

The site area is currently woodland /overgrown, and is within the area to be occupied by the proposed future extent of the Fifteen Mile Stream open pit mine 2018 (refer to Figure 1, attached). In September 2019, the revised proposed future extent of the mine was provided to Stantec which extended the proposed operations to the west and north (refer to Figure 2, attached). At the time of the site visit there was a drill program underway on the Site to further delineate the resources. A site visit was not completed in 2019 as the revised area of the proposed open pit was within the area assessed in 2018.

### Records Review

Based on the historical information gathered during the Phase I ESA, the site areas and the surrounding greater area were developed in 1860s when gold was discovered in Nova Scotia. Between 1865 and 1940s there were various surface excavations, mine shafts of various depths, and numerous stamp mills or crushers utilized for the extraction of gold from the quartzite ore. The nearby outflows from Seloam Lake to the northeast was modified with diversions, dams, and flumes to provide wash water and power for the gold mining operations. Based on the information reviewed there were at least four mine operations in the area of Fifteen Mile Stream; the largest was Egerton Workings which was located in the area of the currently proposed pit. Several other mines and pits extended westward approximately 1 km along what is now the gravel access road to the current development. The historical practice of gold mining in the 1800s/early 1900s used crushers to render the ore into sand size particles. The sand size particles were then washed with water and mercury to recover the fine gold particles. The resulting tailings mixture was allowed to flow from the stamp mills into adjoining low lying areas in an uncontrolled manner with alternating amounts of water to push the tailings further from the stamp mill as needed. The base rock from which the gold was extracted was sandstone and slate of the Meguma Group Goldenville Formation; this formation is also known to be high in natural concentrations of arsenopyrite (FeAsS) which is associated with gold deposits in Nova Scotia. The tailings areas may contain both mercury and arsenic. Mapping provided by the Nova Scotia Department of Natural Resources illustrate numerous excavations, shafts and mining operations on the Site and surrounding areas.

Between the 1940s and the 1980s, the area of the Site was allowed to become overgrown with trees. In the late 1980s there was renewed interest in the presence of gold in the area of the Site. This included various prospecting activities including drilling boreholes to assess the mineral content. Stantec (then Jacques Whitford) completed geotechnical work at the Site related to proposed dyke and diversion channels. Based on this work there was evidence of extensive tailings and waste rock present on the Site along the existing Seloam Brook. A photograph from the 1980s of the camp setup reveals several mobile trailers with propane tanks. Based on the aerial photographs around this time a large test sample of rock was excavated approximately 200 metres west-southwest of the proposed pit (this later infilled with water). This rock was reportedly processed at Gays River to extract the gold.

For this property no previous environmental reports were identified. A report prepared by the Department of Natural Resources titled Review of the Environmental Impacts of Historic Gold Mine Tailings in Nova Scotia from October 2015 indicated the following general information about tailings impacts from historical gold mining areas. There are an estimated 3 million tonnes of tailings from historical gold mines in Nova Scotia. In some areas the tailings have been reported to be several metres thick and have migrated in rivers and streams for more than 2 km. Based this document there were no available test results for arsenic or mercury concentrations in the tailings at Fifteen Mile Stream. Based on the amount of ore crushed it was estimated that there was 51,000 tonnes of tailings produced at Fifteen Mile Stream between the 1860s and 1940s.

A request was made to Nova Scotia Government for information related to waste rock or tailings management through the Freedom of Information process. According to the administrator the department has several boxes of information related to the potential opening of the mine in the 1980s. Records relate to our specific request are pending.

## Executive Summary (continued)

### Records Review (continued)

The presence of the tailings and associated waste rock represent a potential environmental concern to the Site.

### Site Visit/Interviews

During the site visit completed on November 13, 2018, the foundations of the suspected stamp mill and other mine related features were located along with Department of Natural Resources signs warning of the presence of historical mine operations. At each of the former mine sites there were also piles of waste rock and in a few locations areas of surface debris (rusted metal cans, debris, etc.). During the site visit, Stantec staff discussed with the Atlantic Gold representative if there were obvious signs of tailings noted during the exploration drilling. It was reported that overburden was cased and they did not report on the nature of the overburden, only depth to bedrock. However, he did note that there was apparent tailings observed from a temporary bridge constructed to cross Seloam Brook. Further visual evidence of tailings was observed in various areas after excavation of a shallow ( 5 to 10 cm) layer of organics further; details are part of a concurrent Phase II ESA (reported under separate cover).

### Conclusions

The Phase I ESA has revealed evidence of potential environmental contamination associated with the Site.

Based on the information gathered there are apparent tailings and waste rock both within the area of the proposed open pit development as well as adjacent to the proposed open pit operations which are potentially impacted with arsenic, mercury and have an acid generating potential. Further delineation of the historical tailings areas and waste rock is currently underway to determine the extent of the materials.

A reply from Nova Scotia related to previous assessment and management of waste rock and tailings is pending.

The statements made in this Executive Summary are subject to the same limitations included in the Closure (Section 7.0) and are to be read in conjunction with the remainder of this report.



# **Phase I Environmental Site Assessment**

## 1.0 General Information

### Client Information:

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### Project Information:

121619250 - Atlantic Gold  
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### Site Information:

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Trafalgar, NS

### Consultant Information:

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Site Visit Date: 11/13/2018

Report Date: 09/27/2019

Site Assessor: Patrick Turner, B.Sc, P.Eng.

Report Preparer: Patrick Turner, B.Sc, P.Eng.

Senior Reviewer: Don Carey, M.Sc., P.Eng.

Site Assessor:



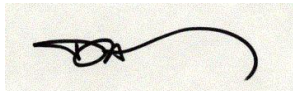
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The environmental site assessment and preparation of this report were completed in general accordance with the objectives, requirements or standards of the CSA Phase I Environmental Site Assessment Standard Z768-01 (R2016).

