ENVIRONMENTAL ASSESSMENT REGISTRATION DOCUMENT FOR A PROPOSED SURFACE AND UNDERGROUND GOLD MINE PROJECT AT GOLDBORO, GUYSBOROUGH COUNTY, NOVA SCOTIA

Submitted to:

Nova Scotia Environment

Submitted by:

Anaconda Mining Inc.

Orex Exploration Inc.

Toronto, Ontario

August 2018

Contents

List of Figures

List of Tables

Glossary

AES – Atmospheric Environment Service

AMS – Annual maximum series

Anaconda – Anaconda Mining Inc.

ARD – Acid rock drainage

CLC – Community Liaison Committee

Company – Anaconda Mining Inc.

Doré – gold bullion

GHD – GHD Consulting

hr - hour

km – kilometre

KMKNO – Mi'kmaq Rights Initiative

m – metre

mm – millimetre

mm/hr – millimetres per hour

MEKS – Mi'Kmaq Ecological Knowledge Studies

Mercator - Mercator Geological Services Limited

ML – Metal leaching

Mm^3 – Million cubic metres

MMER – Metal Mining Effluent Regulations

MODG – Municipality of District of Guysborough

MOU – Memorandum of Understanding

NSE – Nova Scotia Environment

NSDNR – Nova Scotia Department of Natural Resources

Onitap – Onitap Resources Inc.

Orex – Orex Exploration Inc.

Osisko – Osisko Mining Corporation

PEA – Preliminary Economic Assessment

Project – The Goldboro Project (site and accompanying infrastructure including construction and operation)

Property – The Goldboro claim block

Site – The Goldboro Mine Site

Tailings – Any waste from the processing of minerals

The Company – Anaconda Mining Inc.

The Project – The Goldboro surface and underground mine project

Thibault – Dean Thibault and Associates

t - tonne

tpd – tonnes per day

TSF – Tailings storage facility

WSP – WSP Canada Inc.

yr – year

1 Proponent Description

Anaconda Mining Inc. ("Anaconda" or "the Company") is a TSX-listed gold mining, exploration, and development company focused in the prospective Atlantic Canadian jurisdictions of Newfoundland and Nova Scotia. The Company operates the Point Rousse Project located in the Baie Verte Mining District in Newfoundland and Labrador. The Point Rousse Project is comprised of the Pine Cove open pit mine, the fully-permitted Pine Cove Mill and tailings facility, deep water port capable of docking Panamax size vessels, the Stog'er Tight Mine, the Argyle Deposit, and approximately 5,800 hectares of prospective gold-bearing property. Anaconda is also developing the recently acquired Goldboro Gold Project ("the Project") in Guysborough County, Eastern Nova Scotia, Canada with the potential to leverage existing infrastructure at the Company's Point Rousse Project.

Anaconda is a producing gold mining company with experience in the expedient development, efficient operation, and effective reclamation of project sites. The Company has a long-term goal of amalgamating gold resources in Atlantic Canada, with a firm belief that through organic growth a sustainable mining company can be built up while simultaneously contributing to the communities it operates within. Anaconda's reclamation approach is further detailed in Section 5.7.

The Goldboro Project is a high grade mineral resource currently owned by Anaconda. Anaconda is interested in developing this resource to the point where a gold concentrate can be produced, shipped to Newfoundland via tanker truck, and processed in Anaconda's Pine Cove Mill. Figure 1-1 shows the proximity of the two sites along with the planned route for the transport of concentrate.

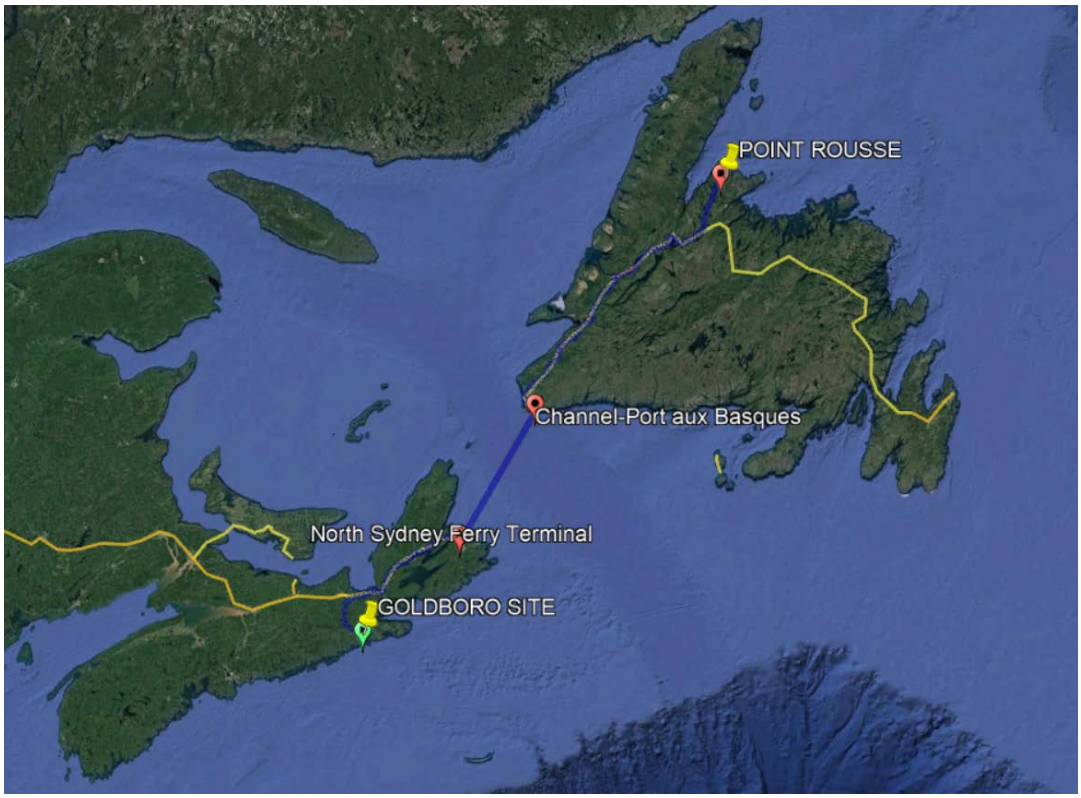

Figure 1-1: Proximity of Goldboro and Point Rousse sites with route between them in blue

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Anaconda's corporate offices are located at 150 York Street Suite 410, Toronto, Ontario, Canada and the company is listed on the Toronto Stock Exchange under the trading symbol ANX.

Executive Management Team

Dustin Angelo – President, CEO & Director
Robert Dufour – Chief Financial Officer
Gordana Slepcev – Chief Operating Officer
Paul McNeill – Vice President, Exploration
Allan Cramm – Vice President, Innovation and Development
Lynn Hammond – Vice President, Public Relations

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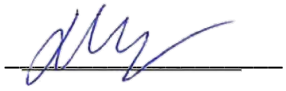
I, Dustin Angelo hereby accept the responsibility for the content of this Environmental registration document.



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2 The Undertaking

2.1 Name

The name of the proposed undertaking is The Goldboro Gold project.

2.2 Location

The Project is located approximately 175 km northeast of the city of Halifax, 75 km southeast of the town of Antigonish, and 1.6 km north of the community of Goldboro on the eastern shore of Isaac's Harbour, in Guysborough County, Nova Scotia, Canada (Figure 2-1). All weather Highway 316 links the community of Goldboro to the town of Antigonish. A secondary gravel road (Goldbrook Road), accessed from Highway 316, crosses the Goldboro Property ("the Property") and passes near the historic Boston Richardson shaft and exploration decline. Smaller logging roads and trails provide good access to most areas of the Property. The ground surface at the Site is gently rolling with an elevation ranging from 65 to 80 m above sea level. The Project is centred at coordinates 5007200m north, 606900m east (UTM Zone 20 NAD83) (45° 12' 2.6" N latitude and 61° 39' 2.0" W longitude).

The preliminary baseline study area, which encompasses the proposed project area and surrounding extents, includes the following properties listed by Service Nova Scotia Parcel Identifiers (PID's): 35094366 35065267, 35065275, 35065283, 35082775, 35151208, 35065325, 35065366, 35121771, 35121789, 35125798, 35151182, 35173996, 35151190, 35065853, 35065929, 35065960, 35065986, 35097138, 35149582, 35149566, and 35149574.

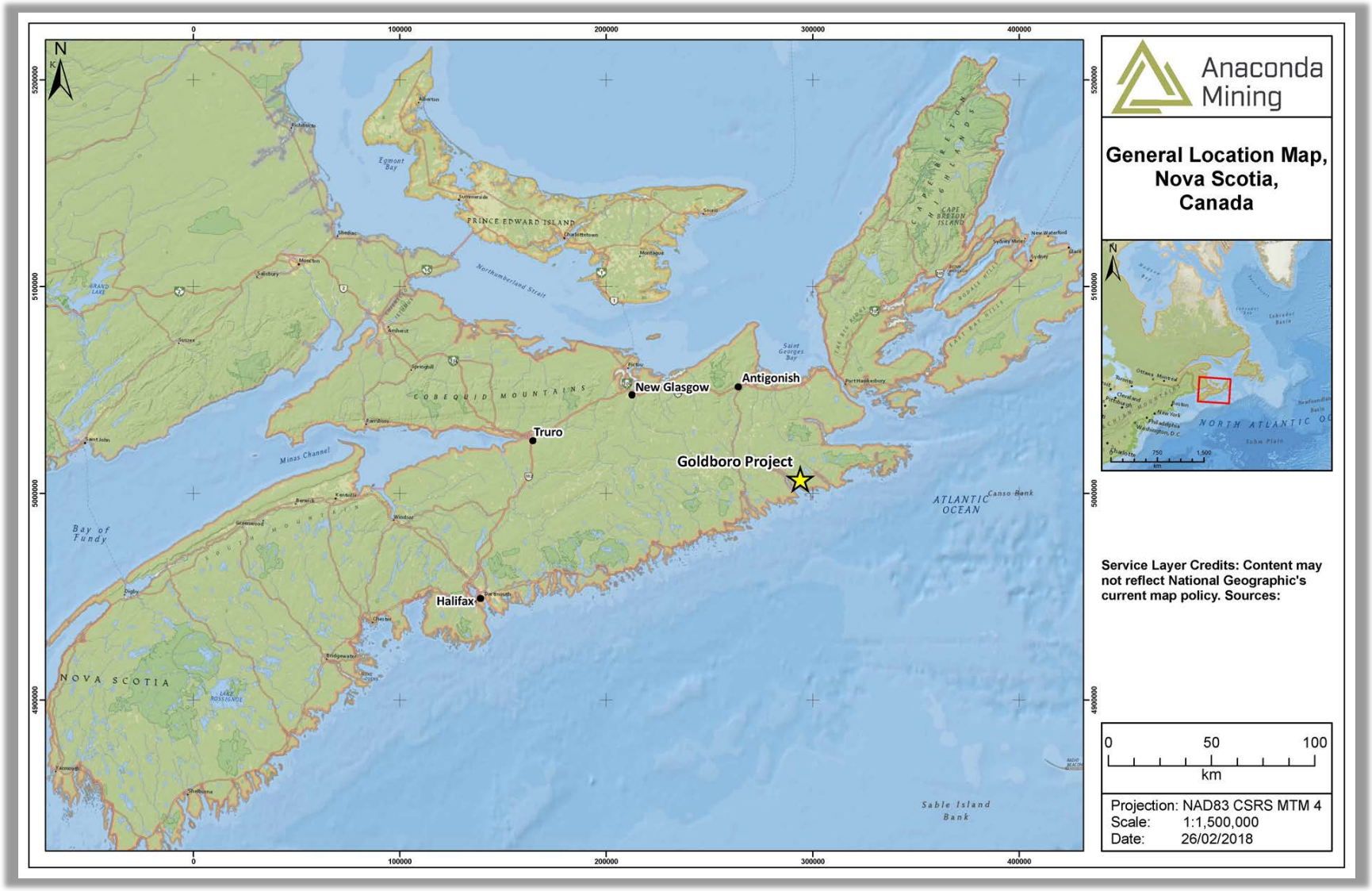


Figure 2-1: General Location Map for the Goldboro Project, Nova Scotia, Canada (WSP, 2018)

2.3 Description

Anaconda is proposing to develop the Project as a 575 tonne per day (tpd) mining and milling facility. The Project (or "the Property") is comprised of the West Goldbrook, Boston-Richardson, and East Goldbrook mineralized gold systems. Anaconda acquired the Property through the acquisition of its wholly owned subsidiary, Orex Exploration Inc. ("Orex").

The Project would start as an open pit development and would transition to underground mining by year 3 of operation. During the summer of 2018 Anaconda intends to complete a 10,000 tonne underground bulk sample using pre-existing development infrastructure. Prior to commercial production, Anaconda intends to construct an ore concentrator facility where the feed material would be subject to crushing, grinding, and mineral concentration by gravity and flotation methods. Inert tailings produced from the concentrator processing circuit would be stored on the Goldboro Site ("the Site") in an engineered tailings storage facility. The concentrate product would be filtered to remove moisture prior to shipping it to Newfoundland for gold extraction at Anaconda's Point Rousse processing facility. The current timeline for the Project is presented in Figure 2-2.

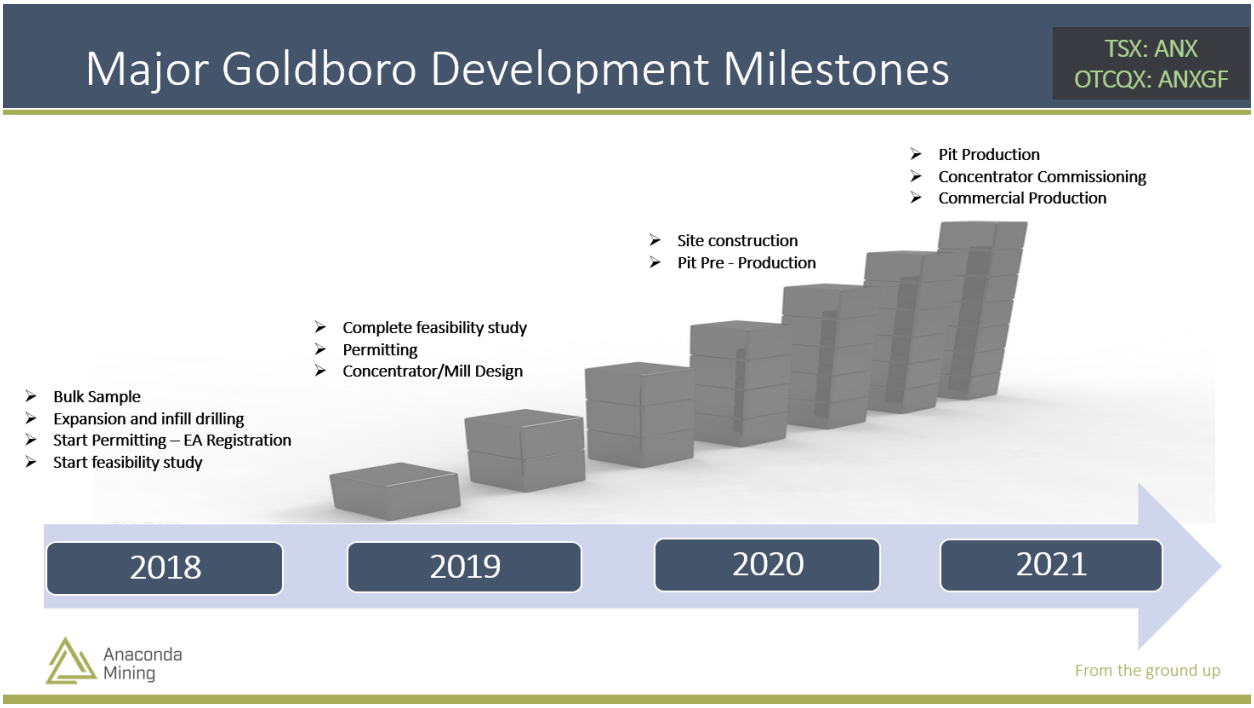


Figure 2-2: Goldboro Project timeline

The results of the recent (effective January 1, 2018) Mineral Resource Estimate are summarized in Table 2-1.

Table 2-1: Goldboro Project Mineral Resource Statement

Resource Type	Au Cut-off (g/t)	Category	Tonnes (Rounded)	Au (g/t)	Troy Ounces (Rounded)
Open Pit	0.50	Measured	397,000	2.88	36,800
		Indicated	662,000	3.09	65,800
		Measured and Indicated	**1,059,000**	**3.01**	**102,500**
		Inferred	**45,000**	**2.54**	**3,700**
Underground	2.00	Measured	22,000	4.70	3,300
		Indicated	2,564,000	5.09	419,600
		Measured and Indicated	**2,586,000**	**5.09**	**422,900**
		Inferred	**2,497,000**	**4.28**	**343,600**
Combined Open Pit and Underground	0.50/2.00	Measured	419,000	2.98	40,100
		Indicated	3,226,000	4.68	485,400
		Measured and Indicated	**3,645,000**	**4.48**	**525,400**
		Inferred	**2,542,000**	**4.25**	**347,300**

The Property consists of 37 contiguous claims, held under Exploration Licence No. 05888, covering a total area of approximately 592 hectares (see Table 2-2, Figure 2-1, and Figure 2-3). This title is in its 38th year of issue in 2017.

Table 2-2: Goldboro Property Claims held under Exploration License No. 05888 (WSP, 2018)

Exploration **Licence No.**	**NTS Sheet**	**No. of Claims**	**Hectares**	**Expiry Date**
05888	11-F-04-A	37	592	November 29, 2018

Access to the Site is excellent. The Goldbrook Road provides access from Highway 316 at Goldboro which transitions to a gravel road passing through the Site. An existing portal is located north of the gravel road. A mine shaft (Boston-Richardson Mine) and storage building (currently used for drill core logging) are located on the south side of the road which also accesses the southern tip of Gold Brook Lake, immediately east of the mine shaft. The proposed site for the mill is located to the north of the shaft and storage building.

Residential dwellings are present along the road to the Site with the closest being approximately 2 km along the Goldbrook Road. A cemetery is located on the east side of the road, approximately 1.5 km south of the Site. The area is moderately to heavily forested. The surface rights are held by various private landowners and by the Nova Scotia government.

The Goldboro area has been an active and productive mining area for many years around the turn of the century from 1893 to 1910. There are historic workings as well as contamination throughout the area due to this history of mining. The historic mining in the area is further outlined in Section 3.3.1.

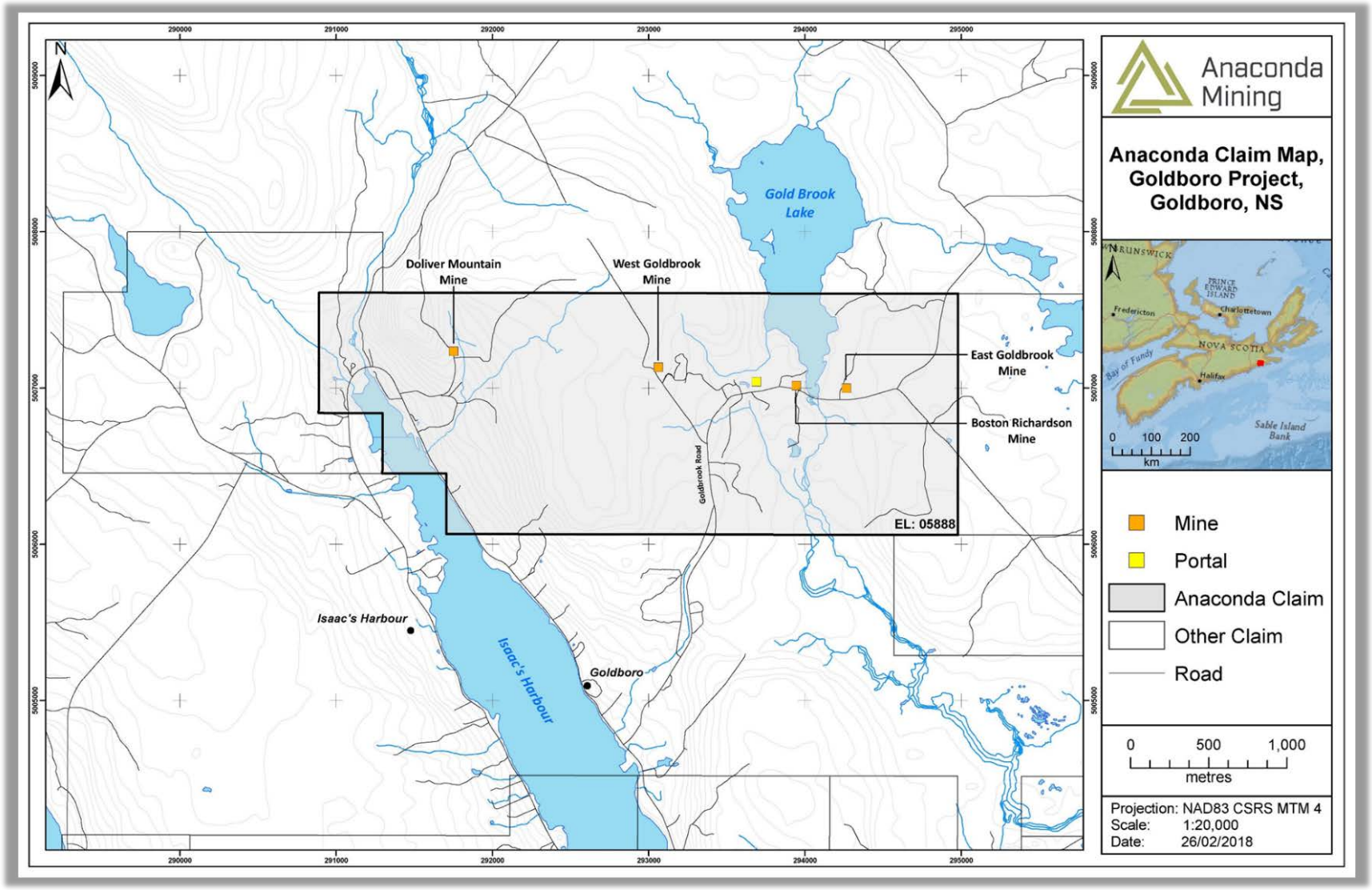


Figure 2-3: Goldboro Project Location Claim 05888 (WSP, 2018)

3 Scope

3.1 Scope of the Undertaking

Anaconda proposes to develop a 575 tonne per day (tpd) mine and a concentrator/processing facility at the Site approximately 2 km northeast of the community of Goldboro in Guysborough County, Nova Scotia. A mine plan, based on a nominal 575 tpd mining rate and a 575 tpd mill feed rate, has been developed for the Project based on a combined open pit and underground mine plan. A concentrator will be built north of the road and existing shaft that will produce gravity and flotation concentrates to be trucked to the fully permitted Point Rousse Processing facility in Newfoundland for milling and gold recovery. Anticipated mine life is approximately nine years while the concentrator will run for about 1.5 years longer processing the lower grade ore accumulated during development of the pit.

The mine planning work for the Project is based on the 3D block model (3DBM) and resource estimate prepared by Mercator Geological Services Limited ("Mercator") based in Dartmouth, Nova Scotia, while metallurgical testing and preliminary plant layout was prepared by Dean Thibault and Associates ("Thibault") of New Brunswick. The mine plan was prepared by the mining consulting firm WSP Canada Inc. ("WSP") based in Toronto & Sudbury, Ontario.

3.2 Purpose and Need for the Undertaking

The purpose and need for the undertaking is to extract economically significant gold ore from the Property for processing. The Project will bring significant economic stimulus to the area. It is estimated that during the Project's life approximately 150 people will be employed in the mine and concentrator combined, with up to 200 employees while underground development occurs beginning in year 2.

Anaconda retained Mercator in March 2017 to prepare an updated, independent mineral resource estimate in accordance with National Instrument 43-101 ("NI 43-101") for the Project. The purpose of the updated estimate was to re-cast resources to reflect re-modeling of gold distribution within the deposit at a new and higher peripheral constraint gold cut-off value. The updated resource block model forms the basis of the Preliminary Economic Assessment (PEA) study carried out by WSP and Thibault, results of which are presented in NI-43-101 technical report. The issue date of this report is March 2nd, 2018. The effective date of the PEA study is January 17th, 2018.

Based on the positive PEA results Anaconda has decided to proceed with the next phase of development of the Project including registration with Nova Scotia Environment. In the anticipation of registration of the Project, Anaconda has carried out several studies. These include baseline hydrology, hydrogeology, archeological and Mi'Kmaq Ecological Knowledge Studies whose findings are presented in this report.

3.3 Past and Present Activity

Anaconda, through its 100%-owned subsidiary Orex, has owned a 100% interest in the exploration rights since purchased in 1988 from Onitap Resources Inc. (Onitap) and at the effective date of this report, no lien, mortgage, royalty or other right in favour of third parties was registered with Nova Scotia Department of Natural Resources (NSDNR).

3.3.1 Historic Exploration and Mining

The Goldboro area was an active and productive mining area around the turn of the century from 1893 to 1910. Historical reviews of mining activity in the region have been described by Naert (1988), Roy (1989) and others and are summarized below.

Gold mineralization on the Property was first discovered in 1862 by Howard Richardson of the Geological Survey of Canada in quartz veins within the Isaac's Harbour anticline. In 1892, Richardson first discovered gold-bearing mineralization in the argillite belt which would later bear his name. Development work was undertaken later that same year by the Richardson Gold Mining Company. Mining began on a small scale in February 1893. First, a shaft was sunk on the southern limb (South Shaft), then another on the northern limb (North Shaft), near the apex of the ore body. In 1893, the apex was mined between the two shafts, and in 1898, a third shaft (East Shaft) was opened on the crest of the ore body. Several cave-ins occurred that year, including a very serious one that occurred at the third shaft. This shaft was subsequently developed as the main shaft and reached a depth of 122 metres in 1899. A fourth shaft was sunk on the northern limb of the ore belt, about 60 metres west of the North Shaft. All sites were cribbed, and pillars were left in for support.

The mine became the property of the Boston-Richardson Mining Company in May of 1903. To regain access to the ore body, the new company enlarged the existing shaft to its present dimensions (5.8 metres x 1.8 metres) and sank it down to the Richardson belt at 117.7 metres. It was further developed to 133 metres in 1905, and the 121.9 metre level was mined along both limbs of the belt using more modern shrinkage or room and pillar methods.

The new mining method was a success and the northern limb was mined to within 30 metres of the surface. Operations were suspended on August 15th, 1908 due to financial difficulties.

A year later in 1909, operations resumed under the direction of a new company, the New England Mining Co., but all development work stopped in 1910. Mining continued although only on established sites, which were mined out one after the other. On August 23rd, 1910, a cave-in on the upper part of the northern limb, on one of the older sites, resulted in a dangerous increase in water flow in the mine and work was suspended.

Other discoveries of gold on the Upper Seal Harbour Anticline led to the development of the Dolliver Mountain, East Gold Brook and West Gold Brook Mines.

The Dolliver Mountain Mine was discovered in the early 1890s and development proceeded in 1901 until a shaft of 149 metres cut several ore bodies. In 1905, a drill hole 152 metres below the shaft gave unsatisfactory results and the mine was left to flood. It has since remained idle. Figures of 6,376 grams of gold from 7,311 tonnes were reported for this mine. From 1901 to 1905, three gold-bearing belts were intersected in the Dolliver Mountain mine, located 2 km west of the Boston-Richardson mine. In 1904, 205 oz. (6,376 g) of gold were recovered from 8,059 short tons milled, producing an average gold grade of 0.87 g/t. Work at Dolliver ceased in 1905 due to unfavourable drilling results.

In 1907, the East Goldbrook property that adjoins the Boston-Richardson property to the east was acquired by F.S. Andrews and others. A shaft was sunk 175 feet (53 m), and three promising gold-bearing

belts were explored in 1908. One of these was reported as being well mineralized but no other work was carried out on the property at that time. Operations were suspended on August 15, 1908 due to financial difficulties but were later resumed. Between 1931 and 1934, Renada Mines Ltd. dewatered and sampled the shaft. Their geological interpretation was that the mine was not near the axis or nose of the anticline.

In 1909, the New England Mining Company cleaned an old 26 metre shaft and did some lateral work on what is known as the West Gold Brook Mine. The exploration shaft intersected five gold-bearing belts. Three of these were mill tested but results were unsatisfactory, and the mine was abandoned.

Government records show total gold recovery from 1893 to 1910 for the property to be 54,871 ounces (1,707 kg) from 414,887 short tons of material milled (376,303 t), with this producing an average recovered gold grade of 4.11 g/t. However, mill recovery is reported to be approximately 67 % (Roy, 1998). Intermittent activities on the property between 1910 and 1981 included metallurgical test work, reprocessing of mine tailings, shaft sinking, and cross-cutting.

In 1926, the property was acquired by Metals Mining and Smelting Corporation of Canada Ltd. They attempted to recover the auriferous arsenopyrite from the tailings during 1926-1927. Since then, the property has had formal activities.

In 1929, Locarno Copper Mines Ltd. sank a shaft to 30 metres on the Nugget Lead, west of the New England shaft. In 1956, the Canso Mining Corporation dewatered the shaft and did some cross-cutting to locate previously drilled leads. Work was stopped due to financial difficulties.

In 1981, Patino Mines (Quebec) Ltd. completed a geophysical program covering the Upper Seal Harbour district. In 1984, Onitap Resources Inc. (Onitap) acquired 37 claims overlying the Property. Between 1984 and 1988, Onitap conducted diamond drilling programs, airborne VLF-EM surveys and surface Induced Polarization (IP) surveys. During this period several new mineralized belts were discovered.

In 1984, an exploration hole (1984-01) of 530 metres was drilled downdip from the Boston-Richardson Mine, and in 1985 a five-hole program of 390 metres was drilled on the West Gold Brook Mine.

From January to March 5, 1987, a program funded and managed by Petromet Resources Limited and Greenstrike Gold Corporation was executed. Five holes were drilled for a total of 1,925 metres.

Since May 1987, Onitap has completed an additional 33 holes for a total of 11,865 metres.

In 1987, an IP survey was conducted over the central area of the claims. Helicopter-borne magnetic and EM 16 surveys were done by Aerodat Limited of Mississauga.

Surface exploration programs conducted in 1988 and 1989 accounted for a total of 13,069 metres of drilling in 61 holes within the western part of the Boston-Richardson Mine area and the West Gold Brook Mine area. In addition, a total of 234 metres was drilled in four holes in the 1988 underground exploration program.

In 1988, a 5 x 4 metre decline with a slope of 15%, was driven 416 metres to the 76-metre level and 4 x 3 metre cross-cuts were driven at the 38 and 76-metre levels. A total of 3,000 tonnes of potential ore and 20,000 tonnes of waste rock were brought to surface. A 27.4 metre tall headframe was erected, and the

Boston-Richardson shaft was rehabilitated down to the 122-metre level to allow future access to greater depths.

An ore storage pad with capacity for approximately 30,000 tonnes of ore and waste rock storage facilities was established. Two settling ponds were constructed in series south of the Boston-Richardson Mine to treat water pumped from the mine shaft as well as leachate from the ore storage area.

The site around the mine shaft and the decline was cleared and levelled for surface facilities. An office trailer complex was installed and a shop/dry, including air and water lines was constructed.

An area about 0.5 km south of the Site, immediately east of the Site access road, was cleared for the future mill, office, and maintenance facilities. A sewage disposal system was also installed.

Orex acquired the Goldboro property from Onitap in 1988 and, except for a period of inactivity from 1996 to 2004, has actively pursued both surface and underground exploration programs since that time. This includes large amounts of core drilling, metallurgical testing programs, resource estimation programs, and economic assessments of the Property. The most recent major exploration effort consisted of an extensive core drilling assessment of the Property that was carried out by Osisko Mining Corporation ("Osiko") under terms of agreement with Orex from 2010 to 2012. Osisko completed systematic diamond drilling on the Property testing the Boston-Richardson, East and West Goldbrook zones for bulk-tonnage style disseminated mineralization.

In March of 2017, Anaconda acquired control of the Property under terms of a court-approved Plan of Arrangement whereby Orex became a subsidiary of Anaconda. Work programs carried on in 2017 by Anaconda are summarized below.

3.3.1.1 Old Tailings Facilities

Records indicate that a large portion of the material brought to surface from the historic underground workings was milled at the Goldboro site. More than 385,000 tonnes of ore are reported to have been crushed from 1893 to 1912 in a stamp mill capable of production rates of up to 1,800 tonnes per month.

Early gold production was via stamp mill and mainly mercury (Hg) amalgamation (see Parsons et al, 2012). Gold concentrate was obtained by gravity methods using Wilfley tables until 1906, after which a bromo-cyanide plant was built. The continued use of gravity methods thereafter is uncertain.

The mill produced more than 1,700 kg of gold. Records also show that at least 775 tonnes of arsenical concentrate were produced for shipment to Belgium and Wales.

Four locations are known to have been used for tailings disposal during past milling operations. These are shown in Figure 3-1. None of the tailings disposal sites were contained and tailings migrated down the streams into which they were deposited.

Old foundations suggest the principal mill building was located immediately west of Gold Brook Lake, north of the road (Figure 3-1). The presence of another mill is suggested based on the location of the tailings areas to the south of Goldbrook Road and Gold Brook Lake. The locations of past waste rock storage and ore storage areas are unknown.

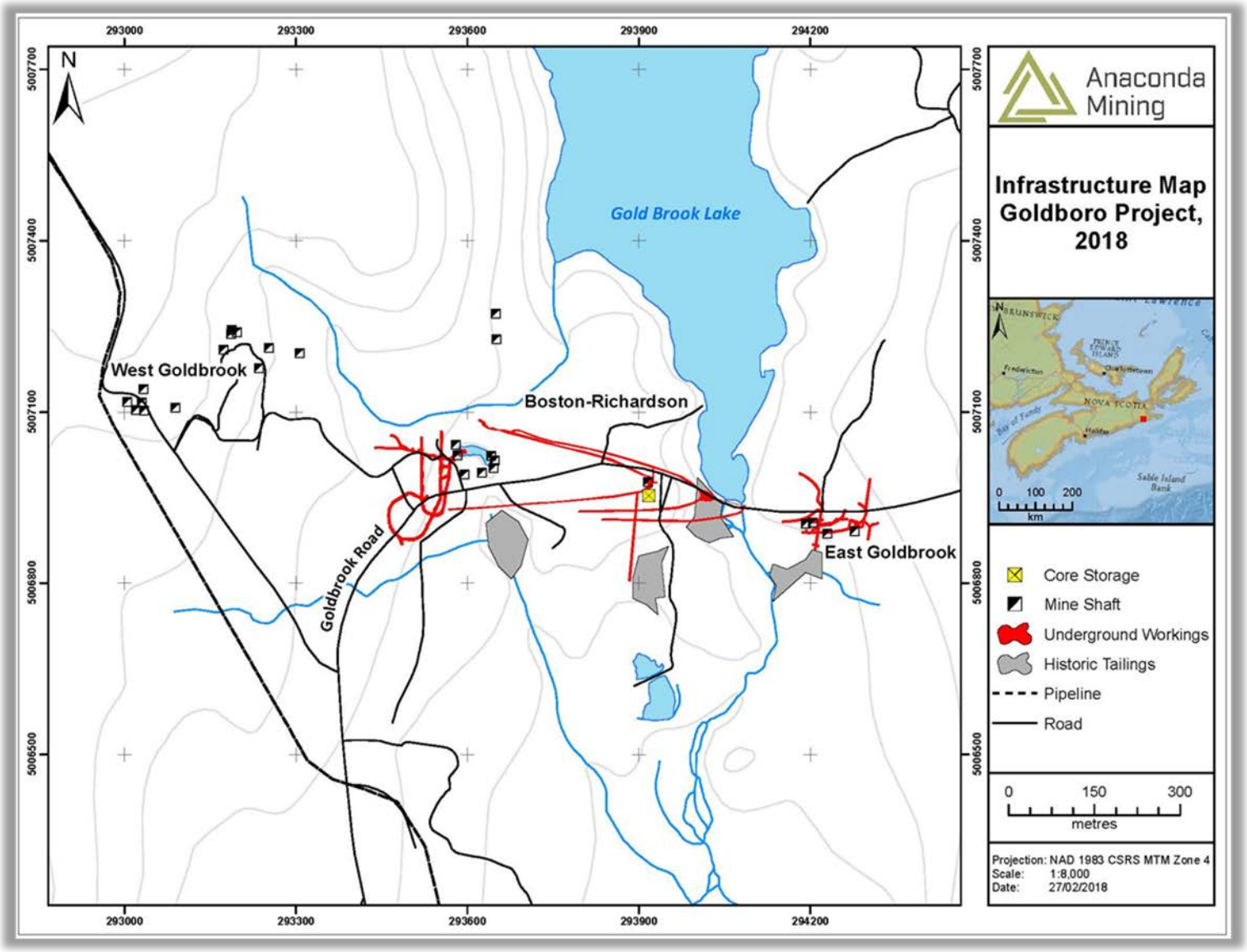


Figure 3-1: Goldboro Project location relative to historic workings and tailings locations

3.3.1.2 Environmentally Sensitive Remnants of Past Activities

The old tailings areas, which are not owned by, (or the liability of), Orex, are likely to present a continuing threat to the environment. Tailings were simply deposited into streams and wetland areas with no provisions for containment or control of leachates. Consequently, tailings migrated along Gold Brook. Stream water samples collected downstream of the southernmost historic tailings areas (Figure 3-1) have shown elevated levels of arsenic and iron. The Goldboro site has been subject to numerous research activities that are well documented. *A Review of Activities Related to the Occurrence of Arsenic in Nova Scotia Well Water* by G. W. Kennedy and J. Drage issued by Nova Scotia Department of Natural Resources in 2016 (Kennedy and Drage, 2016). Sampling by the Geological Survey of Canada in 2012 (Parsons et al., 2012) showed elevated arsenic (As) and mercury (Hg) levels within tailings of the Upper Seal Harbour area. Elevated Hg and As are also present along Gold Brook where tailings from mill processing from 1893 to 1910 were deposited within or adjacent to natural watercourses. The main method of gold extraction was via mercury amalgamation that lead to mercury enrichment within the tails. Concentrations up to 7.2 wt. % As and 120,000 μg/kg Hg were measured directly within the foundation of the Richardson Mill with elevated values along Gold Brook.

Arsenic is now considered the most prevalent naturally occurring groundwater contaminant in the province, and research over the past four decades has indicated that bedrock geology is the most important control on arsenic concentrations in well water in Nova Scotia (e.g. Bottomley, 1984; Dummer et al., 2015) as well as in the broader region of the northern Appalachian orogen (Ayotte et al. 2003; Robinson and Ayotte, 2006; Peters, 2008; Klassen et al., 2009; Yang et al., 2009).

Other areas that may be subject to continued effects from past activities include the old mill sites and unidentified waste rock and ore storage sites. These are areas where leachate and milling reagents may have infiltrated into the bedrock although water analyses such as those taken in Gold Brook Lake show no evidence of such effects.

Most of the entrances to old underground workings and caved portions of the surface overlying these workings have been backfilled or otherwise sealed and should, therefore, not present a risk to animals and humans has received an indemnification letter from the Nova Scotia government releasing the Company from any liabilities related to the past mining and milling activities if those areas are not disturbed with new or proposed activities.

3.3.2 Recent Developments

3.3.2.1 Anaconda Acquisition of the Goldboro Property

In March of 2017, Anaconda acquired control of the Property under terms of a court-approved plan of Arrangement whereby Orex became a 100%-owned subsidiary of Anaconda.

Baseline metallurgical, environmental and hydrogeological studies awere initiated as part of development of the Project. Hydrology and hydrogeology studies were conducted from 2017 to 2018 by WSP International Inc. (WSP, 2018). Metallurgical testing and tailings characterizations was completed by Dean Thibault Associates (Dean Thibault) during summer/fall of 2017 and winter of 2018.

Anaconda has participated in a "One Window Meeting" organized by NSDNR on May 5th, 2017 where a general outline of the permitting and approval process was presented to the Company. Anaconda also had an opportunity to meet representatives from both NSDNR and Nova Scotia Environment ("NSE").

In preparation for the EA registration, Anaconda has completed ecological baseline work at the Project during spring and summer of 2017. First Nations and community engagement were initiated in the spring of 2017. Archeological and Mi'kmaq Ecological Knowledge studies were also completed in summer/fall 2017. A second moose survey was completed in March 2018.

Anaconda has engaged into the consultations with Mi'kmaq First Nations and local communities. Section 4.0 outlines the details and results of the consultations completed to date.

3.3.2.2 Baseline Ecological Studies

In 2017, GEMTEC Consulting Engineers and Scientists Limited ("GEMTEC") was retained by Anaconda to complete baseline ecological studies at the Project.

The ecological baseline studies encompassed:

- Wetland delineation and functional assessment;
- An aquatic habitat assessment;
- A vegetation and rare flora survey;
- A wildlife and rare fauna survey (including a mainland moose survey); and
- A water quality sampling program.

The studies were completed to obtain preliminary information on the applicable Valued Ecosystem Components (VECs) listed in Section 6 of the "Guide to Preparing an EA Registration Document for Mining Developments in Nova Scotia" (NSE, 2009). A report was prepared to summarize the findings of the 2017 baseline ecological studies.

3.3.2.3 Archaeological Assessment

In the summer of 2017, Davis MacIntyre & Associates Limited was contracted by Anaconda to conduct an archaeological resource impact assessment of the proposed Project. The assessment included a historic background study as well as a field reconnaissance of all areas to be impacted. This assessment was conducted under Category C (Archaeological Resource Impact Assessment) Heritage Research Permit A2017NS043 issued by the Department of Communities, Culture, and Heritage. This report conforms to the standards required by the Culture and Heritage Development Division under the Special Places Protection Act (R.S., c.438, s. 1).

3.3.2.4 Mi'kmaq Ecological Knowledge Studies

Anaconda contracted Membertou Geomatics Solutions ("MGS") to complete a Mi'kmaq Ecological Knowledge Study ("MEKS"), for the Site and surrounding area of the Project.

The MEKS mandate was to consider land and water areas within the proposed project area and to identify what Mi'kmaq traditional use activities have occurred or are currently within the study area as well as

what Mi'kmaq ecological knowledge presently exists. To ensure accountability and ethical responsibility of the study, the MEKS development has adhered to the "Mi'kmaq Ecological Knowledge Protocol, 2nd Edition". The protocol has been established by the Assembly of Nova Scotia Mi'kmaq Chiefs, which addresses the process, procedures and results that are expected of a MEKS.

The MEKS consisted of two major components:

- Mi'kmaq Traditional Land Use Activities, both past and present
- A Mi'kmaq Significance Species Analysis, considering the resources that are important to Mi'kmaq use.

The Mi'kmaq Traditional Land and Resource Use Activities component utilized interviews as the key source of information regarding Mi'kmaq use within the Project Site and Study Area. The Study Area consisted of areas within a 5 km radius of the Project Site boundaries.

3.3.2.5 Permitting

Other approvals and permits needed prior to production include a Water Withdrawal Permit, Industrial Approval, Mineral Lease, reclamation plan and bond, and a Letter of Authority from the Director of Mines of NSDNR.

Baseline water quality measurements and ongoing water quality testing have been completed as part of the requirements for a Water Withdrawal Permit. Approval of the design of the tailings facility is required for the Industrial Approval.

A reclamation bond will need to be submitted to the provincial government, either in cash or equivalent security, matching the full estimated cost of reclamation. The bond is returned as reclamation activities are carried out.

Anaconda has submitted permitting applications for the excavation and processing of an underground bulk sample of up to 10,000 tonnes during 2018.

3.3.2.6 Diamond Drilling Programs

To date a total of 79,400.02 metres in 437 holes have been drilled on the Property. A list of historic drilling programs prior to Anaconda acquiring the Project is provided in Table 3-1.

Table 3-1: Diamond Drilling Program Summary for the 1984 to 2011 Period (WSP, 2018)

Company	Year	Area	Metres	No. Holes	Series
Onitap	1984	Boston-Richardson	529	1	BR-84-01
Onitap	1985	West Goldbrook Mine	390	5	BR-85-01 to BR-87-04, incl. BR87-01A
Petromet Resources Ltd. & Greenstrike Gold Corp.	1987	Eastern part of the property	1,924	6	BR-87-01 to BR-87-05 and BR-87-05A
Onitap		Boston-Richardson belt and under & East Goldbrook property	11,621	33	BR-87-06 to BR87-38
Orex	1988	Upper Seal Harbour fold (8325E to 9100E) & West Goldbrook mine	10,822	41	BR-88-39 to BR-88-79
		Near decline	459	3	BR-88-80 to BR-88-82
	1988 to 1990	Underground 76-metre level (8637.5E to 8762.5E)	4,979	112	88U-01 to 88U-04 89U-05 to 88U-26 90U-27 to 90U-112
		West Goldbrook (8150E to 8600E)	2,811	26	BR-89-83 to BR-89-108
Minnova	1991	Twinned BR-88-48, BR-88-62, BR-88-60 and BR-87-35A	722	5	BR-91-109 to BR91-113
Orex	1993	Twinned BR-88-48/BR-91-109, BR-88-85, BR-88-62/BR-91-110 and BR-91-113	593	7	BR-93-114 to BR-93-117, BR-93-114B and BR-93-116B
Placer Dome	1995	Near ramp portal	1,263	7	BR-95-119 to BR-95-125
Orex	2005	Boston-Richardson Belt at 8675E	2,422	23	BR-05-001 to BR-05-023
	2008	West Goldbrook and East Goldbrook	12,065	45	BR-08-01 to BR-08-44 and BR-08-20A
Osisko	2010	Ramp, West Goldbrook and Dolliver Mountain	12,993	59	OSK10-01 to OSK10-59
Osisko	2011	East Goldbrook and West Goldbrook-Dolliver Mountain	2,375	10	OSK11-01 to OSK11-10

Since the summer 2017, Anaconda has completed a total of 42 diamond drill holes (BR-17-01 to 13 and BR-18-14 to 42) totalling 12,246.6 metres. Drilling has focussed on testing the down-plunge, down-dip and along strike extension of the Boston-Richardson ("BR") Gold System and the East Goldbrook ("EG") Gold System. Drilling also focussed on infilling under-drilled areas of the deposit to upgrade mineral resources from the inferred to indicated category with focus on sections 9050E, 9100E, 9150E, 9250E, 9350E, 9450E, 9500E, 9550E and 9650E (see Figure 3-2).

Drilling of the first five holes (BR-17-01 to 05; 643 m) was completed to collect samples for metallurgical test work on the Goldboro mineralization, with each of the completed holes twinning an historic drill hole.

- Highlight assays from the summer 2017 drilling program include:
- 779.97 g/t gold over 0.5 m within 151.42 g/t gold over 2.6 m (33.1 to 35.7 m) and 26.89 g/t gold over 1.0 m (110.0 to 111.0 m) in hole BR-17-04.
- 8.95 g/t gold over 3.7 m within 3.57 g/t gold over 11.4 m (169.2 to 180.6 m) in hole BR-17-02.
- 15.13 g/t gold over 2.3 m within 3.25 g/t gold over 13.4 m (17.4 to 30.8 m in hole BR-17-03.
- 204.34 g/t gold over 0.8 m within 11.12 g/t gold over 16.6 m (44.4 to 61.0 m) in hole BR-17-03.
- 12.92 g/t gold over 1.0 m within 2.96 g/t gold over 5.5 m (115.5 to 121 m) in hole BR-17-05.
- 141.02 g/t gold over 1.2 m within 17.94 g/t gold over 10.0 m (25.0 to 35.0 m) in hole BR-17-01.
- 57.41 g/t over 0.5 m within 14.60 g/t gold over 2.0 m (53.5 to 55.5 m) in hole BR-17-01.

In addition to the metallurgical drilling program described above, Anaconda completed 37 drill holes on the Property (BR-17-06 to BR-17-13 and BR-18-14 to 42) totaling 11,603.6 m. Hole locations were selected to provide local infill and mineralized zone extension information. Results of sampling and assaying are pending for holes BR-17-30 to 34, 41 and 42.

Highlight assays to date from the 2017-2018 drilling program include:

- 59.97 g/t gold over 0.5 m (272.7 to 273.2 m) in hole BR-17-06;
- 24.34 g/t gold over 3.8 m (389.9 to 393.7 m) in hole BR-17-06;
- 31.56 g/t gold over 1.0 m (259.0 to 260.0 m) in hole BR-17-08;
- 9.12 g/t gold over 3.2 m (293.8 to 2.97 m) in hole BR-17-08;
- 34.70 g/t gold over 3.5 m (82.0 to 85.5 m) in hole BR-17-09;
- 17.68 g/t gold over 0.5 m (69.6 to 70.1 m) in hole BR-17-10;
- 252.76 g/t gold over 0.4 m (76.6 to 77.0 m) in hole BR-18-15;
- 31.04 g/t gold over 1.0 m (6.2 to 7.2 m) in hole BR-18-17;
- 25.31 g/t gold over 1.0 m (62.0 to 63.0 m) in hole BR-18-18;
- 12.87 g/t gold over 2.0 m (130.6 to 132.6 m) in hole BR-18-18;
- 9.29 g/t gold over 2.1 m (420.6 to 422.7 m) in hole BR-18-21;
- 5.10 g/t gold over 9.6 m (116.0 to 125.6 m) in hole BR-18-22, including 25.82 g/t gold over 1.5 m;
- 11.27 g/t gold over 13.5 m (201.0 to 214.5 m) in hole BR-18-22, including 15.63 g/t gold over 1.4 m and 44.33 g/t gold over 2.5 m;
- 10.55 g/t gold over 6.1 m (223.0 to 229.1 m) in hole BR-18-22, including 18.78 g/t gold over 3.1 m;

- 7.22 g/t gold over 6.5 m (310.5 to 317.0 m) in hole BR-18-23, including 16.00 g/t gold over 2.0 m; and
- 4.13 g/t gold over 20.5 m (324.5 to 345.0 m) in hole BR-18-23, including 9.93 g/t gold over 7.5 m and 79.34 g/t gold over 0.5 m.

Six of the drill holes (BR-18-35 to BR-18-40) targeted two specific areas of the BR Gold System as a potential site for a future underground bulk sample and to confirm the existing geological modelling in the area within, and adjacent to, an open pit outlined within the PEA.

The holes were drilled from surface to intersect several previously modelled zones of mineralization adjacent to existing underground exploration drifts. These holes were successful in confirming mineralization modelled from previous drilling as well as repeating observations of the geological setting as outlined in previous exploration efforts. Highlights of these six drill holes testing the planned bulk sample area include:

- 21.05 g/t gold over 11.5 metres (77.5 to 89.0 metres) in hole BR-18-37;
- 17.41 g/t gold over 7.5 metres (93.5 to 101.0 metres) in hole BR-18-39;
- 2.73 g/t gold over 15.0 metres (106.0 to 121.0 metres), including 9.30 g/t gold over 1.0 metres in hole BR-18-36;
- 23.74 g/t gold over 1.5 metres (104.0 to 105.5 metres) in hole BR-18-37; and
- 3.69 g/t gold over 9.0 metres (38.0 to 47.0 metres), including 32.09 g/t gold over 0.5 metres in hole BR-18-40.

Drilling completed by Anaconda in 2017 and 2018 has not been included as part of the current NI 43-101 Mineral Resource.

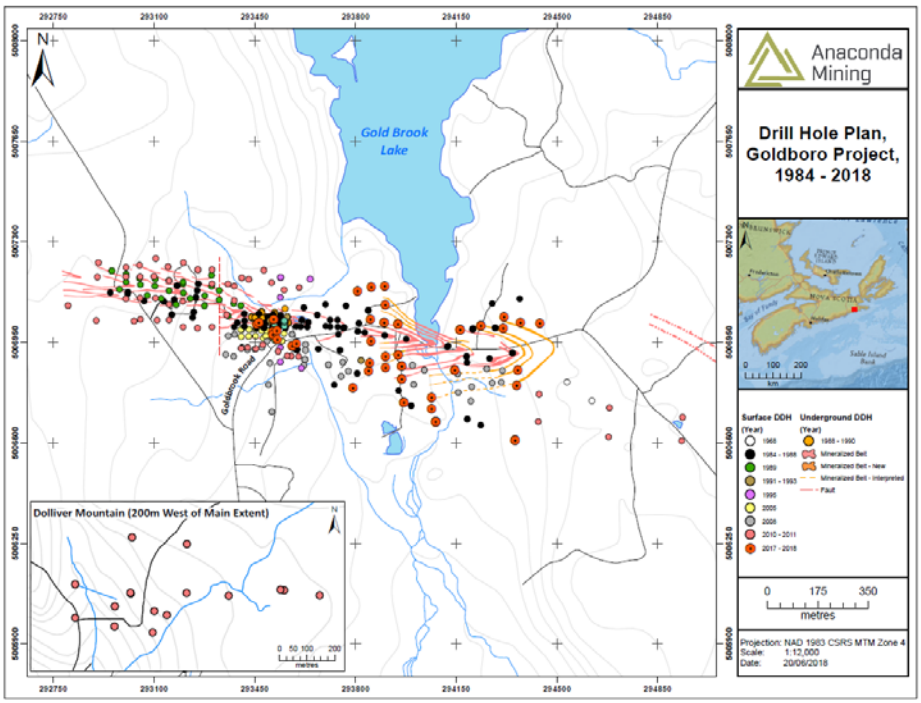


Figure 3-2: Drillhole Location Plan for 1984 – 2018 Programs

3.3.2.7 Metallurgical Test Work

The Goldboro Deposit is characterized by relatively abundant and coarse free gold and gold associated with sulphide minerals, predominantly arsenopyrite. Based on previous testing by other developers and a 2017 test program by Anaconda, Goldboro is a free-milling deposit which can be readily pre-concentrated by gravity concentration and flotation. The contained gold is amenable to leaching by cyanidation.

The 2017 bench-scale metallurgical test program assessed the extraction of gold from a single composite sample grading 3.44 g/t gold, 0.59% sulphide sulphur, and 1.02% arsenic. The composite metallurgical sample was collected from all assay samples greater than 0.5 g/t gold from drill holes BR-17-01 to 05. A total of 139 samples were used to create a 324 kg composite sample. At a grind size of 80% passing 110 micron, 46.4% to 62.1% of the gold was recovered to a gravity concentrate grading 4,255 to 4,587 g/t gold. Flotation of the gravity tailings produced a concentrate mass yield of 5.8% to 6.7%, grading 22.3 to 24.3 g/t gold. The combined gravity and flotation recovery of gold was 96.6% to 97.8%. The gravity concentrate was readily leachable using an intensive cyanide leach, with 99.5% extraction of gold over 48 hours. Cyanide leaching of the flotation concentrate resulted in 96.6% to 97.3% extraction of the contained gold within 48 hours, for regrind specification of 80% passing 18.1 and 12.8 microns, respectively. The overall flowsheet tested, including gravity, flotation, flotation concentrate re-grind, cyanide leach of the flotation concentrate, and intensive cyanide leaching of the gravity concentrate, was 95.1% to 95.3%.

Two process strategies were considered for this study. Base case scenario, based on a gravity-flotation concentrator at Goldboro with delivery of concentrate to the existing Pine Cove facility for leaching and gold recovery, and Scenario 3 where the resource material is shipped for complete processing at Pine Cove during a start-up period before transitioning to building and operating a new gravity-flotation concentrator at Goldboro as in Base Case. Different tonnage rates were chosen for these scenarios to observe the effect scaling the operation would have on the financial feasibility. These are further detailed in Section 3.1.3.

The concentrator at Goldboro would include two-stage crushing, single-stage ball milling, centrifugal gravity separation, and flotation. The concentrates would be thickened and filtered to facilitate transportation to Pine Cove. The existing Pine Cove facility includes crushing, grinding, flotation, concentrate regrind, cyanide leach of concentrate, leach slurry filtration, Merrill Crowe gold precipitation, and cyanide destruction. At Pine Cove, a gravity circuit would be added only for the start-up period of Scenario 3 when complete processing takes place at Pine Cove. Otherwise, the Pine Cove modifications include equipment to feed the flotation concentrate to the existing regrind and cyanide leach, and additional tailings treatment equipment for arsenic removal. The gravity concentrate would be refined at Pine Cove in the existing furnace currently in use for gold recovered from the Merrill Crowe operation.

Based on the 2017 bench scale test recoveries for gravity, flotation and cyanidation, and typical Pine Cove gold recoveries downstream of the cyanide leach, the study has been based on the following overall gold recoveries from Goldboro: 93.6% with a Goldboro concentrator feeding Pine Cove, and 92.7% if no concentrator is built at Goldboro and all processing is at Pine Cove.

3.3.2.8 Acid Rock Drainage Test Work

Two rounds (Round 1 and Round 2) of sampling and static testing for metal leaching and acid rock drainage (ML/ARD) have been completed for the Project (GEMTEC, 2018). Sample selection for both Round 1 and Round 2 laboratory testing was initiated by Anaconda based on exploration and mine planning information for the Project. The testing was carried out by RPC from Fredericton, New Brunswick. GEMTEC was hired to conduct ML/ARD characterization of the samples to aid in project permitting and planning. Samples were selected for the initial round of static testing (Round 1) to provide an overall characterization of ML/ARD potential in ore and waste rock material across the mineralized belts of the Property. Samples were selected for the second round of static testing (Round 2) based on the results of the initial round and focused on providing more data on the major lithological units and the various mine components of the project (i.e., tailings, waste rock, and pit walls), as well as improving spatial and volumetric representation within the pit.

In total 42 samples were collected for the Project for ML/ARD laboratory testing. The testing and results are further described in Section 6.1.2.

3.3.3 Reasons Decreasing Likelihood of Negative Impacts due to the Project

No significant negative impacts are anticipated for the following reasons:

- The development area appears to contain no unique or unduly sensitive environmental elements.
- The area has been impacted by previous mining activity around the turn of the century.
- The concentrator will only produce gravity and flotation concentrate which will then be transported to Newfoundland for gold recovery. Cyanidation will be applied at the Point Rousse facility to only about 6 % of the mill feed. Cyanide levels in this waste stream will be treated in the mill using the proven SO2-Air process prior to mixing with the larger volume flotation circuit wastes and mine water from Point Rousse ores. The levels on cyanide discharged to the environment (tailings disposal facility) will, therefore, be very low and reliably controlled. Arsenic levels in the tailings stream will be treated in the mill with the addition of ferric-sulfate prior to discharging into the tailings facility and mixing with the other tailings.
- Tailings from the Project are deemed uncertain with respect to acid generating potential. However, the flotation concentrate will be shipped to Newfoundland for processing and the tailings from it mixed with those from other non-acid generating ores, significantly decreasing its ability to produce any acid. Point Rousse ores are non-acid generating and with the current plan to submerge all tailings in an in-pit tailings facility with a permanent water cover to prevent oxidation and thus acid generation. Goldboro gravity and flotation tailings would not have a major impact on the environment other than physical inundating of the disposal area (35 hectares) upon reclamation and closure of the Site.
- Potentially contaminated surface water would be treated in constructed settling ponds which also provide the means to control accidental spills of oil or fuel in the mill area.
- Anaconda does not plan to disturb any of the historic tailings areas.
- The water quality sampled from the underground workings is better than samples taken from surface areas including wetlands, Gold Brook Lake, or Gold Brook.
- The old Boston Richardson mine is unlikely to have any further significant impact upon groundwater quality in terms of influencing wells within the community of Goldboro based on the hydrology study completed by WSP in late 2017/early 2018.

- Potential impacts upon the populace such as increased levels of airborne dust and noise are expected to be minimal due to the relatively isolated location of the Project.
- Anaconda proposes that existing local labour be used and does not anticipate the need for camp facilities on the Site. This will maximize benefits to the community and reduce potential social problems.

3.3.4 Consideration of Alternatives

Gold recovery is based on pre-concentrating the Goldboro ore on the Site, shipping the concentrate to the Point Rousse processing facility in Newfoundland, and using the existing gold doré (bullion) production capabilities at the Pine Cove facility. The Base Case process option along with three Alternate Scenarios were assessed. Different mining methods, mining and processing rates, and tailings pond locations (Figure 3-3) were evaluated. The preferred tailings storage facility location is in the area that has been impacted by historic mining and drainage from historic tailings. Construction of the tailings storage facility will also improve on water drainage quality from the two most western historic tailings storage areas (refer to Figure 3-1, Figure 3-3).

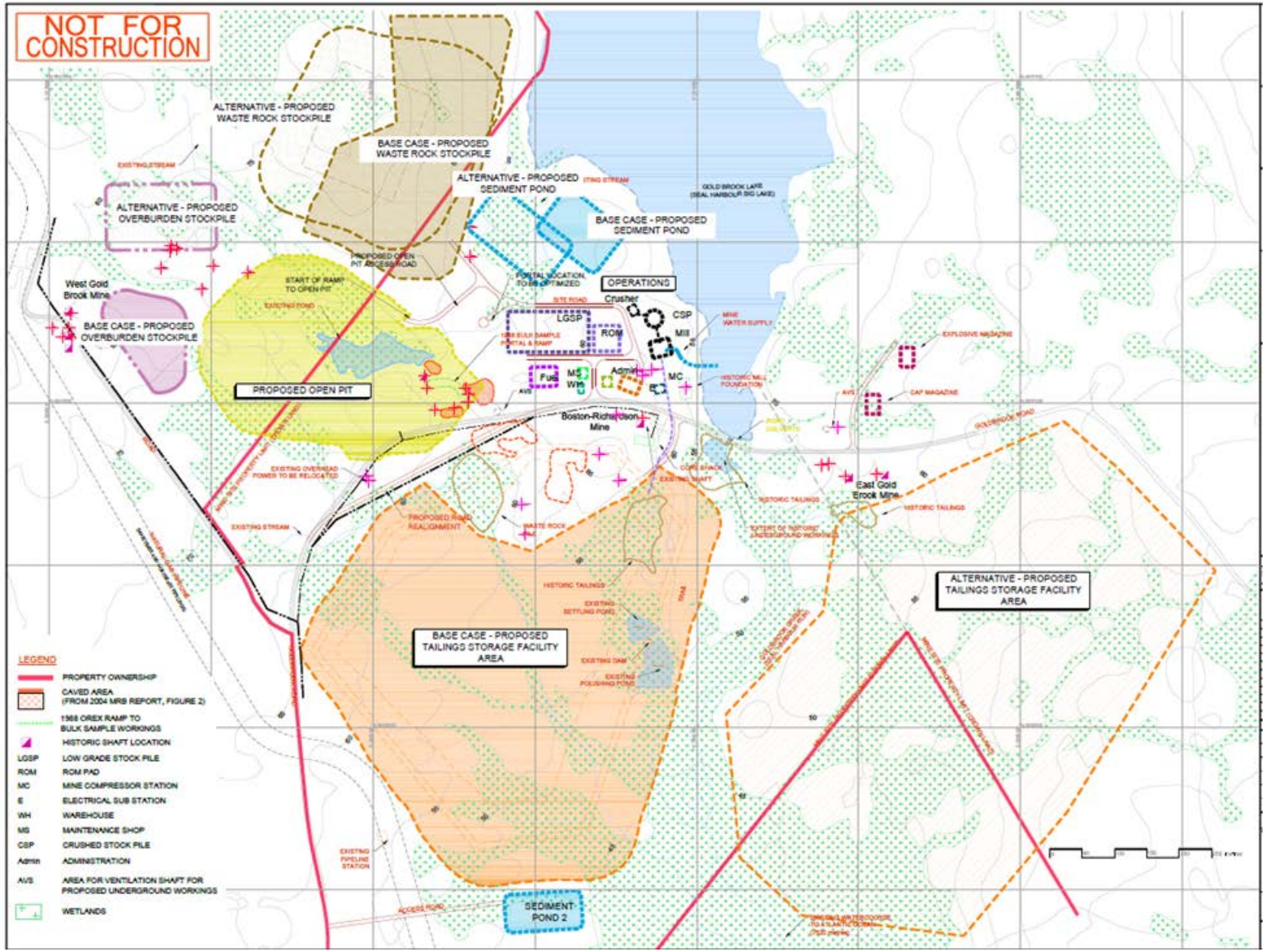


Figure 3-3: Preliminary Goldboro site plan showing alternate locations for the tailings storage facility

The optimal waste dump location was chosen based on minimizing impact upon the surrounding wetlands. Location 1 was optimized from original proposed location in PEA. Optimization was carried out for the overburden stockpile area as well as the collection and sedimentation ponds. The concentrator location was chosen so it was on historical development sites but away from sites of possible archeological value. The concentrator location was also chosen so that it was not too close to the open pit and accompanying blasting. Information from the baseline work completed in 2017 and early 2018 was used to optimize the proposed site features.

The development and recovery methods for the base case and alternative scenarios are summarized as follows:

3.3.4.1 Base Case

Construct and operate a 575 dry tpd gravity-flotation concentrator in Goldboro and ship the concentrate product to the existing Pine Cove processing facility for leaching and recovery of gold. Modifications made at the Pine Cove facility for additional tailings treatment requirements.

3.3.4.2 Alternative Scenario 1

An underground production scenario but at a process capacity of 800 dry tpd. This option was deemed not feasible as processing the Measured and Indicated mineral resources would create a very short mine life (three years) that would be difficult to finance due to its long payback period. Hiring and retaining personnel for short lived projects has been proven difficult as well. An underground-only mine development scenario would create a shortage of the waste rock needed for construction of the tailings storage facility as well as the surface roads. Rock would need to be sourced from other locations or a quarry would need to be opened in the area. All of this would negatively impact the project operating costs.

3.3.4.3 Alternative Scenario 2

Same as Alternative Scenario 1 but at a process capacity of 575 dry tpd. Creates the same challenges as Alternative Scenario 1 during its projected less than five years mine life.

3.3.4.4 Alternative Scenario 3

Process rate of 575 dry tpd, initially shipping crushed whole ore mill feed from the open pit to Pine Cove in Newfoundland for processing. The modifications to the existing Pine Cove mill will include the addition of a gravity gold recovery circuit and tailings treatment as required for the Goldboro feedstock. A 575 tpd gravity-flotation concentrator will be constructed at Goldboro to process the underground ore and concentrates will be shipped to Pine Cove for leaching and recovery of gold. This scenario was not adopted due to the risks of interruptions in the feed to the processing facility because of the short shipping season when barges are used. Also, the economics of this scenario were not as favourable as Base Case. When the entire feed (rather than concentrate) is shipped to Pine Cove during Alternative Scenario 3, the Pine Cove facility still has additional capacity to treat additional feedstock from the area at 680 dry tpd for a total of 1,280 dry tpd. Similarly, when only concentrates are shipped from Goldboro to Pine Cove in all other scenarios, the concentrates enter the process only from cyanide leaching onwards. Therefore, the

full capacity of the Pine Cove concentrator at 1,280 dry tpd is available for other feedstock with sufficient available residence time in cyanide leaching for the additional Goldboro concentrate.

3.3.4.5 Alternative Scenario 4

Same as Base case except for processing (throughput increased to 800 dry tpd). This, as any other 800 dry tpd scenario, would amount to amine life of three and a half to five years which are difficult to finance and advance toward production. Also, this scenario calls for starting underground development in year 1 of the production which would require higher capital investment at the project start-up than the base scenario.

3.3.4.6 Selection

The base case was chosen due to it being the most economically attractive, as well as removing the concern of Potential Acid Generating ("PAG") tailings being necessary to be stored in a tailings storage facility on the Site. Instead, the tailings will be housed in the approved Pine Cove Pit tailings storage facility, lessening the potential environmental impact of storing PAG tailings in an engineered tailings storage facility due to its water coverage and comingling of the tailings with NAG ores from Point Rousse project.

The Base Case mine plan used in the PEA shows a nine year mine life at a processing rate of 575 tpd. During this preliminary assessment, Inferred Mineral Resources were included which makes up 27% of the total mined tonnes. Anaconda is preparing to start a feasibility study which will only include Measured and Inferred Mineral Resources for mine planning. The current Measured and Indicated Mineral Resources will be sufficient for nine years of the mine life which will allow for investment pay back and generating positive returns within 3.6 years from the start of the production. All 2017/2018 exploration drilling in East Goldbrook suggests that the ore zones are thinner than previously modeled but do carry out very high grades making lower mining rates with decreased mining dilution possible, delivering a higher grade, lower tonne product to the mill. Drilling in the Boston-Richardson area has outlined more mineralization deeper around 500 meters of depth which would require more equipment and longer hauls to maintain the production rates. A production rate of 575 tpd is more suited to high grade narrow vein deposits making those more likely to achieve the projected project economics. This mining rate is chosen to avoid undue pressure upon the mine to produce up to an overambitious prescribed mill throughput rate. The base case calls for beginning the underground development in year 2 when the open pit operation has been established and positive project cash flow generated. This will help with financing the underground development.

3.4 Scope of the Environmental Assessment

This document serves to provide information required to provide Nova Scotia Environment for the basis of approving the Goldboro open pit and underground gold mine project in the Municipality of Guysborough, Nova Scotia. The Nova Scotia Government's "A Proponent's Guide to Environmental Assessment" and "Guide to Preparing an EA Document for Mining Developments in Nova Scotia" were consulted in the writing of this document.

Anaconda has participated in "One Window Meeting", organized by Nova Scotia Department of the Natural Resources, on May 5th, 2017 where a general outline of the permitting and approval process was

presented to Anaconda. The Company also had an opportunity to meet representatives from both NSE and NSDNR. As per direction provided, Anaconda has done the required work during the spring, summer and fall of 2017 and winter of 2018 that will provide the basis for an EA document.

In preparation for the EA registration, Anaconda has completed baseline environmental work at the Property during spring and summer of 2017 with a winter moose survey completed during the winter of 2017/2018. Hydrology and hydrogeology investigation was carried out in the fall of 2017 by WSP. Acid rock drainage (ARD) and metal leaching (ML) testing was completed during late 2017 and early 2018. An archeological study was completed during the summer/fall of 2017.

All baseline environmental conditions were considered in the construction of this EA, with specific regard towards sensitive ecological conditions whose change would be impactful of the local human and wildlife populations. These include atmospheric and climate conditions, local air quality, local noise levels, and quantities and species of wildlife that currently inhabit the Site.

Anaconda has also initiated both First Nations and local community outreach and engagement early in the spring of 2017. Archeological and MEKS were completed in summer/fall of 2017.

4 Public Involvement

Productive and open relationships with all stakeholders and rightsholders is a key component of Anaconda's corporate culture. Anaconda has opened opportunities for dialogue and engagement with representation from the Nova Scotia Mi'kmaq, the Municipality of the District of Guysborough, the business community, the Nova Scotia mining industry associations, and the public regarding the Project.

4.1 Methods of Involvement

Upon project acquisition in May 2017 Anaconda has placed early engagement with all stakeholders and rightsholders as a top priority. Anaconda has immediately opened opportunities for dialogue and engagement with representation from the Nova Scotia Mi'kmaq, the Municipality of the District of Guysborough, the business community, the Nova Scotia mining industry associations, and the public regarding the Project.

Presentations

Anaconda executives have made several presentations were since Project acquisition including:

- VP Innovations Allan Cramm, presentation to the Mining Society of Nova Scotia 130th AGM, June 2017
- President & CEO Dustin Angelo, presentation at Canso Superport days July 2017
- COO Gordana Slepcev, presentation to the Mining Society of Nova Scotia 131st, AGM in June 2018
- COO Gordana Slepcev, presentation to Canso Superport days July 2018

First Nations Engagement: Mi'kmaq of Nova Scotia

Anaconda Mining Inc. respectfully recognizes that the Mi'kmaq of Nova Scotia possess Aboriginal rights, including asserted Aboriginal title, and Treaty rights in relation to the lands and natural resources that may be affected by the Project. Anaconda also recognizes that the Mi'kmaq of Nova Scotia hold rights and responsibilities to respect and protect the lands, waters, fish, wildlife, habitat and other natural resources within their traditional territory, these rights and title being affirmed in the Constitution of Canada.

Anaconda is committed to the goal of sustainable development and strives to balance social, environmental and economic considerations in how it manages its business. Anaconda strives to engage openly and honestly with communities to address concerns and respect local laws, customs and culture.

Anaconda initiated engagement early in the development process to inform Mi'kmaq Chiefs of Nova Scotia and KMKNO about its proposal, to identify and understand the issues and concerns with respect to the proposed Project, and to establish a respectful relationship. Anaconda is committed to ensuring that KMKNO is actively engaged throughout the development of the Project.

To date First Nations engagement has been primarily with the Assembly of Mi'kmaq Chiefs and KMKNO on behalf the 11 participating Mi'kmaq communities in Nova Scotia, namely Acadia First Nation, Annapolis Valley First Nation, Bear River First Nation, Eskasoni First Nation, Glooscap First Nation, Membertou First Nation, Paq'tnkek First Nation, Pictou Landing First Nation, Potlotek First Nation, Waycobah First Nation, and Wagmatcook First Nation. Anaconda will also engage in information sharing and dialogue with the

communities of Millbrook First Nation and Sipekne'katik First Nation as well as other Mi'kmaq organizations.

Anaconda has participated in four meetings thus far with Chief Terry Paul who is the Co-Chair of the Assembly of Mi'kmaq Chiefs for Nova Scotia and is responsible for the Mining portfolio. These meetings included a combination of members of Anaconda's Senior Management team including President & CEO Dustin Angelo, COO Gordana Slepcev, VP Public Relations Lynn Hammond, VP Innovation Allan Cramm, and Goldboro Project Manager Iain Smart. Chief Terry Paul was accompanied by representatives of Mi'kmaq Rights Initiative (KMKNO) staff.

Anaconda also had a meeting on July 18, 2018 with Chief Paul James Prosper of Paqtnkek First Nation, as well as Director of Administration Darryl McDonald, and Director of Economic Development Rose Paul. The Goldboro Project Manager as well as the VP Public Relations from Anaconda were in attendance.

Ongoing dialogue and information sharing with the Association of Mi'kmaq Chiefs is maintained by VP Public Relations and Mi'kmaq Rights Initiative (KMKNO) staff. Information shared includes project information, news releases, company job descriptions, etc.

Anaconda commissioned a Mi'kmaq Ecological Knowledge Study (MEKS) by a company that follows the Protocol for completion of MEKS. Anaconda representatives including the VP Public Relations as well as the Goldboro Project Manager participated in the site visit component of the MEKS study to receive first-hand knowledge shared by a Mi'kmaq Elder from the nearest Mi'kmaq community of Paqtnkek.

During the meetings held with Chief Terry Paul and KMKNO staff raised the following issues:

- Protection of Aboriginal and Treaty Rights
- Request to Anaconda to contract a Mi'kmaq Ecological Knowledge Study (MEKS)
- Employment opportunities for Mi'kmaq people
- Ensuring opportunities for Mi'kmaq companies to compete for work
- Training and skills development for Mi'kmaq people to be eligible for jobs
- Financial Benefits for Nova Scotia Mi'kmaq
- Archeological cooperation with KMKNO
- Environmental monitoring, management and mitigation

On February 2nd, 2018, the information about the Project was presented to the Benefits Committee of the Assembly of Mi'kmaq Chiefs in Millbrook by VP Public Relations and Goldboro Project Manager.

Anaconda President & CEO Dustin Angelo met with Chief Terry Paul on March 8th, 2017 and have agreed to the establishment of a Memorandum of Understanding (MOU) with the goal of establishing a Mutual Benefits Agreement (MBA). A draft MOU has been initiated and the parties aim to sign the MOU document in the near future.

It is anticipated that Anaconda Mining and KMKNO on behalf of the Association of Mi'kmaq Chiefs and the Mi'kmaq people of Nova Scotia, based on equality, reciprocity and mutual benefit, cooperate with each other with respect to the Goldboro Project and make reasonable, good faith efforts to discuss and enter into a Mutual Benefits Agreement to facilitate meaningful Mi'kmaq participation in the Project.

Anaconda has extended an open invitation for Chief Terry Paul and KMKNO representatives to visit Anaconda's Point Rousse Project in Baie Verte, Newfoundland and Labrador.

Based on discussions between Anaconda and Mi'kmaq that the engagement process will continue to facilitate open dialogue on matters related to Mi'kmaq interest regarding environment and economic development.

Municipal Government

A positive relationship has been established with the Municipality of the District of Guysborough (MODG). In July of 2017 Anaconda Senior Management including the President & CEO, the COO, the VP Public Relations, and the Goldboro Project Manager attended a meeting with the full MODG council to provide information about the Company and the Project. The Company actively shares new information and engages regularly with MODG Council and staff.

The Company provides a full-page update on the Project for insertion in the MODG quarterly newsletter which was delivered to every household in the municipality. The Company will to continue work with MODG to provide the public with a quarterly update in this newsletter.

Local Goldboro Community

A meeting was held between Anaconda Senior Management representatives and the Goldboro Economic Development Committee who also maintain responsibility for the community wharf. Relationships have also been developed between Anaconda management and staff with members of the Goldboro community.

Community Liaison Committee

As required by Nova Scotia Environment, a Community Liaison Committee ("CLC") has been established to ensure information sharing with the community. The goal of the CLC is to maintain good public relations, foster environmental stewardship, and act as a vehicle for transparent and ongoing communications between community, stakeholders and rightsholders, and the Company on matters pertaining to current and planned development. This CLC was formed using the guidance document developed by NSE.

Open House

Anaconda, working with the CLC, hosted an open house in Goldboro for the public on February 27th, 2018. Advertising of the meeting time and location was circulated in the MODG Newsletter, in the local newspaper Guysborough Journal and website, as well as social media including Facebook© and Twitter©. Approximately 90 people attended the open house over a period of four hours. During this time Anaconda presented its current plans to develop this project for feedback from the community.

Media and Press Releases

Anaconda distributes press releases via Canada News Wire Services, news releases posted on SEDAR, and direct email to members of local media.

Website, Email and other digital Media

Anaconda launched a new and comprehensive web site in January 2018. It maintains historical news releases and publications as well as the most recent information regarding ongoing projects. As of March 2018, the website is available in both English and French.

Anaconda maintains an email database where any member of the public can sign up to receive news releases at the same time as public release. Anaconda Mining also has a community email list for Goldboro to share information that may not be circulated on the newswire.

Anaconda maintains active social media accounts on Facebook, Twitter, and LinkedIn.

Additional Communication Methods

The Company regularly participates in media interviews in Nova Scotia to provide updates on the Project. In November and December of 2017 weekly advertising was placed in the Guysborough Journal, the local print, and online publication, including direct contact information for the Anaconda VP Public Relations.

Anaconda will build upon these engagement activities as the Project advances.

4.2 Public Comments

4.2.1 Concerns from the Open House

During the open house residents from the community expressed a mainly positive attitude towards development of the Project with some minor reservations and questions.

The following are public comments and questions raised at the February of 2018 Open House along with responses from Anaconda.

Will there be any impact on household well water in the community? What will the Company do to ensure the quality of household well water?

Anaconda has conducted hydrology and hydrogeology studies in the surrounding area of the Project. According to the results, we do not anticipate any impact upon household well water. However, we will be conducting baseline studies of household well water to identify current quality levels. We will also maintain a regular testing program with homeowners to monitor for any changes in water quality or composition. NSE would have Conditions related to water quality testing in any EA Approval issued.

Historic gold operations in the region left contaminated tailings including arsenic in tailings. What is your plan for tailings?

The area of the previous mine tailings from 100 years ago is currently contaminated. This pre-existing pollution is not Anaconda's legal responsibility.

It is Anaconda's responsibility to act in an environmentally sustainable way and remediate the site at the end of the Project so that it is equal to or better than it is today.

New tailings produced at Goldboro will be finely crushed rock with gold and other elements removed. A tailings storage facility area will be created for the duration of the Project. This will later be addressed in the environmental reclamation of the area.

Anaconda will ensure that there are no long-lasting environmental effects due to the work performed on the site, as well as mitigate any currently contaminated areas in which the company deems it necessary to perform work for the operation of the Project.

When Anaconda is finished working in Goldboro, the area will be in better environmental condition than it is right now. That is our commitment.

Should residents be concerned about environmental arsenic contamination?
Anaconda will be creating a concentrate at Goldboro that will be shipped to our Point Rousse facility in Newfoundland for further processing and the pouring of gold doré bars. Arsenic is naturally found in the geology in this area, so the concentrate will contain gold, arsenic, and other elements. Anaconda has a proven process to remove the arsenic at our plant in Newfoundland before water and tailings are released into the environment.

Anaconda will comply with all legislation relative to mine water quality discharges.

What is stopping Anaconda from taking the gold out of the ground and walking away/leaving an environmental mess?
All mining companies, Anaconda included, are required to submit an environmental reclamation plan at the beginning of the Project. With that comes a financial bond that is determined by the provincial government and held with them to ensure that adequate funds are in place to ensure that environmental remediation takes place.

Anaconda has a solid reputation for environmental stewardship at our current operations in Newfoundland and we will extend the same commitment in Nova Scotia.

What can we expect in terms of noise pollution? What will the company do to mitigate against noise pollution?
There will be some noise during the work day while the open pit is in operation for the first three years until we transition to underground mining methods. However, there are engineering designs being considered to reduce noise as much as possible. There will be no drilling and blasting during the night time hours. It is not expected that drilling should create noise that will be noticed in the town.

Blasting activities will be scarcely heard in the town and as the pit is developed and increases in depth, the audibility of blasts will decrease. A berm will be constructed around the rim of the pit to aid in containing noise.

Anaconda is also committed to holding further town hall meetings and information sessions to explain the blasting process so all those involved are comfortable with the activity.

Anaconda will be conducting additional sound testing during the summer of 2018.

What can we expect in terms of lights at night? Will it be noticeable or disruptive to homes nearby?
Lighting on the Site will primarily be for security purposes at night around the major mine facilities. Lights will be placed to ensure this goal is met while not being a nuisance to nearby homeowners. NSE would have conditions related to light level monitoring in any EA Approval issued and Anaconda will abide by those conditions.

What will be done to protect the foundations of nearby homes from blasting activities?
In discussions with the blasting contractor, it is of our opinion that the likelihood of blasting damage to houses is extremely unlikely. In discussions with the town, provincial agencies, and our contractors, Anaconda has committed to performing the required due diligence to ensure that houses in a determined proximity are assessed to ensure that if there is damage, the proper avenues will be called upon to deal with the claims as needed. This will include baseline studies of the homes closest to the Site.
Under no circumstance will blasting be performed in a manner that will damage the property of those living in the community of Goldboro. Anaconda is confident that the Project can be operated in a manner that does not result in property damage.

Local roads are already in very bad condition. What kind of trucking will be involved? Will it further damage the roads, what can the company do about that?
There will be large trucks operating on the Site but except during the bulk sample in the summer of 2018, there will be no large equipment operating outside of the Site. For the transport of the concentrate to Newfoundland, trucks will leave from site and travel to Sydney, Cape Breton to board the ferry. The rate of trucks leaving the Site is estimated to be approximately one per day, or five to seven per week. This will have minimal impact upon the local highways. Community roads fall within the responsibility of the provincial and municipal governments. The gravel section of Goldbrook road will be maintained by Anaconda.

Will the company be using the dock? Will the company be doing any upgrades to the dock?
No, Anaconda does not plan to use the dock as the method of ore transportation to Newfoundland. Use of the dock was considered for shipping whole ore but shipping concentrate via tanker truck was chosen instead.

The current mine plan foresees the construction of a concentrator at the Goldboro Site with a gold concentrate to be trucked to Newfoundland on the ferry from North Sydney. This was determined to be the more economical option in our Preliminary Economic Assessment.

The dock may be used for the bulk sample however this is an isolated circumstance.

What kind and how many jobs will be available?
Anaconda anticipates there will up to 200 jobs at peak production. These positions will vary from engineers, geologists, administration, heavy equipment, mining, security, labour etc.
We are not yet hiring for these positions.

Will local people be considered first for jobs?
At Anaconda our experience is that it is good for the community and good for the company to hire local. For example, most of our workforce in Newfoundland lives within a 30-minute drive of the Point Rousse Site. However, we must also balance that with ensuring that we hire people with the necessary skills and experience to efficiently and safely do the work, which often is very specialized.

Will there be a work camp? If not, where will workers live?
It is not our preference to establish a work camp. Ideally entrepreneurs in the area will see housing as an economic opportunity. There is also potential for bus services from areas like Antigonish. Details like this will be determined as we get closer to the start of the Project.

Will you be shipping out whole ore or is the company going to build a mill here?
Anaconda is planning an underground bulk sample in the summer of 2018. For the bulk sample, less than 1% of the total ore at the site, the unprocessed ore will be shipped via barge from Goldboro to the Point Rousse Project in Newfoundland. It is anticipated that this is the only time that unprocessed ore will be shipped from Goldboro.

In the long term, Anaconda plans to build a concentrator at the Site. Gold and other elements will be converted into a concentrate and transported to Newfoundland for final processing.

What is the remediation plan for the open pit? Will it be filled in?
The open pit will only be in operation for three years, so it will be relatively small. It is intended that there will be grading along the perimeter of the pit and once exhausted will become a pond. This will be further outlined in the Site remediation plan.

Will residents able to continue to use Goldbrook Road that goes through the site?
Anaconda recognizes that the community uses this road for recreational purposes. As with any mining operation there will be security measures established to ensure safety of employees, contractors and the public.

There may be times when the road will be temporarily closed for safety purposes, however the company will aim to maintain public accessibility as much as possible.

Will the company engage the local fire department as first responders?
Yes. Anaconda Mining maintains emergency response plans that include local first responders. We will also work with first responders to ensure that they have the equipment and training that they need to provide us with assistance.

Have there been considerations of the LNG pipelines proximity to the mine? It that safe?
Yes. Anaconda has considered the pipeline in our vicinity and it has factored into our mine design process. Currently the designs involve staying a safe distance away from the pipeline on surface and ensuring that any underground mining done in the area does not compromise ground stability underneath the pipeline.

4.2.2 Concerns from Aboriginal Peoples in the Region

As discussed in Section 6.3, Anaconda has met numerous times with Mi'kmaq representatives to identify the concerns of Mi'kmaq communities about potential environmental effects of the Project and to promote First Nation involvement in the Project. No environmental concerns were brought up during the MEKS or other conversations with the local Mi'kmaq. During reclamation of the Project, Mi'kmaq will be consulted as to the final state of the Site and any potential wetland compensation areas. The following topics were discussed and will continue to be discussed as a Mutual Benefits Agreement is established.

Topic Protection of Aboriginal and Treaty Rights

Response Anaconda Mining Inc. respectfully recognizes that the Mi'kmaq of Nova Scotia possess Aboriginal rights, including asserted Aboriginal title, and Treaty rights in relation to the lands and natural resources that may be affected by the Goldboro Project (the "Project"). We also recognize that the Mi'kmaq of Nova Scotia hold rights and responsibilities to respect and protect the lands, waters, fish, wildlife, habitat and other natural resources within their traditional territory, these rights and title being affirmed in the Constitution of Canada.

Topic Request to Anaconda to contract a Mi'kmaq Ecological Knowledge Study (MEKS)

Response A Mi'kmaq Ecological Knowledge Study, also commonly referred to as a MEKS or a Traditional Ecological Knowledge Study (TEKS), was developed by Membertou Geomatics Solutions (MGS) for Anaconda Mining Inc. with regards to the proposed Goldboro Project located in Goldboro, Nova Scotia.

The MEKS mandate was to consider land and water areas in which the proposed properties contained within the proposed project area are located and to identify what Mi'kmaq traditional use activities have occurred, or are currently occurring within, and what Mi'kmaq ecological knowledge presently exists in regards to the area.

Topic Employment opportunities for Mi'kmaq people

Response At Anaconda, our experience is that it is good for the community and good for the company to hire as local as possible. For example, most of our workforce in Newfoundland lives within a 30-minute drive of the Site. However, we must also balance our preference to hire local with ensuring that we hire people with the necessary skills and experience to safely and efficiently do the work which is often very specialized.
Anaconda has already initiated conversations with contractors regarding efforts to seek Mi'kmaq applicants for positions as they are posted.
Anaconda has also provided KMKNO with the current position descriptions for employees at the Newfoundland Point Rousse Project so they can see the type of skills that may be required at the Goldboro Project.

Topic Ensuring opportunities for Mi'kmaq companies to compete for work

Response Anaconda has committed to ensure Mi'kmaq companies are considered in the contracting and purchasing process. Anaconda has been working directly with KMKNO to identify Mi'kmaq companies that provide services such as construction, heavy equipment, personal protective equipment, security, delivery services etc.

Topic Training and skills development for Mi'kmaq people to be eligible for jobs

Response Anaconda has a strong relationship with the College of the North Atlantic and Memorial University in Newfoundland and would like to replicate those relationships in Nova Scotia. Anaconda and KMKNO have briefly discussed ideas and this will be further discussed during the Mutual Benefits Agreement process.

Topic Financial Benefits for Nova Scotia Mi'kmaq

Response The issue of financial benefits was briefly discussed. It will be considered as part of discussions toward a mutual benefits agreement.

Topic Archeological cooperation with KMKNO

Response Mutual sharing of historical and archeological data is ongoing.

Topic Environmental monitoring, management and mitigation

Response Anaconda has completed ecological baseline studies, an archaeological assessment and a MEKS study as part of the Environmental Assessment process as well as hydrology and hydrogeology work.

Anaconda has identified that some wetlands that may be impacted by project development. Chief Terry Paul has specified that Mi'kmaq would have an interest in working together to identify compensation locations that would create benefit to local communities.

Anaconda has committed to there being no long-lasting negative environmental effects due to the work Anaconda performs on the site. As well, Anaconda will mitigate any currently contaminated areas in which the company deems it necessary to perform work for the operation or construction of the Project.

4.3 Steps taken to Address Public Concerns

The open house was an opportunity for the company to learn about concerns within the community. Anaconda representatives including the Chief Operating Officer, VP Public Relations and Goldboro Project Manager answered as many questions as possible.

A Questions & Answers document was prepared and shared with the Community Liaison Committee.

We will seek their guidance regarding any additional information to add to the document and then distribute it more broadly within the community.

5 Description of the Undertaking

5.1 Geographical Location

The proposed Site will be located approximately 2 km northeast of the community of Goldboro in Guysborough County on the eastern shore of Nova Scotia, approximately 180 km north east of Halifax (Figure 2-1). It is located at 5007200 m north, 606900 m east (UTM Zone 20 NAD83). The ground surface at the Site is gently rolling with an elevation ranging from 65 to 80 m above sea level.

Access to the Site is via gravel roads from Highway 316 which pass through the Site. An existing portal is located north of the gravel road. A mine shaft (Boston-Richardson Mine) is located on the south side of the road which also accesses the southern tip of Gold Brook Lake, immediately east of the mine shaft.

Residential dwellings are present along the gravel road to the Site. A cemetery is located on the east side of the road, approximately 1.5 km south of the Site. The area is moderately to heavily forested.

5.2 Physical Components

The Property is crossed in a northwesterly fashion by the Maritimes and Northeast natural gas pipeline ("M&NP"). Although the location of the pipeline does not jeopardize future underground operations, it is being considered in mine planning studies, particularly those related to assessment of open pit and underground development potential. Anaconda has opened conversation with M&NP discussing its development plans and working on determining safe setbacks for open pit and underground operations. M&NP has shared that minimal open pit blasting distances should be kept at 500 feet from the pipeline. Geotechnical engineers in cooperation with M&NP have determined the required crown pillar size below the pipeline. Those distances have been incorporated into the mine plan. Further discussion will be ongoing during the feasibility and project planning stages.

The Site building currently has power and 3-phase industrial power does exist near the Site. Sufficient undeveloped lands exist adjacent to the Site to support potential tailings storage areas, potential waste disposal areas, waste rock pads, and potential sites for a processing plant.

The Gold Brook Lake and Gold Brook drainage system crosses the Property and other streams of lesser size are also present. Hydrology and hydrogeology studies completed by WSP show that sources of surface and/or groundwater are sufficient to meet the potential future plant water requirements on the Property.

Geotechnical investigation that has formed a base for waste dump and underground and open pit design was conducted in the summer/fall of 2017. Site soil and foundation studies must be completed to determine the optimum locations for waste rock, tailings disposal, plant site location, and other infrastructure. The major infrastructure items include the mill facility, tailings storage facility, maintenance and warehouse facilities, administration offices, waste rock and mineralized rock stockpiles. Figure 5-4 illustrates the preliminary site plan.

The main permanent infrastructures will include area requirements for the manipulation of the mineralized material and waste. These include access, site and hauling roads, mineralized material and waste pads.