## 2.0 Introduction

### 2.1 Objectives

Stantec Consulting Ltd. (Stantec) conducted a Phase I Environmental Site Assessment (Phase I ESA) of the historical tailings areas located at the Atlantic Gold Fifteen Mile Stream Project property located in Tralfalgar, Nova Scotia, herein referred to as the "Site". The Phase I ESA was conducted as part of project feasibility due diligence underway for the potential re-development of the gold mine at this location. The purpose of the Phase I ESA was to assess if evidence of potential or actual environmental contamination exists in connection with the Site, as a result of current or past activities on the Site or neighbouring properties. The Site has been defined as the proposed extent of the open pit mine for this Phase I ESA due to the lack of defined property boundaries. The assessment was originally completed on the proposed open pit layout from 2018 (Figure 1 attached); in September 2019 a revised pit boundary was provided (Figure 2 attached). The area provided as part of the revised proposed pit extent falls within the area that was assessed in 2018.

Site plans are included in Appendix A and selected photographs of the Site are included in Appendix B.

### 2.2 Scope of Work

The Phase I ESA carried out by Stantec on this property was conducted in general accordance with Stantec's Proposal Number 121619250 dated September 12, 2018 and the Canadian Standards Association's (CSA) Phase I Environmental Site Assessment Standard Z768-01 (R2016) and consisted of the following:

- records review including, but not limited to, publicly available city directories, aerial photographs, fire insurance plans, geological and topographic maps
- provincial government regulatory search
- review of available environmental databases and records
- review of previous environmental reports and existing title searches, if made available
- interviews with persons having knowledge of the Site
- a site visit
- evaluation of information and preparation of the report provided herein

A Phase I ESA does not include sampling or testing of air, soil, groundwater, surface water or building materials. For this Phase I ESA, no enhancements to the CSA standard were made.

This assessment did not include a review or audit of operational environmental compliance issues, or of any environmental management systems, which may exist for the Site.

The assessment of the Site for the potential presence of hazardous building materials was based on the age of the building(s) and components, and a non-intrusive visual review of the Site. No sampling of materials was conducted. A Phase I ESA does not constitute a Hazardous Materials Survey or Designated Substances Survey.

The assessment of the Site for microbial contamination and moisture damage was made during the walk through of the building(s). This assessment was visual only and not every area was assessed. No sampling or intrusive investigation was conducted.

The professional qualifications of the project team are provided in Appendix C.

The site visit was conducted by Patrick Turner, P.Eng., of Stantec, on November 13, 2018. The Site and readily visible and publicly accessible portions of adjoining and neighbouring properties were observed for the presence of potential sources of environmental contamination. Stantec was unaccompanied during the site visit.

Interviews were carried out with David Lowe, geologist with Atlantic Gold to obtain or confirm information on the historical operations and activities on the Site. Mr. Lowe had limited information about the site prior to the current exploration program. Pertinent information gathered from the interviews is presented within the appropriate sections of this report.

Due to the size of the property (approximately 900 acres), the wooded areas to the north (across Seloam Brook), east, and south of the proposed pit which were outside the area of historical mine development in the 1800s were assessed by driving portions of the available woods road and through review of historical aerial photographs, LIDAR imagery, and topographical and geologic maps of the area. It should be noted that

## 2.0 Introduction (continued)

### 2.2 Scope of Work (continued)

portions of the Site are covered by thick vegetation which prevented a thorough assessment of the ground surface in those areas of the Site during the site visit. As noted above northern portions of the Site were inaccessible due to the presence of Seloam Brook which runs east / west across the area of the proposed pit development. At the time of the site visit the temporary crossing had been removed due to a high water safety concern.

As noted above a revised proposed open pit layout was provided in September 2019 (Figure 2) and the revised pit area was compared to the areas assessed in 2018 (Figure 1). The revised 2019 proposed pit location is within the areas assessed in 2018 and a site visit was not completed as part of this reassessment/ update of the Phase I ESA completed for this Site.

### 2.3 Regulatory Framework

In Nova Scotia, the Contaminated Site Regulations and associated Ministerial Protocols (effective on and after July 6, 2013), prescribe the regulatory process and time frames to notify the Department, assess the site, remediate the impacts and obtain "Closure" for a contaminated site. The first step in the full property remediation process is completing a Phase I ESA as prescribed in the applicable Ministerial Protocol. A Phase I ESA may identify potential environmental concerns on the property which may lead to additional assessment and remediation.

During a Phase I ESA samples are not collected, however, if there are previous soil or groundwater sample results available, the results are compared to applicable federal and provincial regulations and guidelines.

A Phase I ESA involves a review of any site buildings for the potential presence of hazardous materials related to building components and materials. Specific federal or provincial regulations, guidelines or codes of practice exist for these individual hazardous materials. Where required, this documentation was utilized to determine appropriate conclusions and formulate appropriate recommendations.

### 3.0 Records Review

#### 3.1 Information Sources

The applicable search distance for the records review included the Site, properties immediately adjoining the Site and other neighbouring properties where activities considered to be potential sources of environmental contamination were apparent. Information sources obtained and reviewed as part of the records review are listed below.

SOURCE	INFORMATION/CONTACT
Aerial Photographs	1931, 1947, and 1954 - National Airphoto Library
	1966, 1974, 1982, 1992 and 2004 - Stantec Aerial Photography collection
	September 2007 - GoogleEarth Pro Imagery accessed November 2018
Fire Insurance Plans	None available
City Directories	Nova available
Previous Environmental Reports	None provided
Company Records	NI 43-101 Technical Report on Updated Mineral Resource Estimate - Fifteen Mile Stream Property, Halifax, County, Nova Scotia, Canada, prepared by Acadian Mining Corporation, Effective Date August 29, 2012.
	NI 43-101 Technical Report and Resource Estimate on the Fifteen Mile Stream Gold Property, Halifax County, Nova Scotia. Prepared for 6179053 Canada Inc., Acadian Mining Corporation, Annapolis Gold Corporation by A. Bruce Hudgins, P. Geo, Hudgtec Consulting Limited, Effective date May 27, 2008. This report referred to reports prepared by Jacques Whitford (now Stantec) from 1980s including:
	Design Brief for Flood Protection Levee and Effluent Retention Structure at Fifteen Mile Stream Gold Property, Halifax County, Nova Scotia. February 1989. Jacques Whitford Project No. M1335.
Geological and Geotechnical Reports	Surficial Geology Map of the Province of Nova Scotia, Nova Scotia Department of Natural Resources, Map 92-3, 1992.
	Geological Map of the Province of Nova Scotia, Nova Scotia Department of Natural Resources, Map ME2000-1, 2000.
	Map Showing Potential Radon in Indoor Air in Nova Scotia, Province of Nova Scotia, Department of Natural Resources. Accessed interactive map in November 2018.

### 3.0 Records Review (continued)

#### 3.1 Information Sources (continued)

SOURCE	INFORMATION/CONTACT
Geological and Geotechnical Reports	the Environmental Impacts of Historic Gold Mine Tailings in Nova Scotia dated October 2015
Regulatory Infractions	Due to the absence of a civic address it was not possible to search for records related to Regulatory Infractions.
Reportable Spill Occurrences	Due to the absence of a civic address it was not possible to search for records related to Reportable Spill Occurrences.
Contaminated Sites	Site is identified as a former gold mine based on DNR records and potential source of arsenic and mercury.
Landfill Records	Site is identified as a former gold mine based on DNR records and potential source of tailings and waste rock.
Underground & Aboveground Storage Tanks	Due to the absence of a civic address it was not possible to search for records related to tank registrations.
Other Available Information	A review of the DNR electronic library was completed for various plans and documents related to operation of the mine in the late 1800s to the mid 1940s. These included photographs of the buildings on the site, survey plans of the mines in the area as well as a detailed plan of the Egerton Mine.
Water Well Records	Based on a review of the interactive mapping provided by DNR there are no wells on the Site. Information accessed November 2018.
Mapping	<p>Smith, PK, and Goodwin TA 2009, Historical Gold Mining, Fifteen Mile Stream Area, Part of NTS Sheets 11E/02 and 11E/01, Halifax and Guysborough Counties, Nova Scotia. Nova Scotia Department of Natural Resources, Mineral Resources Branch, Open file map ME 2009-1 (Sheet 39 of 64), scale 1:9000.</p> <p>East Lake Topographic Map Sheet No. 10 451000 62500, Prepared by Service Nova Scotia and Municipal Relations, scale 1:10,000 based on aerial photography taken May 2006.</p>

#### 3.2 Previous Reports

Stantec obtained a copy of a Technical Report and Resource Estimate on the Fifteen Mile Stream Gold Property, Halifax County, Nova Scotia. This report was prepared by Hudgtec Consulting Limited for 6179053 Canada Inc, Acadian Mining Corporation and Annapolis Gold Corporation. Acadian Mining Corporation is now a portion of Atlantic Gold. This report refers to an MGI Limited report from 2004 (not provided) which identified potential environmental liabilities including:

- acid generation potential from waste rock piles (based on a single sample);
- possible unreclaimed trenches;

### 3.0 Records Review (continued)

### 3.2 Previous Reports (continued)

- possible safety hazards related to open shafts and diamond drill casings; and
- possible contaminant pathways related to improperly abandoned diamond drill holes.

Other potential liabilities discussed in this report from the late 1980s identified by Jacques Whitford and MPH include possible salmon spawning habitat and historical mill tailings in the flood plain of and in Seloam Brook.

This report included a brief history of the mining operations which reports various pits and shallow mines/shafts were excavated on the site and areas to the west. The deepest was reported to be 73 meters. Like other mining operations in Nova Scotia these were not worked continuously, but instead were worked for various short periods of time between 1875 and 1902. Each time an operation ceased it was renamed. Common names that reappear include New Egerton, Old Egerton, Egerton Gold Mining Group, Mother Seigal Mine, Island Mine, etc.

A report prepared by the Department of Natural Resources titled Review of the Environmental Impacts of Historic Gold Mine Tailings in Nova Scotia from October 2015 indicated the following general information about tailings impacts from historical gold mining areas. There are an estimated 3 million tonnes of tailings from historical gold mines in Nova Scotia. In some areas the tailings have been reported to be several metres thick and have migrated in rivers and streams for more than 2 km. Based on this document there were no available test results for arsenic or mercury concentrations in the tailings at Fifteen Mile Stream. Based on the amount of ore crushed DNR estimated that there was 51,000 tonnes of tailings produced at Fifteen Mile Stream between the 1860s and 1940s.

The presence of the historical mining operations represent a potential environmental concern to the Site which is being delineated under separate cover.

### 3.3 Regulatory Information

We have not received Nova Scotia Environment 's response to our inquiry for the subject site and adjoining properties. It must be noted that our request to Nova Scotia Environment was limited due to the lack of civic addresses on the property records, and absence of dwellings with civic numbers (NSE files are based on civic addresses). Due to the lack of civic numbers a traditional Environmental Registry request was not made, instead a Freedom of Information request was made for information related to previous work completed by the Department related to reclamation of historical operations from the 1980s or earlier. We specifically did not request information about the development of the current proposed gold mine. A copy of the request is attached in Appendix D.

### 3.4 Physical Setting

#### 3.4.1 Surficial Geology

Based on an available surficial geology map, the native surficial soils of the Site consist of glacial till. The characteristic permeability of these soils is moderate. A site-specific determination would be required in order to obtain detailed soil profile and permeability information. Previous subsurface investigations conducted on the Site indicate the subsurface soil profile at the Site to consist of glacial till, as well as historical tailings and waste rock in some areas between 2 and 3 metres thick. Bedrock was encountered between 2 and 3 metres below grade.