Surface infrastructures will include buildings (office, dry, garage, warehouse, fuel storage, explosive storage, and gate) as well as the infrastructure for the mine such as main ventilation fans and compressors.

Water management infrastructure will include fresh a water pumping station, water distribution network, dewatering pumps for the mine, settling ponds, and sewage system.

Electrical systems will include powerline from utility company, main substation, electrical distribution, telecommunications and security systems.

The following buildings and infrastructure are envisioned for the Project to support operations:

- Administration office;
- Maintenance workshop and warehouse;
- Process plant building and laboratory;
- Fuel storage;
- Explosive magazines;
- Tailings storage facility;
- Waste rock storage pads;
- Overburden storage pads;
- Access roads, stockpile pads;
- Underground portal, ventilation fans and compressors;
- Electrical system – main substation.

The locations of surface facilities have not been subjected to detailed studies. Geotechnical studies will be required to be completed to determine optimal locations for the various infrastructure items.

5.2.1 Existing Infrastructure

The only recoverable surface infrastructures on the Site are power lines and the Goldbrook Road (Figure 5-1), the access roads to the core shack and explosives storage (Figure 5-2), and the core shack itself. It was considered that all existing roads require partial clearing, minor granular refilling, culvert addition and/or repair, and levelling with a grader.

Figure 5-1: Goldbrook Road looking west showing end of powerline (WSP, 2018)

Figure 5-2: Access road from Goldbrook Road to the core shack (WSP, 2018)

5.2.2 Access

The Property is accessible via Goldbrook Road, a gravel covered road approximately 2.5 km from Goldboro, Nova Scotia. Goldboro is on Route 316, which is a provincial road along the southern shores of Nova Scotia and can be reached from the TransCanada highway via Highway 7. Access to the Site is shown in Figure 5-3.

Figure 5-3: Access to Goldboro mine site (WSP, 2018)

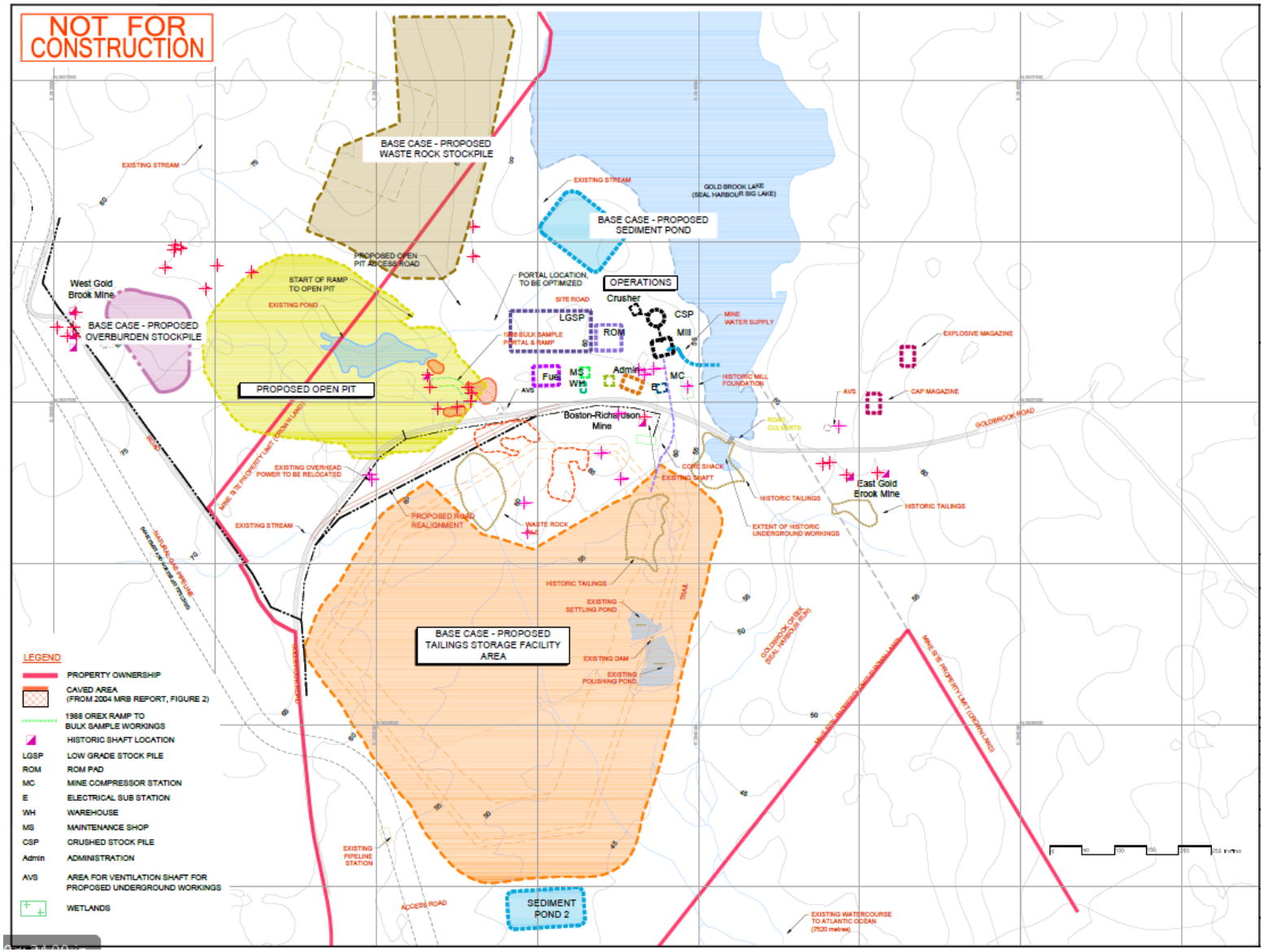


Figure 5-4: Goldboro preliminary site plan.

5.3 Construction and Operation Schedule

Site construction is expected to begin in 2020 upon completion of a feasibility study, mill design, and all of the required permitting is obtained. Pit development work including grubbing and stripping of the footprint and other pre-production work will begin in 2020. Following the commisioning of the mill in 2021, the project will move into full production. Underground development work will begin in the second year of pit production to allow the operation to ramp up and transition to full underground production once the pit is exhausted in 2023. Underground production is currently projected to last six years. Progressive reclamation efforts will be applied for the project with final decommisioning and reclamation expected to last for up to three years after the completion of underground mining. This sequencing is summarized in Figure 5-5.

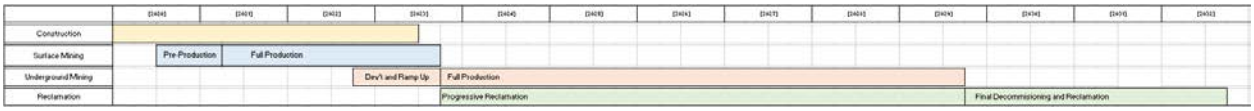


Figure 5-5: Proposed Construction and Operation Timeline

5.4 Site Preparation and Construction

5.4.1 Roads

The location of the new buildings and infrastructure areas were selected to maximize the use of the existing Goldbrook Road and other access roads on the Site. Goldbrook Road is the main access road and its current layout will intercept the proposed open pit and will therefore have to be realigned and offset at least 30 m from the open pit. Approximately 510 m of Goldbrook Road will require tree cutting, grading, and granular refilling. An estimated 1,200 m of site roads will also be required for access in and around the Site. Stripping work is also included for placement of the explosives storage buildings. Please refer to Mine Site General Arrangement Drawing (Figure 5-4).

5.4.2 General Site Work

General preparation of the Site includes tree cutting, topsoil removal and storage, excavation, backfill material, grating, drainage ditches, and finishing surfaces to provide slopes and collect surface water. The general site work covers roads, ore and waste pads, administration building, maintenance shop / warehouse and other surface infrastructures, as well as the crushing area and process plant area. Table 5-1 summarizes the different areas of ground necessary to be cleared for the different components of the Site infrastructure.

Table 5-1: Approximate necessary areas for different site infrastructure

Type of Site Infrastructure	Approximate Necessary Area (m^2)
Low-grade Ore Stockpile	7,800
ROM Stockpile	1,600
Open Pit	94,000
Tailings Storage Facility	297,000
Site Layout (buildings and laydown)	80,000

The planned sequencing for the Site construction activities is to begin clearing for the concentrator and tailings storage facility (TSF) first, (as these take the longest to construct) followed by clearing and grubbing of the pit and dump footprints. Once this is accomplished overburden stripping and waste mining can occur. The first waste extracted from the pit will likely be used as building materials for other, non-essential areas (secondary access roads, laydowns, pads, etc.) after which the waste mined will be used for building the consecutive lifts of the TSF. Open pit pre-stripping is envisioned to take about half a year, while TSF and concentrator construction would take approximately a year. Special consideration will be given to runoff and drainage control. All runoff from around construction areas will be collected and treated if required prior to release to the environment or reuse. Current mine plan outlines about 6,000 tonnes of ore that would be excavated during pre-stripping. This ore would be stockpiled at the ROM pad until the concentrator is commissioned.

5.4.3 Electrical and Communications

5.4.3.1 Electrical Power Supply and Distribution

A Nova Scotia Power 69 kV power line is already established on the Site. However, a section of this power line will have to be relocated with the road realignment for the proposed open pit mine. The power demand for the Site with the underground mine is estimated to be 7 MVA. To meet the anticipated electrical power needs of the Project, the installation of a single 7.5 MVA (10 MVA with one ventilation stage) electrical transformers (69 to 4.16 kV) feed from Nova Scotia Power 69 kV main power line is proposed. Discussions with Nova Scotia Power indicate that the energy would be possible to obtain to meet the mine load in addition of the existing infrastructures. Anaconda has been in contact with Nova Scotia Power since December 5th, 2017 and continues to work with them to find the best solution to obtaining the necessary power for the Project without removing resources from the current residential and commercial loading upon the system. Discussions are ongoing to determine how much augmentation to the existing system is necessary to satisfy the requirements of all the loading that will be upon the line in this area.

The transformer will be installed in the main electrical substation and will feed a 4.16 kV switchgear. This switchgear will distribute the power to the crusher building, the mill, to the underground distribution via the portal, and whatever other loads. Aerial lines on wooden poles will be used to distribute the power to the more remote loads such as the explosive storage buildings, the main ventilation fans for underground, and to the portal. The cables to the crusher, to the mill, and to the mine will be buried.

A single 4.16 kV to 600 V transformer is proposed to feed the loads near the electrical main substation. This transformer will feed a 600 V switchgear and the switchgear will feed the service loads and compressors. The 600 V distribution cables will be buried between the administration building, the maintenance shop, and the warehouse.

5.4.3.2 Communication System

The main network will be composed of fibre optic cables connecting the various buildings together. These include the administrative building, the garage, the mill, the gatehouse, the crushing plant, the explosive storage area, the blasting cap storage area, the water treatment plant, and pumping stations. Optical fibre cables will be installed on overhead wooden poles where there are electrical power lines, and buried where there are no overhead lines.

The server room in the administrative building will include two servers to handle the files, printers, emails, user accounts, etc., and one special server for the voice over IP (VoIP) phone system. A hardware firewall will also be used to protect the network from intrusions. The workers will mostly communicate using the cell phone system or portable radios. Forty radios and one repeater station are included to cover most of the Site.

A total amount of 40 local computer users and coverage for 40 cell phone users are estimated to be necessary for the Project.

5.4.4 Run-of-mine and Waste Pads

The run-of-mine (ROM) and waste pads will be prepared with waste material. This material has been tested as part of the ARD/ML study and designated as NAG (GEMTEC, 2018). The waste material will be applied as a 500 mm bottom layer of coarse material (+112 mm), and a 150 mm top layer of finer material (-112 mm). The ROM pads are divided into a low-grade stockpile (LGSP) of approximately 425,000 tonnes requiring an area of 7,800 m^2 and ROM stockpile of approximately 17,500 tonnes requiring an area of 1600 m^2.

5.4.5 Maintenance Shop and Warehouse Building

The maintenance shop and warehouse will be 20 m x 15 m and will be in proximity to the office and dry building along Goldbrook Road. The maintenance shop will use an area of approximately 13 m x 15 m, and the warehouse will use an area of approximately 7 m x 15 m. A laydown area of approximately 300 m^2 will be set up behind the maintenance shop and warehouse building.

The maintenance shop will include a washing bay and a maintenance bay. This maintenance shop will be equipped with minimum equipment to perform maintenance work.

5.4.6 Office and Dry Building

The office and dry building will require an area of approximately 15 m x 18 m and will be in proximity to the maintenance shop along Goldbrook Road. This building will be built with four prefabricated modules.

It will contain two modules for the dry and worker locker space, and two modules for offices, mechanical room, and a washroom.

The mine dry includes lockers, baskets, showers, washrooms and all other required services to accommodate the open pit and underground miners. This building will also have space and electrical capacity for the battery charging racks and a lamp repair room.

5.4.7 Gate

There would be tow gates installed to limit access to the Property. All gates will be remotely monitored and operated through camera and automation systems by security personnel. Cameras and automation devices for the gates will be housed in the same insulated 8 x 20 ft container as the instruments for the truck scale.

5.4.8 Fuel Storage and Station

Based on the estimated maximum fuel consumption in Year 2 the fuel station will require two horizontal, 5,000L tanks.

The mining fuel consumption considers all mining activities that require fuel such as drilling, blasting, loading, hauling, dozing, grading support, and maintenance.

The fuel station will be designed based on NFPA 30 requirements and will consist of two horizontal tanks within a containment area, a truck refuelling station, and light and heavy vehicles refuelling distributors.

Appropriate lighting, grounding, and control panels will be installed for a safe operation.

5.4.9 Earthworks

Most of the surface infrastructure will require earthworks. The earthworks requirements for each specific building are estimated and included with the other construction costs. However, there are many general areas such as the laydown area and parking that were also considered. The following is a list of these areas, with approximate dimensions:

- Parking (30 x 30 m);
- Underground ventilation pad (20 x 30 m);
- Exhaust raise pad and compressors (20 x 30 m);
- Run of mine pad (1,600 m^2);
- Low-grade stockpile (15,625 m^2);
- Waste pad (43,750 m^2).

Whenever appropriate, the granular backfill is to be made using waste material from the mining operation.

5.4.10 Fence

There will be a fence installed to control access at the Site entrance, electrical substation, and explosive storage areas.

5.4.11 Explosives Storage

There will be two magazines: a powder magazine and a cap magazine. Both will have electric heat and lighting. The necessary size and suitable locations for these two magazines will be determined prior to the submission of the Industrial Approval document, abiding by the Nova Scotia Blasting Regulations as well as the Canadian Federal Explosives Regulations regarding the quantity-distance requirements and construction parameters. The working plan for these magazines is to have them capable of housing enough explosives to maintain blasting requirements for the Project for a couple of weeks, with regular deliveries from a vendor replenishing explosive supplies as necessary.

5.4.12 Water Management

5.4.12.1 Fresh Water

Gold Brook Lake has been identified as a potential fresh water source. Based on the technical report completed to accompany the Application for Water Withdrawal for the 2018 Exploration Program, Gold Brook Lake is considered a feasible source for the water necessary for the Project (W. G. Shaw & Associated Ltd., 2018). In that report, it was stated that "the proportion of surface runoff (streamflow) to the south end of Goldbrook Lake taken by withdrawals for the drilling program would be approximately 1%". This drilling program was projected to use 160,000 litres per day (Lpd) which is greater than the projected operating usage of the Project once the initial water withdrawal occurs. Gold Brook Lake has also historically been the water source for past operations and has no observable negative impacts due to this in terms of a water deficit.

A pumping station and pipeline will be installed next to Gold Brook Lake, approximately 100 m from the process plant. The pumping station will be housed in an insulated container and will feed the fresh water storage tank. Fresh water will mostly be used as make-up water for the process plant (dilution, reagent preparation, and gland seal water) and for sanitation services and washrooms. Drinking water will be brought onto the Site as necessary.

5.4.12.2 Process Water

Most of the process water will be supplied by recycling the water extracted from the dewatering of the tailings. Make-up water from Gold Brook Lake will supplement the recycled water for the process plant as needed. As designed, effectively 100% of the process water will be recycled and recirculated back into the mill circuit. Discharge from the process water circuit will occur only when makeup water overcomes the water storage capacity within the concentrator.

5.4.12.3 Water Storage and Distribution Loop

The water storage tank will be in proximity to the process plant. From there the water will be distributed to the process plant, the office and dry, the garage and warehouse, and will have the possibility to feed the underground supply pumping station.

The equipment will be housed in an insulated container.

Water will be circulated in a loop. The pipeline will be buried in trench approximately 200 m long.

5.4.12.4 Potable Water

Considering the relatively small number of personnel at the Site, potable water will be distributed in bottles brought into the Site. The peak personnel requirements for the Project are estimated at 200 workers. Estimates of 15 gal/day/person if no showers are on the Site, 40 gal/day/person if showers are on the Site, and 80 gal/day/person if everything is on the Site (showers, laundry, meals, etc.), and assuming that all workers on the Site are utilizing the facilities to the maximum estimated amount, (80 gal/day/person) 16,000 gal/day is estimated to be necessary during the peak employment period of the Project (overlap between surface production and underground development). These estimates of necessary water quantities per day were obtained from GHD Consulting upon request.

5.4.12.5 Sewage System

A sewage system, including a 7,500 L septic tank and all the required piping and instrumentation is proposed to serve the maintenance shop, warehouse, office, and dry. There are currently existing sewage tanks from the previous Orex operation as described in Section 3.3.1. However, these are not correctly positioned as the mine layout is currently designed, so the final sewage tanks used for the Project will likely have to be installed from scratch. The location of these tanks will be determined once the Site plan is finalized for the Industrial Approval document.

5.4.12.6 Underground Water Supply

A pumping station is included to feed the underground mine. The pumping station will be housed in an insulated container. The location of the pumping station is to be determined but it is typically situated near the settling ponds.

5.4.12.7 Mine Dewatering

The mine water will be pumped from sumps within the open pit and underground workings to the settling ponds. Water will be partly re-used in underground operation to wash the face, wet freshly blasted muck piles, and within the drills. It will also be collected at surface as necessary for both surface and underground dust control applications, as well as a source of makeup water as necessary for the mill.

The testing performed upon the groundwater chemistry and overall quality is presented in the Hydrogeology Report prepared by WSP. Further testing of the groundwater inflow rate and quality will be performed prior to submission of the Industrial Approval document. A dewatering effluent monitoring plan will also be put in place which will dictate the contaminants that will be monitored for as well as the frequency and locations for this effluent quality testing.

5.4.12.8 Measuring Station (Final Effluent)

For the final discharge from the settling pond, a measuring station will be housed in the same container as the underground supply pumping station.

Any dewatering effluent will be treated as necessary according to any measured contaminants within it prior to discharge to the environment. The most likely source of contamination in this water will be suspended solids, which will be treated by the water spending the requisite retention time within the

settling ponds to pass water discharge standards. For regular discharge the Metal Mining Effluent Regulations (MMER) will be upheld, with special care taken regarding the mercury and arsenic levels.

5.4.13 Surface Infrastructure for Underground Mine

5.4.13.1 Ventilation Equipment

Two main fans will be required to feed air to the underground mine from the fresh air raise.

The installation will be two heavy-duty mine vane axial fans, each driven by a 100 hp electric motor pushing the air in the fresh air raise.

The fans will be installed in parallel and each will have half the flow capacity at maximum pressure. The fans will be horizontally mounted on a concrete slab and connected. Inlet cone, silencer, dampers, transitions pieces, and flexible connections will be included with each fan. An electrical room, a soft-starter, and a transformer will be installed to drive the mechanical equipment.

Fresh air will be heated with a propane mine air heater. Propane will be stored in a tank close to the fans.

Instrumentation will be installed in the fresh air raise to detect propane leakage, verify the flow of air and detect carbon monoxide.

A manual stench gas system will be installed in the fresh air raise to provide evacuation alarming when required for underground mine.

5.4.13.2 Compressors

A compressed air system will be required to support underground operations. The system will supply air to mining equipment and services. The system will be installed near the service raise. An aboveground piping system will supply air to the portal.

Average compressed air consumption will be 1,740 cfm with peak a consumption of 2,900 cfm. Two 1,740 cfm compressors, at 350 hp each, are included in this study. All the equipment will be mounted on modular skids to minimize on-site installation costs. To avoid a water loop, the compressors will be air cooled.

5.4.14 Tailings Storage Facility

Tailings management for the Project will consist of an on-land tailings storage facility (TSF). The mill feed identified for the Project is 2.4 M tonnes with the waste tailings directed to the TSF. The TSF will contain the tailings solids from the planned mine life and will also provide sufficient containment of operational water and stormwater management. The proposed location of the TSF is shown on Figure 5-4. The location of the TSF was selected based on the location of the existing and planned open pit, and proximal to the proposed plant site and considered the location of local water courses. The preferred TSF location is in the area that has been impacted by historic mining and drainage from historic tailings. Construction of the tailings will also improve on water drainage quality from the two most western historic tailings storage areas (refer to Figure 3-1, Figure 3-3).

Storage capacity requirements and corresponding perimeter embankment heights were developed based on the mill feed, identified above, as well as requirements for water management. Volume of tailings solids requiring storage within the TSF was developed based on a preliminary assigned in situ density of 1.3 t/m^3. The in-situ density of the tailings solids will be required to be confirmed and optimized with laboratory testing as the Project is advanced.

The layout of the TSF was established based on the local topography to optimize the embankment alignments while providing sufficient storage capacity for tailings solids, operational, and stormwater management. The dam will be constructed in stages to minimize initial capital costs. Embankment staging will consist of the initial starter dam, completed as part of pre-production, with an initial crest height at El. 59.0 m with two subsequent embankment raises to the final crest level at El. 67.5 m. Each embankment stage and corresponding crest height will be established to provide sufficient storage capacity for tailings solids, operational, and stormwater management.

Operational water management will consist of water from the plant site used to transport the tailings slurry to the TSF as well as annual precipitation. Stormwater management will consist of containment of an Environmental Design Storm (EDS) and to manage the Inflow Design Flood (IDF). An allowance will be provided to contain the volume of water resulting from the EDS within the facility above the maximum operating pond level. An emergency spillway will be established with invert above the pond level resulting from the EDS to provide containment. The emergency overflow spillway will have sufficient size to pass the peak flows resulting from the IDF. The presence of the emergency spillway will protect the dam from instability by ensuring that water does not overtop the embankment. An additional freeboard is provided above the peak flow depth in the spillway, during the occurrence of the IDF, to prevent water from overtopping the embankments resulting from wave run-up. The IDF for the facility will be established based on the dam classification from the Canadian Dam Association Dam Safety Guidelines. An emergency spillway will be included with each embankment stage.

The tailings basin area will be lined with a geomembrane to prevent seepage of water from the facility for environmental protection. The basin area will be prepared by clearing of all trees, stripping and grubbing, and site grading. A non-woven geotextile will be placed on the prepared foundation prior to placement of the liner to provide a protection layer and prevent damage to the liner. An underdrainage system will be established within the basin area to provide additional drainage for the tailings to increase the in situ settled density of the tailings. This will reduce the storage capacity requirements of the tailings solids. The underdrainage system will consist of a series of finger and collector drains that will collect and direct water to a collection point. The water will be pumped into the TSF and become part of the supernatant pond.

The embankment cross-section will consist of zoned earth fill with an upstream low-permeable liner to provide containment for water within the TSF. The liner will be placed on a bedding layer consisting of a fine-grained soil and non-woven geotextile to protect the liner from damage during installation and operations. The upstream side of the liner will be covered with a sand layer and riprap to protect the liner from potential damage from ice buildup. The upstream slope will be set at minimum 3H: 1V to facilitate installation and provide long-term liner stability. Graded filter and transition zones will be located adjacent to the liner and bedding layer that will be used to control potential seepage flows through the dam and maintain embankment stability by ensuring that the embankment fill does not become fully saturated.

The bulk fill for the downstream shell zone, adjacent to the graded filter/transition zones, will utilize local borrow material for the starter dam and mine waste rock for the subsequent raises once mine waste material becomes available. The current basic impoundment design is shown in Figure 5-6. Note the raised embankment, downstream centreline method of construction. The final design for the TSF will be included in the Industrial Approval document. The mine waste rock will consist of non-acid generating (NAG) material. The downstream slope for the starter dam has been assigned at 3H: 1V for the subsequent embankment raises at 2H: 1V. The downstream slope design will be confirmed as the Project is advanced based on-site investigation and assessment of the foundation strength.

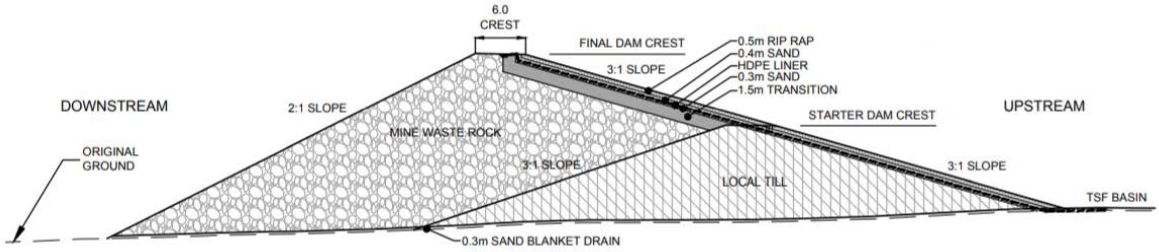


Figure 5-6: Cross section showing current basic design of the tailings impoundment (WSP, 2018)

Collection of mine contact water consisting of run-off from the downstream embankment as well as potential seepage through the embankment, will be collected with a perimeter collection ditch for additional environmental protection. Water collected in the ditch will be routed to a temporary holding pond located at the southern extent of the TSF. Water collected in the holding pond will be managed by transferring into the TSF with a pump and pipeline system.

Tailings will be transferred to the TSF via a HDPE pipeline for deposition into the TSF. Tailings slurry from the plant will be pumped to the TSF with the tailings delivery pipeline to a flow control assembly. The flow control assembly will be situated on the crest of the dam and will be used to direct tailings slurry flows for strategic deposition into the facility. Tailings deposition will utilize the deposition pipeline complete with spigots placed on the crest of the dam. The flow control assembly and deposition pipeline will be raised as part of each embankment stage during the operations.

A water reclaim system will be established to manage excess water within the TSF. A water collection tower with water reclaim pump will be constructed at the low-point of the TSF. Excess water will be pumped to the plant to be reused in the processing circuit. The water return pipeline will consist of HDPE and will follow the same route to the plant as the tailings delivery pipeline.

5.5 Operation and Maintenance

5.5.1 Mining

The Goldboro Deposit would be mined by a combination of open pit and underground mining. The development will start with a small open pit and would transition to underground mining in year three. Conventional open pit mining methods will be used to extract a portion of the Goldboro Deposit. This method was selected considering the deposit's size, shape, orientation, and proximity to the surface. Drilling, blasting, loading, and hauling will be used to mine the open pit resource material and meet the

mine production schedule. The current open pit design is displayed in the Figure 5-7, while the design and operating details are displayed in Table 5-2 and Table 5-3 (WSP, 2018).

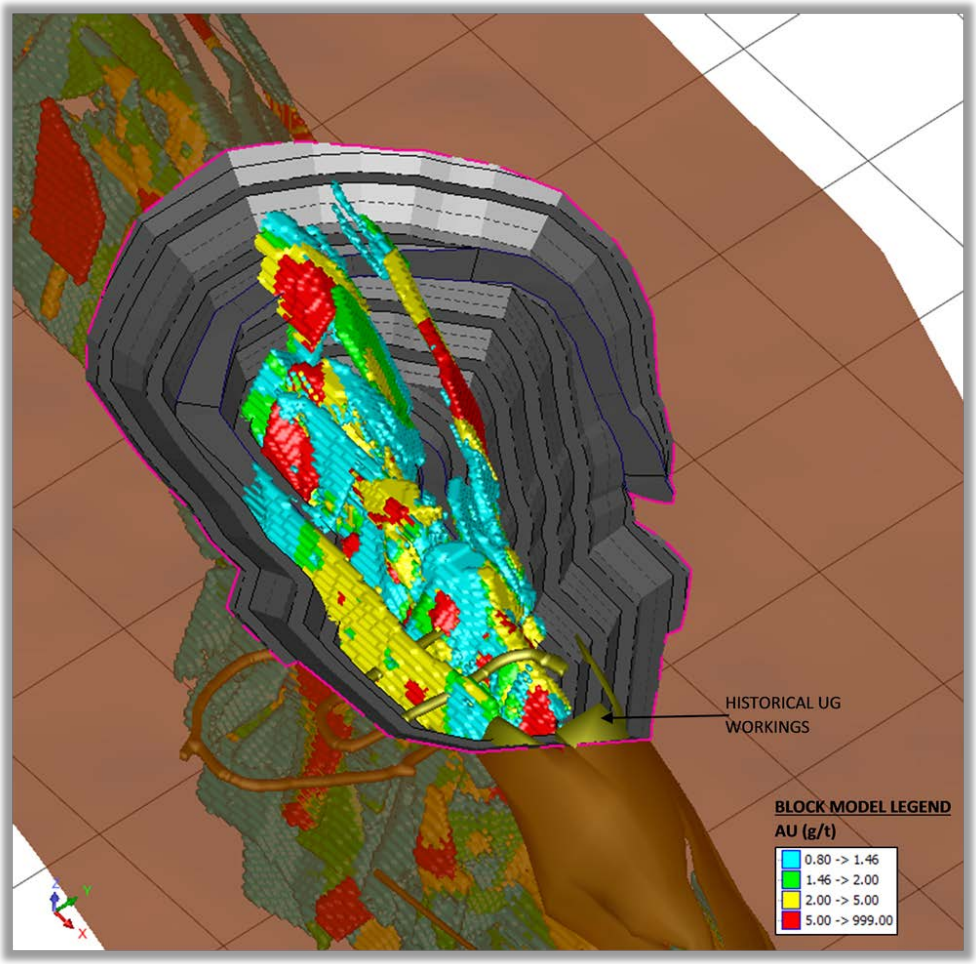


Figure 5-7: Goldboro Pit Design – Boston-Richardson Pit (isometric view) (WSP, 2018)

Table 5-2: Ultimate Pit Design Results, Pit Contents, Base Case (WSP, 2018)

Rock Type	Unit	Value
Total material mined	k t	8,951
Total waste rock mined	k t	7,875
Total potential mill feed (PMF) rock mined	k t	1,076
Gold	g/t	2.99
Strip ratio	W:PMF	7.3
PMF by Resource Category		
Measured + Indicated resource	k t	1,034

Gold	g/t	3.01
Inferred resource	k t	42
Gold	g/t	2.63
PMF by Grade Category		
LG PMF (0.80 > gold (g/t) < 2.0)	k t	578
Gold	g/t	1.16
HG PMF (gold (g/t) > 2.0)	k t	498
Gold	g/t	5.12

Table 5-3: Ultimate Pit Design Results, Pit Dimensions (WSP, 2018)

Item	Unit	Boston-Richardson Pit
Length	m	425
Width	m	290
Top Elevation	m	~5015
Bottom Elevation	M	4898, 4926
Pit Exit Elevation	M	5005

Blasting would always be performed by qualified persons. Standard operating procedures would be established for blasting to ensure that neither persons nor equipment are ever endangered. These would include a site clearing procedure, posting of signage and barricades at all site access points, pre-blast alarms and warnings, and verbal communication between the blaster and predesignated muster leaders accounting for all personnel on site prior to blasting occurring.

For the purposes of this Project, the mining would, in general, follow a top-down sequencing approach, assuming no formal pushbacks. Low-grade material (LG) has been defined as material with grades above 0.80 g/t gold and below 2 g/t gold, while high-grade material (HG) has been defined as material with grades above 2 g/t gold.

Waste rock generated from the Project will require the development of a waste rock storage area. The dump size requirements for the Project are shown in Table 5-4. The storage capacity has been designed to accommodate waste rock generated from both the open pit and underground operations. Waste rock storage areas will be near the mining areas to minimize waste haulage distances.

Table 5-4: Waste Rock Storage Area Design Details (WSP, 2018)

Design Detail	Value	Units
Total overburden to store	0.8	Mm^3
Total waste rock to store	2.3	Mm^3
Swell factor	30	%
Total waste rock storage volume required	3.0	Mm^3
Haulage ramp width	15	m
Haulage ramp gradient	6-8	%
Dump lift height	10	m
Berm width	6.3	m
Overall dump reclaimed slope angle	27	degrees
Overall waste rock storage height (estimated)	70	m

To prepare these areas, topsoil is removed, stockpiled, and seeded for long-term storage and later use during reclamation. Waste rock is then end dumped from the haul trucks forming lifts. Trucks dump near, but at a safe distance from, the edge of the lift. Lifts will be constructed such that the final waste rock storage areas have an overall slope angle that does not require rework at closure, thus reducing reclamation costs.

Results of the ARD/ML testing done up to this point indicates that waste is non-acid generating (GEMTEC, 2018). So, there are no plans for the mitigation of ARD generation from the waste stockpiles. If further testing work indicates that the waste may be acid generating, Anaconda will prepare a mitigation plan prior to project start-up to address any possible acid generation. These plans may include lining of the dump, as well as collection and treatment of runoff and leachate.

The proposed mine plan will generate approximately 7.9 million tonnes of waste rock, which includes overburden. Assuming a swell factor of 30%, a volume of 4 million m^3 of waste storage is required. Refer to Table 5-4 for the details.

Where possible, waste rock material will be used in road, pad, and tailings embankment construction, thus reducing the footprint required for the waste rock storage area. As condemnation drilling has not been undertaken, the purpose of illustrating the waste rock storage areas is to demonstrate possible spatial extents for the waste rock dump design. The designed footprint for waste rock storage will be optimized prior to submission of the application for Industrial Approval to balance among other things, open pit haulage times and environmental objectives.

5.5.2 Low-Grade Stockpile

A low-grade stockpile has been considered for the Project to store the open pit low-grade material. This material is above the open pit mill cut-off grade for on-site processing. The estimated amount of low-grade material to stockpile is 578,000 tonnes. Most of the material is scheduled as mill feed at the end of the open pit mine life and is expected to be combined with the underground mill feed as required. Due to the PAG nature of the low-grade material, leachate and runoff collection will be maintained for the low-grade stockpile with ongoing monitoring of the water chemistry occurring and treatment as necessary. The stockpile will be designed to minimize the footprint and affected area.

5.5.3 Pit Water Handling

The progressive development of the open pit will result in increasing water infiltration from precipitation and groundwater inflows. As the pit deepens and increases in footprint, it will be necessary to control water inflow through the construction of in-pit dewatering systems such as dewatering wells, drainage ditches, sumps, pipelines, and pumps.

An allowance has been included in the open pit capital and operating costs for in-pit dewatering through in-pit sumps. A hydrogeological field investigation was finalized in winter of 2018 and is further detailed in Section 6.1.5.

5.5.4 Mine Equipment Schedule

The objective of equipment selection for this level of study is to produce a preliminary estimate of costs, and not necessarily to design an optimized equipment fleet. The major mining equipment selected for the Project is summarized in Table 5-5. The mining equipment was selected to match the mine production schedule.

Table 5-5: Assumptions used in estimating the annual equipment production hours (WSP, 2018)

	Typical Value
Calendar days	365
Calendar hours	24
Total time (TH)	8,760
Non-scheduled days	
Holidays	5
Weather	10
Non-scheduled hours	360
Scheduled hours	8,400
Mechanical availability	85%

Utilization	92%
Operation efficiency	80%
No. of shifts per day	2
Annual production hours	5,250

During operations, safe working procedures for drilling and blasting when approaching historical workings will require development.

5.5.5 Loading

A front-end loader type of excavator was envisioned for the Project for waste handling, one that could be interchangeable with pit loading and stockpile loading, as well as match the selected haul truck model. A 3.8 m^3 bucket capacity was assumed when estimating the loading fleet requirements. A backhoe type of excavator was envisioned for the mineralized material handling, as well as for use as a utility excavator. A 2.3 m^3 bucket capacity was assumed when estimating the loading fleet requirements.

Loading fleet numbers have been estimated on first principles based on the operating hours required to achieve the production schedule, calculated by cycle times and estimates of the equipment's rated capacities and productivities.

5.5.6 Hauling

Haul truck fleet numbers have been estimated on first principles based on the operating hours required to achieve the production schedule, calculated cycle times, and estimates of the equipment's rated capacities and productivities.

5.5.7 Ancillary Service and Support Equipment

The primary pit operations will be supported by additional equipment including track dozers with ripper attachments, road graders, water truck, and maintenance service vehicles.

5.5.8 Pit Operation Personnel

The personnel estimates are based on the equipment fleet required to achieve the production schedule. A combination of rotation schedules is envisioned. Most of the operations and maintenance crews were assumed to be 24 hours per day, 7 days per week. The administrative positions are planned as 5 days per week. Where possible, combination of positions and sharing of positions between Open Pit area, Underground Mine area, Mill area, and G&A have been planned for. The personnel estimate has been grouped into the following general categories:

- Mine supervision;
- Mine operations; and
- Mine technical services.

Table 5-6 tabulates the estimated labour by category for the positions attributed to open pit operations only. Where denoted by "UG", the position is assumed to be covered by the underground operations.

Table 5-6: Estimated Open Pit Operations Personnel by Year

OP Labour Positions	Y -1	Y 1	Y 2	Y 3
OP Mine Supervision				
Pit General Supervisor	1	1	1	1
Mine crew supervisor	4	4	4	2
OP mine clerk	1	1	1	1
OP Mine Operations				
Driller	2	4	4	4
Blaster	2	2	2	1
Loader operator	6	8	6	6
Haul truck operator	8	24	16	16
Dozer & Grader operator	12	12	12	12
Support Crew	4	4	4	4
OP Mine Maintenance	5	5	5	2
OP Technical Services				
Technical services manager (or Chief Engineer)	1	1	1	UG
Mine planner	1	1	1	1
Production engineer	1	1	1	1
Geologist	1	1	1	UG
Grade control technician	2	2	2	UG
Surveyor	2	2	2	2
Subtotal	**53**	**73**	**63**	**53**

5.6 Underground Mining Methods

The Boston-Richardson belt was mined from underground between 1893 and 1912, and mine production has been recorded as 414,887 short tons grading 0.132 oz./T (376,383 tonnes grading 4.53 g/t gold) for a total production of 54,871 ounces of gold. It must be noted, however, that the head grade was estimated

at 6.8 g/t gold, and poor recoveries at the time brought the recovered head grade down to 4.53 g/t gold (WSP, 2018). Figure 5-8 illustrates the known historical workings in the East Goldboro Mine (WSP, 2018).

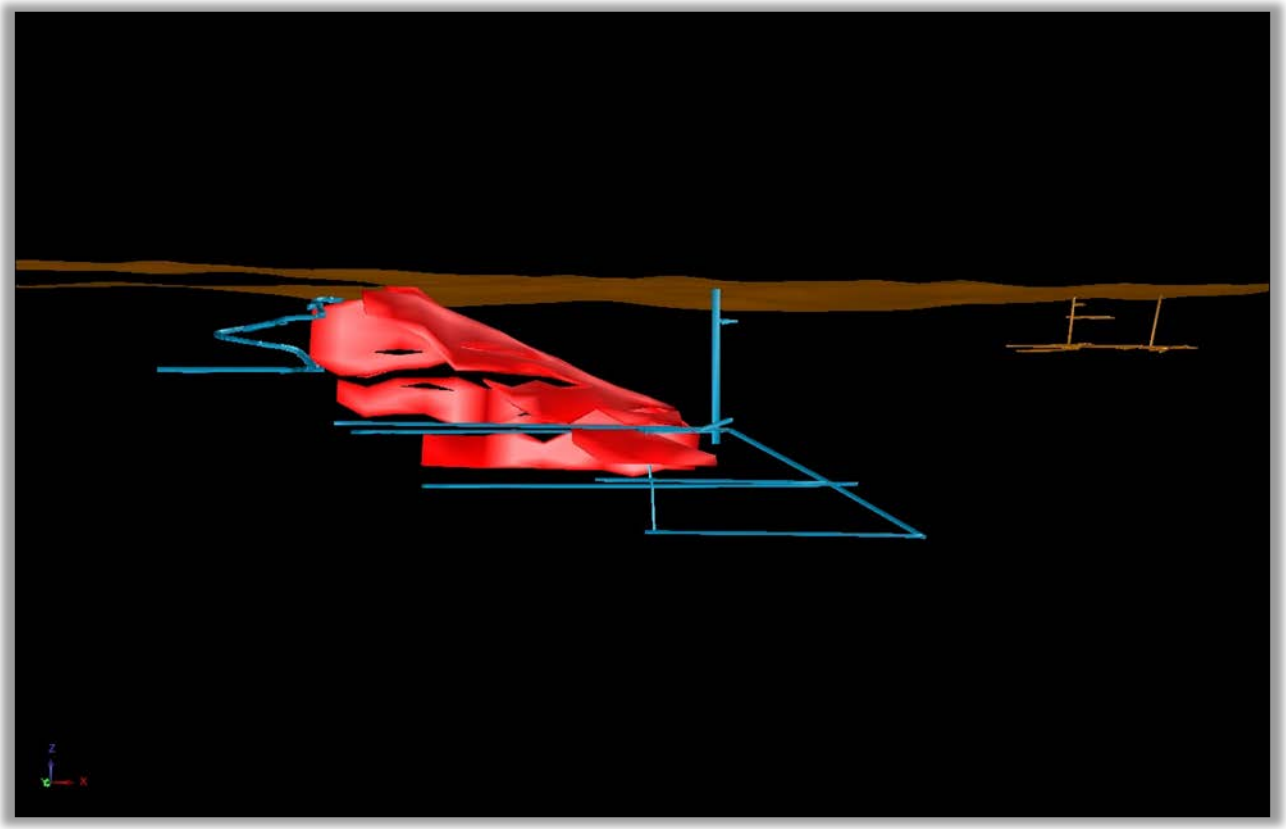


Figure 5-8: Underground Workings (WSP, 2018)

There is also evidence of underground workings in the West Goldboro but there are no historical records. Any previous underground openings would have been backfilled, and they are also located in the currently designed permanent West Goldboro crown pillar (see description below) so they should not affect future mining.

5.6.1 Mine Design

The block and geological models were modelled using 2 m x 2 m x 2 m resource blocks and a cut-off grade of 0.5 g/t gold which were both ill-suited for narrow vein stope design in an underground mine. In addition, the mineralized material grade values stored in the resource model blocks include internal stope dilution that will be incurred with a 2-metre minimum mining width, which is the minimum width necessary for narrow vein mechanized cut and fill.

Potentially economic stoping areas were outlined in mine longitudinal sections by filtering out all blocks below cut-off grade and tracing around any remaining contiguous Possible Mill Feed ('PMF') pods. The resulting 2D surfaces were then projected through the block model veins to create 3D 'cookie cutter' shapes that were queried to determine the tonnages and grades contained in each longhole stoping area.

A total of 36 stoping area shapes were originally identified to be potentially mineable resources but this was based on a mechanized cut and fill cut-off grade.

After lowering the cut-off grade for narrow vein longhole mining, six of the stope area shapes were combined with adjacent stopes due to the marginal mineralized material between adjacent stope shapes becoming economic.

In addition, six of the stoping area shapes were subsequently removed from the inventory after considering the incremental capital expense required to retrieve them. A longitudinal view of the mine showing the 24 remaining economic longhole stoping areas is shown on Figure 5-9.

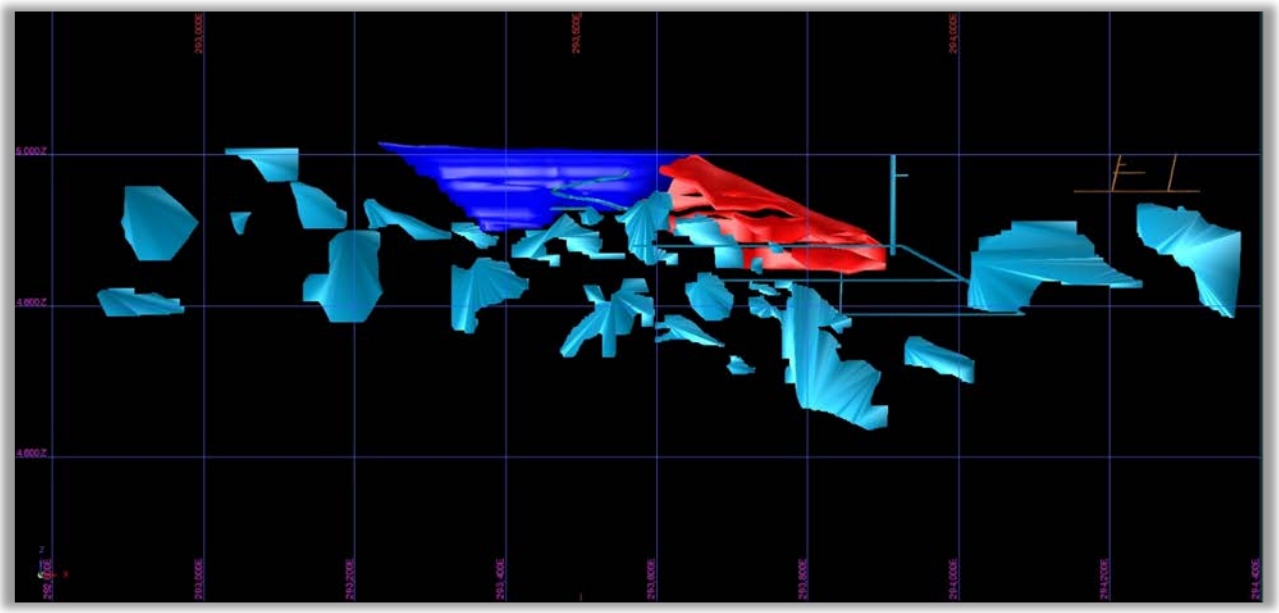


Figure 5-9: Economic Underground Stope Shapes (WSP, 2018)

A basic 3D model was created for the major capital mine development and ventilation raises using AutoCAD and Surpac™. Operating development headings consisting of stope accesses and sill drifts were not designed but were estimated from mine plans and longitudinal sections. The capital development 3D model is shown on Figure 5-10.

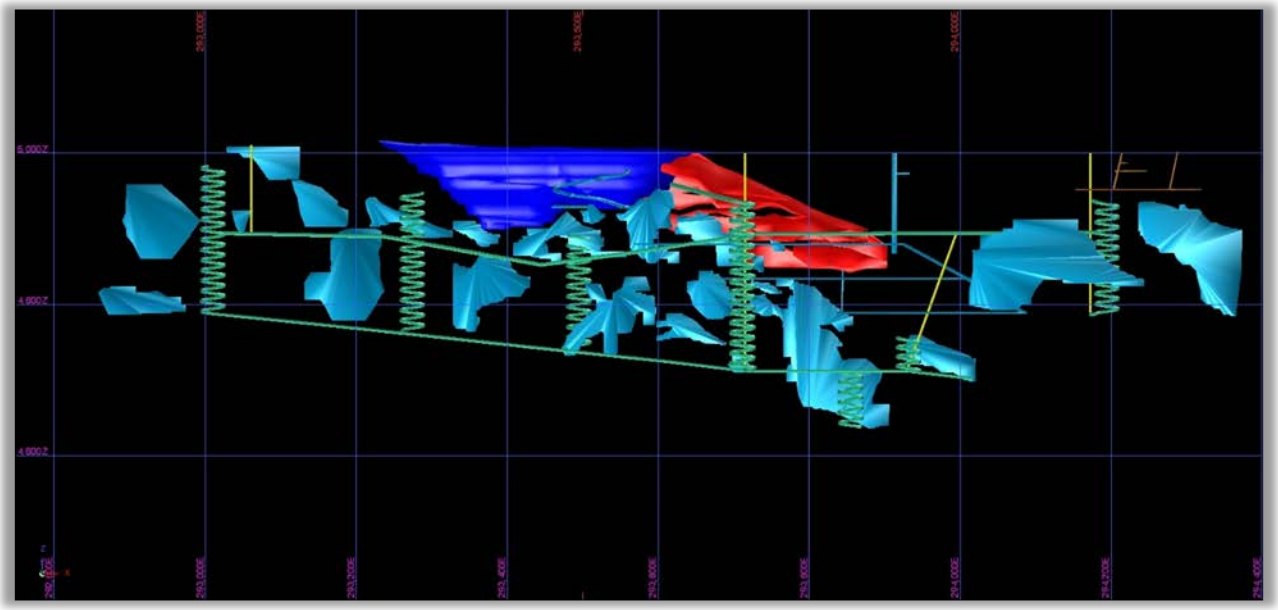


Figure 5-10: New Underground Capital Development (WSP, 2018)

5.6.1.1 Underground Mine Access

Primary underground mine access will be via a portal at surface. A (5 m x 5 m) high main access ramp will be driven from the portal to the main haulage elevation of 4,890 m where the main mine haulage levels will be established. The main ramp will continue down to the bottom of the presently identified stope areas.

Main haulage drifts will be driven (5 m x 5 m) high from the main ramp location to the West Goldbrook and East Goldbrook stoping areas located on either extremity of the Property. The main east haulage drift will be driven at +3% grade to eliminate water drainage issues, whereas the main west haulage will be driven at variable grade to provide access for pit crown pillar recovery at the end of the underground mine life.

A second (4 m x 4 m) ventilation / service ramp will be driven from the bottom of the main ramp along the bottom extent of the west portion of the mine for ventilation, exploration, dewatering, and a secondary mode of egress.

A total of six (6) (4 m x 4 m) access ramps will be driven from the 4,890 main haulage drifts to provide access to the individual stoping areas. These ramps have been spaced approximately 220 metres apart to reduce lateral development requirements while allowing the use of trucks for material haulage.

5.6.1.2 Stope Access

Each longhole mining panel will be accessed via a single (3 m x 3 m) high heading driven from the local access ramp to provide end access the longhole stope sill. They will be spaced 15 metres apart vertically in coincidence with the designed stope height. It was assumed that the stope accesses will average 30 metres in length during scheduling.

Mining sills in narrow stoping areas will be driven a minimum of (2.7 m x 2.7 m) to accommodate the selected mining equipment. PMF sill drifts will be driven with a larger cross-section in wider PMF areas, but it was assumed that all drill and extraction headings would be driven at the minimum size for this study.

5.6.2 Life-of-Mine Plan Development Summary

The underground development schedule during the pre-production period prioritizes accessing the production areas east of the main ramp as quickly as possible, along with establishing the permanent ventilation and dewatering systems in the upper section of the mine.

A single capital development crew will drive the main ramp from the portal to 4,890 m level at which time a second development crew will be added. Both crews will prioritize completing the main ramp and all capital development in the east half of the mine, after which time a single crew will be required.

Similarly, two operating development crews will be required for three years near the beginning of the overall schedule for the mine to achieve sustainable production in a timely manner. However, only one will be required once the operating development can sustain the full mine production rate.

5.6.3 Production Forecast

5.6.3.1 Current Development

There is historical development in the old Boston-Richardson Mine but none was used in the new development plan. All new development headings were designed to avoid old mine workings where possible, and to completely avoid crossing over any old mining areas to minimize potential ground stability issues.

5.6.3.2 Mine Production Rate

A soft limit of 575 total tonnes per day was placed on the planned underground production rate to provide for over five years of mine life for the underground mine. The proposed mine plan outlines 10 years mine life where the open pit has been mined for first four years and underground mining starts in year 3 and continues until year 10. Refer to Table 5-7 for details.

Table 5-7: Mine Production schedule (WSP, 2018)

	UNITS	TOTAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14
					YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	YR11	YR12
NG PRODUCTION SCHEDULE																
TOTAL OP MATERIAL MINED	k tonnes	8,951		1,500	4,000	2,426	1,025	0								
TOTAL OP WASTE MINED	k tonnes	7,875		1,494	3,643	1,928	811	0								
TOTAL OP PMF MINED	k tonnes	1,076		6	357	498	214	0								
TOTAL OP PMF MINED - HG	k tonnes	498		3	162	210	123									
	g/t	5.12		3.57	4.31	4.84	6.69									
TOTAL OP PMF MINED - LG	k tonnes	578		3	195	288	92	0								
	g/t	1.16		1.02	1.13	1.17	1.19	0.00								
TOTAL UG PMF MINED	k tonnes	1,358					74	210	210	210	210	210	210	23		
	g/t	6.83					7.23	7.35	6.64	9.45	6.00	6.44	5.24	4.32		
TOTAL PMF MINED	k tonnes	2,434		6	357	498	289	210	210	210	210	210	210	23		
TOTAL MINED GRADE, Au	g/t	5.13		2.21	2.57	2.71	5.09	7.35	6.64	9.45	6.00	6.44	5.24	4.32		
STOCKPILE REHANDLE	k tonnes	578		0	45		13							187	210	124
STOCKPILE GRADE, Au	g/t	1.16		0.00	1.16		1.16							1.16	1.16	1.16
FEED SCHEDULE																
MILL FEED TONNES	k tonnes	2,434			210	210	210	210	210	210	210	210	210	210	210	124
HEAD GRADE																
Au	g/t	5.13			3.63	4.84	6.54	7.35	6.64	9.45	6.00	6.44	5.24	1.51	1.16	1.16

The targeted production rate will be primarily met with sill development PMF material supplemented by production PMF material until all sill development activities are completed, at which time a minimum of four concurrently active longhole stopes will be required to meet the full production target.

5.6.4 Processing

5.6.4.1 Goldboro Concentrate Integration with Pine Cove Process Description

To maximize utilization of the existing infrastructure at the Point Rousse project in Newfoundland where throughput capacity is available at the back end of the mill as well as minimize the use of chemical processing unit operations (such as cyanide leaching and high-temperature flux refining) at Goldboro, flotation and gravity concentrates produced at Goldboro will be transported to Pine Cove for further processing using the existing hydrometallurgical circuit. A retrofit to the existing circuit at Pine Cove for processing of Goldboro concentrates would include the addition of the following unit operations.

5.6.4.2 Refining of Gravity Concentrate

The gravity concentrate that is transported from Goldboro will be processed at Pine Cove by refining in the existing furnace. The same flux recipe as the one used for the zinc precipitate has been assumed. Further evaluation will be required to confirm any concentrate upgrading requirements prior to refining, the refining reagent requirements, or the optional use of intensive cyanide leaching in place of refining.

The Point Rousse facility has a long-term tailings disposal facility in the form of the Pine Cove Pit. This pit is depleted except for some planned pushbacks and has been approved as a tailings disposal facility as of September 2017. The walls of the Pine Cove Pit as well as the tailings produced from all current Newfoundland projects are classified as having a high “buffering capacity”. This is due to the high calcite content within the ore material and pit walls. This buffering capacity would neutralize any ARD generated from tailings generated from the Goldboro concentrate.

The Goldboro concentrate will likely be transferred from the tankers into a restock tank, after which it will enter the Pine Cove mill circuit as feed to the regrind mill. This will ensure proper and uniform grain size distribution for the leaching circuit and will occur simultaneously to input from other Newfoundland projects. The Pine Cove mill license has been updated to reflect the planned feed from Goldboro. An arsenic removal circuit will be implemented within the Pine Cove mill circuit due to naturally occurring arsenic present within the Goldboro ore material.

5.6.4.3 Arsenic Precipitation Reactors

The processing of concentrate feedstock from Goldboro (containing arsenic mineralization) will result in the partial leaching of arsenic in cyanide leaching unit operations. Control of process and final discharge water quality will require the addition of arsenic precipitation unit operations. A new two-stage wastewater treatment system will be installed to precipitate arsenic from the tailings water downstream of cyanide destruction. This includes two new agitated wastewater treatment tanks downstream of the existing cyanide destruction. Ferric sulphate and lime are added to precipitate arsenic from solution and the resulting slurry is pumped to the tailings impoundment for separation of the tailings solids and

precipitate from the treated water. Secondary arsenic precipitation for treatment of the final discharge from the polishing pond has not been included at this point but it may be required based on the outcome of further testing of the primary arsenic precipitation prior to discharge to the tailings pond and the stability of solid phase arsenic in the tailings pond.

Additionally, an ongoing monitoring program will be in effect for the effluent from the tailings line to ensure that the level of arsenic is adequately low to pass the MMER standards for arsenic (0.5 mg/L).

5.6.4.4 Ferric Sulphate Reagent System

A new reagent system for dosing liquid ferric sulphate solution as-received (undiluted) will be installed, including a holding tank and diaphragm metering pumps to deliver the chemical to the new wastewater treatment reactor.

5.7 Decommissioning and Reclamation

5.7.1 Reclamation Overview

Prior to starting development work at the Project, a comprehensive Reclamation and Closure Plan would be prepared and submitted to Nova Scotia Environment (NSE) and Nova Scotia Department of Natural Resources (NSDNR) for review and approval. This Reclamation and Closure Plan will define the measures that will be taken to restore the Property as close as is reasonably possible to its former use or condition, or to an alternate use or condition that is considered appropriate and acceptable by NSE and NSDNR.

A reclamation bond of an amount approved by NSE and NSDNR will be established and secured to cover the cost of reclamation of the Project. The plan would be developed with consultation of the relevant stakeholders including community, first nations groups, as well as NSE and NSDNR. The Company plans to hold further meetings with the Community Liaison Committee to further determine the best method for the community by which to pursue reclamation of the Site and facilities. Comments and concerns about the reclamation process from the public during the open house were taken down and recorded. The plan will employ the best practices of industry-recognized reclamation.

Anaconda is aware of the Nova Scotian reclamation requirements and will ensure that the Site is reclaimed in a manner that best suits the condition of the Site at the end of the Project's production phase.

There are three stages of reclamation activity that occur over the life of a mine:

- Progressive reclamation;
- Closure reclamation; and
- Post-closure monitoring and treatment.

Progressive reclamation is considered to include reclamation completed, where possible or practical, during and throughout the mine operation stage prior to closure. This includes activities that would contribute to the reclamation effort that would otherwise be carried out upon cessation of mining operations (closure reclamation). It is envisioned that a crossover between progressive reclamation activities and operational activities will exist. Anaconda would proceed with progressive reclamation activities as soon as the open pit has been exhausted. The current mine plan sees the surface mining

activities in the pit being completed in year 3 which would allow reclamation of the waste rock piles to start. Overburden and topsoil would be placed on the top of the waste dumps and the piles seeded to promote vegetation growth.

Closure reclamation would include the measures remaining after progressive reclamation activities that are required to fully restore or reclaim the Property as close as is reasonably possible to its former condition or to an approved alternate condition. This would include demolition and removal of site infrastructure, re-vegetation, and all other activities required to achieve the requirements and goals as detailed in the Reclamation and Closure Plan.

Upon completion of the closure reclamation activities, a period of post-closure monitoring is then required to ensure that the reclamation activities have been successful in achieving the described goals. At this stage of reclamation, some treatment requirements may continue until the natural baseline conditions are restored and until these conditions persist without additional treatment. Once it can be demonstrated that practical reclamation of the Site has been successful, the Site would then be closed-out, or released, by the Department of Natural Resources, and the land is relinquished to the owner or the Crown.

The core objectives of the Reclamation and Closure Plan for the Goldboro Mine Site will be:

- Restoration of the health and fertility of the land to a self-sustaining, natural state in both ecological stability and visual aesthetic while reusing material originally removed from the Site
- Removal of all buildings and infrastructure not necessary for long-term monitoring from the Site as well as ensure that any remaining tailings on site are both chemically and mechanically stable
- Provision of an agreeable habitat for wildlife (including fish) in a balanced and maintenance-free ecosystem
- Provide a safe environment for long-term public access.

5.7.2 Land Fertility and Revegetation

Prior to the beginning of the Project, all marketable timber or biomass will be removed from the footprint of the pit, crusher, and waste rock disposal areas. Organic debris (roots, stumps, brush) will be stockpiled and mulched to provide biomass for reclamation. Once stockpiled, special care will be taken to re-disturb the organic materials as little as possible to minimize loss of microbes already living within the material. Topsoil will be stockpiled and used for reclamation at closure. Upon spreading of the topsoil material, topsoil will be blended with the organic material to facilitate the growth and healthy propagation of microorganisms within the soil.

For the final layer of soil used as a base for revegetating exposed areas and rock stockpiles, an overburden analysis of each major strata on the site to determine rock type, texture and thickness and to analyse for chemical and mineral parameters to determine what strata is best suited for the top lift of mine soil will be performed. The determination if organic materials, mulches, pH adjustment, fertilizers and any other soil amendments are necessary will be included within the soil assessment. If no suitable sources of final surfacing soil are found on the Site's surface, topsoil substitutes from deeper soils on the Site will be investigated and stored separately if found to be a feasible option.

Once a suitable source of soil for covering disturbed ground is found, the top soil will be applied to a depth sufficient to maintain adequate root growth and nutrient requirements. The original topsoil will be mixed with deeper topsoil substitutes at final grading to ensure proper inoculation of soil microbes and the slow release of nutrients. Stockpiles covered in soil will be mounded to a sufficiently gentle gradient to minimize erosion of the soil layer due to wind or precipitation. Drainage channels of riprap sized stone will be placed as necessary to further reduce the capacity of the Site for erosion due to rainfall.

Compaction of the final lift of soil will be minimized by end dumping and placement with dozing equipment to avoid excessive compaction. Flat surfaces which may have been compacted by heavy equipment will be scarified or ripped to promote revegetation.

Site drainage will be facilitated through engineered trenches and grading to prevent ponding and water erosion on revegetated and other reclaimed areas. Windbreaks also be established in the form of berms to prevent wind erosion of revegetated and other reclaimed areas.

Annuals/perennials will be used for quick cover and provision of soil nutrients for successional vegetation. 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.

5.7.3 Surface Facilities

During decommissioning, all surface infrastructure will be removed. This includes the concentrator building, offices, change rooms, maintenance shop, and any additional buildings. Surface electrical and power distribution centres and networks that were constructed for the Project will also be dismantled and removed from the Site.

All the surfaces that were used for storage during the Project, including stockpiles and access roads, would be scarified and seeded to promote vegetation growth. The open pit will be allowed to flood creating a lake with established shorelines. Any slopes left around the rim of the pit will be investigated in terms of geotechnical stability and altered/reduced in gradient if necessary.

Tailings produced during the concentrator operation will be stored in the designated tailings facility south of the road and west of Gold Brook. At this point it is envisioned that the tailings would be capped with waste rock and overburden/topsoil. The overburden and topsoil cover would then be hydroseeded to promote revegetation. Anaconda is currently performing research in cooperation with the College of North Atlantic and Memorial University involving repurposing the tailings from the Pine Cove Pit as a soil mineral regenerative agent and the results are currently positive. See Figure 5-11 for the progress of the grass and peppers growth in the tailings sand. During the development of the Goldboro Project, further investigation will be made into the tailings composition to see if Goldboro tailings could be repurposed in a similar fashion.

Figure 5-11: Point Rousse tailings vegetable growth testing

5.7.4 Wildlife Habitat

Through the previously mentioned method of resurfacing all exposed rock piles and disturbed areas with topsoil, it is envisioned that within a decade fast-growing shrubs, plants, and trees will recover all the areas disturbed by the Project. This would match the surrounding environment which is young-growth forest mainly composed of alder, spruce, and cherry trees.

This would be an effective replacement of the land disturbed by the construction of the Project as it would match the currently undisturbed habitat within the footprint of the planned operation.

For the maintenance of fish habitat and clean waterways around the Site the main strategy will be prevention of further pollution. As mentioned in the previous section, some of the watershed, notably Gold Brook Lake, have been previously contaminated from the processing by-products of historic mining in the region. The results of the baseline ecological study performed by GEMTEC will be used in conjunction with ongoing monitoring of the various waterways and watersheds around the Site to ensure that Anaconda's work is not releasing additional contamination, nor is historic contamination becoming remobilized due to alteration of drainage pathways on the Site.

Due to the necessary footprint of some of the Project's infrastructure, (pit and waste stockpiles) some wetlands will be damaged beyond repair. For these wetlands, Anaconda plans to participate in a wetland compensation program with implementation beginning while the Project is in the production phase.

5.7.5 Safe Environment for the Public

When the Goldboro Site is deemed "closed" by Anaconda, the goal is to leave behind a site that is in a safe configuration for the populace to enjoy. Ideally, the area would be as suitable for normal forestry recreational activities as any of the surrounding crown land and will have no restrictions upon public use of the space.

Foremost is the prevention/removal of any soil or water contamination due to Anaconda's operation. Although there is pre-existing contamination on-site due to the historic mining as well as the naturally occurring arsenic within some lithologies, Anaconda will ensure that any areas directly impacted by the Company are cleaned up to a standard acceptable by NSE and NSDNR.

Leaving high cliff faces/steep slopes behind will be avoided as much as possible, with the pit wall faces being decreased in gradient wherever possible, as well as berming/fencing off areas deemed too dangerous. Signage will also be placed around any high faces left intact. With the current plan of turning the pit into a lake, shorelines will be established at multiple points around the pit rim to provide a mode of egress from the lake for any people/animals that may happen to enter the lake.

All underground openings such as the decline and any vent/access shafts will be sealed with concrete. Signage will also be placed indicating the presence of workings in the area.

5.7.6 Summary

Reclamation of the Site will require approximately three to five years after cessation of operations. Approximately two years will be needed to completely regrade and revegetate the Site, after which monitoring will continue until deemed no longer necessary. This is typically a period of two to three years post-reclamation. The reclamation measures are designed to enable eventual abandonment of 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.

Anaconda is committed to sustainable development and has always been returning the natural features of their projects to as close to the original stage as possible. Minimizing wastage is also a major priority of the Company, demonstrated by the effort performed in cooperation with its mining contractor Guy J. Bailey and their wholly owned subsidiary Shoreline Aggregates to reuse waste rock through crushing and reselling as aggregate. The Company was awarded an Industry Excellence Award for Environmental Stewardship in 2018 from Mining Natural Resources Magazine.

6 Valued Ecosystem Components & Effects Management

6.1 Biophysical Environment

6.1.1 Geology

Nova Scotia is situated on the trailing edge of a plate margin, so the risk of tsunami or direct earthquake is low. However, in 1829 an earthquake off the Grand Banks caused a tsunami three to seven metres tall which struck the southern shore of Newfoundland (NSDNR: Assessment of Geohazards).

The Meguma Terrane contains fossils representative of deep water early Cambrian to Ordovician aquatic life and include: organic-walled microfossils (acritarchs); the trace fossil Oldhamia; and the Early Ordovician-aged graptolite Rhabdinopora flabelliformis (White et al., 2012). Although graptolites are of interest to fossil collectors, generally these fossil species are widespread and tend to be microscopic and thus not of general interest to fossil collectors. No such fossils, particularly graptolites, have been noted at Goldboro.

The area around the Site is covered with a cobble, silty sand till of the Quartzite Till Sheet (Stea and Fowler, 1979). It is described as a bluish to greenish-grey ablation till, formed primarily of weathering and erosion of the underlying quartzite bedrock. The till is typically very sandy and contains up to 95% locally derived pebble to cobble sized clasts of bedrock. It grades into a slightly siltier phase near the coastline as compared to the typically sandier phase inland.

The composition of the Quartzite Till matrix in the Eastern Shore region averages 80% sand, 15% silt and 5% clay (ibid.). The thickness of the till sheet on a regional basis average 3 metres, but locally may attain depths of up to 20 metres.

From the Nova Scotia Land System map for the area (11F4- Scale 1:50,000), the landform is of glacial origin and consists of basal moraine to the west of the Site and of fluvial and outwash plain to the east of the Site. Regionally, there is little expression of the structure of the underlying bedrock, apart from fault-induced lineations. The topography of the area appears to be the result of glacial erosion and the deposition of glacial landforms.

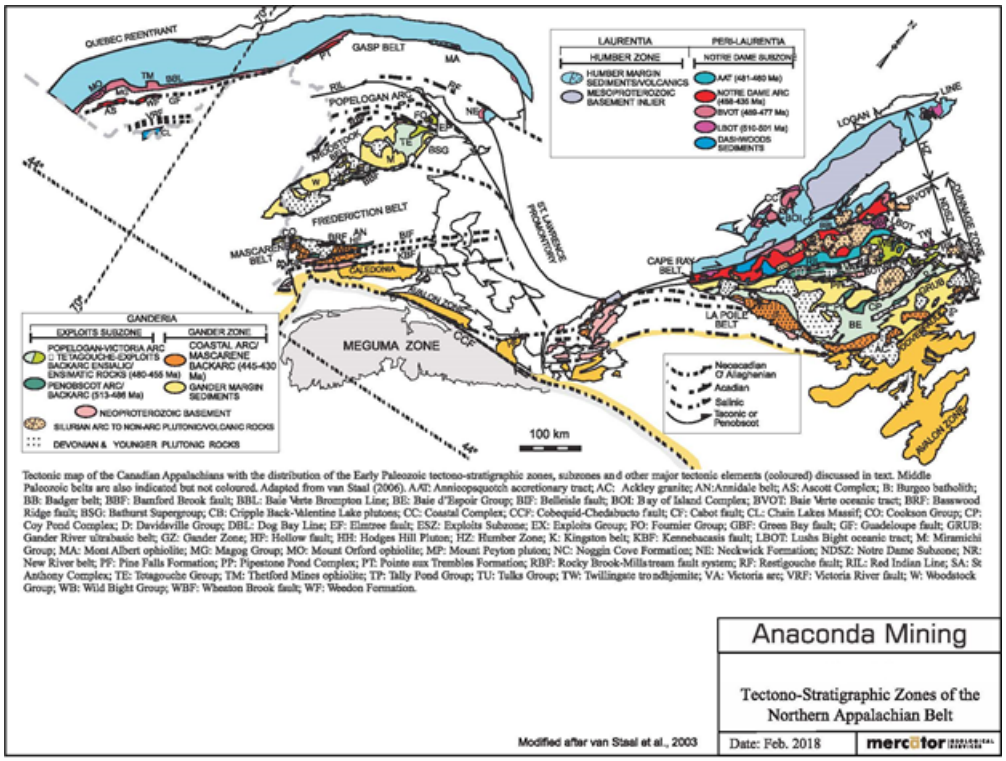
There are several different soil types in and around the Site which have developed from the glacial till due to the variable drainage conditions that exist in the area. Drainage can be limited by such factors as low topography and the silt content and degree of compactness of the underlying glacial till.

In the immediate area of the Site, the soils are typically imperfectly drained. Regionally, significant peat deposits have developed in poorly drained topographic depressions located on the northwest shore of Gold Brook Lake, to the west and east of the Site, and within the flood plain of Gold Brook.

The on-site surficial material consists of relatively uniform silty sand and gravel till with frequent cobbles and boulders. The silt and clay content of the till typically increases with depth, as the contact with the bedrock surface is approached. The depths to bedrock over the Site are in the range of 1 to 7 metres. Outcrops of bedrock are rare.

There are five tectono-lithostratigraphic zones within the Appalachian Belt in eastern Canada, (Figure 6-1) these being:

1 Humber;
2 Dunnage;
3 Gander;
4 Avalon; and
5 Meguma.



Tectonic map of the Canadian Appalachians with the distribution of the Early Paleozoic tectono-stratigraphic zones, subzones and other major tectonic elements (coloured) discussed in text. Middle Paleozoic belts are also indicated but not coloured. Adapted from van Staal (2006). AA7: Annicopsquotch accretionary tract; AC: Ackley granite; AN:Annidale belt; AS: Ascott Complex; B: Burgeo batholith; BB: Badger belt; BBF: Bamford Brook fault; BBL: Baie Verte Brompton Line; BE: Baie d'Espoir Group; BIF: Belleisle fault; BOI: Bay of Island Complex; BVOT: Baie Verte oceanic tract; BRF: Basswood Ridge fault; BSG: Bathurst Supergroup; CB: Cripple Back-Valentine Lake plutons; CC: Coastal Complex; CCF: Cobequid-Chedabucto fault; CF: Cabot fault; CL: Chain Lakes Massif; CO: Cookson Group; CP: Coy Pond Complex; D: Davidsville Group; DBL: Dog Bay Line; EF: Elmtree fault; ESZ: Exploits Subzone; EX: Exploits Group; FO: Fournier Group; GBF: Green Bay fault; GF: Guadeloupe fault; GRUB: Gander River ultrabasic belt; GZ: Gander Zone; HF: Hollow fault; HH: Hodges Hill Pluton; HZ: Humber Zone; K: Kingston belt; KBF: Kennebacasis fault; LBOT: Lushs Bight oceanic tract; M: Miramichi Group; MA: Mont Albert ophiolite; MG: Magog Group; MO: Mount Orford ophiolite; MP: Mount Peyton pluton; NC: Noggin Cove Formation; NE: Neckwick Formation; NDSZ: Notre Dame Subzone; NR: New River belt; PF: Pine Falls Formation; PP: Pipestone Pond Complex; PT: Pointe aux Trembles Formation; RBF: Rocky Brook-Millstream fault system; RF: Restigouche fault; RIL: Red Indian Line; SA: St Anthony Complex; TE: Tetagouche Group; TM: Thetford Mines ophiolite; TP: Tally Pond Group; TU: Tulks Group; TW: Twillingate trondhjemite; VA: Victoria arc; VRF: Victoria River fault; W: Woodstock Group; WB: Wild Bight Group; WBF: Wheaton Brook fault; WF: Weedon Formation.

Figure 6-1: Tectono-Stratigraphic Zones of the Northern Appalachian Orogen (WSP, 2018)

Most of the southern mainland of Nova Scotia occurs within the Meguma zone (hereafter referred to as the Meguma Supergroup) that is in structurally juxtaposed against the Avalon zone to the north along the Cobequid-Cedabucto Fault system (Smith and Kontak, 1996).

The Meguma Supergroup corresponds to a Cambro-Ordivician sedimentary rock succession formed along the continental margin of the Gondwana paleo-continent during closure of the Iapetus and Rheic oceans (Smith and Kontak, 1996). The Meguma Supergroup includes a basal sandy flysch sequence (Goldenville Formation) that is estimated to be approximately 6.7 km thick, but with an unknown base, and an overlying shaley flysch sequence (Halifax Formation) that measures approximately 11.8 km in thickness (Sangster and Smith, 2007).

The massive, thick-bedded metagreywacke sequence of the Goldenville Formation is dark grey (carbonaceous) to light grey in colour and contains thin slate horizons that commonly separate the thick, coarser beds. The Goldenville Formation grades upwards through manganese-rich strata into a basal Halifax Formation unit that consists of sulphidic black slate. The manganese-rich section, along with Tremadocian fossils, marks the transition between the two formations. Black carbonaceous sulphidic slate

and thinly bedded to cross-laminated metasiltstone comprise much of the Halifax Formation, but lithologies in the uppermost stratigraphy consist mostly of grey-green slate and siltstone (Sangster and Smith, 2007).

The Meguma Supergroup is pervasively folded and characterized by kilometre-scale wavelengths and E-W to NE-SW axial trace directions. Folds are upright to slightly inclined, with plunges to both east and west. Doubly-plunging fold trends produce domal structural culminations that in many instances correspond with historic gold producing districts. Cleavages are also a predominant structural feature and include regional slaty cleavage, AC cleavage, and pressure-solution cleavage. The bedding-cleavage intersection lineation reflects local plunge variations and indicates a general non-cylindrical character (Horne, 1996).

The Meguma Supergroup in the eastern part of Nova Scotia (Figure 6-2) was metamorphosed to greenschist-amphibolite facies grade during the mid-Devonian Acadian Orogeny (ca. 400 Ma) and was subsequently intruded by peraluminous granite, granodiorite, and minor mafic intrusions of mid-Devonian to Carboniferous age (375 Ma) (Sangster and Smith, 2007). The locations of these intrusions relative to the perceived location of the anticlines as well as the various formations is shown in Figure 6-2.

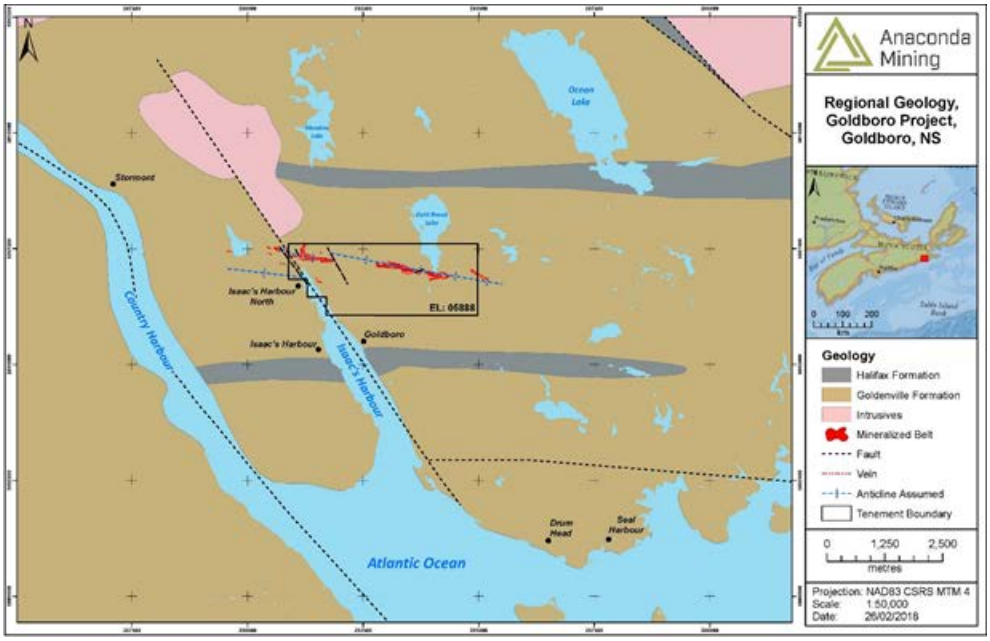


Figure 6-2: Regional Geology of Eastern Nova Scotia (WSP, 2018)

The Property is entirely underlain by sedimentary rocks of the Goldenville Formation, which consists of greywacke, arenite, and slate. The stratigraphic succession of the Goldboro area is repeated across the axial zone of the Upper Seal Harbour anticline, which is an upright, east-west trending fold that in the immediate area plunges to the east at an inclination of 10° to 30°. Slate unit intervals occurring in the core of the anticline are thicker than their laterally equivalent intervals on the north and south fold limbs and this indicates substantive influence of flexural slip folding processes. Parent (1989) postulated slate unit thicknesses in the fold hinge areas to be as much as 2.8 times greater than in the fold limbs. The axial trace and apex of the Upper Seal Harbour anticline is cut by several steeply dipping, northwest and east

trending brittle faults that have the effect of locally disrupting continuity of individual mineralized quartz-slate belts. The east trending New Belt Fault is an example of a structure that produces such dislocation and passes from the south limb of the anticline to the north limb. Gold-bearing belts intersected by the faults commonly show brecciation and brittle shearing of both quartz and slate lithologies, with distribution of comminuted material along the fault plane. Sedimentary sequences differ across this fault and in previous property reporting have been separately referred to as the South and North limbs (Roy, 1998). A typical cross-section at 8,750 m E of the mine grid, (looking east) is shown in Figure 6-3.

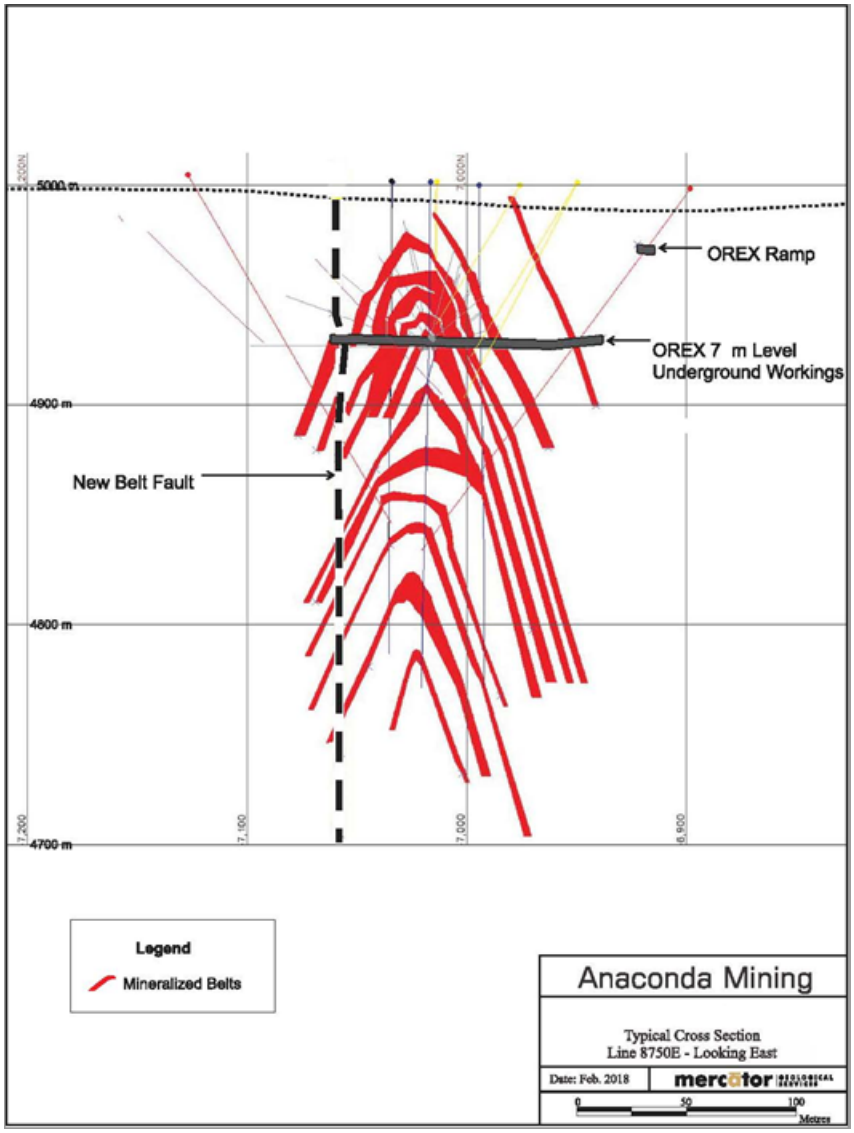


Figure 6-3: Typical Cross-Section through Central Property Area (OREX 76 m Level) (Mercator, 2017)

Gold mineralization at Goldboro occurs in quartz veins and in association with disseminated sulphides in some wall rock intervals. Gold-bearing wall rock typically, but not exclusively, consists of altered shale-argillite (slate). Both greywacke and arenite also host gold-bearing strata-bound and discordant quartz veins and vein arrays. Based on drilling database entries, quartz veins range in thickness from less than 0.1 cm to 2.1 m, with an average thickness of 9 cm and median thickness of 2.5 cm. The veins are

characterized by quartz, pyrrhotite, arsenopyrite, and native gold, with arsenopyrite in vein settings commonly being gold- bearing. Native gold also occurs as a disseminated phase in some altered slate belt intervals, showing no direct association with quartz veining. Wall rock generally contains more pyrrhotite and arsenopyrite than directly associated quartz veins.

The turbidite-hosted gold deposits of Nova Scotia have been compared to similar-age turbidite-hosted quartz vein deposits elsewhere in the world, particularly those in the Bendigo and Ballarat areas of the Lower Paleozoic Lachlan Fold Belt in the state of Victoria, Australia, and have historically been similarly classified. Robert et al. (1997) recognized this deposit class and proposed that it be identified as a member of the 'Turbidite-hosted, quartz carbonate vein deposit (Bendigo Type)' category. Ryan and Ramsay (1996) also addressed the similarity of Nova Scotia turbidite-hosted gold deposits with those in Victoria. As noted by Gervais et al. (2009), categorization within the USGS classification system of mineral deposits presented by Berger (1986) places the Goldboro Deposit in the broad 36A category of 'Low-Sulphide Gold-Quartz Vein Deposits'.

The Goldboro Deposit is a turbidite-hosted orogenic gold deposit hosted within a sequence of alternating argillites and greywacke (Figure 8.1 in the Preliminary Economic Assessment (WSP, 2018)). These deposit types are typically characterized by the formation of gold bearing quartz veins within the argillite units, commonly referred to as belts, which are interbedded with greywacke units. The belts are folded into upright anticlines, and gold has typically been deposited at various positions and times during the fold formation process. Veins, which form during deformation, form in three major geometries commonly referred to as reefs: saddle reefs, leg reefs and spur reefs. Saddle reefs occur about the apex of the fold and are commonly the dominant vein types within some deposits. Leg reefs extend down the limbs of the fold, beyond the saddle reef and are generally parallel with the argillite layers. These are also commonly termed bedding parallel or 'BP' veins in the Nova Scotia goldfields. Spur reefs are veins that cross between layers and may be in the apex of the fold or on its limbs. This style of vein is in part captured under the term "angular" in the Nova Scotia goldfields. The Goldboro Deposit contains all three types of reefs outlined above but is also characterized by mineralization within the argillite forming the belts. Because the Goldboro Deposit contains saddle, leg and spur reefs and often has lower grade gold within the argillite hosting the veins, it has potential to contain significantly more gold resources than deposits of similar style that contain gold only within the quartz veins (reefs) themselves.

The Goldboro Deposit contains at least 30 stacked, belts that vary in thickness from less than a meter up to 20 meters. The belts are folded into a tight, gently east-plunging, anticline referred to as the Upper Seal Harbour Anticline. The deposit is divided into three broad zones: East Goldbrook, Boston-Richardson, and West Goldbrook systems. The East Goldbrook and Boston Richardson systems are separated by a thick greywacke sequence (the Boston-Richardson Marker) with the East Goldbrook system above the greywacke and the Boston Richardson below. The West Goldbrook system is separated from the Boston Richardson by a fault zone but is generally the continuation of the Boston Richardson zone on the west side of the fault. The trace of this Upper Seal Harbour anticline crosses the property and is found near the Dolliver Mountain several kilometres to the west of the Goldboro Deposit demonstrating that the structure which hosts gold continues for several kilometres.

6.1.2 Static ML/ARD testing

Two rounds (Round 1 and Round 2) of sampling and static testing for metal leaching and acid rock drainage (ML/ARD) have been completed for the Project (GEMTEC, 2018). Sample selection for both Round 1 and Round 2 laboratory testing was initiated by Anaconda based on exploration and mine planning information for the Project. The testing was carried out by RPC from Fredericton, New Brunswick. GEMTEC was hired to conduct ML/ARD characterization of the samples to aid in project permitting and planning. Samples were selected for the initial round of static testing (Round 1) to provide an overall characterization of ML/ARD potential in ore and waste rock material across the mineralized belts of the Property. Samples were selected for the second round of static testing (Round 2) based on the results of the initial round and focused on providing more data on the major lithological units and the various mine components of the project (i.e., tailings, waste rock, and pit walls), as well as improving spatial and volumetric representation within the pit.

Figure 6-4 provides a site plan showing the locations of the drill holes sampled as part of the Round 1 and Round 2 sampling programs. Representative longitudinal and cross sections showing geological and deposit data for the sampled drill holes were provided by Anaconda and are provided in Appendix A of the GEMTEC ML/ARD report.

The Round 1 samples were collected from two drill holes, including BR-17-02 located within the proposed pit in the western portion of the Project area, and BR-17-04, located outside of the pit along the mineralized belt in the eastern portion of the Project area (refer to Goldboro Project Plan in Appendix A of the GEMTEC ML/ARD report). Anaconda selected the samples so that they were spaced vertically within each borehole to provide a reasonable representation of the major lithological units at each location. For the most part, the samples collected as part of the Round 1 sampling program represent material classified as either ore, marginal ore, or waste rock. Except for one (1) sample collected from BR-17-MET2, no other samples were collected from the area of the pit walls as part of the Round 1 program.

The second round of samples (Round 2) were selected from four (4) historical drill holes (OSK-10-18, OSK-10-21, OSK-10-24, and OSK-10-25) drilled in 2010 from within the footprint of the pit, and further represent major lithological units and waste rock, marginal ore, and ore mine components. No samples were collected from the area of the pit walls as part of the Round 2 program.

In total 42 samples were collected for the Project for ML/ARD laboratory testing, as further described below.

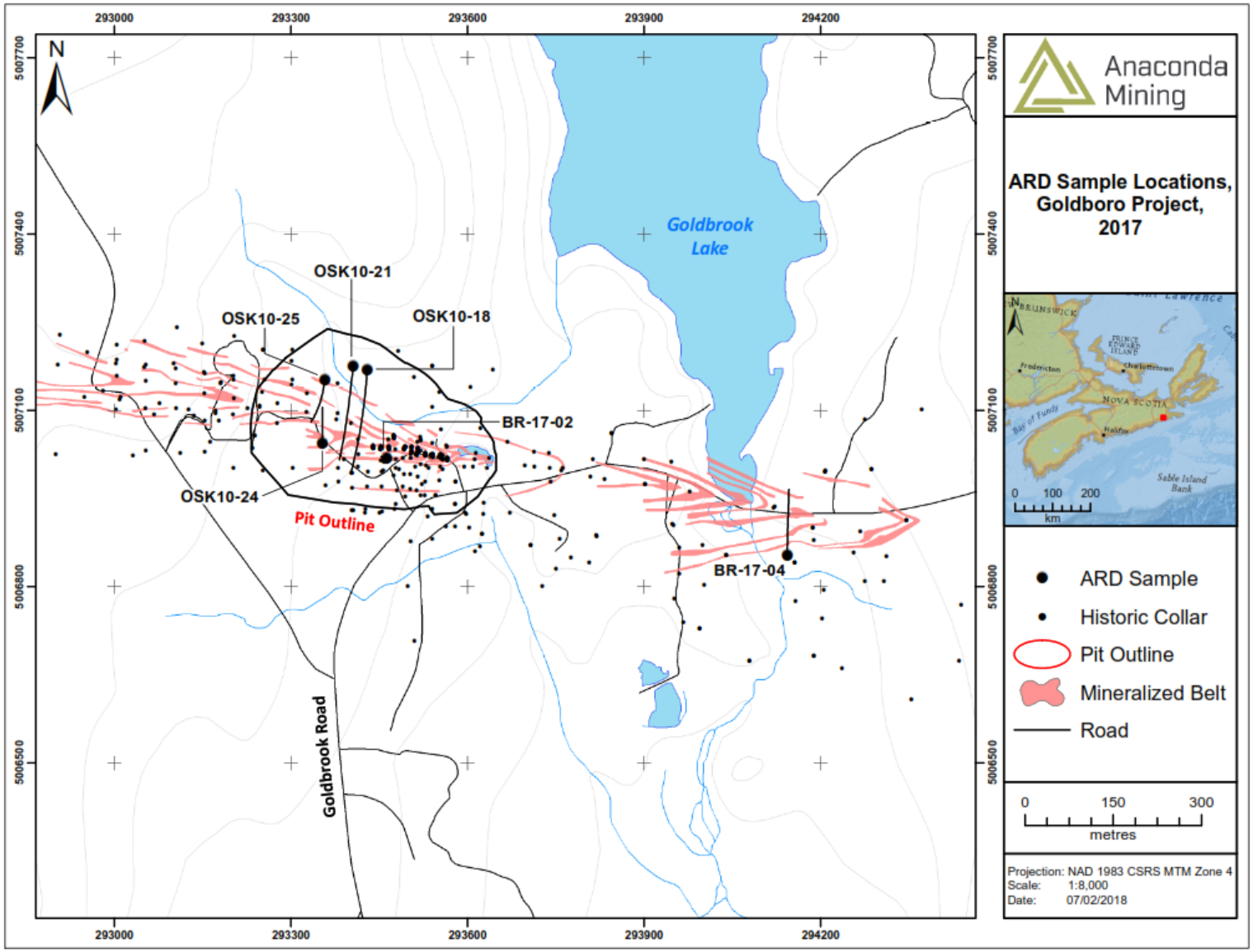


Figure 6-4: Site map showing the location of drill holes sampled during the ARD sampling program (GEMTEC, 2018)

Pit Wall Rock Samples

Only (1) one waste rock sample (I951408) was collected in BR-17-02 in the general vicinity of the base of the pit. No other samples were collected in the pit wall rock material as part of the Round 1 and Round 2 programs. However, based on provided geological and deposit data, it is expected that the ore, marginal ore and waste rock lithologies sampled during the Round 1 and Round 2 sampling programs extend to the limits of the pit, and can be used to characterize similar geological materials along the pit walls.