#### 3.4.2 Surface Water Drainage

The surfaces of the Site consist of a combination of open wetland, rock piles and woodland. Stormwater is anticipated to drain by infiltration and/or overland flow. Seloam Brook crosses the site from the east to the west and there are various pools and ponds on the Site.

### 3.0 Records Review (continued)

### 3.4 Physical Setting (continued)

#### 3.4.3 Topography and Regional Drainage

The site areas are woodland which have re-grown after historical gold mining in the 1800s to mid-1900s, which included construction of various dams along local water ways, surface mining, water washing, and excavation of numerous mine shafts/pits.

Based on an available topographic map and the observed site topography, regional undisturbed surface drainage (anticipated shallow groundwater flow direction) appears to be to the west following Seloam Brook toward Fifteen Mile Stream.

It should be noted that the direction of the shallow groundwater flow in limited areas can also be influenced by the presence of underground mine workings and is not necessarily a reflection of regional or local groundwater flow or a replica of the Site or area topography.

#### 3.4.4 Bedrock Geology

Based on an available bedrock geology map, bedrock in the area of the Site consists of slate and quartzite of the Goldenville Formation.



## 4.0 Site Description

### 4.1 Property Information

The Site is located in a rural forest area near Tralfalgar, a region of Halifax Regional Municipality. The Site is located 1 km east of Route 374 along an unnamed gravel road which is located approximately 30 km north of Sheet Harbour, Nova Scotia.

The Site consists of portions of several different properties owned by MacGregor Properties Limited; Property Identification Numbers (PID Nos.) include:

- PID 40202020, 101 acres known as "The Hudson Lot";
- PID 40201998, 100 acres known as "The Fish Lot";
- PID 40202004, 120 acres known as "The Chipman Lot";
- PID 40202012, 100 acres known as "The McDougald Lot";
- PID 00565101, 100 acres known as "The Hattie Lot";

In addition to the MacGregor lands, part of the greater proposed development of the mine operation includes undeveloped land to the south and east of the proposed pit area owned by the Province of Nova Scotia, including portions of the following PIDs:

- PID 40750796, 50 acres
- PID 40750622, 13729 acres (approximately 400 acres of the northern portion of this PID are in the proposed development area for the Fifteen Mile Stream Project.

The PIDs are not currently serviced being in a rural portion of the province. A summary of the property information is provided below.

<b>Current Site Owner:</b>	MacGregor Properties Limited and the Province of Nova Scotia
<b>Legal Description:</b>	Refer to PIDs above
<b>Property Area:</b>	Approximately 900 acres
<b>Utility Providers:</b>	
<b>Water:</b>	None
<b>Storm and Sanitary Sewers:</b>	None; the camp is serviced by temporary toilet facilities
<b>Electricity:</b>	The camp is serviced by portable diesel generators
<b>Natural Gas:</b>	None

### 4.2 On-Site Buildings and Structures

There are no permanent buildings on the Site, only temporary camp buildings associated with the exploration project which are located to the west of the proposed pit location. Foundation of a suspected former stamp mill along with other mine workings were located during the site visit along with several DNR signs indicating the presence of underground mine workings.

### 4.3 Historical Land Use

Historical land use for the Site was determined through historical records listed in Section 3.0. A summary of the historical information is presented below.

#### 4.0 Site Description (continued)

#### 4.3 Historical Land Use (continued)

Period/Date:	Land Use:
pre-1865	The area was undeveloped woodland
1866 to early 1900s	The area was actively mined for gold. Based on the reviewed information sources, there were numerous stamp mills operating on the Site and in the surrounding area. The stamp mills or crushers were either water or steam powered. In the records reviewed there was mention of various engine house and power generation systems to supply the various shafts, mining equipment and stamp mills. Mine operations reportedly started and stopped frequently during this period with various operations operating under similar names. The waste rock and tailings generated represent a potential environmental concern.
Early 1900s to late 1930s	After the early 1900s the area was not actively mined again until the late 1930s. There was limited information available for this period of time. Based on the available aerial photograph there is a disturbed area in the general vicinity of the currently proposed pit which aligns with the mapping showing the various pits, shafts and general mine operations in the area. The eastern area of the Site including Seloam Lake shows evidence of dams which are retaining water as the lake is visibly larger than in later aerial photographs.
Between the late 1930s and early 1980s	<p>Between 1939 and 1942 the Provincial government rehabilitated the mine. During this time the underground workings were expanded and some gold was produced. Due to the on-going World War II further development of the mine ceased. In the 1947 aerial photographs the dams along Seloam Lake are no longer in operation as the lake is lower and there is an obvious area of exposed ground around the perimeter of the lake and Seloam Brook toward Fifteen Mile Stream. This action resulted in flooding of the Seloam Brook which based on the DNR records would account for the possible wide distribution of the tailings.</p> <p>Between the late 1940s and early 1980s there was limited use of the site although the gravel access road was maintained as passage to woodland areas for harvesting lumber.</p>
Early 1980s to present	Based on the reviewed records, there was a renewed interest in the gold potential of the area. This included exploratory drill holes, resurveying the area, and in the late 1980s to the west southwest, the excavation of a test sample to confirm the quantity of gold in base rock. This excavated material was processed at Gays River, off-site. Work completed by Jacques Whitford as part of a geotechnical project in the late 1980s identified waste rock and tailings on the site along Seloam Brook to a depth of 1.5 to 2 metres. No reported environmental testing of the tailings was completed at this time. There were surface water samples collected. Based on the file review completed total oil and grease was detected in the surface water. This was attributed to the use of an oil based drilling mud. It was indicated that this was reported to NSE at the time. There may be isolated pockets of limited hydrocarbons near drill sites from the 1980s. A map of the area indicates that in the 1980s the camp was located along the gravel road near the eastern edge of the proposed pit development. A photograph of the camp from the late 1980s shows a cluster of portable buildings with propane cylinders for heating. The presence of the camp in the late 1980s is not anticipated to represent a concern to the Site. By the early 1990s the Site was vacant and again became over grown. The current drilling reportedly started in late 2017 / early 2018 and is on going.

## 5.0 Site Visit Findings

### 5.1 Current Site Operations

The Site is currently occupied by historical tailings and waste rock covered by a brook, wetlands, trees, shrubs and other vegetation. A gravel access road runs east-west through the proposed open pit location. There are several mobile drill crews operating on the Site as part of the exploration process. These mobile setups include portable power generation, diesel powered water pumps, and mobile drill equipment. It was reported that drilling muds are not being used, only water which is being direct to collection areas on the Site.

### 5.2 Waste Generation and Storage

#### 5.2.1 Solid and Liquid Wastes

No hazardous waste generation or storage was identified to be conducted on the Site. There were areas of waste rock from the historical mining activities noted during the site visit along with occasional surface metal debris.

#### 5.2.2 Drains, Sumps, Septic Systems and Oil Water Separators

No floor drains, sumps, septic systems, interceptors, or separators were identified on the Site.

#### 5.2.3 Air Discharges and Odours

No sources of air emissions that are suspected to result in residual contamination to the property were identified on the Site. Further, no strong, pungent, or unusual odours were identified during the site visit.

### 5.3 Fuel and Chemical Storage

#### 5.3.1 Underground Storage Tanks (USTs)

No chemical or fuel storage USTs were identified on the Site. Further, no vent or fill pipes indicating the potential presence of an abandoned or decommissioned UST were observed.

#### 5.3.2 Aboveground Storage Tanks (ASTs)

No permanent chemical or fuel storage ASTs were identified on the Site. There are mobile tanks associated with the exploration process that are not considered to be a potential environmental concern to the Site.

#### 5.3.3 Other Storage Containers

No permanent chemical storage was observed on the Site. There are pails and other supplies associated with the mobile exploration operations that are not considered an environmental concern to the Site.

### 5.4 Building Systems/Equipment

#### 5.4.1 Heating and Cooling Systems

No heating or cooling systems are on the Site, as the Site is undeveloped.

#### 5.4.2 Hydraulic Equipment

No in-ground hydraulic equipment is on the Site, as the Site is undeveloped. There are hydraulics associated with the mobile exploration operations that are not considered an environmental concern to the Site.

## 5.0 Site Visit Findings (continued)

### 5.5 Exterior Site Observations

#### 5.5.1 Surface Features

No hydrocarbon stained surficial materials were observed on the Site. It was noted that in locations there are exposed historical tailings present at the surface and there is no vegetation in these areas; similarly there are areas of waste rock piled at the surface and no vegetation is growing in these areas. During the site visit, several DNR warning signs were noted indicating the presence of historical mine workings several of which were present as noticeable pits with debris present in the openings. As noted previously the historical tailings and waste rock are being delineated as part of other reports, and are to be managed during the development of the proposed open pit mine.

#### 5.5.2 Fill Materials

There are areas of exposed historical mine tailings at the Site. Based on information obtained during the site visit, the average depth was around 30 centimetres with deeper areas extending 1.5 to 2 metres according to the reviewed reports. Based on the history of the area, the surficial soils have been reworked numerous times between 1866 and 1940 with tailings, waste rock and other materials placed on native till layers.

#### 5.5.3 Wells

No abandoned or existing wells (water, oil, gas or disposal) were identified on the Site. There were records for a number of drilled exploration holes as part of the assessment of the area for development of a mine both on the Site and in the surrounding area in a grid pattern. It is unknown how the historical drilled holes, which extended several hundred feet in some cases, were backfilled. It was reported that current boreholes are grouted at the bedrock interface. If exploration wells are encountered during tailings management operations (e.g., removal of the historical tailings to the new tailings management areas), they should be properly decommissioned, in accordance with provincial regulations.

### 5.6 Hazardous Building Materials

#### 5.6.1 Asbestos-Containing Materials (ACMs)

The common use of friable (crumbles easily by hand pressure) asbestos-containing materials (ACMs) in construction generally ceased voluntarily in the mid 1970s but was only banned through legislation in the mid-late 1980s. Asbestos was used in thousands of building products and the common uses of friable ACMs included boiler and pipe insulation, and spray-on fireproofing. Asbestos was also used in many manufactured products such as floor tiles, ceiling tiles, transite cement products and various other construction materials. Some cement drain piping currently used in the construction of buildings still contains asbestos (non-friable). Vermiculite used as insulation may be contaminated with asbestos fibres.

As the Site is undeveloped, no suspected ACMs were identified on the Site during the site visit.

#### 5.6.2 Polychlorinated Biphenyls (PCBs)

From the 1930s to the 1970s, PCBs were widely used as coolants and lubricants for electrical equipment, including transformers and capacitors, and in a number of industrial materials, including sealing and caulking compounds, inks and paint additives. The use of PCBs was prohibited in heat transfer and electrical equipment installed after September 1, 1977, and in transformers and capacitors installed after July 1, 1980. Regulations now require that PCB containing equipment be taken out of service prior to regulated deadlines.

No oil-filled transformers or lamps ballasts were observed on the Site.

## 5.0 Site Visit Findings (continued)

### 5.6 Hazardous Building Materials (continued)

#### 5.6.3 Lead-Based Materials

In 1976, the lead content in interior paint was limited to 0.5% by weight under the federal Hazardous Products Act. Lead based water supply pipes were used greater than 50 years ago. Between 1930 and 1986, most buildings used copper pipe with lead-solder joints. Other lead-based products include wall shielding (x-ray rooms).

As the Site is undeveloped, no lead-based materials were identified on the Site.

#### 5.6.4 Urea Formaldehyde Foam Insulation (UFFI)

Urea Formaldehyde Foam Insulation (UFFI) was used as an insulation product for existing houses between the mid-1970s and its ban in Canada in 1980. It was not commonly used for commercial or industrial buildings.

As the Site is undeveloped, no UFFI was identified on the Site.