Ore Samples

A total of 10 ore samples were sent for laboratory analysis and are detailed in Table 6-1; including:

- Pit - six (6) samples collected from drill hole BR-17-02 as part of Round 1 sampling and two (2) samples collected from historical drill holes OSK-10-21 and OSK-10-25 as part of Round 2 sampling. These samples are located within the pit and represent the ore material that will be transported to the mill for processing. Drill hole BR-17-02 is a vertical hole located in the center of the pit. Samples from this drill hole were selected from the various intercepted mineralized zones to provide some variation in the geological and mineralization characteristics vertically within the pit.
- Outlying Project area - two (2) samples that represent ore material from the location of BR-17-04, along the mineralized belt in the eastern portion of the Project area.

Table 6-1: Ore samples selected for ML/ARD characterization (GEMTEC, 2018)

Sampling Round	Drill hole ID	Sample Number	Mine Component	Au (g/t)
1	BR-17-02	I951403	ORE	1.061
	BR-17-02	I951404	ORE	3.659
	BR-17-02	I951407	ORE	6.626
	BR-17-02	I951408	ORE	2.775
	BR-17-02	I951411	ORE	1.188
	BR-17-02	I951412	ORE	3.148
	BR-17-04	I951418	ORE	4.378
	BR-17-04	I951419	ORE	2.332
2	OSK-10-21	Sample 5 *(948711 / 948712)*	ORE	1.246
	OSK-10-25	Sample 13 *(948727 / 948728)*	ORE	3.445

Marginal Ore Samples

A total of four (4) marginal ore samples were sent for laboratory analysis and are detailed in Table 6-2; including:

- Pit - one (1) sample collected from drill hole BR-17-02 as part of Round 1 sampling, and two (2) samples collected from historical drill holes OSK-10-18 and OSK-10-24 as part of Round 2 sampling that are located within the pit and represent the marginal grade ore that will be stored in a temporary stockpile for later processing following the completion of pit extraction,

- Outlying Project area - one (1) sample that represents marginal ore material from the location of BR-17-04, along the mineralized belt in the eastern portion of the Project area.

Table 6-2: Marginal Ore samples selected for ML/ARD characterization (GEMTEC, 2018)

Sampling Round	Drill Hole ID	Sample Number	Mine Component	Au (g/t)
1	BR-17-02	I951413	MARGINAL_ORE	0.431
	BR-17-04	I951415	MARGINAL_ORE	0.471
2	OSK-10-18	Sample 3 *(948704 / 948705 / 948706)*	MARGINAL_ORE	0.692
	OSK-10-24	Sample 19 *(948737 / 948738)*	MARGINAL_ORE	0.532

Waste Rock Samples

A total of 28 waste rock samples were collected and sent for laboratory analysis during the Round 1 and Round 2 sampling programs. These are detailed in Table 6-3, and include:

- Pit - 12 samples of un-mineralized greywacke, two (2) samples of un-mineralized argillite, and seven (7) mixed samples comprising varying percentages of un-mineralized greywacke, argillite and quartz vein material from within the pit that will be stored on waste rock piles
- Outlying Project area – seven (7) samples of un-mineralized greywacke from BR-17-04, located outside the pit along the mineralized belt in the eastern portion of the Project area.

Table 6-3: Waste Rock samples selected for ML/ARD characterization (GEMTEC, 2018)

Sampling Round	Drill Hole ID	Sample No.	Geological Material	Au (g/tonne)
1	BR-17-002	I951401	WASTE_GREYWACKE	0.231
	BR-17-002	I951402	WASTE_GREYWACKE	0.063
	BR-17-002	I951406	WASTE_GREYWACKE	0.080
	BR-17-002	I951409	WASTE_GREYWACKE	0.014
	BR-17-004	I951414	WASTE_GREYWACKE	0.038
	BR-17-004	I951416	WASTE_GREYWACKE	0.120
	BR-17-004	I951417	WASTE_GREYWACKE	0.018
	BR-17-004	I951420	WASTE_GREYWACKE	0.010
	BR-17-004	I951421	WASTE_GREYWACKE	0.031
	BR-17-004	I951422	WASTE_GREYWACKE	0.100
	BR-17-004	I951423	WASTE_GREYWACKE	0.013
	BR-17-002	I951410	WASTE_MIXED	0.219
	BR-17-002	I951405	WASTE_ARGILLITE	0.008
2	OSK-10-25	Sample 12 *(948726)*	WASTE_ARGILLITE	0.066
	OSK-10-18	Sample 2 *(948703)*	WASTE_GREYWACKE	0.022
	OSK-10-21	Sample 7 *(948715 / 948716)*	WASTE_GREYWACKE	0.018
	OSK-10-25	Sample 9 *(948721 / 948722)*	WASTE_GREYWACKE	0.016
	OSK-10-25	Sample 10 *(948723 / 948724)*	WASTE_GREYWACKE	0.022
	OSK-10-25	Sample 11 *(948725)*	WASTE_GREYWACKE	0.012
	OSK-10-24	Sample 14 *(948729)*	WASTE_GREYWACKE	0.022
	OSK-10-24	Sample 16 *(948734)*	WASTE_GREYWACKE	0.012
	OSK-10-24	Sample 18 *(948736)*	WASTE_GREYWACKE	0.006
	OSK-10-18	Sample 1 *(948701/948702)*	WASTE_MIXED	0.118
	OSK-10-18	Sample 4 *(948707/948708/ - 948709/948710)*	WASTE_MIXED	0.022
	OSK-10-21	Sample 6 *(948713 948714)*	WASTE_MIXED	0.012
	OSK-10-21	Sample 8 *(948717/948718 / 948719/948720)*	WASTE_MIXED	0.024
	OSK-10-24	Sample 15 *(948730/948731/ 948732/948733)*	WASTE_MIXED	0.026
	OSK-10-24	Sample 17*(948735)*	WASTE_MIXED	0.014

All boreholes which samples were taken from for ML/ARD testing are presented in Figure 6-4. All 42 samples collected by Anaconda during the Round 1 and the Round 2 sampling programs were submitted to RPC Science and Engineering (RPC) in Fredericton, New Brunswick for the following laboratory analysis:

- Total sulphur and sulphate sulphur speciation analysis to determine sulphide sulphur content, by the difference between the two;
- Total inorganic carbon analysis to determine carbonate content;
- Whole rock analysis by XRF;
- Acid Base Accounting (ABA) using the Modified Sobek method; and,
- Multi-element (trace metals) analysis by ICP-OES scan

6.1.2.1 ARD/ML Assessment Methodology

ARD potential for the major lithological units and mine components for the Project was evaluated using Acid-Base Accounting (ABA) by the modified Sobek method and the total sulphur analysis. The ability of the rock to generate acid is a function of the balance between the potentially acid producing (sulphide) minerals and the potential acid consuming minerals. As such ABA analysis is based on the neutralization potential (NP) of a rock assuming the neutralizing minerals react like calcium carbonate, and the acid potential (AP) of a rock assuming all sulphide minerals react like pyrite. The results of the ABA testing are presented in Table 6-4.

The net neutralization potential (NNP), or acid/base account is determined by subtracting the AP from the NP (NNP = NP - AP). A ratio of NP to AP (NPR) is also used. An NNP of 0 is equivalent to an NP/AP ratio of 1. Units for static test results (AP, NP, NPR and NNP) are expressed in mass (kg) of calcium carbonate ($CaCO_3$) per tonne. The criteria of NP/AP <1 and NNP <-20 are commonly applied to classify a rock material as potentially acid generating (PAG); the criteria at 1<NP/AP<2 and –20<NNP<20 is applied to classify a rock material as uncertain with respect to acid generation potential; and the criteria of NP/AP>2 and NNP>20 is applied to classify a rock material as non-acid generating (NAG) (MEND, 2009).

Further, the Nova Scotia Sulphide-Bearing Material Disposal Regulations (Nova Scotia Environment Act, 1995), consider rock material with sulphide sulphur content <0.4 wt% as not a hazardous ARD material (GEMTEC, 2018).

Table 6-4: Summary of Acid-Base Accounting Data and Metals Concentrations for the Goldboro Project (GEMTEC, 2018)

Lithology	Mine Component	Statistic	Au (g/tonne)	Paste pH	Total Sulphur (Wt.%)	Total Inorganic Carbon (Wt.%)	Acid Production Potential (AP)	Neutralizing Potential (NP)	Net NP (NNP)	NP/AP (NPR)	ARD Classification	Ag	As	Cd	Cr	Cu	Fe	Mo	Ni	Pb	Se	Tl	Zn
Un-mineralized Greywacke (n=12)	Waste Rock/ Pit Wall	Min	0.01	8.0	0.02	0.01	0.56	4.71	-3.07	0.61	-	<0.2	10	<5	47	6	19,574	1.0	10.2	8.9	<5	<5	31
		Median	0.02	9.0	0.09	0.03	2.70	9.95	6.90	3.89	NAG	**0.50**	**111**	<5	**158**	20	26,589	1.0	20.0	26.7	<50	<50	95
		Max	0.23	9.3	0.39	0.10	12.30	16.30	12.20	22.61	-	**1.60**	**1,565**	<5	**1,217**	47	50,336	**11.2**	34.8	**719.9**	<50	<50	**356**
Un-mineralized Argillite / QTZ Vein (n=2)	Waste Rock/ Pit Wall	Min	0.01	8.9	0.01	0.01	0.20	2.20	2.00	1.70	-	<0.2	7	<5	76	6	4,645	1.0	4.1	9.4	<5	<5	10
		Median	0.04	9.1	0.06	0.02	1.90	4.20	2.30	6.35	NAG	<0.35	**259**	<5	77	22	21,693	**5.5**	20.3	38.5	<50	<50	89
		Max	0.07	9.2	0.12	0.03	3.60	6.20	2.60	11.00	-	<0.5	**510**	<5	78	38	38,740	<10	36.5	67.7	<50	<50	168
Un-mineralized mixed lithologies (n=7)	Waste Rock/ Pit Wall	Min	0.01	8.2	0.03	0.01	0.80	5.20	-11.50	0.30	-	<0.2	21	<0.5	62	12	29,297	<1	26.7	9.1	<5	<5	58
		Median	0.02	9.0	0.10	0.04	3.09	7.70	6.50	3.12	NAG	**0.5**	**44**	<0.5	73	22	37,118	**10.0**	30.8	54.2	<50	<50	104
		Max	0.22	9.4	0.56	0.11	17.40	24.20	23.40	30.90	-	**2.645**	**492**	<0.5	149	53	46,954	**11.9**	41.0	**863.3**	<50	<50	**474**
All un-mineralized lithologies (total) (n=21)	Waste Rock/ Pit Wall	Min	0.01	8.0	0.02	0.01	0.56	2.20	-11.50	0.30	-	<0.2	7	<5	47	6	4,645	<1	4.1	8.9	<5	<5	10
		Median	0.02	9.0	0.09	0.03	2.95	7.90	6.40	3.55	NAG	**0.5**	**63**	<5	79	22	30,583	**10.0**	24.5	**28.2**	<50	<50	98
		Max	0.23	9.4	0.56	0.11	17.40	24.20	23.40	30.90	-	**2.645**	**1,565**	<5	**1,217**	53	50,336	**11.9**	41.0	**863.3**	<50	<50	**474**
Marginal Grade Ore (n=3)	Temporary Stockpile / Pit Wall	Min	0.43	8.1	0.18	0.04	5.50	6.10	-8.60	0.60	-	<0.2	**34**	<5	67	22	20,562	<1	11.9	10.3	<5	<5	56
		Median	0.53	8.9	0.38	0.05	12.00	8.97	-3.03	0.75	PAG	**0.35**	**774**	<5	108	30	33,114	<5.5	25.8	**144.6**	<27.5	<27.5	216
		Max	0.69	9.0	0.76	0.05	23.70	15.10	0.60	1.10	-	**0.961**	**3,897**	<5	179	42	48,844	<10	49.6	**356.8**	<50	<50	**414**
Ore (n=8)	Mill & Tailings / Pit Wall	Min	1.06	7.9	0.04	0.01	1.28	5.00	-71.0	0.1	-	<0.2	**33**	<5	79	14	9,815	<1	9.4	<5	<5	<5	33
		Median	2.96	8.6	0.44	0.02	13.60	6.37	-8.0	0.4	PAG	0.255	**1,122**	<5	190	31	45,537	1.0	35.7	23.8	<5	<5	95
		Max	6.63	9.1	2.46	0.05	76.88	14.37	9.1	8.1	-	**3.57**	**10,454**	<5	355	64	64,650	<10	50.8	**1,307.0**	<50	<50	**1,289**

Notes:
Elements greater than 5XCA are bolded
Elements with Reportable Detection Limits greater than 5XCA are underlined

6.1.2.2 Results

The results of the static testing for both rounds of sampling, and the detailed analytical results are provided in are summarized in the 2018 GEMTEC ML/ARD report in Table 12 and Tables B.1 through Table B.3 in Appendix B, respectively. The RPC laboratory reports are provided in Appendix C of the GEMTEC report. The results for all the samples analyzed as part of the sampling programs are presented below; however particular emphasis is placed on the analysis and interpretation of results for samples collected from within the pit as these directly relate to the potential for ML/ARD issues associated with the Project.

6.1.2.3 Sulphur Abundance and Speciation

The results of the total sulphur and sulphate sulphur speciation analysis are summarized by lithological unit and mine component in Table 12 of the ML/ARD GEMTEC report. Detailed results are presented in Table B.1 in Appendix B of the GEMTEC Report. The concentration of total sulfur in the samples analyzed were relatively low, ranging from <0.005% to 2.55%. A comparison of the total sulphur concentrations in the pit samples with the analytical results for sulphur speciation indicates that the dominant sulphur species is sulphide, with sulfide typically representing approximately 92% of the total sulphur content in the samples. Based on provided geological and deposit data, arsenopyrite is the dominant sulphide mineral with varying amounts of galena, and much lesser pyrite, chalcopyrite, and sphalerite (Piercey, 2017). The measured total sulphur content in the samples was used to define its AP value in the ABA analysis, and assumes that sulphide is the dominant sulphur species, and that oxidation of pyrite is the primary acid-generating source. Depending on the actual composition and abundance of the sulphide mineralogy associated with the various lithological units and mine components, the actual AP for the rock materials may differ from that determined based on sulphur analysis since other sulphide mineral components will have different magnitudes of acid generation as compared to pyrite (GEMTEC, 2018).

At low sulphide sulphur concentrations, interpretation of ARD potential using NPR and NNP may not be meaningful because oxidation of small concentrations of sulphide produces low amounts of acid that may be neutralized by other mineral components in addition to carbonate. For this assessment, the Nova Scotia Sulphide-Bearing Material Disposal threshold of 0.4 wt% sulphide sulphur is used as the threshold criterion for classification of ARD potential; and samples with sulphide sulphur contents below this criterion were classified as “uncertain” even if the NPR and NNP value indicated PAG conditions. This criterion affected 10 samples (24% of the dataset), including five (5) waste rock samples (I951401, I951406, I951421, Sample 1, Sample 2), two (2) marginal ore samples (I951413, Sample 3), and three (3) ore samples (I951408, Sample 5, Sample 13), that were classified as PAG using NPR and NNP but had less than 0.4% sulphide sulphur. However, while low sulphide sulphur content may limit the potential for acid generation in a rock, MEND (2009) protocol dictates that low sulphide content alone cannot be used to fully classify the ARD potential of a rock particularly for material with low AP and NP values, since minor variations in mineralogy and associated relative rates and magnitude of acid generation and neutralization can significantly alter the predicted and resulting drainage chemistry.

6.1.2.4 Total Inorganic Carbon Analysis and Whole Rock Analysis

The results of the total inorganic carbon analysis are summarized by lithological unit and mine component in Table 12 of the GEMTEC ML/ARD report. Detailed results are presented in Table B.1 in Appendix B of

the GEMTEC report. The analyses indicated that the inorganic carbon content was low, ranging from <0.01% to 0.11%.

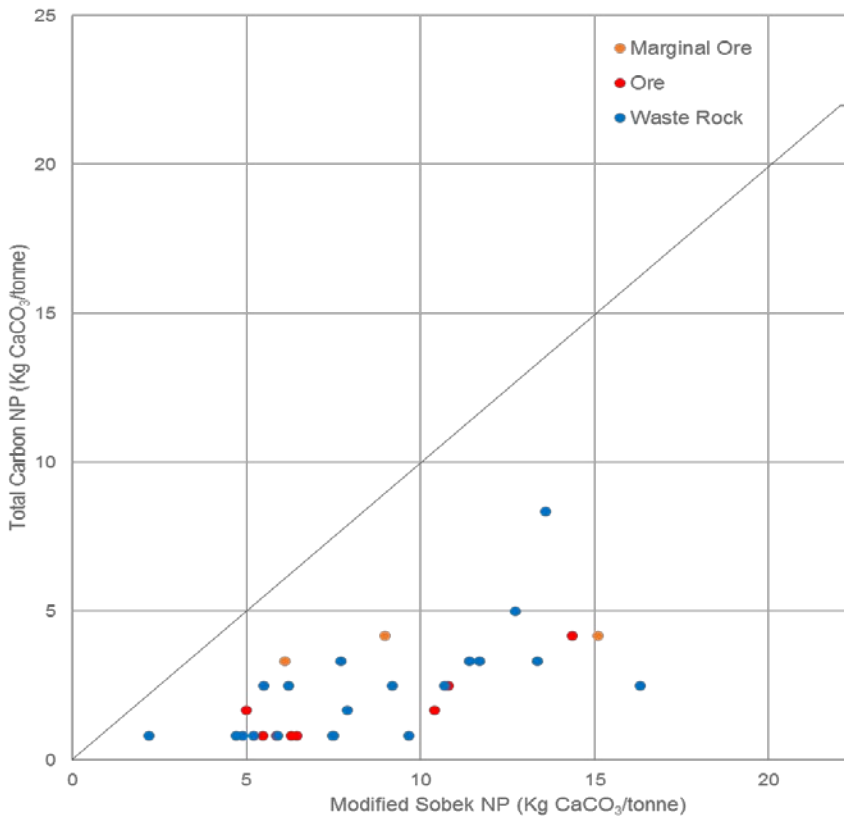


Figure 6-5: Scatter plot showing Total Carbon NP versus Modified Sobek NP for the pit samples (GEMTEC, 2018)

The measured total inorganic carbon concentrations can also be used to calculate a neutralizing capacity for the samples (Total Carbon NP) and can be compared to the determined Modified Sobek NP to better understand the mineralogy contributing to the NP of the rock. A scatterplot of Total Carbon NP (converted to the same units $CaCO_3$ kg/t) and Modified Sobek NP provided in Figure 6-5 shows that the Modified Sobek NP is greater than the Total Carbon NP for all the lithological units suggesting that non-carbonate minerals may also be contributing to the neutralization capacity of the samples.

The results of the whole rock analysis by sample are presented in Table B.2 in Appendix B of the GEMTEC ML/ARD report. Whole rock analyses confirmed the bulk composition of the lithological units and suggests that aluminosilicates are likely the most prominent source of NP in all lithologies, with Ca and Mg carbonates occurring in relatively minor quantities. However, whole rock geochemical analysis on its own does not allow for a detailed analysis of the composition and relative abundance of minerals, and mineralogical analysis is required to better understand the mineral constituents influencing the AP and NP of the rocks.

6.1.2.5 Acid – Base Accounting (ABA Results)

The results of the ABA analysis, including calculated NPR ratios and NNP values, are summarized by lithological unit and mine component in Table 12 of the GEMTEC ML/ARD report. Complete results by sample are presented in Table B.1 in Appendix B of the GEMTEC ML/ARD report.

The measured paste pH values for all the samples were above 7 indicating that all the lithological units are currently non-acidic, returning values ranging from 7.3 to 9.4 and a median paste pH of 8.8.

An estimation of the potential future net acid drainage of the presently alkaline geological material in the Project area, and more specifically within the pit, was predicted using the ABA results.

For all the samples, the ABA results show NPR ratios ranging from 0.1 to 30.9, and NNP values ranging from -71.4 to 23.4.

Specifically, with respect to the pit samples, the ore had a median NPR of 0.4 and NNP of -8.0, which indicates a likely potential for acid generation. The marginal ore had similar results, returning a median NPR of 0.75 and NNP of -3.03. Based on the ABA results, both the ore and marginal ore materials for the Project are PAG. However, several samples had low sulfide sulphur contents (<0.4 wt%) that may constrain their acid generating potential, and although ABA testing indicates PAG conditions, these samples have been classified as “uncertain”. Further, one (1) sample of ore (I951408) and one (1) sample of marginal ore (Sample 3) had NPR values between 1 and 2 and NNP values between >-20 and <20 and were further evaluated using Net Acid Generation (NAG) testing. The NAG pH for both samples was below 4.5, returning values of 3.0 and 3.4, respectively (see Table B.1 in Appendix B), and therefore both these samples remain classified as “uncertain”.

The waste rock material had a median NPR of 3.55, which suggests that this material has low potential for acid generation. Further, the NPR results did not vary significantly between the different waste rock lithological units. Based on the ABA results, the waste rock materials are generally considered NAG. However, four (4) of the waste rock samples (I951401, I951406, Sample 1, and Sample 2) returned NPR values less than 1.0 but had low sulfide Sulphur contents (<0.04 wt%) and are therefore classified as “uncertain”. Two (2) samples (Sample 6 and Sample 12) had NPR values between 1 and 2 and were further evaluated using NAG testing. The NAG pH for both samples was above 4.5, returning values of 6.2 and 7.3, respectively (see Table B.1 in Appendix B), and are therefore classified as NAG.

The NNP values for the waste rock material ranged from -11.50 to 23.4 and with a median of 6.4 suggesting that the material is only mildly alkaline and has the potential to either become acidic or remain neutral.

Only one (1) sample (I951408 in BR-17-02) was collected from the pit wall material and returned a NP/AP value of 1.2, and a NAG value of 3.0 and is therefore classified as “uncertain”.

6.1.2.6 Multi-Element ICP-OES Analysis

The purpose of this analysis is to determine the concentrations of a suite of metals that may provide an indication of the leaching potential of the lithological units present in the pit and associated with the various Project components. Concentrations of metals can be compared to average crustal abundances of these elements to highlight potential enriched metal concentrations that may be a ML concern because

of in-situ weathering of the rock. To determine potential metals enrichment and ML concerns for the Project, the analytical results for the Canadian Counsel of Ministers of the Environment (CCME) regulated metals (arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), lead (Pb), molybdenum (Mo), Nickel (Ni), selenium (Se), silver (Ag), thallium (Tl) and zinc (Zn)) were compared to five (5) times their normal crustal abundance. Note mercury (Hg) is also a regulated metals parameter but was not analyzed as part of the Round 1 and Round 2 testing programs.

The results of the multi-element analysis for the above CCME regulated metals are summarized by lithological unit and mine component in Table 12 of the GEMTEC ML/ARD report and complete results by sample are presented in Table B.3 in Appendix B of the ML/ARD GEMTEC report. The bold numbers in the tables indicate values that are greater than five (5) times the concentration in typical crustal rock. For all the lithologic units, as had mean concentrations that exceeded five (5) times crustal concentrations. In addition, exceedances in Ag, Cr, Mo, Pb, and Zn were also noted in several individual samples from the various lithological units.

The reported detection limits were greater than the five (5) times crustal concentration values for Cd, Se, and TI, and therefore the ML potential for these metals could not be assessed. Further work will be initiated to determine ML characteristics of the ore samples. If there is a possibility of the ML leaching within the project footprint mitigation measures would be developed prior to project start up.

6.1.2.7 Conclusions

Based on the static ML/ARD test work completed to date, GEMTEC has provided the following conclusions:

- Ore and marginal ore should be treated as PAG. Permanent subaqueous disposal is the preferred ARD prevention option for long term storage of the ore tailings. Design of the marginal ore stockpiles should account for the management of PAG material to prevent any acid generation, and potential poor-quality drainage. The recommended approach is lining of the ore and marginal ore pads combined with lined leachate and runoff collection ditches directing water to the TSF.
- Waste rock is generally considered NAG. However, there were samples within the dataset of waste rock lithological units that were classified as uncertain due to their low NPR and NNP values, and despite having associated low sulphide contents (<0.4%), have the potential to generate acid where the corresponding NP values are low. As such, without further testing, planning should account for management of PAG rock within the waste dump to prevent any acid generation.
- Pit wall exposures are expected to be a mix of PAG and NAG rock, and management of the drainage in and out of the pit will be required, at least during operations. Given the relatively short life of the deposit, post closure flooding will prevent any acid generation if the flood level is expected to be at or near the crest. If sufficient flooding to cover the exposed PAG wall rock is not expected, long term drainage issues will need to be addressed.
- ML potential is primarily for As, Ag, Cr, Mo, Pb, and Zn based on the observed enrichment of these elements in the various lithological units. Segregation and management of ARD potential will result in a level of control of ML potential in the various pit rock materials as well; although ML generation can also be associated with neutral conditions and other weathering processes besides sulphide oxidation.

6.1.2.8 Recommendations for additional ML/ARD assessment

The test work completed to date is based on the results it is anticipated that if the lithological units mined from the Goldboro Deposit are exposed to weathering (oxygen and water) that at least a portion of the resulting drainage effluent could be poor quality (low pH and high metals concentrations). In the extreme case, Anaconda may choose to treat all materials, including the waste rock, as PAG and plan to employ appropriate engineered preventative measures (subaqueous disposal, covers, etc.). Alternatively, further ML/ARD sampling and testing will be carried out on the rock material to better characterize and define the spatial distribution and volumes of the PAG and NAG waste rock materials in the pit. This additional work will determine the complexity of the ML/ARD management requirements and determine if less rigorous and costly measures can be employed to prevent poor quality effluent drainage from the open pit and waste deposits during operations and post-closure.

Anaconda intends to conduct additional ML/ARD test work for the waste rock include kinetic testing (e.g. humidity cell testing or other appropriate methods) to determine such kinetic issues such as rates of reaction, time to onset of ARD and approximate length of time for ARD generation, as well as leachate quality.

Also, in conjunction with kinetic testing, mineralogical analysis be completed for the Project's lithological units to determine the major sulphide and silicate and carbonate minerals and their abundances. This mineralogical data is necessary to be able to qualify rates and extent of acid producing and neutralizing reactions determined through kinetic testing, and only indicated in a gross sense by the existing static test analytical data.

As an experienced gold-producing company Anaconda is confident that the pre-existing conditions on the Site as well as the perceived impacts the implementation of the Project will have upon the Site are manageable. Anaconda will take periodic samples from the ore, marginal, and waste extracted during the mine life and continually revaluate the ML/ARD generating potential of the material removed from the pit according to typical mining practices. This will be done on a regular schedule according to tonnes extracted, as well as whenever a significant change in lithologies is reached during production. Further discussion with NSE is needed to determine the frequency with which this will occur.

6.1.3 Surface Water and Hydrology

6.1.3.1 Methodology Overview

The mathematical models and procedures used in this preliminary analysis integrate precipitation data from neighbouring Environment Canada weather stations with site-specific data (topography, soil, and precipitation) to assess the hydrologic response and hydraulic capacity of the existing culverts. Existing flows within the Site were quantified using a hydrologic model developed in the PCSWMM Stormwater modelling software using the SWMM 5 engine. The hydrologic input was derived using spatial interpolation procedure and site-specific physical parameters. A hydraulic model was also created to assess existing culverts using the CulvertMaster model.

6.1.3.2 Site-Specific Precipitation Input

This preliminary analysis used a natural neighbour (NN) spatial interpolation procedure to generate precipitation data for a variety of return periods (2, 5, 10, 25, 50 and 100 years) and durations (5, 10, 15 and 30 min, and 1, 2, 6, 12 and 24 hr). The application of the NN method allowed for the derivation of site-specific precipitation patterns based on neighbouring site information, mitigating the spatial and temporal variability concerns associated with using time-series data from a single weather station outside of the Study Area. The NN interpolation is based on proportionate areas by finding the closest subset of input data points (Table 6-13) and applying a weighted coefficient based on proximity to the desired location (Simonovic et al., 2016). The calculations were performed using an online tool available through the University of Western Ontario (Srivastav et al., 2015) where coordinates are entered for the desired site location and output is in the form of site specific precipitation data tables (both intensity and volume) for a range of return periods (2, 5, 10, 25, 50 and 100 years) and storm durations (5, 10, 15 and 30 min, and 1, 2, 6, 12 and 24 hr). Further information pertaining to the NN spatial interpolation procedure can be found in Sibson (1981) and Simonovic et al. (2016), which are cited in the attached Hydrology Report performed by WSP. The output of the NN algorithm for the Site is summarized in Section 4 of the Hydrology Report in the form of average maximum annual precipitation volume for each of the storm durations listed above.

6.1.3.3 Atmospheric Environment Service (AES) Distribution

The annual maximum series (AMS) for the Site derived using the NN procedure described in Section 3.2 of the Hydrology Report (WSP, 2018) was fit to an Atmospheric Environment Service (AES) distribution for a 12-hour duration design storm for use in the PCSWMM model. The 12-hour duration storm is regional specific and suitable in producing a temporal distribution representative of the convective shower and synoptic scale cyclonic circulation events relevant for Canadian flood hydrology studies (Hogg, 1980-1982). The general form of the AES distribution is shown in Figure 6-6**.**

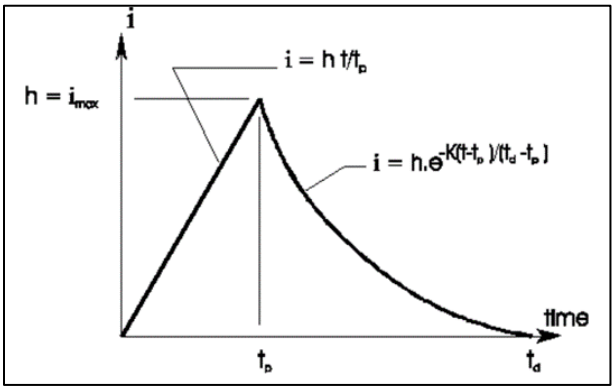


Figure 6-6: Canadian AES Design Storm (Hogg 1980) (WSP, 2018)

The design hyetograph features a linear rising portion followed by an exponentially decreasing recession curve where i_{max} is the maximum rainfall intensity, t_d is the duration in minutes, t_p is the time to peak intensity in minutes and K the decay coefficient. Time to peak and decay coefficient are regionally specific

values that can be found in Watt et al. (1986). The annual precipitation volumes for each recurrence interval was fit into a corresponding AES design storm to serve as input into the PCSWMM hydrologic model to drive the event-based rainfall-runoff analysis.

6.1.3.4 Catchment Areas

The Site was subdivided in seven (7) catchment areas for the hydrologic/hydraulic analysis: 101 through 107. Five (5) of the catchment areas, 101 to 105, were delineated using the culvert location as reference points. Catchments 106 and 107 were delineated using the location where Gold Brook west branch joins the main channel, 106 drains to the west branch and 107 drains to the main channel. Figure 6-7 depicts all catchment areas within the area of the Project, new installed on-site rain gauge and claim boundary.

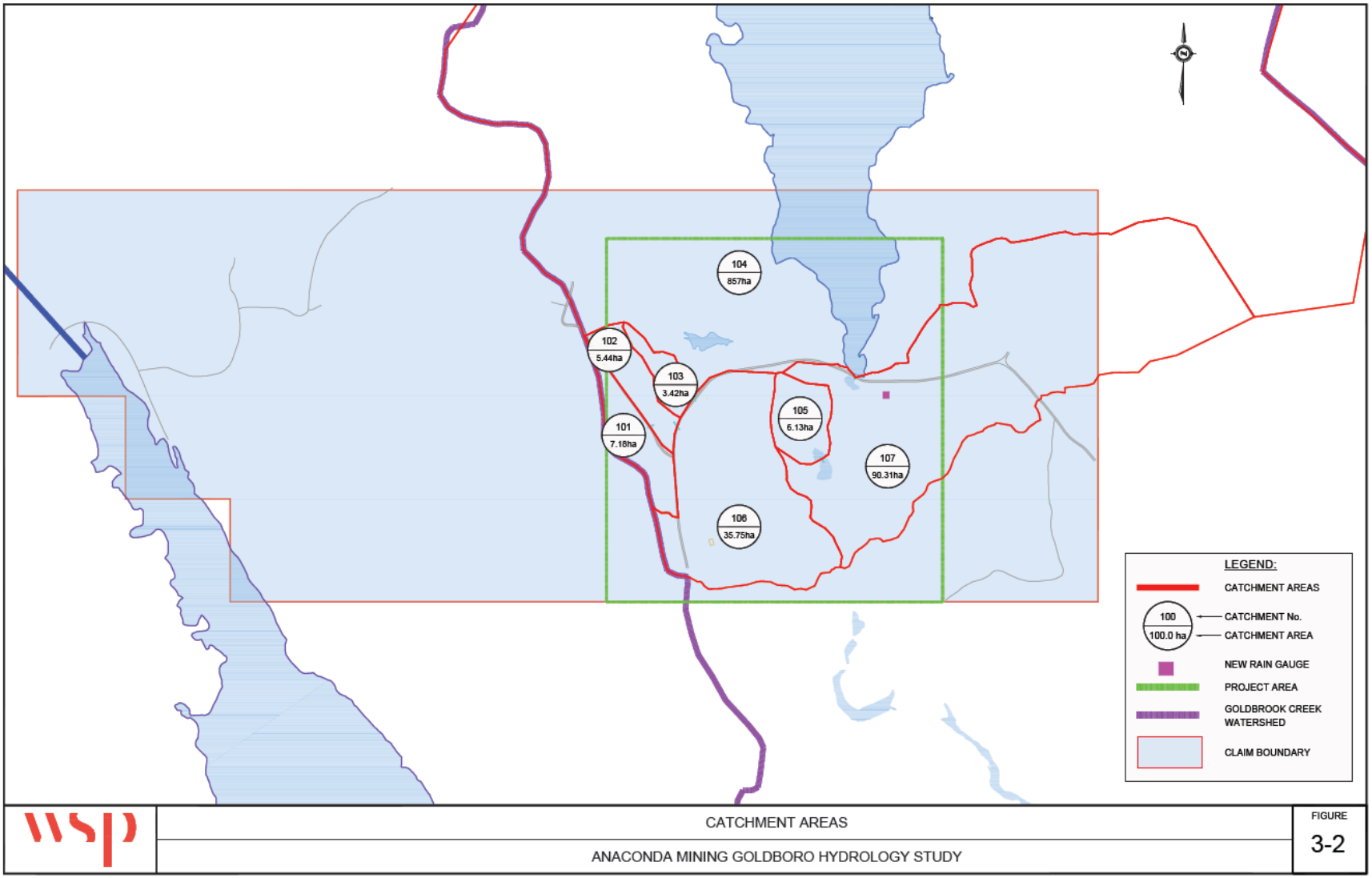


Figure 6-7: Catchment Areas (WSP, 2018)

A breakdown of catchment areas and receiving culverts is provided in Table 6-5.

Table 6-5: Goldboro Mine Site Catchment Areas and Receiving Culverts (WSP, 2018)

Sub-Catchment ID	Area (ha)	Receiving Culvert ID / Conveyance
101	7.18	C-01
102 & 101	12.62	C-02
103	3.42	C-03
104	857	Gold Brook Lake and C-04 & C-05
105	6.13	C-06
106	126	Gold Brook west branch
107	13.38	Gold Brook main channel

6.1.3.5 PCSWMM Modelling

The PCSWMM modelling software was used to estimate the hydrologic response of the catchments under storm events with 12 hr duration and recurrence intervals. The design storms served as input into PCSWMM to facilitate the event-based runoff analysis of the Site. Figure 6-8 illustrates the PCSWMM model of the Site.

The Site was sub-divided into 7 drainage areas based on natural topography, overland flow routes and culvert locations. Figure 6-8 shows the schematic for the PCSWMM model. The undeveloped land was represented in PCSWMM using a Manning's roughness coefficient (Manning's n) of 0.24 representative of dense grass for all pervious surfaces (Rossman, 2010) (see the Hydrology Report performed by WSP). Runoff from catchments 101 to 105 is conveyed through the existing culverts. A full list of input parameters for the Site PCSWMM model are provided in Appendix C of the Hydrology Report. The results of the rainfall-runoff model design-event simulation are presented in Section 4.3 of the Hydrology Report (WSP, 2018).

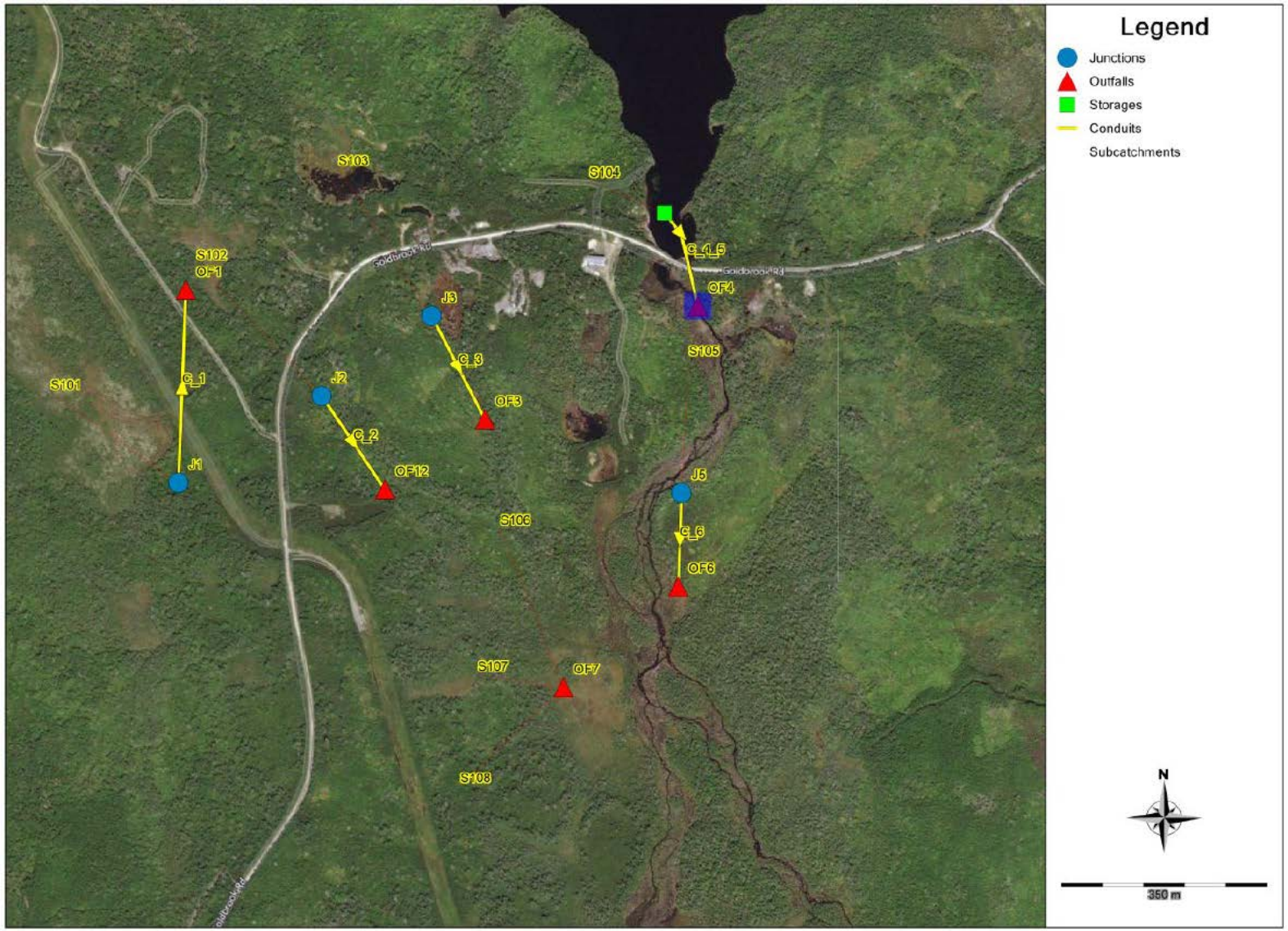


Figure 6-8: PCSWMM Hydrologic Model Schematic (WSP, 2018)

6.1.3.6 Hydrologic and Hydraulic Analysis

Overview

Annual precipitation for the Site was assumed based on the closest rain gauge location (Eddy Point). The Site is expected to receive on average 1,184 mm of annual precipitation, 17% of which will fall as snow. As shown in Table 6-6 and Figure 6-9, the wettest period in terms of rainfall is expected to be the fall months from September to November while the warmest season will be the summer period from June to September when the approximate average daily high temperature is 16ºC.

Table 6-6: Estimated Monthly Precipitation and Daily Temperature Averages (WSP, 2018)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Rainfall	63	47	66	70	93	93	85	80	104	105	103	73	980
Snowfall	55	45	41	16	2	0	0	0	0	0	12	43	215
Temp (ºC)	-7	-6	-2	4	10	15	18	18	14	8	3	-3	

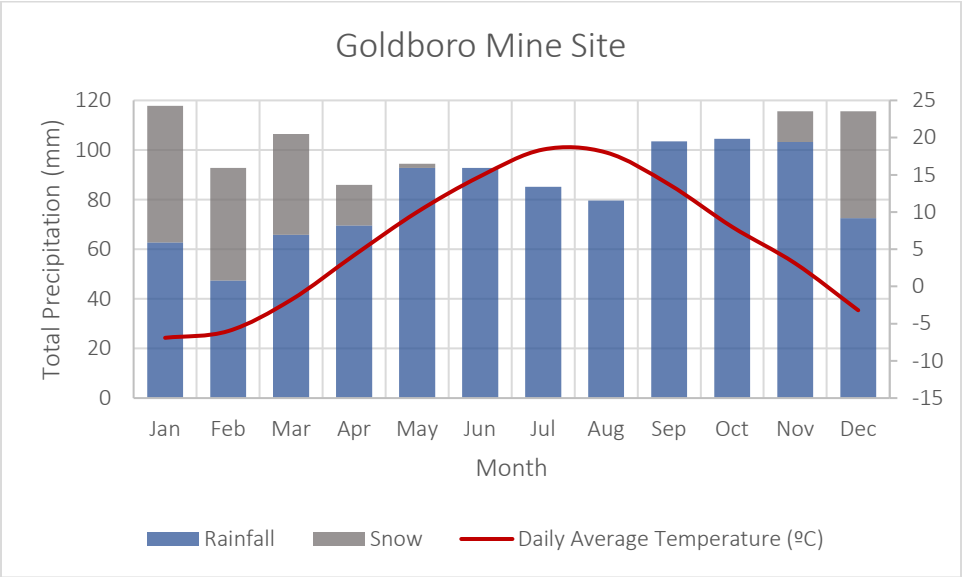


Figure 6-9: Estimated Monthly Precipitation and Daily Temperature Averages (WSP, 2018)

Atmospheric Environment Services (AES) Intensity-Duration-Frequency

Derived intensity (mm/hr) and volume (mm) values using the method described in Section 3.3 of the Hydrology Report performed by WSP are presented in Table 6-7 and Table 6-8 for the 2, 5, 10, 25, 50, and 100 year design storms using the AES distribution.

Table 6-7: Goldboro Mine Site Storm Intensity-Duration-Frequency (mm/hr) (WSP, 2018)

T (years)	2	5	10	25	50	100
5 min	60.1	78.3	91.5	110.1	125.8	143.3
10 min	7.6	62.2	71.2	82.3	90.4	98.5
15 min	41.8	54.7	62.7	72.2	78.8	85.2
30 min	28.3	38.5	46.4	58.0	67.9	79.1
1 h	20.1	27.1	32.1	39.0	44.5	50.3
2 h	13.7	17.4	20.2	24.6	28.6	33.5
6 h	7.0	8.7	9.7	11.1	12.2	13.3
12 h	4.5	5.5	6.0	6.7	7.1	7.5
24 h	2.8	3.3	3.6	3.9	4.0	4.2

Table 6-8: Goldboro Mine Site Storm Volume-Duration-Frequency (mm) (WSP, 2018)

T (years)	2	5	10	25	50	100
5 min	5.0	6.5	7.6	9.2	10.5	11.9
10 min	7.9	10.4	11.9	13.7	15.1	16.4
15 min	10.4	13.7	15.7	18.0	19.7	21.3
30 min	14.1	19.3	23.2	29.0	33.9	39.5
1 h	20.1	27.1	32.1	39.0	44.5	50.3
2 h	27.3	34.8	40.5	49.1	57.1	67.0
6 h	42.0	51.9	58.4	66.8	73.2	79.5
12 h	54.4	65.7	72.3	79.8	84.8	89.4
24 h	66.0	78.5	85.2	92.3	96.9	100.9

Hydrologic Analysis

Runoff flows and catchment delineation map outlining the discretization of the 107.5 ha watershed and the general flow direction were used for the preparation of the hydrologic model. Table 6-9 presents the peak runoff flows for each of the 7 catchments. Catchment areas and parameters served as input into the hydrologic modelling software PCSWMM to quantify the runoff hydrograph for each of the catchment areas. The purpose of the peak flow estimation is to understand the hydrologic response of the Site and to estimate the hydraulic capacity of the existing culverts.

Table 6-9: Catchment Areas Peak Flows (WSP, 2018)

Catchment	Peak Flows (m^3/s)					
	2-year	5-year	10-year	25-year	50-year	100-year
101	0.14	0.20	0.25	0.29	0.32	0.35
102	0.18	0.27	0.33	0.39	0.44	0.49
103	0.05	0.07	0.09	0.10	0.12	0.13
104	2.75	4.50	5.69	7.12	8.15	9.12
105	0.12	0.17	0.20	0.24	0.27	0.29
106	0.38	0.61	0.77	0.96	1.09	1.21
107	0.60	0.95	1.18	1.46	1.65	1.83

PCSWWM hydrologic modelling parameters and modelling output files are in the Hydrology Report performed by WSP in Appendix C and Appendix D, respectively.

Hydraulic Analysis

Under existing conditions, three of the six culverts (culverts C-01 to C-03) were evaluated for using the CulvertMaster modelling software. Peak flows obtained by using the 12-hour AES distribution were used for the assessment. All design storms (2-year to 100-year) peak flows, along with the physical culvert characteristics (e.g. inverts, size, and length) were used as input parameters to the PCSWMM model to determine hydraulic capacity for each analyzed culvert. Hydraulic modelling output files are included in the Hydrology Report performed by WSP in Appendix E. A summary of the input parameters is shown in Table 6-10.