#### 5.6.5 Ozone-Depleting Substances (ODSs)

Refrigeration and air conditioning equipment in place before 1998 may contain refrigerants containing Ozone-depleting Substances. Non-ODS refrigerants have been developed and are available to replace these materials in newer equipment.

As the Site is undeveloped, no equipment containing ozone-depleting substances (ODSs) was identified on the Site.

## 5.7 Special Attention Items

### 5.7.1 Radon Gas

Radon is a radioactive gas associated with uranium rich black shale and/or granite bedrock. Radon emits alpha particles and produces several solid radioactive products called radon daughters. Harmful levels of radon and radon daughters can accumulate in confined air spaces, such as basements and crawl spaces.

Based on a the online map supplied by the Nova Scotia Department of Natural Resources, the Site is in an area of low radon potential.

### 5.7.2 Microbial Contamination (Mould) and Indoor Air Quality

The growth of mould in indoor environments is typically due to a moisture problem related to building envelope or mechanical systems deficiencies or design, and can produce adverse health effects. There is no practical way to eliminate all mould and mould spores in the indoor environment. The way to control mould is to control moisture.

No visual evidence of suspected indoor mould growth was observed on the Site, at the time of the site visit, as no buildings or structures exist.

### 5.7.3 Electromagnetic Frequencies (EMFs)

Electrical currents induce electromagnetic fields. No scientific data supports definitive answers to questions about the existence or non-existence of health risks related to electromagnetic fields.

No high-voltage transmission lines or electrical substations, which could generate significant electromagnetic fields, were identified on or adjacent to the Site.

## 5.0 Site Visit Findings (continued)

## 5.7 Special Attention Items (continued)

### 5.7.4 Noise and Vibration

The effects of noise and vibration on human health vary according to the susceptibility of the individual exposed, the nature of the noise/vibration and whether exposure occurs in the working environment or in the home.

The site activities involve drilling which generates significant intermittent and non-permanent noise/vibration, however given the proposed industrial nature of the surrounding area this is not considered to be a concern to the Site.

## 5.8 Neighbouring Property Information

The current activities on neighbouring properties observed at the time of the site visit and a summary of historical information gathered through the records review are presented in the following sections.

The greater area of the proposed open pit mine encompasses the former historical mining operations. Located to the west and south of the proposed pit were numerous open pits, mine shafts, stamp mills and engine houses for the processing of rock for the extraction of gold between 1866 and the early 1940s. The majority of the adjoining property based on the aerial photographs has been woodland since the 1920s.

The historical mining operations in the area of the Site represent a potential concern due to the use of mercury in recovery of gold in mining practices from the late 1800s/early 1900s. The source of power for the steam engines used is also unknown, although given the lack of a rail connection it is likely that these were wood fired rather than coal fired owing to the difficulties of transporting coal to the mine sites. The native rock in the area has a high concentration of arsenic based on mapping provided by DNR which could be considered an environmental concern. The presence of tailings, waste rock and former mining operations represents a potential environmental concern.

## 5.9 Client-Specific Items

No specific client requests were made with respect to this Phase I ESA.

## 6.0 Conclusions

The Phase I ESA has revealed evidence of potential environmental contamination associated with the Site.

Based on the information gathered there are apparent tailings and waste rock both within the area of the proposed open pit development as well as adjacent to the proposed open pit operations which are potentially impacted with arsenic, mercury and have an acid generating potential. Further delineation of the historical tailings areas and waste rock is currently underway to determine the extent of the materials.

A reply from Nova Scotia related to previous assessment and management of waste rock and tailings is pending.

## 7.0 Closure

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

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

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

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

This report is limited by the following:

- *Due to the size of the property (approximately 900 acres), the wooded areas to the north (across Seloam Brook), east, and south of the proposed pit which were outside the area of historical mine development in the 1800s were assessed by driving portions of the available woods road and through review of historical aerial photographs, LIDAR imagery, and topographical and geologic maps of the area. It should be noted that portions of the Site are covered by thick vegetation which prevented a thorough assessment of the ground surface in those areas of the Site during the site visit. As noted above northern portions of the Site were inaccessible due to the presence of Seloam Brook which runs east / west across the area of the proposed pit development. At the time of the site visit the temporary crossing had been removed due to a high water safety concern.*
- *In September 2019 a revised proposed open pit area was provided to Stantec. The revised location of the proposed pit extended the pit to the west and north of the area of the 2018 proposed pit location. Stantec reviewed the revised location with the areas that were assessed in 2018 and determined that the assessment encompassed the revised location and a site visit was not completed in 2019 as part of the revision of this report.*

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.



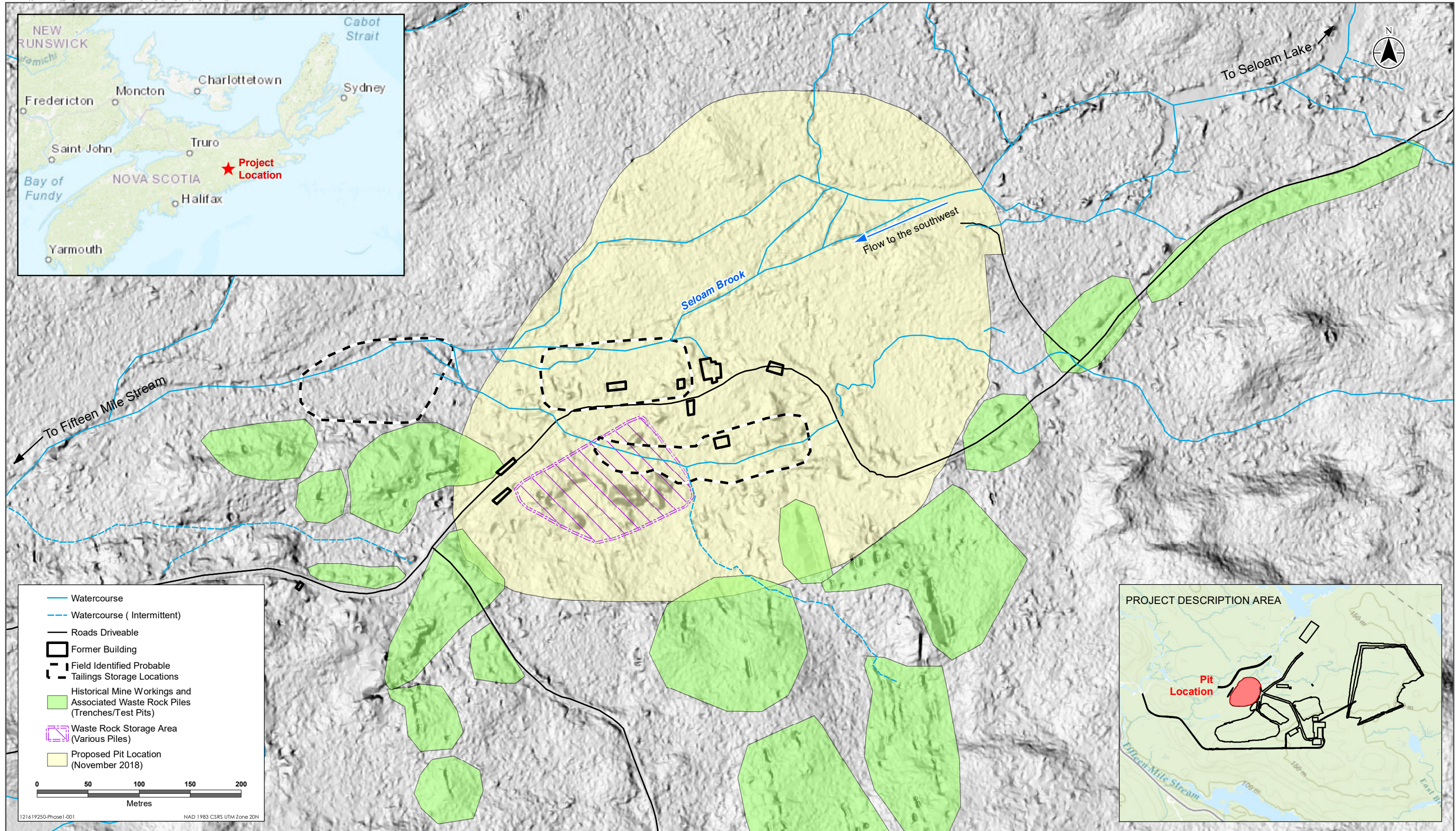
## 7.0 Closure (continued)

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

This report was prepared by Patrick Turner, P.Eng. and reviewed by Don Carey, M.Sc., P.Eng.

# **Appendix A**

## **Site Plans**



Sources: Client, Government of Nova Scotia and Canada

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

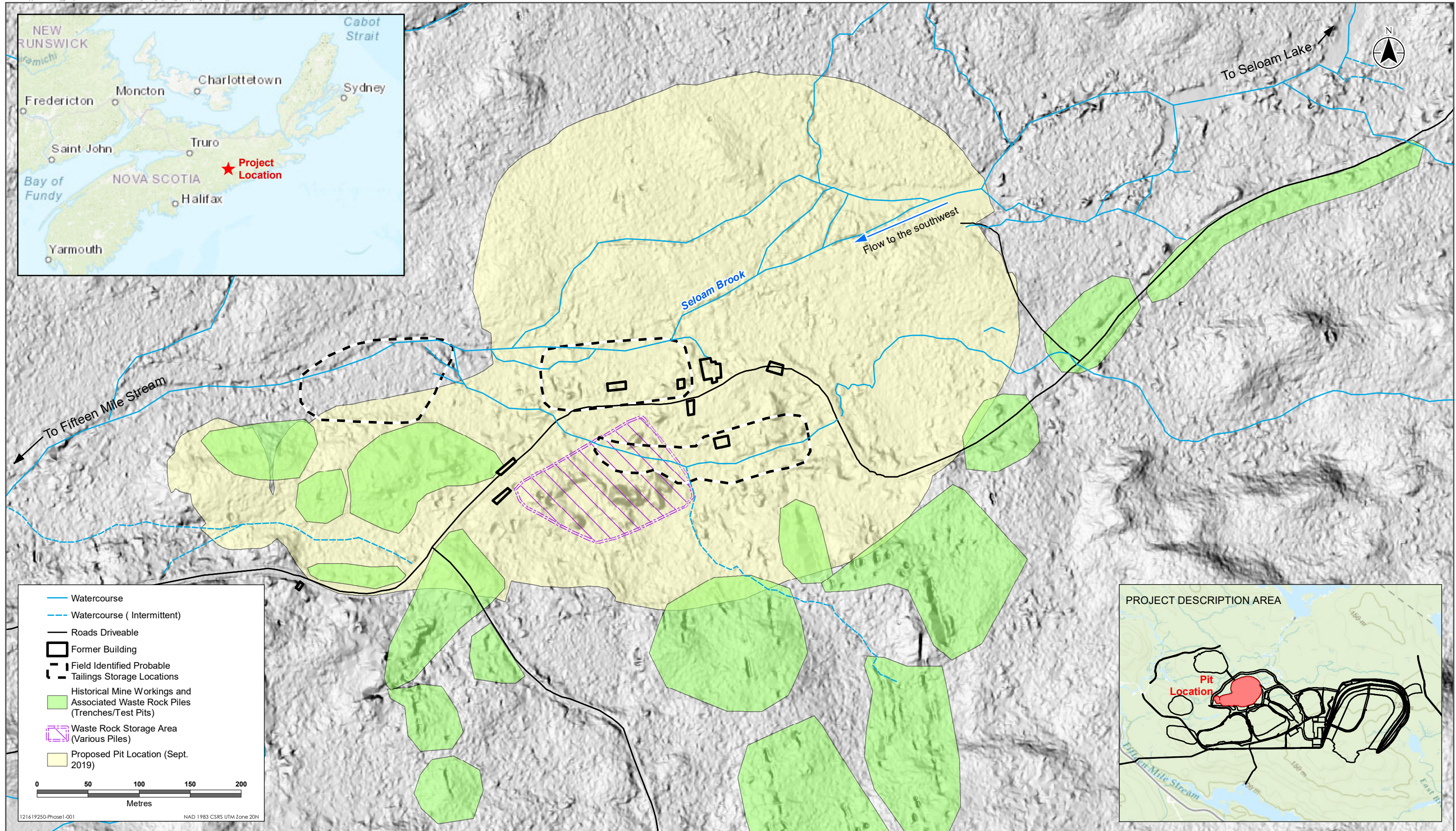
Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.