Table 6-10: Culvert Maximum Hydraulic Capacity (WSP, 2018)

Culvert ID	C-01	C-02	C-03
Length (m)	5.10	10.40	10.40
US Invert	72.01	67.09	68.76
DS Invert	71.96	66.94	68.68
Slope	0.98%	1.44%	0.77%
Tailwater	72.27	67.39	69.18
Material	CSP	CSP	CSP

Below is a summary of the hydraulic analysis:

C-01: For the 2-year return period the culvert inlet will not be submerged. For all other return periods 5-year to 100-year the culvert inlet will be submerged; however, no overtopping of the roadway is expected.

C-02 & C-03: Culvert inlet won't be submerged for any of the return periods and no overtopping of the roadway is expected.

Preliminary Site Arrangement

The preliminary site arrangement for the proposed operations will inform several stormwater management and hydraulic design decisions. The recommendation/conclusions provided below are preliminary and should be further investigated in subsequent studies.

Open Pit

The proposed open pit is in a wetland within Catchment area 104 (Figure 6-7). This wetland currently drains to Gold Brook Lake. It is recommended for runoff proceeding from the dewatering of the wetland to be directed as in the existing condition to Gold Brook Lake. The lake will provide peak flow attenuation and would minimize the impact on Gold Brook due to the wetland dewatering.

Tailings Storage Facility

The proposed tailings storage facility is located mostly within Catchment 106 and partially on Catchments 105 and 107. This strategic location helps intercept and control any runoff proceeding from the tailings storage facility before it reaches Gold Brook.

Water Supply

Gold Brook Lake is the ideal water body for the mine water supply, due to its proximity to the Site and its size. Additional studies are recommended.

Waste Rock and Overburden Stockpile

The proposed waste rock and overburden stockpile are located within Catchment 104. Runoff from the stockpiles can be intercepted with perimeter ditching and diverted to a pond prior to reaching Gold Brook Lake.

Sediment Pond 1

Sediment pond 1 will be located downstream of the proposed stockpiles and the open pit area. Its location will permit control runoff proceeding from these facilities prior to reaching Gold Brook Lake.

Figure 6-10 shows the preliminary site arrangement and highlights the location of the facilities discussed in this section. There are no proposed works outside of the Gold Brook watershed.

The mine development area is in the Gold Brook Watershed (1EQ-SD31) close to the divide of the Isaac's Harbour Watershed (1EP-SD1) and Isaac's Harbour River Watershed (1EP-1).

Within the Gold Brook drainage area, the key components relative to the Site are Gold Brook Lake (formerly Seal Harbour Big Lake, which drains southward to Seal Harbour via Gold Brook), Seal Harbour Lake, and West Brook (Figure 6-12).

The drainage area of Gold Brook Lake has been highly impacted by previous mining activities, particularly to the south of the lake. The original gold mill was located on the southwest shore of Gold Brook Lake. The area has been largely cut over and is now covered by a secondary growth of tag alders, maple, birch, spruce, balsam and tamarack. Some additional clearing of trees has occurred because of the current exploration activities. Mill tailings were dumped directly into the lake and to the south adjacent to Gold Brook. Over time the tailings have been transported downstream, and because of flood waters have spread over the flood plain of Gold Brook. The tailings are now predominately covered by moss and so are relatively stabilized. Two tailings ponds, used for the disposal of arsenic and cyanide wastes, are also located to the south of the lake. These areas are somewhat re-vegetated except in areas where contamination appears to have inhibited regrowth.

The areas which have historic tailings deposited within them are either within the footprint of the planned location of the tailings storage facility or will not be impacted by the Site construction. These historic tailings that are within the planned footprint of the tailings storage facility should not be allowed to mix with the tailings produced from the Project. These tailings have elevated arsenic and mercury levels and allowing them to mix with the bulk of the newer tailings would make remobilization of these potent chemicals possible. Anaconda is looking at different methods of mitigating this possibility, with construction of a containment cell(s) or removal to a different location currently the most attractive options. The areas around where historic tailings have been deposited will be continually monitored and the results compared to the baseline sampling to ensure that these tailings do not become remobilized as a side effect of the construction work occurring.

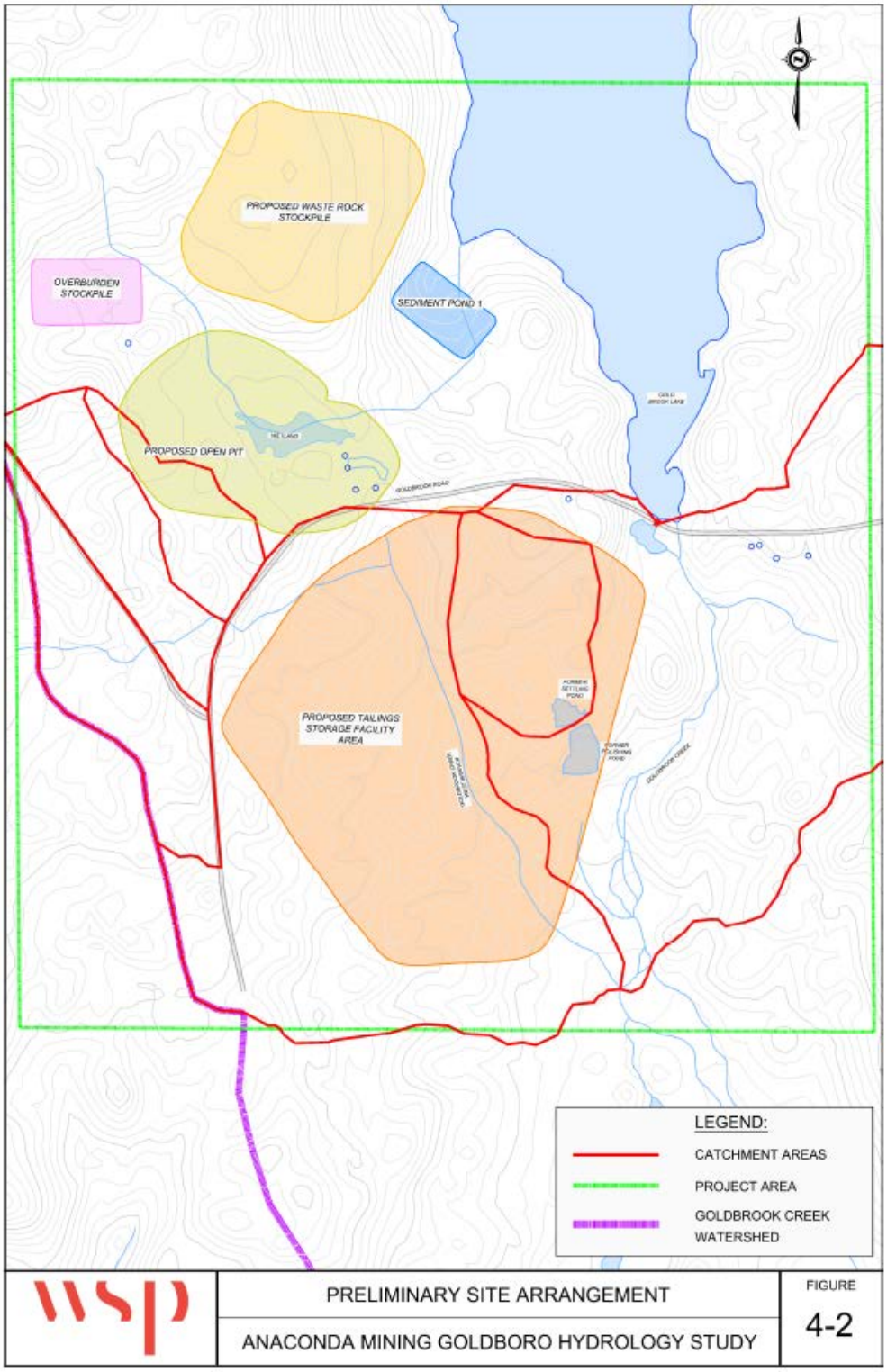


Figure 6-10: Preliminary Site Arrangement (WSP, 2018)

6.1.3.7 Surface Water Resource Utilization

Anaconda will apply for a Water Withdrawal Approval permit for water withdrawal from Gold Brook Lake. The water intake will be located at the southwestern side of the lake.

There are currently no other water withdrawal permits within the Gold Brook watershed.

6.1.3.8 Channel Morphology

The watershed has somewhat irregular single channel systems everywhere except where Gold Brook splits into two channels immediately to the south of Gold Brook Lake. These two channels reunite into one about one kilometre downstream of the lake.

There is no direct bedrock outcrop control of channel morphology. However, Gold Brook does follow a pronounced fault system lineation.

Field inspection revealed an abundance of boulders within the flood plain of Gold Brook. Stony till has caused some lateral migration of the main channel. Gold Brook was subjected to excessive sediment loading due to tailings disposal in the past. The result is an increase in the degree of meandering of the brook. Gold Brook now occupies a broad, flat, boulder-filled, and swampy flood plain. It is apparent that during spring runoff and other high flow periods, the brook would occupy a much wider channel than that observed during September flow conditions.

6.1.3.9 Water Discharge

Given the humid climate, geology, and vegetation growth of the area, it is expected that precipitation infiltration and interflow into the soil horizon above the till would predominate.

Stream baseflows would be provided by the glacial till/bedrock hydro stratigraphic units. Given the relatively low permeability of these units, low summer flows would be expected to be low unless significant surface storage is available.

Stream discharge data is only available for Liscomb River at Liscomb Falls and for the St. Marys River at Stillwater. Although topographic relief, geology, and climate are similar to the Study Area, these streams have much larger drainage basins of 389 and 1,350 km^2, respectively. To date no discharge monitoring has been undertaken on Gold Brook. Correlations of the Gold Brook basin to the Liscomb Rivers and St. Marys River are difficult to make.

6.1.3.10 Water Quality

A water quality sampling program was undertaken at pre-determined sampling points within the Study Area. The scope of work for the water quality monitoring included:

- Collection of 12 surface water samples from flowing watercourses;
- Collection of one (1) groundwater source (historic mine shaft); and
- A field duplicate sample as per Quality Assurance / Quality Control (QA/QC) protocol.

6.1.3.11 Methodology

A desktop study was conducted prior to the monitoring program to determine the location of waterbodies within the Study Area. The sampling locations are as follows:

- Seven (7) surface water sampling points were selected to evaluate general property conditions (WS1, WS2, WS3, WS5, WS9, WS10, and WS11);
- Five (5) surface water sampling points at historic tailings ponds and / or their outlets (WS4, WS6, WS7, WS8 and WS12);
- Several mine shafts are located throughout the Study Area; however, during a field investigation of the mine shafts on June 11, 2017, only one (1) shaft contained water (MS1); and
- Proper QA/QC protocols were followed including the submission of a duplicate sample for laboratory analysis (Duplicate).

Sampling locations are presented in Figure 6-11. This map shows the samples taken by GEMTEC during their Baseline Ecological Study, however, WSP also took two (2) surface water samples, one (1) from the southern end of Gold Brook Lake and one (1) from the settlement pond (just north of WS4 in Figure 6-11).

Figure 6-11: Water Sampling Locations and Study Area (GEMTEC, 2018)

Grab surface water samples were collected on June 10th, 2017 (WS10) and June 11th, 2017 (all other samples). When collecting from the tailings pond locations, efforts were made to collect from outflows when possible. Otherwise, samples were collected from ponded water reachable from the bank of the pond. Samples collected from flowing watercourses and drainage channels were collected in water reachable from the bank of the channel. The duplicate sample (Duplicate) was collected at the same location and time as WS3.

The laboratory-supplied bottles were used for sample collection. Temperature (degrees Celsius), conductivity (µS/cm), dissolved oxygen (mg/L), and pH were measured using a calibrated YSI-556 multi-meter. Water quality readings were taken while the probe rested on the watercourse bed without being submerged in fine substrate. GPS coordinates and photos were also captured at each sample location. All samples were stored in laboratory supplied coolers with ice to maintain temperatures +/- 5°C. Samples were submitted to Atlimax Couriers on June 12th, 2017 for delivery to AGAT Laboratories on June 13th, 2017. The laboratory submission form shows samples were measured at 4°C at the time of arrival. Water samples were analysed for general chemistry, total metals and petroleum hydrocarbons (benzene, toluene, ethylbenzene, xylenes (BTEX) and modified total petroleum hydrocarbons (TPH)), and the results were compared to the CCME FWAL and NSE Tier 1 EQS.

6.1.3.12 Drainage Basic Morphology

The Gold Brook drainage basin is roughly rectangular and encompasses an area of 2,976 hectares based upon 1: 50,000 scale mapping (NSDOE, 1980). It is oriented generally northwest-southeast, positioning it roughly perpendicular to bedrock strike and generally parallel to known regional fault trends. Gold Brook essentially follows the lineation created by a major northwest-southeast oriented fault system (Keppie, 1983). The basin drains into the head of Seal Harbour.

The low, gently undulating to rolling topographic relief within the basin rises from 0 m geodetic at the mouth to a maximum height of 76 m geodetic in the northern headwaters of Gold Brook Lake. This gives an overall longitudinal topographic gradient of 1% down the axis of the basin. The relief has created five (5) main lakes within the system named: Gold Brook Lake, Rocky Lake, Seal Harbour Lake, Hay Lake, and Three Corner Lake. Approximately ten (10) much smaller, unnamed lakes are also located within the basin.

Recent bathymetric mapping undertaken by the Nova Scotia Department of Fisheries (1986) indicates that Gold Brook Lake attains a maximum depth of 3 metres in places, but in general averages about 2 metres in depth. Depths of the other lakes in the drainage basin are unknown but are likely of a similar shallow depth.

The lakes in total encompass about 187 hectares or 6% of the watershed. The drainage density is relatively low at 0.53 km/km^2 (based upon 1: 50,000 maps).

6.1.3.13 Summary of Findings

Petroleum hydrocarbon analytical results are presented in the 2017 Ecological Baseline Studies (Goldboro) by GEMTEC in Table 2 (Appendix I), general chemistry analytical results are presented in Table 3 (Appendix I) and total metals analytical results are presented in Table 4 (Appendix I). Laboratory reports are presented in Appendix J of the GEMTEC Ecological Baseline Study. Sample locations and coordinates are presented in Figure 7 and Table 1 (Appendix I) of the GEMTEC Ecological Baseline Study, respectively.

With respect to the NSE Tier 1 EQS and the CCME FWAL guidelines, the following exceedances are noted:

- Aluminium exceeded the NSE Tier 1 EQS guideline limit in all samples;
- The concentrations of arsenic exceeded the guideline of 5 µg/L in the samples collected from WS3 (13 µg/L), WS4 (128 µg/L), WS5 (33 µg/L), WS6 (85 µg/L), WS7 (1610 µg/L), WS8 (288 µg/L), WS9 (7 µg/L), WS11 (44 µg/L), WS12 (52µg/L) and Duplicate (15 µg/L). Three samples (WS1, WS2, and WS10) containing arsenic concentrations below 5 µg/L are located upgradient of the historical mining operations / tailings ponds;
- The concentration of cadmium (0.036 µg/L) exceeded the NSE Tier 1 EQS in WS7;
- Iron concentrations exceeded the guideline limit of 300 µg/L in all samples collected within the Study Area. It is likely that high concentrations of iron are naturally occurring in this area;
- The concentration of lead slightly exceeded the guideline (1 µg/L) in WS1 (1.2 µg/L), WS3 (1.2 µg/L) and Duplicate (1.1 µg/L);
- The mercury concentration in the samples collected from WS3 (0.029 µg/L) and WS8 (0.034 µg/L) exceeded the guideline of 0.026 µg/L;
- The concentration of zinc exceeded the guideline (30 µg/L) in the sample recovered from WS12 (53 µg/L);
- The CCME FWAL does not identify ammonia guidelines in samples with a pH lower than 6.0. The pH was lower than 6.0 in eleven of the thirteen samples; therefore, it cannot be determined whether many of these samples analyzed exceeded the guideline; and
- pH was outside the CCME FWAL guideline of 6.5 – 9.0 in eleven samples. The pH ranged from 4.37 (Duplicate) to 7.49 (WS12). High acidity is typically associated with *Sphagnum* bogs (as per the conditions observed on-site).

Petroleum hydrocarbons were not detected in any of the surface water samples. Toluene was detected in water collected from the mine shaft (MS1) at a concentration of 0.008 mg/L.

Field parameters were measured at the time of sample collection:

- Water temperatures ranged from 10.4°C (WS11) to 20.1°C (WS6);
- Field pH ranged from 3.88 (WS3) to 6.79 (WS6);
- Dissolved Oxygen ranged from 3.8 mg/L (MS1) to 9.4 mg/L (WS7); and
- Conductivity ranged from 63.1 µS/cm (WS12) to 12.2 µS/cm (WS8).

Field parameters are presented in Table 5, Appendix I of the GEMTEC Ecological Baseline Study.

6.1.3.14 Site Drainage Characteristic

The Goldboro claim boundary is located within two watersheds: Unnamed watershed (name could not be stablished) and Gold Brook watershed (name was given based on creek name), which are approximately 8,523 ha and 3,761 ha respectively. The current surface property area encompasses approximately 130 ha of undeveloped land adjacent to Gold Brook Lake. The Site is located within Gold Brook watershed. The topography of the Site provides a series of valleys which produce wetlands within the Site, the natural overland drainage path flows from the northwest side to the project area southeast limits with an approximate high point of 70 m and a low point of 45 m resulting in an overall grade change of 2.2%. Runoff

from the Site currently flows overland or is conveyed through one of the six existing culverts before discharge into Gold Brook, on through Seal Harbour Lake, and ultimately to the Atlantic Ocean. The Site also receives external runoff flows from the east.

The Site has several notable features including watercourses and bodies, as well as building ruins that had served as facilities for a previous operation on the Site. Several water courses flow through the property, Gold Brook tributaries, and Gold Brook, two existing ponds (settling and polishing) and multiple wetlands. Gold Brook itself meanders through the east side of the property and outlets outside of the property to Seal Harbour Lake. The Site also features an existing core shack structure located just west of the southern tip of Gold Brook Lake. Results from the hydrogeology report indicate Silty Clay soil classification for the Site. Further details pertaining to infiltration parameters are provided in Appendix C of the Hydrology report prepared by WSP.

Figure 6-12 illustrates the Gold Brook watershed, an unnamed watershed, the Project area, and the claim boundary.

Figure 6-12: Boundary Watersheds (WSP, 2018)

6.1.3.15 Field Inspection

A field inspection of the existing site drainage features was conducted by WSP staff on December 7th, 2017. The following tasks were completed during the Site reconnaissance.

- Confirmed local drainage patterns
- Confirmed size, type, location, material, and physical condition of culverts
- Installed a rain gauge. Data from this rain gauge will be used in subsequent studies.

6.1.3.16 Culvert Inspections

Six culverts were identified for runoff conveyance during the Site investigation. A hydraulic assessment has been performed to evaluate culvert capacities and is described in detail in Hydrology Report prepared by WSP (Appendix A). A photographic inventory of existing culverts, the newly installed rain gauge and different site features is provided in Appendix A of the Hydrology Report. Assessment of existing culverts is provided in Table 6-11.

Table 6-11: Existing Culverts (WSP, 2018)

CULVERT ID	TYPE	MEASURED SIZE (MM)	FLOW DIRECTION	LENTGH (M)	RELATED PHOTO IN APPENDIX A
C-01	Circular CSP	500	SW to NE	8.9	1 and 2
C-02	Circular CSP	750	NW to SE	8.8	3 and 4
C-03	Elliptical CSP	800 x 600	NW to SE	5.1	5, 6 and 7
C-04 & C-05	Two Circular CSP (Twinned)	1800	NE to SW	10.4	8, 9, 10, 11 and 12
C-06	Circular CSP	400	NW to SE	12.1	13 and 14

C-01: Good condition, there is a drop of about 30 cm downstream between the culvert invert and channel invert and a natural pool has formed.

C-02: Downstream end could not be checked, due to the dense vegetation and steep side slopes. Upstream end seemed in in good condition.

C-03: It appeared to have been designed as open footing, since the bottom section of the culvert is missing and the bottom appears to have been cut.

C-04 & C-05: Both culverts are missing the bottom section and corrosion in that area was observed. It could not be determined if the bottom part of the culverts was intentionally removed. As shown in Photo 11 in Appendix A of the Hydrology Report, part of the bottom section of C-05 can still be seen. Both culverts have obstructions inside the barrel at the upstream end; it could not be determined if this was intentional. The culverts could have been designed this way to control flows from Gold Brook Lake (see photos 11 and 12 in Appendix A of the Hydrology Report). These culverts could not be analyzed as part of the hydraulic analysis, since insufficient information for the analysis was available.

C-06: Could not be inspected, due to the dense vegetation and steep side slopes. This culvert controls flows from the former settling pond to the former polishing pond. This culvert could not be analyzed as part of the hydraulic analysis, since insufficient information for the analysis was available.

Length, size, material and inverts for culverts C-01 to C03 were estimated on-site for the hydraulic analysis. Figure 6-13 depicts the drainage mosaic for the Site.

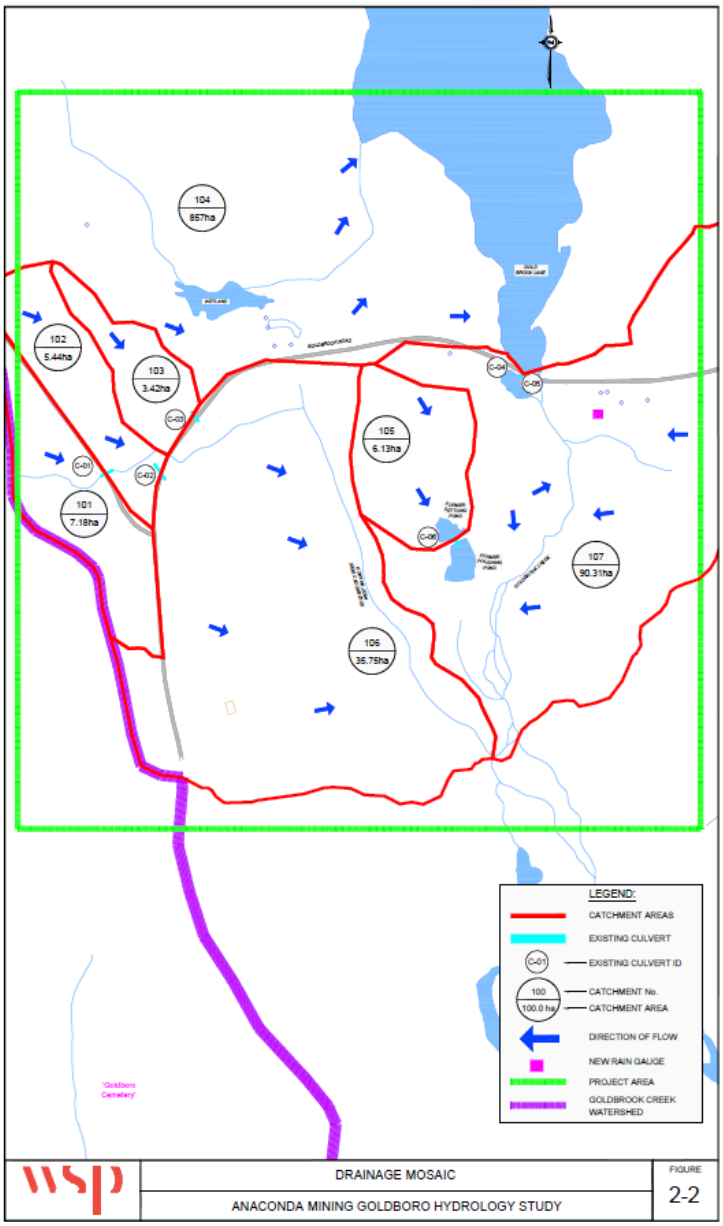


Figure 6-13: Drainage Mosaic (WSP, 2018)

6.1.3.17 Hydrometric Station

A hydrometric station was installed (by others as part of a different study) downstream on Gold Brook Lake (GB2), near culverts C-04 and C-05, and data collected from this hydrometric station was used for the preparatation of the Keltic Comprehensive Study Report. Table 6-12 is extracted from the Keltic Comprehensive Study Report, Section 4.0, Table 4.1-5, dated October 2017. It depicts the monthly summary statistics of flow values for GB2 from October 2001 to May 2003.

Table 6-12: GB2 Statistics of Flow Values (m^3/hr) (WSP, 2018)

Month	Mean	Mode	Minimum	Median	Maximum
October 2001	704	283	260	604	1,745
November 2001	1,009	566	530	943	1,769
December 2001	1,752	2,164	656	1,672	4,113
January 2002	2,168	2,000	740	1,895	5,427
February 2002	2,345	994	784	2,404	6,610
March 2002	5,161	6,873	1,488	5,033	10,324
April 2002	4,119	2,667	1,139	3,456	10,225
May 2002	2,119	1,625	617	1,895	4,770
June 2002	948	1,065	441	960	2,601
July 2002	2,167	2,277	861	2,164	3,488
August 2002	1,642	579	316	994	6,150
September 2002	1,261	316	216	1,083	3,423
October 2002	2,625	2,000	1,139	2,306	5,657
November 2002	4,609	1,973	1,555	3,390	10,850
December 2002	2,464	1,158	1,065	2,404	4,836
January 2003	1,128	1,236	484	994	3,225
February 2003	3,251	960	799	2,601	9,272
March 2003	2,004	894	670	1,745	11,507
April 2003	4,981	2,930	1,870	3,439	11,934
May 2003	3,283	3,488	815	3,521	5,789

6.1.3.18 Site Meteorology

The Site lies in a mid-temperature zone where the climate is classified as continental rather than maritime. The temperature extremes of the continental climate are moderated by the Atlantic Ocean which is situated approximately 9 km southeast of the Site. The seasonal distribution of precipitation based on the continental classification indicates higher precipitation volumes in the summer season compared to the winter. Environment Canada Weather stations closest to the Site with available precipitation data are presented in Table 6-13. The Site is expected to receive on average 1,450 mm of annual precipitation based upon the proximity to the weather stations.

Table 6-13: Rain Gauges near Goldboro Mine Site (Meteorological Service of Canada, 2018)

Location	Distance to Mine Site (km)	Historical Annual Precipitation (mm)	Projected Annual Precipitation for the 2020's (mm)
Antigonish	30	1383.3	1415.8
Guysborough	128	1425.8	1452.8

A new rain gauge was installed on-site December 7th, 2017 with the purpose of obtaining more accurate and current information. Data collected from this gauge will be utilized in subsequent studies. The location of the gauge is shown in Figure 6-13 and Figure 6-7.

6.1.4 Fish and Fish Habitat

An aquatic habitat assessment was conducted to determine the presence of any fish habitat / fish bearing watercourses within the Study Area. This assessment included:

- Determining whether fish habitat / passage was present in any areas containing surface water;
- If fish habitat was present, conduct a species presence / absence survey; and
- Conducting a steam survey of Gold Brook.

6.1.4.1 Methodology

A GEMTEC biologist determined if any encountered aquatic features (flowing or ponded waterbodies) within the Study Area contained fish habitat and / or had the potential to be fish-bearing. Fish habitat was determined by traversing the waterbody to determine the presence (or seasonal possibility) of:

- Sufficient water depths to accommodate fish;
- Adequate water quality (via field measurements of temperature, dissolved oxygen, conductivity, and pH);
- Nutrient inputs for feeding (*i.e.,* overhanging vegetation, surface water influx, woody debris, *etc.*); and / or
- Passage from Gold Brook Lake, Gold Brook or any other known fish bearing waterbodies (*i.e.,* vegetation in the stream, deadfall, beaver berm, *etc*.).

If any of these characteristics were found, a fish presence / absence survey was completed. An LR-24 Smith-Root backpack electrofisher that was powered by a 24-volt battery was used to live capture fish. Any captured fish were released into the same waterbody in which there were retrieved.

The fish habitat assessment did not include the collection of soil or sediment samples for laboratory analysis, nor the collection or analysis of Benthic Macroinvertebrate samples (BMI). Additionally, the scope of work did not include the collection of fish specimens for disease or mercury / heavy metal analysis.

6.1.4.2 Gold Brook Stream Survey

Gold Brook is known fish habitat and a significant aquatic feature that may be affected by the Project (i.e., change in inflowing water quality / quantity). As such, a stream survey of Gold Brook was conducted within the Study Area boundaries. The scope of the stream survey was as follows:

- Visual observation of bank stability, bank erosion and riparian vegetation;
- Visual assessment of the substrate size and embeddedness;
- Measurement of flow;
- Water depth and quality determination (via field measurements of temperature, dissolved oxygen, conductivity, and pH); and
- Presence / absence survey for fish.

These characteristics were assessed at sample points along the watercourse within the Study Area. The sample points were conducted at 100 m intervals downstream of the culvert outlet at Goldbrook Road (Point 1). In instances where the channel braided, a sample point was collected at each braid along a horizontal transect line and sub-labelled (i.e., Point 7A, Point 7B, Point 7C).

6.1.4.3 Physical Habitat Assessment

To characterize and determine the relative bank stability the following DFO ratings were used:

- "good" – more than 80% of the bank is stable and well vegetated;
- "fair" – 50% to 80% stable banks with minimal evidence of erosion; or
- "poor" – less than 50% stable banks and considerable evidence of erosion.

Shallow waters in Gold Brook allowed for the visual observation of the substrate composition in-situ. The size of substrate was characterized using the DFO criteria outlined in Table 6-14.

Table 6-14: Substrate Classification (GEMTEC, 2017)

Name	Size
Boulder	> 461 mm
Rock	180 mm – 460 mm
Rubble	54 mm – 179 mm
Gravel	2.6 mm – 53 mm
Sand	0.06 mm – 2.5 mm
Fines	0.0005 mm – 0.05 mm

Substrate embeddedness (a measure of the amount of fine sediment that is deposited in the interstices between the larger stream substrate of boulders, rocks and rubble) was categorized using the four DFO criteria ratings:

- ≤ 20% of the large substrate is surrounded or covered by fine substrate;
- 20% - 35% of the large substrate is surrounded or covered by fine substrate;
- 35% - 50% of the large substrate is surrounded or covered by fine substrate; and
- ≥ 50% of the large substrate is surrounded or covered by fine substrate.

Flow velocity was measured in the watercourse by using a stopwatch and a float. Flow was measured three times along a length of 1 m at each sample location. Flow was not measured for sample locations that had obstructions that would prevent an accurate result.

The information was recorded on a DNR / DFO Stream Habitat Inventory datasheet.

6.1.4.4 Water Quality

The Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (CCME FWAL) were used as the applicable criteria for assessing of water quality. The CCME FWAL guidelines were chosen because they are good indicators of common water quality problems (*i.e.,* eutrophication, salinization,

acidification, and organic pollution). Conductivity is not included in the CCME FWAL Guidelines; therefore, the Environment and Climate Change Canada (ECCC) Canada's Freshwater Quality in a Global Context Target was used for comparison purposes. The three applicable targets are listed below:

- Dissolved Oxygen: greater than 5.5 mg/L
- pH: 6.5 – 9
- Conductivity: less than 500 µS/cm (EC, 2017).

Many fish species have a distinct thermal optima; therefore, water temperature is an important factor in determining the habitat quality for fish survival and production. Salmonids are sensitive to warm water and tend to avoid areas of water with temperatures greater than 20°C (DFO, 2008). To classify the water temperature in Gold Brook, the DFO classification system for Brook Trout (*Salvelinus fontinalis*) was used:

- Cool: < 16.5°C as ideal;
- Intermediate: 16.5°C to 18.9°C as marginal; and,
- Warm: ≥ 19°C as unsuitable.

Temperature (°Celsius), conductivity (µS/cm), dissolved oxygen (mg/L), and pH were measured at 22 locations in Gold Brook using a calibrated YSI-556 multi-meter. Water quality readings were taken while the probe rested on the watercourse bed without being submerged in fine substrate.

Fish Survey

A fish survey was completed along the length of Gold Brook in the Study Area with the previously mentioned electrofisher. All captured fish were species identified, visually measured and then released back into Gold Brook.

The fish survey did not include quantifying fish populations nor removing the fish from the Study Area. Additionally, the survey did not include obtaining specimen samples for laboratory analysis (e.g., tissue sampling) as these practices are not typically required for a baseline environmental study at this stage of the Project.

6.1.4.5 Summary of Findings

The Fisheries Act defines fish habitat as those parts of the environment “on which fish depend, directly or indirectly, in order to carry out their life processes” (GEMTEC, 2017). Preferred habitat varies amongst fish species. Each species can be found in a range of habitat types throughout the year and throughout different life stages. Three areas were identified as containing fish habitat and / or are fish-bearing during the Site visit:

- Gold Brook Lake (central coordinates 45.213514ºN, -61.637875ºW). The scope of work did not include the assessment of Gold Brook Lake (except for water quality as discussed in Section 6.0). Gold Brook Lake is not expected to be affected by the Project, as such, no comment is made with respect to Gold Brook Lake;
- Gold Brook (central coordinates 45.200072ºN, -61.635883ºW). Gold Brook originates at the outlet of Gold Brook Lake and flows south through the Study Area; and

- An unnamed beaver pond (central coordinates 45.203587ºN, -61.644065ºW). It was determined that this pond contains fish habitat; however, no fish were captured during the electrofishing presence / absence survey. An outlet channel flows east into Gold Brook Lake. At the time of the Site visit, fish passage was not possible between the two waterbodies due to low water levels and abundant natural fish barriers.

6.1.4.6 Gold Brook Stream Assessment

A stream assessment was conducted along Gold Brook on June 7th, 2017. The closest EC weather station; Malay Falls, Nova Scotia (located approximately 70 kilometers (km) southeast of Gold Brook) showed day-time air temperatures ranging from 7.9°C – 15.6°C. Recorded on-site conditions were sun with cloud.

A total of 22 sampling points were recorded at 12 - 100 m intervals along Gold Brook. Survey sampling points are presented on Figure 3. The stream assessment data forms and watercourse photos are attached in Appendix E and Appendix D of the GEMTEC Ecological Baseline Study, respectively.

6.1.4.7 Physical Habitat Assessment

Gold Brook is an open stream originating at the outlet of Gold Brook Lake. Two damaged corrugated steel culverts facilitate flow from the lake to the watercourse, under Goldbrook Road (Photo 1, Appendix D of the GEMTEC Ecological Baseline Study). A historic tailings pond is present west of the culvert outlet which has naturally reclaimed to a floodplain area containing emergent vegetation. In general, the vegetation along the banks of Gold Brook is predominantly Black Spruce (*Picea* mariana), Lambkill (*Kalmia angustifolia*), Sedges, (*Carex* sp.), Rushes (*Juncaceae* sp.), Grasses (*Poaceae* sp.), and *Sphagnum* moss. Overhanging vegetation is present along some of the perimeter of the watercourse (Photo 11, Appendix D of the GEMTEC Ecological Baseline Study).

In general, the banks of Gold Brook appeared stable and were rated “good” on the DFO classification scale. The banks contained mostly rubble, rock and boulder sized substrate that is stable (Photo 2, Appendix D of GEMTEC Ecological Baseline Study). Evidence of erosion or undercutting of the watercourse banks was not observed at any sampling points within the Study Area. The water within the watercourse is clear and suspended sediments / turbidity was not observed.

Substrate size within the Study Area is mixed. Large size boulders and rocks were observed abundantly throughout the channel with small / fine grained substrate (pebble, sand and fines) in between (Photo 18, Appendix D of GEMTEC Ecological Baseline Study). Rubble and gravel sized substrate was sparsely found at the sampling points. The substrate was not highly embedded; two sampling points (10B and 11A) received an embeddedness rating of 3 and no sampling points received a rating of 4.
Gold Brook did not contain any pools. Some slow flowing water was observed just downstream of large boulders; however, all sampling points contained flowing water with riffles. The field measured flow ranged from 11.1 centimetres (cm)/s (Point 7C) to 32.5 cm/s (Point 11B).

6.1.4.8 Water Quality

Field parameters were measured at each sampling point on June 7th, 2017:

- Water temperatures ranged from 13.3°C (Point 1 and Point 3) to 21.2°C (Point 12);
- Field pH ranged from 4.8 (Point 7B) to 5.69 (Point 11A);

- Dissolved Oxygen ranged from 7.9 mg/L (Point 10B) to 11.0 mg/L (Point 7B); and
- Conductivity ranged from 10.3 µS/cm (Point 7A) to 23.3 µS/cm (Point 12C).

See Figure 6-11 for water sampling locations. The temperature of the water generally increased from Point 1 to Point 12 (A, B, C). This is likely due to two factors: (1) The distance / transition from the deep lake to the shallow, minimally shaded watercourse channel, and (2) The assessment began at Point 1 in the morning and ended at Point 12 in the afternoon when ambient temperatures were increasing. All temperatures at Point 9, Point 10 (A, B, C), Point 11 (A, B, C) and Point 12 (A, B, C) are considered warm for salmonid fish species.

High acidity was found throughout Gold Brook. All measured pH values are outside the CCME FWAL guideline. The concentration of dissolved oxygen and the conductivity are within the guidelines; however, the conductivity did generally increase at the downgradient sample points.

All field water quality measurements are presented in Appendix I of the GEMTEC Ecological Baseline Study.

6.1.4.9 Fish Survey

A fish survey was conducted by GEMTEC in Gold Brook on June 5th, 2017. A total of 19 fish were captured in Gold Brook during the presence / absence survey including American Eel, Banded Killfish and Brook Trout (Photo 23, Photo 24 and Photo 25, Appendix D in the Ecological Baseline Study, GEMTEC). Visual observation of several schools of Brook Trout were also observed during the field investigation. A summary of the results of the fish survey is presented in Table 6-15.

Table 6-15: Summary of fish recovered in Gold Brook June 5th, 2017 (GEMTEC, 2017)

Common Name	Scientific Name	# of Fish	Average Length (cm)
American Eel	*Anguilla rostrata*	3	15
		11	20
		1	40
Banded Killifish	*Fundulus diaphanus*	1	4
Brook Trout	*Salvelinus fontinalis*	3	15
	Total	**19**	**-**

6.1.5 Groundwater

WSP was commissioned by Anaconda in December of 2017 to undertake a preliminary hydrological and hydrogeological investigation study on the Site. The focus of the hydrogeological assessment was on groundwater components that may affect mining operations and the surrounding groundwater regime.

Objectives:

The primary focus of this program was to characterise hydrogeological conditions surrounding and/or influencing the mining developments to provide information for the use in the preliminary design for the Goldboro mine to Pre-feasibility levels. Within the framework of this program, the following objectives have been satisfied:

- Establish baseline conditions on-site with respect to groundwater levels and quality;
- Develop a hydrogeological conceptual model;
- Identify and evaluate water management issues that could impact the Project, such as mine dewatering and water supply, as well as other environmental aspects that could impact Gold Brook Lake.

The following can be concluded from the pre-feasibility hydrogeological study investigation:

- The Goldboro Property has been the subject of previous historical mining activity starting 1893. Intermittent mining activity occurred on the property between 1910 and 1984;
- Under a waste rock fill, the surficial geology is composed of stony till material described as a silty, gravelly sand till with frequent cobbles and boulders. The upper till is more gravely compared to the lower till which is siltier.
- The Property is underlain by folded sedimentary rocks of the Cambro-Ordovician Goldenville Formation of the Meguma Supergroup. This formation consists of interbedded meta-greywacke, meta-arenite, and meta-siltstone (slate or argillite) that are affected by the east-west trending, upright, Upper Seal Harbour anticline.
- The bedrock is highly faulted (east trending New Belt Fault is an example) with quartz vein intrusion along fault shear zone which cross cut the strata. Some faults are highly brecciated;
- The main hydrostratigraphic units are the glacial till, the peat deposit, the bedrock and the underground mine workings;
- Six (6) water wells are located within a radius of 3 to 4 km from the Site, of which one (1) is a dug well in the overburden and five (5) are drilled wells in the bedrock. The wells completed at a depth of 45 m indicated a higher yield between 18 and 68 Lpm, compared to the deeper wells (95 m) for which the reported flowrate was between 2 and 14 Lpm.
- Packer testing in two boreholes targeted fractured intervals. Nine out of the total of ten (10) tests results, completed down to a depth of 110 m in the first borehole, show a Lugeon value less than 1, which indicates a very tight rock and hydraulic conductivity of 1 $x10^{-7}$ m/s. One tested zone located near the bedrock surface at depths between 10.22 m to 13.62 m, just below the steel casing showed a Lugeon value of 8 and a hydraulic conductivity of 9 $x10^{-7}$ m/s, which is considered moderate with few partly open fractures. In the second borehole tested down to 58 m, four (4) out of the five (5) tests results show a Lugeon value of 0 to 3, meaning a maximum hydraulic conductivity of 3 $x10^{-7}$ m/s, and one zone showed a Lugeon value of 10 and a moderate hydraulic conductivity of 1 $x10^{-7}$ m/s.
- Hydraulic conductivity determined by permeability testing in monitoring wells indicates a more permeable gravelly matrix of the till near the surface (k: 3 $x10^{--6}$ m/s) than in the depth, where the till is siltier (k: 6 $x10^{-7}$ m/s). The top of the fractured bedrock and the bottom of the till (when permeable) shows an average hydraulic conductivity 6 $x10^{-6}$ m/s, higher than the maximum permeability determined by packer testing.
- The estimated transmissivity in three (3) of the four (4) wells submitted to short pumping tests was less than 1 m^2/d, which is considered very low and lower than the median transmissivity of the Metamorphic groundwater region of the Meguma Supergroup. A higher transmissivity of 2 to 3 m2/d was estimated in the BR-17-MET-3, which is the same order of magnitude for the Meguma groundwater region. The hydraulic conductivity ranges from 3 $x10^{-8}$ to 3 $x10^{-7}$ m/s in three locations and 10^{-6} m/s at BR-MET-17-3.
- Regional piezometry of the bedrock aquifer or extent are unknown. The groundwater located in the till generally follows usually the topography and is delimited by the extent of the catchment

area. The direction of the hydraulic gradient in the bedrock aquifer at the Site is oriented to the south-east, which indicates a general tendency of the groundwater flow, however the fracture or fault orientations, bedding planes dip and hydraulic conductivity divert the flow. In addition, many fault zones are known to be present at the Site, which may have an influence on the groundwater flow network as well.

- Surface water quality was compared to NSE Tier 1 EQS in samples previously collected by GEMTEC and by WSP in this mandate. All surface water samples report metals exceedances of aluminum, arsenic and iron. Total metal (GEMTEC) and dissolved metal (WSP) concentrations were in the same range at the same locations. One surface water sample (Gold Brook Lake) reported a cadmium concentration of 0.018 µg/L (WSP) which exceeds the NSE Tier 1 EQS for Surface Water, but was slightly higher than the detection limit of 0.017 µg/l. In general, analytical results of samples collected by WSP (analysed at Maxxam laboratory) are comparable to those collected by GEMTEC (analysed at AGAT laboratory), with differences in mercury (not detected in the GEMTEC samples, 0.013 µg/L and 0.017 µg/L in WSP samples), cyanide (detected only by WSP at the clarifying pond, 0.0021 mg/L) and zinc reported in the WSP sample only (7.5 µg/L).
- Groundwater quality, determined in filtered samples collected from existing metallurgical boreholes after short pumping tests and monitoring wells, exceeds the NSE Tier 1 EQS and CDWS standards for As only. Dissolved Hg or cyanide was not detected in any of the eight (8) samples analysed. Elevated As concentrations at the Site can be attributed to both naturally occurring and anthropogenic sources due to past mining activities. None of the samples analysed for general chemistry parameters exceeded the NSE Tier 1 EQS standards for potable water except pH and colour.
- Total metals concentrations in groundwater exceed the NSE Tier 1 EQS standards for surface water for ten (10) metals (Al, As, Cd, Cu, Fe, Pb, Mn, Ag, Ti, V, Zn) and indicate a need for treatment of the pumped groundwater from the dewatering of the open pit before discharge. The results show suspended solid concentrations were very high (22,000 mg/l) in one sample (MET-1). The metallurgical boreholes used for this study were not submitted to well development, since they were not built as pumping wells. Well development followed by longer duration pumping can significantly decrease the sediment content of the pumped water, therefore decreasing the total metal content as well. However, dissolved metal concentrations in filtered water samples but Al, As, Cu, Fe and Zn still exceed the surface water quality standard. Dissolved Cd slightly exceeded the standard in one sample as well, concentration close to the detection limit. The preliminary hydrogeological conceptual site model is described below:
- Recharge in the Project area to the hydrogeological system is likely to occur through the overburden since no preferential recharge zones seem to be present. However, the regional topography shows a slight slope towards the south, which indicates a possible regional flow in the bedrock from north to south.
- The groundwater located in the till follows usually the topography and is delimited by the extent of the catchment area. The lower till appears to be less permeable than the upper till and seems to act as a semi-confining layer for the bedrock aquifer which can be artesian locally.
- Groundwater flow within the bedrock is expected to be controlled by secondary porosity (fractures) since the bedrock matrix is considered negligible.
- Acoustic and optical televiewer survey in existing boreholes along with packer testing indicated that the frequency and aperture width of fractures decrease with depth, ranging from 20% of total fractured zone length in the first 20 m of bedrock, to less than 1% for the following 100 meters bedrock interval starting below 60 m. Since fracture frequency and fractured zone length decrease with depth, with the same average hydraulic conductivity of fractured zones of 10^{-7} m/s, the bulk

hydraulic conductivity of the formation decreases with depth as well. The packer test results combined with short pumping and permeability testing show an overall low transmissivity below the first 1 to 2 m of higher permeability bedrock.

- The apparent regional New Belt Fault identified by the west-east lineation in which the Gold Brook mine is located along with other faults with potential for higher permeability may provide a preferential pathway for groundwater flow in the bedrock. The locations of groundwater infiltration zones in existing mine working are not available, however historical observations made in mine working indicated that some large faults have been made impervious by breccia fines. Packer testing and pump testing in one borehole, which seems to intercept the New Belt Fault, show low permeability of the fault at the location crossed by the borehole.

Based on the testing completed within the framework of this study it can be assumed that the upper 60 m of bedrock had a more significant water inflow contribution to the mine workings, without excluding the possible contribution of some permeable fault, since the extent of the workings dewatered, the water level measurements or water entry zones are not documented. More testing is required to better understand the hydraulic connections between the mine workings, the surrounding aquifer and the fault zones. The surface water and groundwater interaction can be summarized as follows:

- The groundwater flow in the upper till seems to discharge into the Gold Brook Lake, to Gold Brook stream and other smaller water courses,
- The Gold Brook Lake which has a maximum depth of 3 m and an average depth of 1.7 m seems to be underlined by the lower and less permeable till layer;
- The Beaver Pond, probably less deep than the Gold Brook Lake, appears to be underlined by the upper and lower till as well;
- The low permeability of the lower till layer underlying the Gold Brook Lake seems to create a hydraulic barrier between the bedrock and the lake. These assumptions need to be verified by water level monitoring of the lake, pond and groundwater along with additional soil characterization. The preliminary conceptual site model is based on limited hydraulic data and can be completed with pumping tests of the existing mine workings. The impact assessment considerations are the followings:
- Dewatering of the mine pit and the Boston-Richardson Mine workings may have an influence on local groundwater regime. The influence of dewatering on the area of study would be represented by a depressed water table and pressure head and redirected groundwater flow towards the mine.
- Pit dewatering would create a larger capture zone than the past existing mine workings dewatering, extent of which can be limited by the impermeabilization of water entry zones in the existing mine workings.
- The influence of the pit dewatering should be limited to the bedrock surface, where a thin permeable fractured and weathered zone is present, followed by the first 60 m of bedrock aquifer, which would supply the major part of the water into the pit. The rest of the 125 m of bedrock should not have a significant contribution to water inflow into a 200 m deep pit.
- The pit and mine dewatering should not have a significant influence on the Gold Brook Lake or the Gold Brook, due to the presence of the silty dense till layer that seems to maintain the wetland in the Gold Brook valley, the aquifer semi-confined and locally artesian (in lower topography areas).
- The extent of the capture zone of the dewatering of the future Boston Richardson pit and mine workings could be estimated by hydrogeologic numerical modeling which would require more detail on stratigraphy (test pits) and surface and groundwater elevations (monitoring by data loggers).

Hydrogeological risks and uncertainties related to the Ssite hydrogeology:

- Potential for highly transmissive structures in pit vicinity that may cause increased inflow rates to pit. The existence of transmissive structures can be determined by a high capacity pumping test of the mine workings.
- The character of the resulting cone of groundwater depression from pit development, and its extent and magnitude with distance from the pit.
- The quality of groundwater flowing into the pit (from shallow and deep horizons) requires more sampling events and analysis to validate whether specific management or treatment is required before it is either used in the plant or discharged to the environment.

Further hydrogeological data collection is planned prior to the application for Industrial Approval, with notable focus being upon the extent of an induced cone of depression upon the local water table. Also planned are additional groundwater quality and rate of inflow studies in the Project area. Through simultaneous borehole measurement around the perimeter of the Project while the former Orex decline and associated workings are dewatered.

6.1.6 Wetlands

A wetland assessment was conducted within the Study Area (see Figure 6-14). The wetland assessment included:

- The boundary delineation of any encountered wetlands;
- Identifying the wetland characteristics of each encountered wetland; and
- An ecological functional assessment for each encountered wetland.

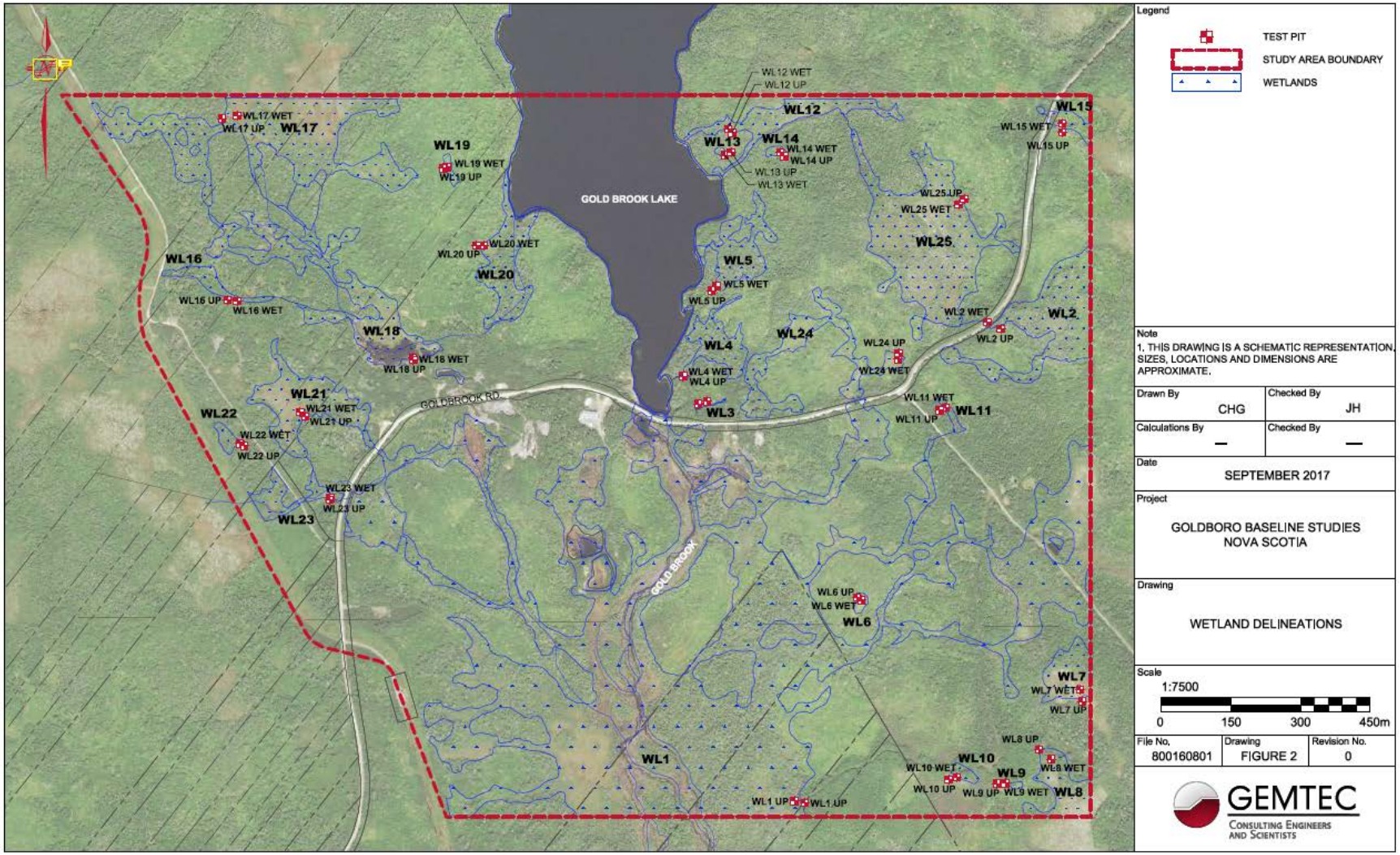


Figure 6-14: Wetland Locations (GEMTEC, 2017)

6.1.6.1 Methodology

Teams of GEMTEC environmental biologists identified the location, boundary, and characteristics of each wetland encountered during the field reconnaissance program in June and July of 2017. Each team was led by a recognized wetland delineator and accompanied by a qualified field assistant. Delineations were recorded using handheld Global Positioning System (GPS) units and photos.

The wetland delineations were completed using accepted industry standards as described by the Army Corps of Engineers in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. The standard defines a wetland as containing all three of the following:

- Wetland hydrology features (*i.e.,* high water table, water-stained leaves, oxidized rhizospheres on living roots, drainage patterns, stunted or stressed plants, *etc*.);
- Dominant hydrophytic vegetation containing a wetland indicator rank of obligate (OBL), facultative wetland (FACW) and facultative (FAC) (*i.e., Picea mariana, Larix laricina, Osmunda cinnamomea, Gaultheria hispidula, etc.*); and
- Hydric soil (*i.e.,* histosol, thick organic layer, flooded, anaerobic conditions, chemical reduction, hydrogen sulfide odor, low matrix chroma, *etc*.).

The wetland indicator rank for vascular flora varies across regions; therefore, the NS rankings for each observed species was used during the wetland delineations within the Study Area. The NS wetland indicator rank were obtained from NSE.

As per standard practices, two test points were documented on each side of the wetland boundary (Wetland and Upland). The Wetland sample point was a location chosen to be the most representative for the wetland. The Upland sample point was located near the wetland boundary to show the definitive transition from wetland to upland. At each test point, the following steps were executed:

- Soil test pits were excavated determine the presence hydric soil conditions. These pits were dug until they reached at least 30 centimetres (cm) below the ground surface, or until root or rock refusal occurred. Documented information at each pit included: pit depth, depth of each soil layer, soil colour using Munsell Soil Color Charts, presence of redox features, soil texture and any hydric soil indicators listed on the Army Corps of Engineers in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual;
- A vegetation inventory was recorded to determine the presence / absence of hydrophytic communities. Assessment of the herbaceous (herb), shrub / sapling (shrub) and tree stratums were taken to determine if hydrophytic vegetation was dominant on the sample location. The herb stratum included all non-woody plants ≤ 1 metre (m) in height, the shrub stratum included woody plants ≤ 1 m in height and < 8 cm in diameter, and the tree stratum included woody plants ≥ 8 cm in diameter. Each dominant species was assessed for percent cover within three plot sizes: herb (1.5 m radius), shrub (15 m radius) and tree (30 m radius). Percent cover and species inventory also included determining the dominance of upland species (Facultative Upland (FACU) and Upland (UPL) rank) within the plot.

- Observations were made at each pit location and surrounding area for any primary or secondary hydrology indicators listed on the Army Corps of Engineers in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual.

The information was recorded on the NS Wetland Delineation Data Form supplied by NSE. A data form was completed for each sample point (*e.g.,* Wetland 1: Wetland Pit; Wetland 1: Upland Pit).

Each delineated wetland was assessed for ecosystem function using the Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC). WESP-AC is a rapid assessment tool for function and value of non-tidal wetlands throughout temperate North America. WESP-AC uses three multiple choice forms to generate scores (0 to 10 scale) and ratings (Lower, Moderate, Higher) for each of the wetland's functions and benefits. The forms consist of an initial office component and is followed by a field component to assess the wetland's functions and existing stressors. The program automatically generates scores intended to reflect a wetland's ability to support the following functions:

- Water Storage and Delay;
- Sediment Retention and Stabilization;
- Phosphorus Retention;
- Nitrate Removal and Retention;
- Thermoregulation;
- Carbon Sequestration;
- Organic Matter Export;
- Pollinator Habitat;
- Aquatic Invertebrate Habitat;
- Anadromous Fish Habitat;
- Non-anadromous Fish Habitat;
- Amphibian & Reptile Habitat;
- Waterbird Feeding Habitat;
- Waterbird Nesting Habitat;
- Songbird, Raptor and Mammal Habitat;
- Pollinator Habitat; and
- Native Plant Diversity.

The higher rated wetland functions are discussed in this report as the function describes the ecological process that a wetland conducts within the environment. The benefit score is not discussed as it describes the context within which the function is being performed; however, the benefit scores are presented in the WESP-AC Score Sheets in Appendix C of the GEMTEC Ecological Baseline Study. It is important to note that not all "high-functioning" wetlands are healthy / intact, and no single wetland can rate highly in all functions as many functions operate naturally in opposing directions.

6.1.6.2 Summary of Findings

A total of 25 wetlands were identified within the Study Area during the field reconnaissance program. The delineated wetlands ranged in size from 0.03 hectares (Wetland 3) to 47.19 hectares (Wetland 1).

However, several wetlands continued beyond the boundary of the Study Area (Wetland 1, Wetland 2, Wetland 7, Wetland 8, Wetland 12, Wetland 15, and Wetland 17). In such instances, the delineation ceased at the Study Area boundary; thus, the actual size of the wetland is larger than described herein. Table 2 in the GEMTEC Ecological Baseline Study outlines the Wetland Identification (ID), size within the Study Area and notable wetland characteristics. Wetland locations are depicted on Figure 6-14. Site photos and field datasheets are presented in Appendix A and Appendix B of the GEMTEC Ecological Baseline Study, respectively.

In general, the topography slopes towards Gold Brook Lake and Gold Brook, resulting in a complex drainage system towards these features. Wetland 1 is comprised of larger wetland areas (*i.e., Sphagnum* bogs, historic tailing ponds, and forested swamp wetlands) that are connected via vegetated wetland channels. Many of these channels contain flowing surface water with a riparian fringe. The flow from Wetland 21, Wetland 23 and Wetland 24 also contribute to Wetland 1 but the channels have been reduced to culverts under Goldbrook Road that may limit a persistent outflow connection; thus, separate delineations were conducted. The drainage connections are presented on Figure 2 of the GEMTEC Ecological Baseline Study.

In general, the encountered wetlands have high functionally in:

- Native plant habitat (23 wetlands);
- Phosphorus retention (22 wetlands); and
- Pollinator habitat (22 wetlands).

These functions are correlated with dense, expansive, natural vegetation communities as found within the Study Area. Other common highly rated wetland functions found within Study Area include:

- Songbird, raptor, & mammal habitat (17 wetlands);
- Carbon sequestration (15 wetlands);
- Organic nutrient export (14 wetlands);
- Aquatic invertebrate habitat (13 wetlands);
- Nitrate removal & retention (11 wetlands);
- Waterbird feeding habitat (10 wetlands); and
- Waterbird nesting habitat (10 wetlands).

The wetland containing the most highly rated functions is Wetland 18, which is comprised of varying habitats including: drainage channels, bog areas and an inactive beaver pond that may provide fish habitat. The wetland containing the fewest highly rated functions is Wetland 24, which has been impacted by clear-cutting within the last 10 years.

The high rated functions for each encountered wetland are presented in Table 6-16. The WESP-AC cover sheet and score pages are presented in Appendix C of the GEMTEC Ecological Baseline Study. Should additional information/re-calculation be required for any of the wetland functional assessments, GEMTEC can supply the full WESP-AC package on an as requested basis.

Based on the numbering in Figure 6-14 and the preliminary site plan (Figure 5-4), the wetlands that will be impacted are WL16 through WL21 by the open pit, stockpiles, and site buildings and roads, and WL6

by the TSF. Due to the currently preliminary nature of the designs, the exact position of certain infrastructure is not finalized and so the impacts on the wetlands in the area are not fully known. Once the designs for the infrastructure is finalized, the positions of each of them will be chosen to minimize the surface area of the wetlands that are affected as well as preventing impact of downstream wetlands through the interference with drainage channels. For example, the drainage channel in Figure 6-14 linking the northern wetlands to Gold Brook lake will be designed around and accommodated for so that the overall drainage path is not drastically altered.

Table 6-16: Summary of Delineated Wetlands and Functional Assessments (GEMTEC, 2017)

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
1	47.19	Wetland 1 is a large wetland system that drains towards Gold Brook. It contains several different wetland types that are connected via narrow wetland channels. Many of the channels contained flowing surface water that outlet into Gold Brook. These channels are characterized as seasonal drainage channels that do not support fish or fish habitat. The northern portion of the wetland is mostly riparian forest along Gold Brook. Historic tailings ponds are present on the east and west sides of Gold Brook which have been naturally reclaimed as wetland (Photo 1 and Photo 3, Appendix A of the GEMTEC Ecological Baseline Study). The tailings pond areas present floodplain characteristics with bare ground and emergent vegetation. A rare horsetail species (*Equistum variegatum*) was found within the boundaries of a historic tailings pond (Figure 4 of the GEMTEC Ecological Baseline Study). The southern portion of the wetland is a bog dominated with dense *Kalmia angustifolia* shrubs and *Picea mariana* stunted trees (Photo 2 and Photo 4, Appendix A of the GEMTEC Ecological Baseline Study). The ground is saturated with thick histosol. The eastern portion is a swamp forest with dense *Sphagnum* cover. The surrounding upland areas were clear-cut approximately 5-10 years ago. Surface water runoff is collected in flowing drainage channels. The western portion contains larger wetland areas (*i.e.,* a historic tailings pond, an *Alnus incana* (alder) swale and bogs) that drain toward Gold Brook through forested drainage channels (Photo 5, and Photo 6, Appendix A of the GEMTEC Ecological Baseline Study).	• Stream Flow Support • Phosphorus Retention • Carbon Sequestration • Organic Nutrient Export • Resident Fish Habitat • Aquatic Invertebrate Habitat • Waterbird Feeding Habitat • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
2	3.23	A flowing drainage channel originates near Goldbrook Road ditching in the southwestern portion of the wetland. The drainage channel flows north around a clear-cut area (approximately 5 – 10 year ago) to adjoin the roadside ditching in the north. Wetland 2 is predominantly a riparian swale that follows the drainage channel; a forested swamp is present in the eastern portion (Photo 7, Appendix A of the GEMTEC Ecological Baseline Study). The wetland contains dense *Sphagnum* cover and is dominated by *Abies balsamea* trees and *Alnus incana* shrubs.	• Water Cooling • Phosphorus Retention • Carbon Sequestration • Organic Nutrient Export • Aquatic Invertebrate Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat
3	0.03	Wetland 3 is a small, open water wetland (Photo 8, Appendix A of the GEMTEC Ecological Baseline Study). Water is dark and deep (greater than 1 metre). The wetland does not contain an outlet channel. An *Alnus incana* swale creates the eastern portion of the wetland and directs overland flow to the wetland. An earthen berm creates the southern wetland boundary; preventing the roadside (Goldbrook Road) ditching from entering the wetland. Surrounding vegetation is mainly trees (*Abies balsamea* and *Picea mariana*) with sparse understory.	• Surface Water Storage • Sediment Retention & Stabilisation • Phosphorus Retention • Nitrate Removal & Retention • Aquatic Invertebrate Habitat • Amphibian & Turtle Habitat • Waterbird Feeding Habitat • Waterbird Nesting Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
4	1.03	Wetland 4 is a forested swamp just east of Gold Brook Lake (Photo 9, Appendix A of the GEMTEC Ecological Baseline Study). The wetland outlets via a small drainage channel into Gold Lake (Figure 2 of the GEMTEC Ecological Baseline Study); flowing water was observed within the channel. No fish were observed nor expected in the channel due to natural woody barriers. The wetland contains dense tree (*Abies balsamea*, *Acer rubrum* and *Picea mariana*) and shrub (*Nemopanthus mucronatus*) stratums with sparse herb cover (6%). Ground cover is mostly (greater than 99%) *Sphagnum* moss.	• Stream Flow Support • Water Cooling • Phosphorus Retention • Carbon Sequestration • Organic Nutrient Export • Aquatic Invertebrate Habitat • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat
5	1.35	Wetland 5 is a forested swamp that contains abundant coniferous snags, downed wood and extensive, steep micro-topography (Photo 10, Appendix A of the GEMTEC Ecological Baseline Study). The western wetland boundary abuts Gold Brook Lake and a small drainage channel with flowing water outlets into the lake. No fish were observed nor expected in the channel due to natural woody barriers. Dominant vegetation includes: *Picea mariana* (tree stratum), *Ledum groenlandicum* (shrub stratum) and Maianthemum canadense (herb stratum). *Sphagnum* moss covers the remaining ground surface.	• Stream Flow Support • Phosphorus Retention • Nitrate Removal & Retention • Carbon Sequestration • Aquatic Invertebrate Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
6	0.08	A small bog located on a natural terrace (Photo 11, Appendix A of the GEMTEC Ecological Baseline Study). The surrounding topography is steeply sloping to the southwest; however, the wetland is mostly flat. The surrounding upland area was clear-cut approximately 5-10 years ago. No trees are present within the wetland boundaries. Dominant vegetation includes: *Kalmia angustifolia*, *Carex trisperma* and *Vaccinium oxycoccus*.	• Surface Water Storage • Sediment Retention & Stabilisation • Phosphorus Retention • Nitrate Removal & Retention • Carbon Sequestration
7	1.01	Wetland 7 is a large bog with minimal trees. Trees and shrubs are limited to the wetland edge and small island clump (Photo 12, Appendix A of the GEMTEC Ecological Baseline Study Dominant herb species include: *Trichophorum cespitosum*, *Chamaedaphne calyculata* and *Kalmia angustifola*. The ground is saturated with sparse surface water pools. Deep histosol (greater than 30 cm from ground surface) was observed. The surrounding topography is steeply sloping towards the wetland and the wetland continues beyond the boundary of the Study Area.	• Sediment Retention & Stabilization • Phosphorus Retention • Nitrate Removal & Retention • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat
8	1.14	A bog located on the top of a hill (70 m elevation). Topography slopes slightly southeast towards Wetland 7 and southwest towards Gold Brook. Wetland 8 continues beyond the boundary of the Study Area. Trees and shrubs are limited to the wetland edges (Photo 13, Appendix A of the GEMTEC Ecological Baseline Study). Dominant vegetation includes: *Kalmia angustifolia*, *Picea mariana, Chadaedaphne calyculata, Rubus chamaemorus,* and *Empetrum nigrum*.	• Surface Water Storage • Sediment Retention & Stabilisation • Phosphorus Retention • Nitrate Removal & Retention • Carbon Sequestration • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
9	0.05	Wetland 9 is a small, inundated swamp present to the east and west of an old skidder path. The wetland and surrounding area has mostly been cleared of trees (*i.e.,* selective thinning) approximately 5 - 10 years ago (Photo 14, Appendix A of the GEMTEC Ecological Baseline Study). Herb vegetation is dominated by sedges (*Carex trisperma* and *Scirpus atrocinctus*) and rushes (*Juncus effuses*). Ferns (*Dryopteris cristata*) and woody shrubs (*Kalmia angustifolia*) are present. Trees are limited to young coniferous species (*Abies balsamea* and *Picea mariana*). *Sphagnum* moss covers the ground surface.	• Surface Water Storage • Sediment Retention & Stabilisation • Phosphorus Retention • Nitrate Removal & Retention • Carbon Sequestration • Aquatic Invertebrate Habitat • Native Plant Habitat
10	0.14	Wetland 10 is a forested bog located south of a historic trail. Some overland flow may enter the wetland from the trail during periods of high surface run-off. Evidence of historic selective thinning was observed within the wetland boundary. Wetland 10 contains abundant snags between coniferous tree / sapling cover (Photo 15, Appendix A of the GEMTEC Ecological Baseline Study). Herb vegetation is dominated by *Carex trisperma* and *Kalmia angustifolia*. *Sphagnum* moss covers the ground surface.	• Sediment Retention & Stabilisation • Phosphorus Retention • Carbon Sequestration • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
11	0.12	Wetland 11 is a forested wetland dominated by coniferous tree species (*Abies balsamea*, *Larix laricina* and *Picea mariana*). The wetland area contains very sparse shrub and herb stratums (Photo 16, Appendix A of the GEMTEC Ecological Baseline Study). The landform has extensive micro-topography throughout the wetland area. Abundant downed wood and snags were observed.	• Surface Water Storage • Sediment Retention & Stabilisation • Phosphorus Retention • Nitrate Removal & Retention • Carbon Sequestration • Native Plant Habitat
12	1.49	Wetland 12 is a segment of a large wetland system in the northeast portion of the Study Area. The wetland continues north, beyond the boundary of the Study Area. The eastern portion of the wetland is a large bog (Photo 19, Appendix A of the GEMTEC Ecological Baseline Study). The bog contains mostly herb and shrub stratums with abundant stressed / stunted *Picea mariana* trees. A drainage channel flows from Wetland 25 to enter the southern boundary of Wetland 12. Two narrow wetland channels (Photo 17 and Photo 18, Appendix A of the GEMTEC Ecological Baseline Study), facilitate water from the western wetland boundary to an outlet into Gold Brook Lake. Drainage channels with flowing water were observed in these areas. Snags and downed wood are present throughout the wetland area. Tree cover is sparse with dominant vegetation of *Nemopanthus mucronatus*, *Viburnum nudum* and *Kalmia angustifolia*.	• Water Cooling • Phosphorus Retention • Carbon Sequestration • Organic Nutrient Export • Aquatic Invertebrate Habitat • Waterbird Feeding Habitat • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
13	0.04	Wetland 13 is a small bog located on a natural terrace. Abundant snags and downed wood are present in the wetland area (Photo 20, Appendix A of the GEMTEC Ecological Baseline Study). The dominant vegetation is *Nemopanthus mucronatus* and *Kalmia angustifolia* in the shrub stratum and stressed / stunted *Picea Mariana* and *Larix laricina* trees. *Sphagnum* moss covers the ground surface.	• Surface Water Storage • Phosphorus Retention • Nitrate Removal & Retention • Carbon Sequestration • Aquatic Invertebrate Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat
14	0.08	Wetland 14 is a small bog located on a natural terrace. Abundant snags and downed wood are present in the wetland area. The wetland contains extensive micro-topography (*i.e.,* hummocky, overturned trees). Ground vegetation is dominated by *Osmunda cinnamomea* (Photo 21, Appendix A of the GEMTEC Ecological Baseline Study). *Sphagnum* moss covers the ground surface. Tree and shrub stratums are dominated by *Picea mariana* and *Abies balsamea*.	• Surface Water Storage • Phosphorus Retention • Nitrate Removal & Retention • Carbon Sequestration • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
15	0.35	The northern portion of Wetland 15 contains a small saturated swamp pocket that is likely influenced by the adjoining roadside ditching. A culvert under Goldbrook Road conveys surface water from north to east toward the remainder of the wetland. During periods of high precipitation / snowmelt, surface water may flow into the eastern portion of the wetland via roadside ditching. Evidence of clear-cutting (approximately 5 – 10 years ago) was observed in the upland areas adjoining Wetland 15 and abundant downed wood was observed within the wetland boundaries. The wetland contains dense herb (*Osmunda cinnamomea* and *Carex trisperma*), shrub (*Nemopanthus mucronatus* and *Viburnum nudum*) and tree (*Picea mariana*) stratums. *Sphagnum* moss covers the ground surface.	• Phosphorus Retention • Carbon Sequestration • Organic Nutrient Export • Pollinator Habitat • Native Plant Habitat
16	0.45	A culvert facilitates a drainage channel from the west side of the pipeline (located along the western boundary of the Study Area) to the east. Wetland 16, a riparian wetland, begins at the culvert outlet and extends downstream, following the drainage channel (Photo 23, Appendix A of the GEMTEC Ecological Baseline Study). Flowing water was present in the channel at the time of the Site visit (July 28, 2017); however, no fish were observed nor expected due to abundant natural woody barriers. The drainage channel flows east, beyond the boundary of Wetland 16, to enter the western boundary of Wetland 18. The tree stratum is dominated by deciduous trees (*Acer rubrum* and *Betula papyrifera*). The shrub and herb stratum are comprised mainly of *Abies balsamea*, *Osmunda cinnamomea* and *Thelypteris noveboracensis*.	• Stream Flow Support • Water Cooling • Carbon Sequestration • Organic Nutrient Export • Waterbird Feeding Habitat • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
17	6.20	Wetland 17 is a bog and forested swamp extending east from the pipeline easement across a hilltop in the northwestern portion of the Study Area. The wetland continues north, beyond the boundary of the Study Area. The ground is highly saturated and contains histosol depths greater than 1 m from the ground surface. Drainage channels with flowing water exit the southern boundary of Wetland 17 to flow into Wetland 18. The wetland does not support a large quantity of trees or shrubs; however, a diverse herb stratum is present. Dominant species include: *Maianthemum trifolium*, *Calamagrostis pickeringii* and *Carex* spp. (Photo 24, Appendix A of the GEMTEC Ecological Baseline Study).	• Stream Flow Support • Organic Nutrient Export • Aquatic Invertebrate Habitat • Waterbird Feeding Habitat • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristic	High Rated Function Attributes
18	3.50	The southern portion of Wetland 18 contains an inactive beaver pond (Photo 25, Appendix A of the GEMTEC Ecological Baseline Study). Ponded water is present at unknown depths. The pond contains emergent vegetation and abundant snags along the edge. The substrate within the pond is very fine and silty. An earthen beaver berm is present in the eastern portion of Wetland 18, which allows travel across the pond. A seasonal watercourse outflows from the eastern boundary of the pond towards Gold Brook Lake. Fish may be able to pass from Gold Brook Lake to the pond during periods of high flow. Drainage channels from Wetland 16 and Wetland 17 enter the northern portion of Wetland 18. These channels contain vegetated, riparian fringe wetlands that connect to the northern side of the beaver pond. Fish were not observed nor expected within these channels due to natural woody barriers. Dominant vegetation within the wetland adjoining the pond includes *Alnus incana*, *Abies balsamea* and *Acer rubrum*.	• Stream Flow Support • Water Cooling • Phosphorus Retention • Organic Nutrient Export • Anadromous Fish Habitat • Resident Fish Habitat • Amphibian & Turtle Habitat • Waterbird Feeding Habitat • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat
19	0.1	Wetland 19 is a small, forested wetland located on a natural terrace. The surrounding area was clear-cut approximately 5-10 years ago. Abundant snags are present within the wetland boundaries. The wetland contains sparse tree cover with mainly shrub and herb stratum vegetation (Photo 26, Appendix A of the GEMTEC Ecological Baseline Study). Dominant species include: *Abies balsamea*, *Acer Rubrum*, *Kalmia angustifolia*, and *Carex trisperma*.	• Surface Water Storage • Phosphorus Retention • Nitrate Removal & Retention • Aquatic Invertebrate Habitat • Pollinator Habitat • Native Plant Habitat

20	1.79	A forested bog located in a natural depression that outlets to Gold Brook Lake (Photo 27, Appendix A of the GEMTEC Ecological Baseline Study). The surrounding upland areas were clear-cut approximately 5-10 years ago. The wetland contains deep, saturated histosol (greater than 45 cm from the ground surface) with a high-water table (30 cm below ground surface). The wetland contains dense herb (*Osmunda cinnamomea* and *Carex trisperma*), shrub (*Picea mariana* sapling) and tree (*Picea mariana* and *Acer rubrum*) stratums. *Sphagnum* moss covers the ground surface.	• Phosphorus Retention • Organic Nutrient Export • Aquatic Invertebrate Habitat • Waterbird Feeding Habitat • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat
21	2.36	The majority of Wetland 21 is a bog with sparse trees and a dominant herb stratum (Photo 28, Appendix A of the GEMTEC Ecological Baseline Study). Dominant herb species include: *Myrica gale* and *Carex* spp. A small, vegetated drainage channel is present entering the northern portion of Wetland 21. The channel disperses within the bog area. However, a drainage channel exits the southern portion of the bog to a culvert which conveys the flow of surface water under the Goldbrook Road into the alder swale contained within Wetland 1. A drainage channel also flows from the southwestern portion of the bog to enter the northern portion of Wetland 23.	• Stream Flow Support • Phosphorus Retention • Organic Nutrient Export • Aquatic Invertebrate Habitat • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
22	0.2	Wetland 22 is a small, forested wetland contained within a depression between the pipeline Right of Way (ROW) and the pipeline access road (Photo 29, Appendix A of the GEMTEC Ecological Baseline Study). The wetland is likely influenced by the roadside ditching and embankment of the pipeline. Large snags and downed trees were observed throughout the wetland. Dominant vegetation species include: *Picea mariana* (tree stratum), *Virbrunum nudum* (shrub stratum) and *Osmunda cinnamomea* (herb stratum). *Sphagnum* moss covers the ground surface.	• Organic Nutrient Export • Waterbird Nesting Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat
23	0.7	Wetland 23 is a small, forested swamp contained within a depression between the pipeline ROW and the pipeline access road (Photo 30, Appendix A of the GEMTEC Ecological Baseline Study). A shallow, vegetated drainage channel enters the northern wetland boundary (from Wetland 21) and flows through the wetland to the southern outlet at Goldbrook Road. A culvert conveys the flow of water under the road into the alder swale contained within Wetland 1. Large snags and downed trees were observed throughout the wetland. Dense tree, shrub and herb stratum are present within the wetland boundaries. Dominant vegetation species include: *Abies balsamea* (tree and shrub stratum), *Picea mariana* (tree and herb stratum), *Larix laricina* (tree stratum), *Acer rubrum* (tree stratum), *Viburnum nudum* (shrub stratum), and *Carex trisperma* (herb stratum).	• Water Cooling • Phosphorus Retention • Organic Nutrient Export • Aquatic Invertebrate Habitat • Waterbird Feeding Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat

Wetland ID	Wetland Size within Study Area (hectares)	Wetland Characteristics	High Rated Function Attributes
24	1.99	Wetland 24 is a forested swamp. The eastern portion was clear-cut approximately 5 - 10 years ago, this is evidenced by ground disturbance and soil rutting in the area. The western portion is mostly undisturbed. A historic road embankment creates a defined boundary between Wetland 24 and Wetland 4. Minimal tree stratum is present in the western portion of the wetland due to the clear-cutting activities (Photo 31, Appendix A of the GEMTEC Ecological Baseline Study). *Picea mariana* saplings were observed in the shrub stratum; *Carex trisperma* and *Kalmia angustifolia* were the dominant herb species.	• Organic Nutrient Output
25	6.20	Wetland 25 is a large, forested bog atop a hillslope (Photo 32, Appendix A of the GEMTEC Ecological Baseline Study). The wetland contains deep (greater than 1 m), saturated histosol. A culvert facilitates flow under Goldbrook Road from Wetland 2 to Wetland 25. No fish were observed nor expected in the channel due to abundant natural woody barriers. Dominant vegetation includes *Picea mariana* and *Abies balsamea* in the tree and shrub stratum. *Kalmia angustifola* is the dominant herb stratum species.	• Phosphorus Retention • Organic Nutrient Export • Waterbird Feeding Habitat • Songbird, Raptor & Mammal Habitat • Pollinator Habitat • Native Plant Habitat

6.1.7 Flora and Fauna Species and Habitat

6.1.7.1 Vegetation and Rare Flora Survey

A rare flora survey was undertaken within the proposed Study Area. The scope of work carried out for the vegetation and rare flora survey included:

- A desktop Species at Risk (SAR) Study;
- Identifying all encountered vascular vegetation within the Study Area; and
- Identifying all encountered rare flora (vascular or non-vascular) within the Study Area.

6.1.7.2 Methodology

A field botanist conducted a vascular vegetation and rare flodra survey within the Study Area. A desktop study for SAR and areas of concern was conducted prior to the Site visit. The SAR screening was conducted by obtaining data from the Atlantic Canada Conservation Data Centre (ACCDC); the search request was limited to within a 5 km radius of the Study Area. This database search provided the following:

- Reported observations of rare and endangered flora and fauna;
- Expert Opinion Maps information to identify species that have not been reported but are expected, based upon estimates of habitat and wildlife distribution; and
- Locations of any Special Areas such as the following:
    - Managed areas with some level of protection;
    - Significant ecological areas of interest;
    - National Defense areas; and
    - First Nations areas.

The species listed within the ACCDC report were referenced to ranking outlined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the Species at Risk Act (SARA), and the Nova Scotia Endangered Species Act (NSESA). During the Site visit, comparison to habitats suited to any identified rare or endangered species of flora identified in the desktop study was completed. The ACCDC report, mapping and habitat comparison table are in Appendix F of the GEMTEC Ecological Baseline Study.

SARA provides protection for flora species against extirpation, extinction or endangerment from human activities. Currently, only the species listed in Schedule 1 of SARA are protected federally. Provisions to protect and recover a species come into effect once it has been listed in Schedule 1 of SARA.

The NSESA provides another level of legislative protection for SAR and Species of Conservation Concern (SOCC). Different levels of protection are afforded for species listed within these acts depending on the species rarity ranking. Several agencies, including the ACCDC and Nova Scotia Department of Natural Resources (NSDNR), contribute lists of 'species of conservation concern' that are not protected by legislation. All species ranked S1 to S3 by the ACCDC are considered rare for this report.

The botanist traversed the Site by foot, focusing on unique habitats (i.e., rock outcrops, watercourses and wetlands) in a random meandering fashion. In general, these habitats have an elevated potential for the occurrence of rare species. Consideration was given to the preferred habitat for several lichen species

(non-vascular flora) that were identified in the ACCDC report. The locations of all encountered rare flora were recorded using a handheld GPS unit and photos. Specimens were collected if a species could not be identified in the field. The botanist also recorded an inventory list of all encountered flora species while conducting the field reconnaissance program.

6.1.7.3 Summary of Findings

The vegetation and rare flora surveys were conducted during multiple stages of the flowering season (late June and late July of 2017) to ensure identification of both the early and late flowering plants. A complete inventory of plant species encountered within the Study Area is presented in Appendix G of the GEMTEC Ecological Baseline Study. The locations of encountered rare flora are presented on Figure 6-15.

Two rare species (S3 Secure) were identified during the surveys:

- Variegated Horsetail (Equisetum variegatum); and
- Southern Twayblade (Listera australis).

A total of six Southern Twayblade plants were found in the forested swamp portion of Wetland 17 (Figure 6-15). The specific location was nearly free of competing herb vegetation and the hydrology appeared to be stable. The populations of Varigated Horsetail were found in isolated to wet, disturbed areas at the southern end of Gold Brook Lake and adjacent to Gold Brook. The plants formed colonies and appeared to be isolated to historic tailings ponds. Table 6-17 summarizes the findings of the Rare Flora survey.

Table 6-17: Summary of Encountered Rare Flora (GEMTEC, 2017)

Scientific Name	Common Name	S-Rank	SGS Rank	Notes	Location*	
					x	y
Equisetum variegatum	Variegated Horsetail	S3	Secure	5 x 5 m patch	607004.54	5006411.70
Equisetum variegatum	Variegated Horsetail	S3	Secure	5 x 1 m patch	607037.06	5006340.08
Equisetum variegatum	Variegated Horsetail	S3	Secure	10 x 5 m patch	607021.84	5006309.38
Equisetum variegatum	Variegated Horsetail	S3	Secure	10 x 8 m patch	607018.95	5006283.92
Listera australis	Southern Twayblade	S3	Secure	1 plant	606187.16	5006839.92
Listera australis	Southern Twayblade	S3	Secure	1 plant	606190.76	5006843.44
Listera australis	Southern Twayblade	S3	Secure	1 plant	606193.12	5006851.07
Listera australis	Southern Twayblade	S3	Secure	3 plants	606188.59	5006852.28

*Coordinate system: NAD1983 CSRS UTM Zone 20N

Figure 6-15: Rare Flora Locations (GEMTEC, 2017)

6.1.7.4 Vascular Plant Species of Conservation Concern

Only one SOCC was identified by the ACCDC as having been reported within a 5 km radius of the Study Area. The Northern Bur-Reed *(Spaganium hyperboreum)* is a perennial, aquatic herb that grows completely under water or as an emergent shallow-water aquatic along sedge-marshy borders. This type of habitat is limiting within the Study Area. There are marshy littoral wetland locations along the border of Gold Brook Lake that may provide habitat, but they tend to be very small (portions of Wetland 1, Wetland 5, Wetland 12 and Wetland 20 in Figure 6-14). These areas within the Study Area were extensively surveyed for emergent and aquatic plants and Northern Bur-Reed was not observed. Table F2 in Appendix F of the GEMTEC Ecological Baseline Study describes the preferred habitat for any flora species listed in the ACCDC.

6.1.7.5 Non-Vascular Species at Risk and Conservation Concern

Most lichen SAR and SOCC identified by the ACCDC have similar habitat requirements and are addressed together in this section. The globally rare species Boreal Felt Lichen (*Erioderma pedicellatum*) in particular, prefers mature forest with an abundance of moisture-loving species such as *Sphagnum* mosses and Cinnamon fern (*Osmundastrum cinnamomeum)*.
Within the Study Area the preferred habitat was mostly identified within coniferous forested swamps, except for a few large upland stands of mature Black Spruce (*Picea mariana*) / Balsam Fir (*Abies balsame*a). Coniferous forested swamps tend to be dense with little light penetration. Mature upland areas of Spruce / Fir tended to be dry outcrops or upland islands with thin soils surrounded by the coniferous forested swamp areas. Understory vegetation in the upland Spruce / Fir stands is sparse and the forest floor was blanketed with feather mosses (*i.e., Pleurozium schreberi* and *hylocomium splendens*). The oldest stands are between 70 and 80 years old (determined through tree core analysis); however, the Study Area tends to slope to the south which does not favour lichen development. Mature coniferous stands and forested wetlands were extensively surveyed during the field reconnaissance programs and no rare lichen species were observed.

6.1.7.6 Moose Survey Results

In 2017 GEMTEC conducted a moose survey on the Property. The results of this study found minimal signs of moose activity within the Project area (one instance of moose tracks and two instances of moose browsing).

In April of 2018 GEMTEC conducted a second moose survey for Anaconda. This was done by first identifying high-probability areas for moose sign (antler sheds, rubbings, scat/pellets, and/or evidence of browsing/trails) to be found and then designing transects (paths) to cross these

This study was originally intended to be performed during the winter months to present the best odds of observing moose tracks in the snow cover. However, due to unfavourable weather conditions and a lack of snow cover, the study was delayed until April. When it was performed, none of the types of moose sign were observed within the Project area. Some light browsing was observed but due to observed tracks it was determined that this was most likely due to white tailed deer in the area.

The transects travelled during the moose survey are shown in Figure 6-16.

6.1.7.7 Bird Survey Results

In September of 2017 GEMTEC conducted a bird survey on the Property. The results of this study found 61 species of breeding birds within the Project area, comprised of 602 individuals (GEMTEC, 2018). Of the 61 species, 24 are considered Species at Risk (SAR) or Species of Conservation Control (SOCC). The findings of the bird survey are illustrated in Figure 6-17.

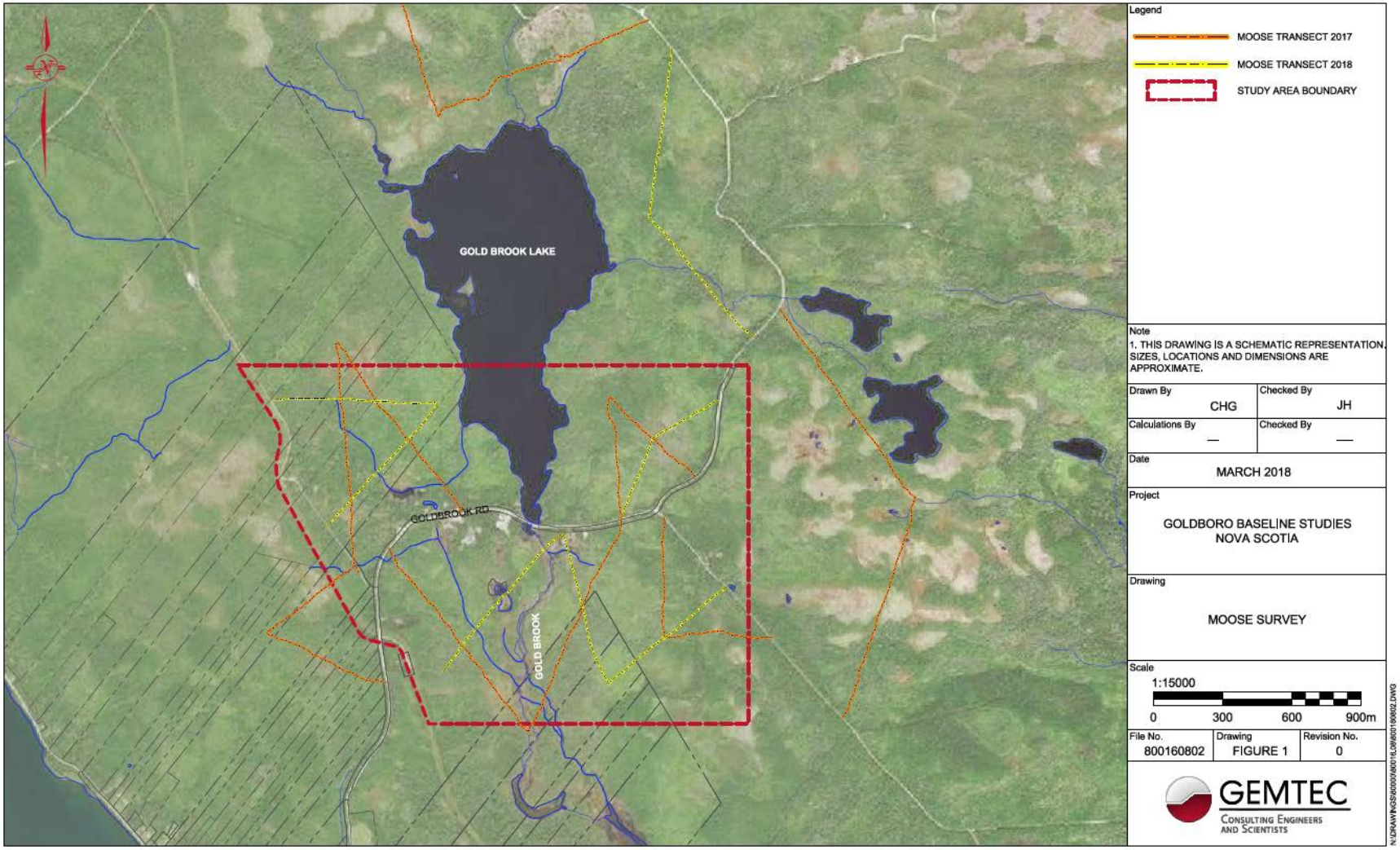


Figure 6-16: 2018 and 2017 Moose Survey Locations (GEMTEC, 2018)

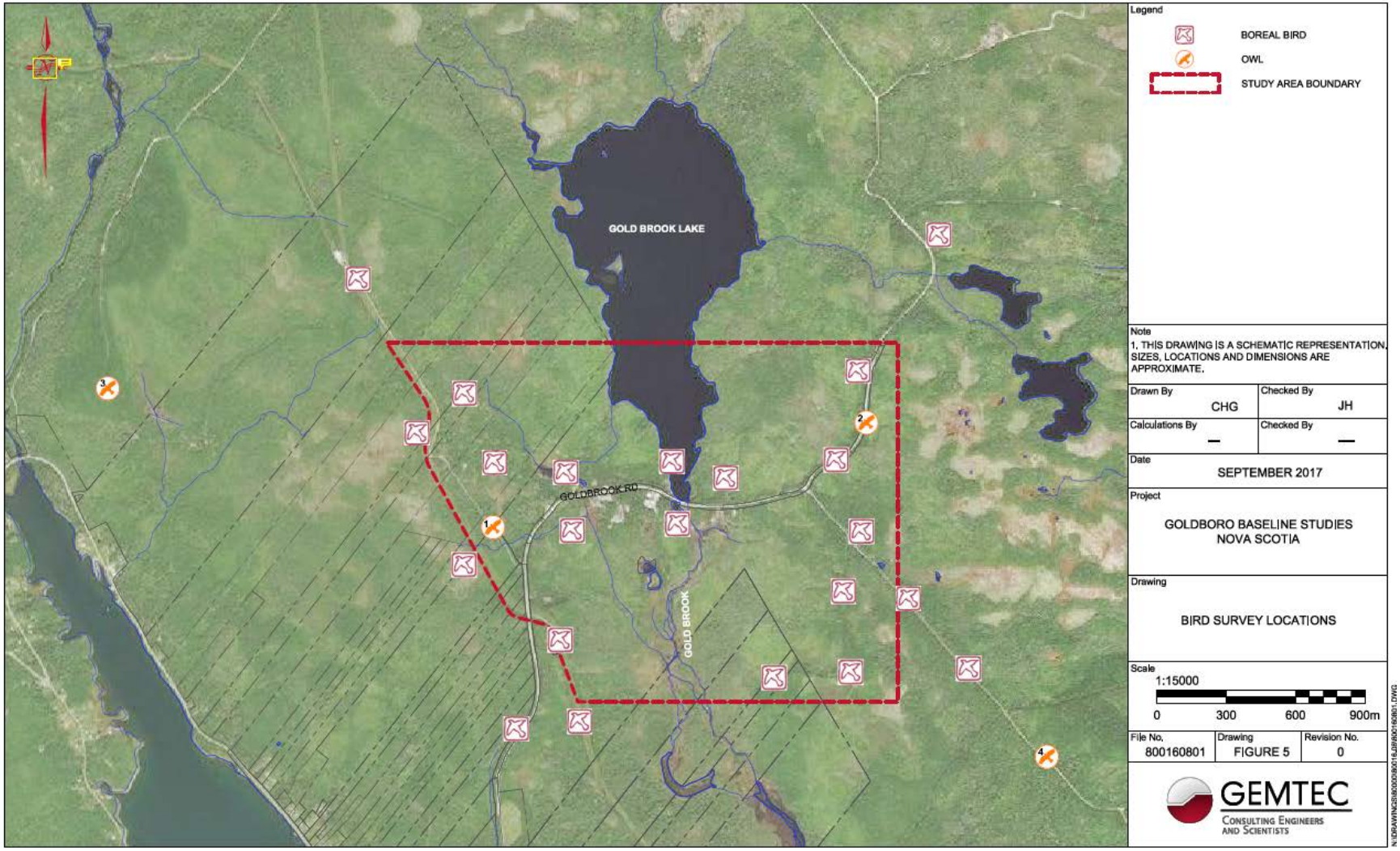


Figure 6-17: 2017 Bird Survey Locations (GEMTEC, 2017)

6.1.8 Atmospheric Conditions / Air Quality

The climate for the local area is marked by relatively large ranges of daily and day-to-day temperatures. Having the Atlantic Ocean to the East and the Bay of Fundy to the West means that the summer temperatures are moderated, and the winter temperatures are prevented from dropping too low. The cooler summer seas also help suppress the development of storms in the area (Pieridae, 2013).