ATLANTIC MINING NS

Atlantic Mining NS  
Fifteen Mile Stream Project

Figure 1



Sources: Client, Government of Nova Scotia and Canada

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

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



ATLANTIC MINING NS

**Atlantic Mining NS  
Fifteen Mile Stream Project**

Figure 2

**Appendix B**  
**Photographs**



Seloam Brook which runs through the proposed pit location



Typical drill operation setup in the area of the proposed pit



Wetland in the central area of the proposed pit location - apparent tailings along the edges



Typical moss covered waste rock piles on the Site



Typical historical mine working / trench with moss covered waste rock



Exposed waste rock in the area of the proposed Pit





Typical water filled excavation, potential shaft



Typical metal debris present on the Site



Concrete foundation to the south of the gravel access road



Typical grey / dark grey sand apparent tailings under a layer of organic material



Exposed waste rock pile several metres high to the south of the gravel access road



Stressed vegetation (dead trees) adjacent to the waste rock pile and wetland



Iron staining in the pond adjacent to the waste rock pile



Graded waste rock along the western edge of the proposed pit



Typical exploration borehole location from the 1980s



Foundation remains adjacent to the gravel road next to Seloam Brook and exposed apparent tailings



Typical access road constructed for current exploration program

## **Appendix C**

### **Assessor Qualifications**

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## Profile

**Patrick Turner, B.Sc., P.Eng.**, has been with Stantec since 2000. Mr. Turner has conducted over 500 Phase I, II and III Environmental Site Assessments (ESAs) in Nova Scotia, New Brunswick, Newfoundland, Ontario and Quebec. These environmental assessments and remediation projects dealt with metal, hydrocarbon, polycyclic aromatic hydrocarbon, polychlorinated biphenyl and chlorinated solvent impacts in soil and/or groundwater. Properties assessed have ranged from single family dwellings to industrial oil refineries.

## EDUCATION

B.Sc. – Dalhousie University – Math, 1997  
Bachelor of Engineering (Civil) –  
Technical University of Nova Scotia 1998

## COMPETENCY

Site Visit  
Report Writer  
Technical Report Review



PHASE I ENVIRONMENTAL SITE ASSESSMENT  
ASSESSOR QUALIFICATIONS – Don Carey

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**Donald A. Carey, M.Sc., P.Eng.**  
Principal

**Profile**

Don Carey, M.Sc., P.Eng., is a Principal and Senior Hydrogeologist in the Dartmouth office of Stantec. He is also the Technical Leader for Site Investigation for Stantec's Canadian operations, and has been and continues to have responsibility for the development of standard operating procedures and quality for Phase I ESAs. Mr. Carey has more than 35 years' experience at Stantec in environmental site assessments, including senior technical review on more than 1,000 Phase I ESAs, for a wide variety of projects, from small residential properties, to large, complex industrial facilities.

**Education**      M.Sc. – University of Waterloo – Hydrogeology, 1985  
                         B.A.Sc. – University of Toronto – Geotechnical Engineering, 1977

**Associations**    **Engineers of Nova Scotia**

**Competencies**   Senior Review

## **Appendix D**

# **Supporting Documentation**

# Application for Access to a Record

Province of Nova Scotia

Freedom of Information and Protection of Privacy Act

Subsection 6(1)

To: Information Access and Privacy (IAP) Services  
Information, Communications and Technology Services  
Department of Internal Services  
12th floor, 5161 George Street  
PO Box 72  
Halifax, NS B3J 2L4

1. This is an application pursuant to the *Freedom of Information and Protection of Privacy Act* for access to: *Check one*

- (a) applicant's own personal information; or  
 (b) other information; or  
 (c) both applicant's own personal information and other information.


2. I am applying for access to the following record: *(Below, precisely identify the material applied for by including particulars such as the specific event or action to which it refers, the date of the record or the date or period to which it relates, the type of record (document, report, letter et cetera), names of department personnel who prepared or may have knowledge of the information, or citations to newspapers or publications which are known to have referred to the record. Attach additional pages if required.)*

Fifteen Mile Stream Gold Mine proposed reopening of the mine in  
the 1980s Gunnor Gold Inc. Former Egerton Mine 1870-1940.  
DNR records related to waste rock or tailings management

3. I wish to: *Check one*

- examine the record; or  
 receive a copy of the record

4. I understand that a cheque in the amount of \$5 made payable to the Minister of Finance should accompany the application and that I may be required to pay an additional fee before obtaining access to the record.

Date: Nov 18, 2018 Signature of Applicant: 

Full Name of Applicant (Print): Patrick Turner

Mailing Address of Applicant: Stantec Consulting Ltd. 102-40 Highfield Park dr  
*(Street/Apartment No./R.F. No.)*

Dartmouth, NS B3A 0A3  
*(Community/County) (Postal Code)*

Telephone Numbers of Applicant: \_\_\_\_\_  
*(Residence) (Business) (Fax)*

## Request to Waive Fees

I hereby request to be excused from paying fees related to the above application because:

- (a) I cannot afford to pay fees; or  
 (b) *(specify any other reason - attach additional pages if required)*

## For office Use Only

Date Received: \_\_\_\_\_ Application No. \_\_\_\_\_