The maximum permissible concentrations of different common industrial contaminants as described in the Nova Scotia Environment Act will be referred to and it will be ensured that the Site is not in violation of any of these limits. Ongoing air quality monitoring will occur on the Site with comparison made to baseline air quality conditions.

Currently the primary contributor to local air pollution is the ExxonMobil gas plant in the area. Their air quality measuring information was obtained from Pieridae's Environmental Assessment. However, this plant is scheduled to begin decommissioning in 2018 so their monitoring may not be an accurate reference for regional air quality during operation of the Project. Their regional air quality monitoring data was collected from June through August of 2004 in the nearby town of Seal Harbour. This monitoring revealed the highest levels within a 24-hour period of nitrogen dioxide (NO_2) and sulphur dioxide (SO_2) to be 3.8 micrograms per cubic metre (µg/m^3) and 10.5 µg/m^3, respectively (Pieridae, 2013). The Canadian National Ambient Air Quality Objectives (NAAQOs) provide guidelines for NO_2 and SO_2 emissions of 200 and 300 µg/m^3, respectively.

The Project will have a variety of diesel-powered heavy equipment operating on-site and as such will contribute to greenhouse gas emissions. To estimate these emissions, the numbers of equipment specified in the Preliminary Economic Assessment performed by WSP (WSP, 2018) were used to provide a high-level estimate of the Project's emissions. This estimate will be further refined at the IA stage when a more exact idea of the Project's equipment requirements is available. The summary of the emission estimate is available in Table 6-18.

Table 6-18: Projected emissions from the Project compared to Nova Scotia's emissions from 2015 (Government of Canada, 2017)

Total Annual CO_2 equivalent produced (t)	2,869
Nova Scotia total CO_2 equivalent produced in 2015 (t)	16,200,000
Projected percentage of Nova Scotia 2015 GHG emissions that would be produced by Goldboro	0.018%

Mining activities have the potential to generate large quantities of dust, both from initial construction activities as well as daily operations. The Project will utilize a combination of water trucks for the roads as well as sprinklers over large exposed dry areas wherever possible to minimize the quantities of dust that are created. Crushing and grinding operations will be limited wherever possible to within insulated

buildings with managed ventilation systems. Goldbrook Road has the potential to produce dust as it is only partially paved. This is not anticipated to be an issue as traffic from within the Site to the outside will be limited to the daily concentrate truck, occasional delivery truck, and workers going to and from the Site. If this regular traffic is found to be causing a dust generation issue, the use of water trucks will be increased in frequency and extent along the Goldbrook Road.

Prior to construction beginning, baseline dustfall samples will be taken according to the ASTM Standard Test Method for Collection and Measurement of Dustfall to establish a baseline for dust quantities in the area. The samples will be taken to the North, South, East, and West of the Project to try and determine if any dust is leaving the Site, with emphasis in the direction of the town of Goldboro. Sample collection will continue on a quarterly basis to capture seasonal changes in weather and environmental conditions, or as a new construction activity commences (e.g., underground development or ramped up construction of the Pieridae LNG plant). Testing will be completed by a third-party laboratory.

If dust is leaving the Site, measures will be taken to either eliminate/reduce the generation of dust or suppress it in a matter that will prevent it from leaving the Site. This might be in the form of the previously mentioned water trucks and sprinklers more heavily applied, water covers/curtains, environmental protection berms, or the alteration of a standard operating procedure for an operations activity.

6.1.9 Noise Levels

Noise levels on the Site will increase due to construction activities but these will be far removed from the community. Impacts on wildlife will be highly localized. A minor increase in the levels of truck traffic through the community will occur, in that approximately five to seven concentrate trucks will leave the Site per week, as well as the occasional delivery truck and explosives truck. This could raise noise levels, but this will occur primarily during normal working hours and will not be out of place beyond the usual truck traffic on the local roads.

Once production begins blasting will be a regular source of noise, but these events will be on the order of once or twice per week, within working hours. Also, due to the distance between the Site and the nearest dwellings, these events will not be damaging/negatively affecting of any persons or property in the area. Drilling from the production drills is a more consistent noise but is unlikely to be audible beyond the Site. Ongoing noise and air pressure monitoring will occur to ensure that the impact of blasting is below the prescribed thresholds for nearby residents.

Ongoing noise monitoring will take place at several locations within the town of Goldboro. The locations, (Figure 6-18) are chosen as the dwellings with the smallest arc distance between them and the rim of the open pit. The ongoing results of the noise monitoring will be compared with the results of a noise baseline study to ensure that the Project is not drastically altering the background noise levels in the town of Goldboro.

Figure 6-18: Proposed noise monitoring locations (in red) relative to a circle of 1.7 km radius from the approximate edge of the open pit

It is not anticipated that any of the noise generated from activities on the Site will negatively impact the environment or any of the residents of Goldboro/the surrounding area. Regular contact with the community will be maintained to ensure that noise generated due to continued production operations in the Project is not negatively impacting the residents of the surrounding areas.

The Site has some natural noise mitigating aspects. This is in the form of the extensive tree cover surrounding the Site, the roughly two km distance between the rim of the proposed pit and the nearest residence, and the fact that there is a perceivable ridge in the land between the proposed pit and the town of Goldboro. Combined, these aspects of the Site will significantly impede the transmission of project-related noise beyond the boundaries of the Site.

Anaconda will also be adding their own measures to mitigate noise pollution. This will take the form of standard operating procedures put in place for the daily operations of the Project. These would include only performing surface blasting during regular working hours, as well as only crushing during regular working hours wherever possible. A berm will also be constructed around the rim of the pit which will contain the brunt of the noise accompanying production activities.

6.2 Socio-Economic Condition

6.2.1 Economy

The local economy in the Goldboro area mainly is comprised of coastal fishing, logging, the ExxonMobil LNG plant, and local traffic/tourism through the area. As of March of 2018, ExxonMobil has applied to decommission and abandon their Goldboro Gas Plant along with their offshore platforms already having begun decommissioning. Currently, the planned Pieridae Goldboro LNG plant is currently undergoing its

final decision gate. It is not clear whether it will proceed but if it does it will be a major factor in the local economy. The construction of the Pieridae project would bring up to three thousand construction workers to the Site along with up to 200 permanent jobs in the area once production begins in 2022.

The unemployment rate in Guysburough County is 18.3%, with a total population of 4,425 between the ages of 15 and 64. For the entire county this works out to a population density of 2.2 people per km^2. The median household income in the county is $55,637 after tax. The average age of the population is 50.6, and the median age is 55 (Canadian Census, 2016).

The nearest commercial centre to Goldboro is the town of Antigonish which is approximately 75 km to the northwest or a one-hour drive. It is reachable via the combination of highways mentioned in Section 6.2.3.

The Goldboro Project would provide up to 150 new, permanent jobs in the Goldboro area, with most of these being operations jobs. There would be a peak at around 200 jobs while there is a transition between open pit and underground mining, but this would be a temporary situation while there is an overlap between open pit production and underground development. The jobs would likely be initially filled by contractors hired by Anaconda, with the contractors gradually training the Company's own, locally-sourced workforce and being phased-out as the necessary skills and acumen are acquired.

The Goldboro Project would have a positive impact upon the community as it would allow migrant workers from the area that have gone elsewhere for work the opportunity to transfer to a workplace closer to home. This may not be the case immediately following commencement of production, but Anaconda has had good experiences with hiring locally before as described in Section 4.2 and plans to follow the same business plan.

6.2.2 Land Use and Value

6.2.2.1 Mining

As previously mentioned in Section 2.3, there are historical mine workings in the area. However, there has not been mining in this area since the 1910's except for exploration drilling and a bulk sample performed by OREX in the 1990's. The population is open to the idea of mining and the land being used to access the mineral resource.

Due to this historic mining and a lack of environmental regulations in the past, the surrounding area and watersheds have been contaminated to various levels, with the most notable of contaminants being Mercury (Hg) and Arsenic (As).

Approximately 50 km to the west of the Project, Atlantic Gold has two early-stage projects in the form of the Fifteen Mile Stream and Beaver Dam deposits. Additionally, Atlantic Gold's Cochrane Hill project is less than 30 km to the northwest. None of these projects are currently in production but have the potential to become surface gold mines close to Goldboro.

6.2.2.2 Forestry

The Project area is 90% Crown Land. Stora Forest Industries Limited of Port Hawkesbury holds a lease for this Crown land and the fibre rights to it. They are permitted to put in roads wherever they need them

and presently have 60% of the area accessed, with possible plans for more roads next year. The forested land is generally low in productivity (Canada Land Inventory: Class 5 to 6), like most forest land in Nova Scotia. Only a small amount of productive Class 4 land exists.

Over the last ten years, softwood and pulpwood have been harvested using a block management system with replanting. The average amount of wood obtained is 15 to 30 cords per acre from wild stands and double that from silvacultured stands.

6.2.2.3 Energy

The Municipality of Guysborough has established large areas (over 15,000 acres in total) zoned as industrial parks with the goal of attracting industries to establish long-lasting businesses in the area. The most prominent of these are the LNG plants, with ExxonMobil's plant being in the process of being decommissioned and the Pieridae plant being still in the final decision gate process.

Large offshore reserves of natural gas come ashore in Goldboro, whereby they travel via pipeline to the northeastern United States. This is a reversible pipeline, which makes Goldboro a strong candidate for the site of an LNG processing and export facility when combined with the deep-water port capabilities in the area as.

Towards the eastern end of the municipality a wind farm (Sable Wind) has been established. This is a six turbine, 13.8 MW wind farm owned and operated by Nova Scotia Power.

6.2.3 Transportation

Transportation of goods, services, and personnel to the Site can be done via Highway 7, Route 276, and Highway 316 from the TransCanada. The dock within Goldboro can also facilitate off-loading of goods transported via ship if necessary.

The route from the TransCanada to the Site is along rural highway with residential dwellings spaced along it. The road conditions are fair for the most part, with most of the highway having been recently repaved. The speed limit is 80 km/h for most of the 77 km from the TransCanada, with the speed limit decreasing in the areas where the route passes through some of the different towns. With these considerations, the estimated travel time from the TransCanada to the Site is approximately an hour.

Traffic in the region is minimal, with reaching of the speed limit being usual. The Project's impact upon traffic will consist of the 5-7 concentrate trucks mentioned in Section 4.2 as well as the traffic of workers to and from the Site. The number of workers will vary slightly depending upon which stage of the Project is ongoing.

Goldbrook Road passes through the Site from the town of Goldboro and connects to some dirt backwoods roads. Although not maintained, Goldbrook Road is technically a public road.

6.2.4 Recreation and Tourism

According to a local fisheries officer and the Goldboro area residents interviewed, not much recreational activity occurs within the Project area. Hunting and sport fishing are restricted due to the bogginess and dense underbrush (such as alders) common in the area. Some hunting does occur in the more open areas.

Sport fishing formerly occurred in Fowler's Lake and the Basin Lake System. A small trail leading to Rocky Lakes appeared well-travelled, and this suggests that these lakes do provide a recreational opportunity for some residents (Pieridae, 2013).

The logging roads are used by skidoos in the winter. Seal Harbour and Coddles Harbour both have clam flats used by locals, and scuba divers collect scallops in Seal Harbour. There are numerous local docks/ marinas along the coastline in the area, but none of them would be impacted by the Project.

The Site would have minimal impact upon the current usage of the land since recreational usage in the immediate area is minimal. The Project would also have negligible impact upon any tourism activities in the area since it would not be visible from any of the main town roads or neighbouring highways. The operating mine would only be visible from the Goldbrook Road due to the surrounding area being young-moderate growth forest, so would have no significant impact on any tourism traffic along the coast.

6.2.5 Human Health

There are three hospitals in the immediate region: Guysborough Memorial in the town of Guysborough, Eastern Memorial in the town of Canso, and St. Mary's Memorial in the town of Sherbrooke. The locations of each of these relative to the Site are shown in Figure 6-19.

The Project is not predicted to have any negative health impacts on the residents of the Goldboro area. Mine workers will have to undergo periodic Miner Medical Examinations to monitor their overall wellbeing (ensuring no accumulation of heavy metals in their bloodstream is occurring, monitoring their lung capacity and efficiency, etc.).

All potential sources of contamination on the Site will be contained in a safe manner and dealt with in a way that ensures they are not released to the environment nor any worker/resident unduly exposed to them.

Figure 6-19: Locations of the nearest hospitals relative to the Site

6.3 Cultural and Heritage Resources

6.3.1 Archaeological Assessment

In the summer of 2017, Davis MacIntyre & Associates Limited was contracted by Anaconda Mining to conduct an archaeological resource impact assessment of the Site. This document can be found in Appendix A. The assessment included a historic background study as well as a field reconnaissance of all areas to be impacted. This assessment was conducted under Category C (Archaeological Resource Impact Assessment) Heritage Research Permit A2017NS043 issued by the Department of Communities, Culture and Heritage. This report conforms to the standards required by the Culture and Heritage Development Division under the Special Places Protection Act (R.S., c.438, s. 1).

Results and Discussion

Archaeological field findings during this assessment are consistent with a nineteenth century gold mine consisting of a key mill complex, a variety of mine shafts and other areas of supporting industrial activity, and some limited domestic activity relating to the mine workers and their families. Although some late twentieth century mining activity is present and has impacted some archaeological features, the isolated nature of the site complex has resulted in relatively good preservation of the archaeological landscape. Dense vegetation throughout poses a difficulty in locating and interpreting archaeological sites, and it appears that vegetation has become much denser than it was during an initial survey in 1988. However, almost all the historic activity in the study area has clustered tightly around known gold seams within the two proposed mining areas, with little activity farther afield where the rough, wet, and heavily overgrown landscape would likely have been inhospitable in the nineteenth century, as it is today. The archaeological findings around the Project are summarized in Figure 6-20.

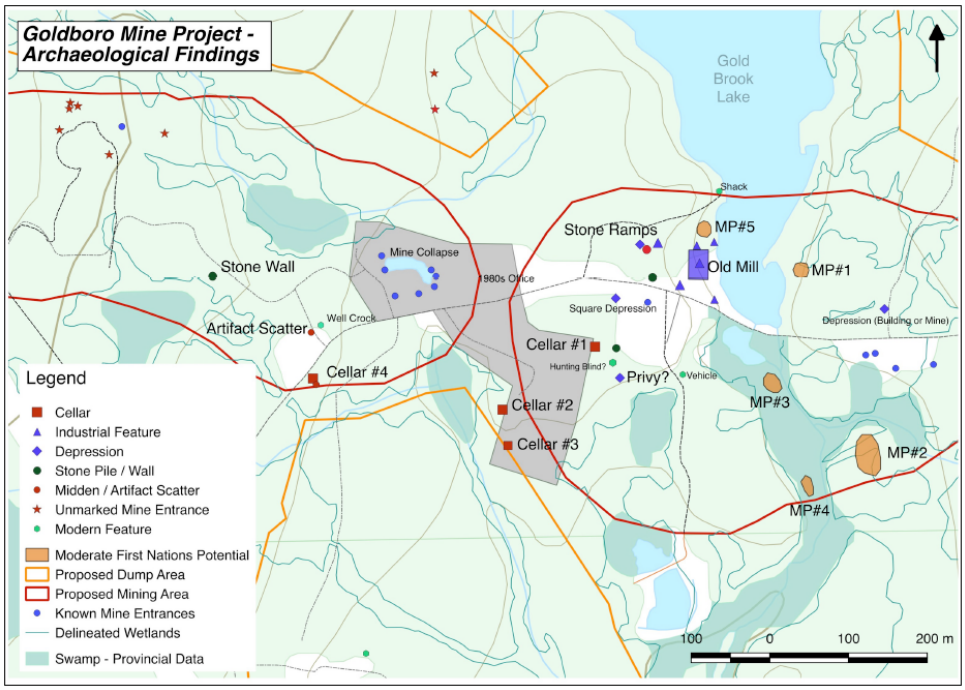


Figure 6-20: Archaeological Findings in the Goldboro Project area (Dave MacIntyre & Associates, 2017)

Recommendations and Conclusions

The historic mill complex by Gold Brook Lake is the most notable archaeological feature within the study area. This large complex is obviously industrial in nature and given the size and the known date range of the site, it is unlikely that archaeological testing in this location would be an efficient means of learning more about the site. As such, if soil disturbance – including mechanical clearing of the trees – is proposed within approximately 50 m of the provided GPS coordinate for the site, it is required that an archaeologist be contracted to monitor mechanical ground disturbance to ensure that the site is properly mitigated. The same is true of the two stone ramps, which lie approximately 60 m northwest of the mill's centre. At the ramp location, a buffer of only 10 m is recommended, and if disturbance encroaches upon this buffer, archaeological monitoring is similarly required. The isolated iron object nearby is of unknown function and age. As such it has not been collected for curation, but it would be recommended that prior to ground disturbance this object be more closely examined and the Museum of Industry in Stellarton be consulted to determine if the object is desirable for curation.

It is required that a 20 m buffer zone be established around Cellar #1 and Cellar #2, both of which were confirmed as late nineteenth to early twentieth century archaeological features in 1988. If a buffer zone is not feasible, further archaeological testing and recording is recommended to collect valuable information about these features before they are destroyed. This would likely take the form of formal test units (50 cm x 50 cm) spaced closely around and inside the features, or a series of trench-like excavation units designed to cross-section the features.

Cellars #3 and #4 are smaller and less distinct and may represent outbuildings or other historic activity of lower significance. As such, archaeological testing at these two locations is recommended prior to ground disturbance within 20 m of both features. If these areas will not be impacted by the development, then a 20 m buffer would be sufficient to avoid disturbing any archaeological resources that they contain. The artifact scatter identified near the former office site (gravel pad) does not appear to be associated with any intact archaeological feature. It is possible that a cellar or other feature once existed under the gravel pad, or that the area was simply a semi-modern dump area. As such, it is not currently a location of high concern. However, if during ground disturbance a large quantity of additional artifacts is encountered, it is required that ground disturbance activity should cease, and an archaeologist be contracted to assess and possibly monitor the area.

The two depressions of unknown function appear most likely to be related to mining activity, and as such it is unlikely that archaeological testing would be helpful in these locations. As such, it is required that if soil disturbance is likely to take place within 10 m of these two depressions, and archaeologist should be contracted to monitor the disturbance and mitigate any significant archaeological resources.

The probable privy associated with Cellar #1 would similarly be unlikely to benefit from archaeological testing unless a test unit was placed directly inside it, which may be a difficult undertaking given the slope of the depression itself. It is therefore required that a 10 m buffer be established around this feature, or if this is not possible, professional archaeological monitoring of ground disturbance at this location should be undertaken.

In all five areas identified as having moderate potential for First Nations archaeological resources, archaeological shovel testing should be undertaken to determine whether any archaeological deposits exist at these locations. Testing would consist of a 40 cm x 40 cm shovel test unit placed every 5 m on a grid in areas smaller than 20 m x 20 m, and every 10 m on areas larger than this. As all these locations border Gold Brook Lake and Gold Brook itself, they may be protected by a buffer zone or set-back area related to other parts of the environmental assessment. If this is the case and these areas shall not be disturbed, then testing need not be undertaken. No mitigation is required for the modern activity areas. Finally, in the unlikely event that archaeological resources are encountered that have not been recorded above, it is required that any ground-disturbing activity be halted and the Coordinator of Special Places (902-424-6475) be contacted immediately regarding a suitable method of mitigation.

6.3.2 Mi'kmaq Ecological Knowledge Study (MEKS)

A Mi'kmaq Ecological Knowledge Study, also commonly referred to as a MEKS or a Traditional Ecological Knowledge Study (TEKS), was developed by Membertou Geomatics Solutions (MGS) for Anaconda Mining Inc. with regards to the Project located in Goldboro, Nova Scotia.

The MEKS mandate was to consider land and water areas within the proposed Project area and to identify what Mi'kmaq traditional use activities have occurred or are currently within the study area as well as what Mi'kmaq ecological knowledge presently exists. To ensure accountability and ethical responsibility of the study, the MEKS development has adhered to the "Mi'kmaq Ecological Knowledge Protocol, 2nd Edition". The protocol has been established by the Assembly of Nova Scotia Mi'kmaq Chiefs, which addresses the process, procedures and results that are expected of a MEKS.

The MEKS consisted of two major components:

- Mi'kmaq Traditional Land Use Activities, both past and present
- A Mi'kmaq Significance Species Analysis, considering the resources that are important to Mi'kmaq use.

The Mi'kmaq Traditional Land and Resource Use Activities component utilized interviews as the key source of information regarding Mi'kmaq use within the Site and Study Area. The Study Area consisted of areas within a 5 km radius of the Site boundaries.

Interviews were undertaken by the MEKS Team with Mi'kmaq knowledge holders from the communities of Paq'tnkek, Pictou Landing and Sheet Harbour in August and September of 2017. These interviews allowed the team to develop a collection of data that reflected the most recent Mi'kmaq traditional use in this area, as well as historic accounts.

The data gathered was also considered according to its significance to the Mi'kmaq people. Each species identified was analyzed by considering their use as food/sustenance resources, medicinal/ceremonial plant resources and arts/tools resources. The resources were also considered for their use and importance to the Mi'kmaq as well as their availability or abundance within or adjacent to the study area.

Trout fishing and deer hunting were the most commonly reported traditional use activities in the Study Area. Overall, the activities took place in the Historic Past and the Recent Past, as defined in the MEKS report. However, there is still some current use in the area.

Other activities include harvesting for salmon, bass, eel, blueberries, fir trees, rabbits, sea urchin, and spruce trees to name a few. The locations of these activities seem to be centered around Country Harbour (from Cook Cove to past the Country Harbour Ferry), Isaacs Harbour area (from Goldboro to between Seal Harbour and Coddles Harbour), and around Meadow Lake to West Brook (including Gold Brook Lake, Seal Harbour Lake, etc.)

6.4 Other Undertakings in the Area

LNG Project

The construction on this project has started in the late winter of 2018. Currently work done is limited to deforestation of the project's footprint but is scheduled to be approaching its final decision gate in spring/summer of 2018.

Maritimes & Northeast Pipeline, NS Operations Enbridge

ExxonMobil Canada East is scheduled to start decommissioning its existing plant and the Maritimes & Northeast Pipeline in 2019. The pipeline is crossing the western side of the property. Anaconda has reached out to ExxonMobil – Enbridge for guidance. Enbridge has provided a guideline document titled "Requirements for Construction near Company Pipelines" to Anaconda to help determine the safe working distances from the existing pipeline. This document is available in the Appendix.

Based on this document, safe working distances from the pipeline were established. As per correspondence with Enbridge, a safe perimeter of 150 m has been established from the pit perimeter to the pipeline.

Any underground development below the pipeline has been limited and a safe crown pillar has been established through the geotechnical investigation program by WSP.

7 Effects of the Undertaking on the Environment

As progressively described within this document, a series of Project-environment interactions can be expected during the construction, operation and decommissioning of the Project. These interactions and their resulting effects on the environment are entirely consistent with and typical of environmental impacts of natural resource development projects in Nova Scotia and elsewhere in Canada. For many reasons the Site is well suited for a mining development given its rich mining history and historic production from the same footprint at the turn of the century.

The large Gold Brook Lake and Gold Brook are not used as a potable water supply. Initially, some water may be drawn from the lake or existing polishing ponds for the Concentrator start-up. During the normal course of the mill operation the tailings discharge would be directed to the tailings pond where the solids would be settled and then the clean water would be directed to the polishing pond where the process water would be recycled for the milling. If the effluent water quality leaving the tailings pond is not in line with the provincial regulations, water treatment options would be evaluated and implemented to meet discharge quality standards.

The Project's footprint is situated within crown lands and private property boundaries, but the nearest residential properties are not situated at the property boundary but rather thousands of metres away. The pit face and concentrator are proposed over 2 km away from the open water and residential development.

Given these considerations and others, the Company concludes that the Project is not likely to result in any significant adverse residual environmental effects. In contrast, the Project is expected to result in long term direct and indirect employment opportunities, in addition to other positive economic benefits for the local, regional, and provincial economies.

7.1 Construction and Operation

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 distribution of fish in waterbodies surrounding the Project is affected by the presence of natural barriers preventing many species from occupying the upstream reaches of creeks. Direct impact to fish bearing watercourses and waterbodies is not expected to occur from infrastructure necessary for the Project.

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 and waste rock storage areas
- 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.

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. Direct effect to aquatic species at risk, if identified within the Project Area are not expected, as watercourse and lakes within the Project Area are not expected to be directly affected by the Project infrastructure.

The potential effects of the Project on the environment are as follows:

- The Goldboro Deposit is characterized by low contents of potentially acid generating sulphide minerals. Thus, the potential for substantial acid generation would be expected to be limited by the low content of sulphide minerals in the area to be mined.
- The physical nature and extent of interaction between the groundwater and surface water and how they might be affected by mining is estimated to not exceed current historic levels. Given the distance to the nearest residence, it is improbable that any potable groundwater resources will be affected.
- Discharges from the mine will only include surface water runoff from the pit and stockpiles. All water will be captured in settling ponds to reduce total suspended solids (TSS) 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 but may be reduced for the ongoing maintenance and operations where possible. The biggest example of this is the wetlands in the area. For example, Beaver Pond is within the planned footprint of the open pit and will have to be dewatered for the pit to be completed. The projected impact of this is minimal but will alter the local habitat for fauna in the region.
- Introduction and spread of invasive and exotic species due to maintenance and operations will be of low concern and weed management programs will minimize the associated impacts.
- Potential impacts to the wetland systems may correlate to construction, operation, and maintenance activities within wetlands. Loss of wetlands in facilities proposed for the Project 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 Project area.
- Wildlife Species listed under the Species at Risk Act, COSEWIC, NSESA, or NS Wildlife Act have the potential to occur, within the Project area. There is the potential to affect wildlife through the loss of habitat due to on-site clearing activities, habitat fragmentation, and disturbance from noise and traffic related to the Project. The potential exists for increased mortality risk through clearing activities. Sensory disturbance can occur primarily from noise generated from the Project, 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 Project area, 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.

Beaver Pond is a relatively recently created pond by beavers located in the southern end of WL18 (Figure 6-14) as identified by GEMTEC in the Ecological Baseline Study completed in 2017. The clearing surrounding it exists due to the ground's highly saturated, boggy nature. As shown in Figure 7-1, Figure 7-2, and Figure 7-3, the pond did not exist in 1971 or 1990 but had appeared by 2017. This shows that rather than being a historic pond, is a relatively recent development within the region.

Figure 7-1: Aerial photo of the Goldboro project on June 23, 1971 showing only a small creek in the area.

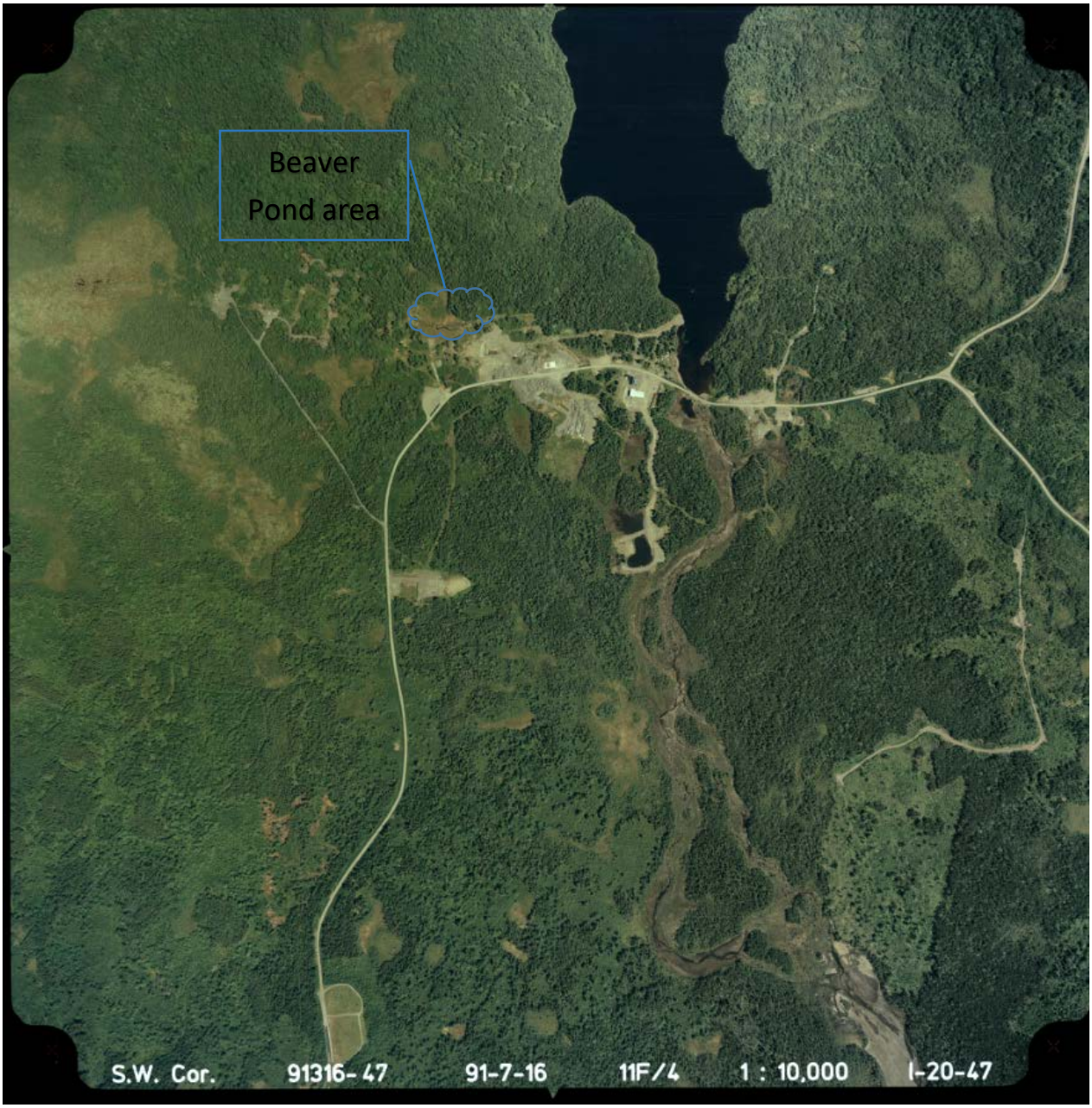


Figure 7-2: Aerial photo of the Project area on July 7, 1991 showing only a small creek in the area.

Figure 7-3: Aerial view of Beaver Pond, 2017. Note the appearance of a body of water in the clearing.

Figure 7-4 shows the surrounding area of Beaver Pond. Beaver Pond is within the footprint of the planned open pit. To facilitate the excavation of the pit, the pond will have to be dewatered and the drainage path rerouted around the pit limits. The current plan to accomplish this is to adjust the drainage path (which currently enters Beaver Pond from the northwest and exits through the northeast) to the north of the planned pit limit and the south of the planned waste dump (Figure 7-5). This will ensure that the impact upon the watershed is as localized as possible and the downstream impact is minimized. The drainage path will still empty into Gold Brook Lake but will be directed around the planned design elements in the region. Upstream impacts are not anticipated.

Figure 7-4: View of Beaver Pond within WL18 as identified by GEMTEC (GEMTEC, 2017)

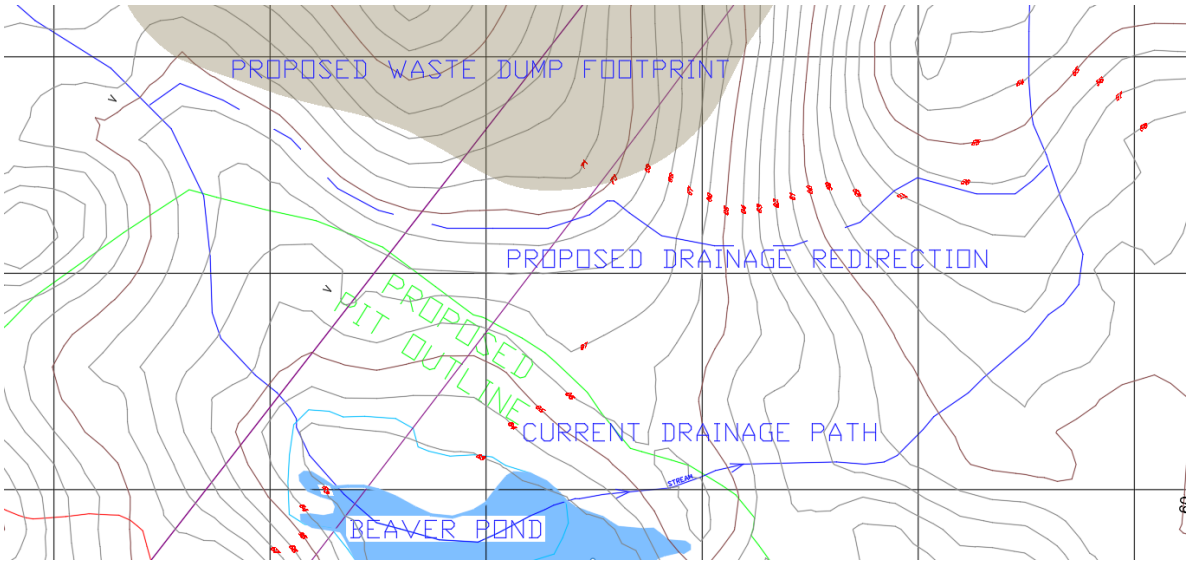


Figure 7-5: Showing proposed redirection of drainage path around planned waste dump and pit limits to maintain drainage direction

7.2 Decommissioning and Reclamation

The reclamation plan and goals are more closely detailed in Section 5.7, however the general concept for reclaiming the Site is to remove all infrastructure that can be dismantled and return the Site to a state that is equal or better than pre-existing condition. Where possible, a progressive reclamation approach will be used to reduce the efforts required at the time of closure and accelerating the revegetation process.

All non-movable physical aspects including the open pit, surface areas and waste rock storage piles will be contoured to blend in with the natural landscape and revegetated. The open pit will be allowed to flood to create a lake with a shallow water wetland border and a viable aquatic habitat. Shorelines will be contoured from the pit edges to prevent steep cliff edges into the lake.

Removal of facilities and remediation of the Site, including revegetation, will take approximately two years after production has concluded. Monitoring of reclaimed site conditions will be done on a quarterly basis for a period specified by NSDNR and NSE with maintenance and remedial action occurring on an as-required basis to ensure that the results of reclamation are sustainable.

Reclamation costs are estimated to be about $3.1 million, based on current known inputs. A reclamation bond will be estimated and negotiated with NSE and NSDNR during the Industrial Approval process. A Reclamation and Closure Plan to be submitted to NSDNR will contain more detail on the reclamation process, as well as be reviewed and approved by NSDNR.

8 Effects of the Environment on the Undertaking

Although environmental assessments typically focus on project-related impacts to the surrounding environment, assessment must also consider the effects of the environment upon the Project. The natural environment has the potential to adversely interact with the Project through meteorological, climatological and seismological events.

Drought or extreme precipitation events leading to flooding could impact the viability and continued operation of the project. Drought could impact the Project's continued operation through removal of the Project's primary water source (Goldbrook Lake). Flooding due to extreme precipitation could cause damage to on-site infrastructure such as the buildings and facilities, as well as flooding the surface and underground mine workings to the point where production is not possible.

Forest fires are a major concern around the Project. Primarily because the Site is surrounded by forested area, but also because of the LNG pipeline that runs directly adjacent to the Site. A forest fire would impact the Project by forcing evacuations and possibly a prolonged shutdown of the Site if the facilities were severely damaged.

Rapid or increasing number of freeze/thaw events could damage the foundations of the various buildings and dam infrastructure through frost heaving. This could cause production delays through property damage if construction was done to an insufficient depth relative to the frost line.

As previously mentioned in Section 6.1.1, seismic activity is unlikely around the Project but is not unheard of in Nova Scotia. Figure 8-1 shows recent earthquakes around the province. The closest to the Project was in Bridgewater (dark green marker) 11 years ago and was of magnitude 3.2 (Earthquake Track, 2018).

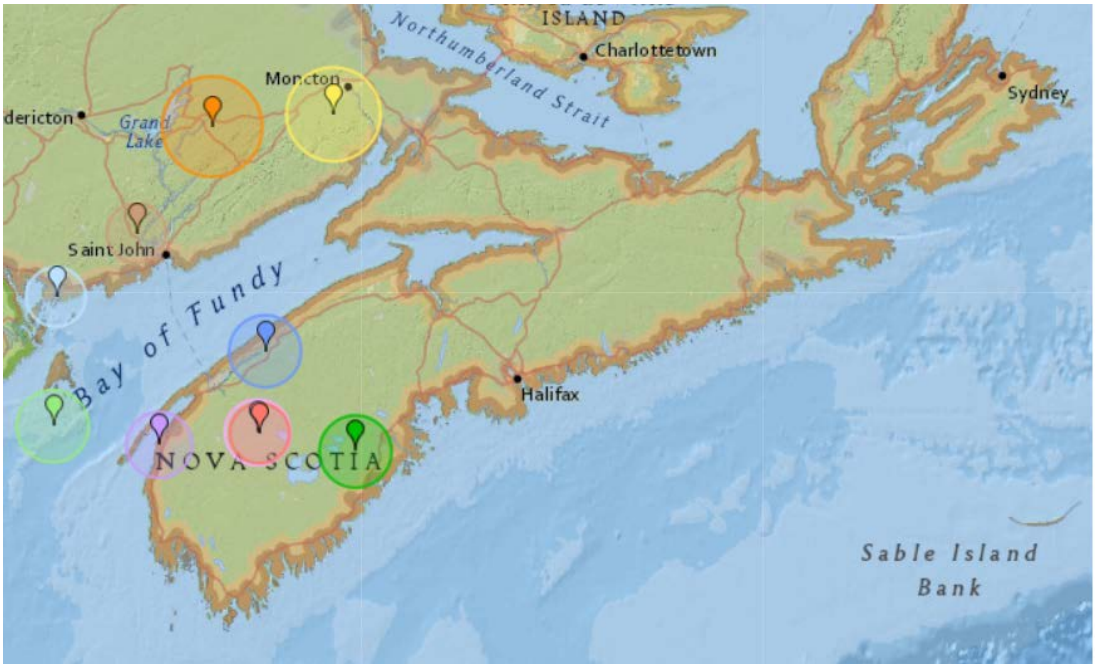


Figure 8-1: Recent earthquakes around Nova Scotia (Earthquake Track, 2018)

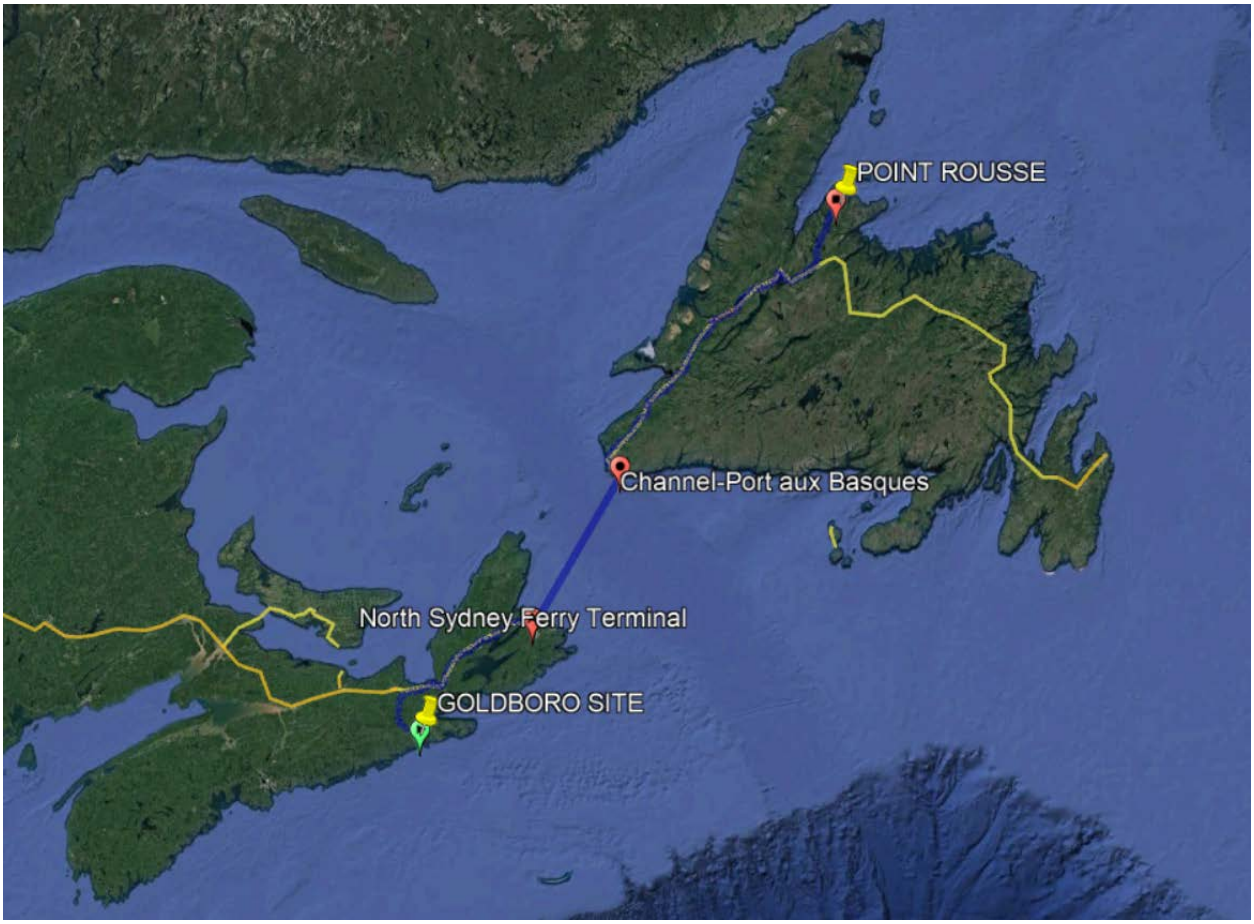


Figure 8-2: Route from Goldboro to the Point Rousse processing facility

This is the most sensitive part of the Project in terms of weather effects as the weather conditions have the potential to dramatically impede/prevent road travel. Examples of conditions that could impede/prevent transport of the concentrate via tanker truck are severe wind storms including hurricanes, ice storms or hail events, extreme marine conditions (high waves plus extreme winds), and late season sea ice. The different types of storms more have to do with road conditions, while aggressive maritime conditions or late season sea ice would be directly related to the ability of the ferry to make a safe and expedient crossing.

The Project is located on a relatively exposed southern coastline exposed to northerly winds, a limited wave action and possible flooding from Gold Brook Lake. Initial designs have considered prevailing historical conditions, including extreme events, as well the anticipated effects of climate change on key weather variables. As the Project moves into the detailed design stage, additional consideration will be given to the effects of the environment on the Project.

The environment could impact the process of reclamation if the climate conditions are unfavourable when reclamation efforts begin. Erosion by wind or precipitation could impede the effects of reseeding disturbed areas and inhibit the growth of planted crops. If this is uncorrected the covering of stockpiles could be undone, and the aesthetic of the property may deteriorate. This will be mitigated by

supplementing the seeding of disturbed land with aggressive hydroseeding to begin anchoring of the soil as soon as possible.

In addition to design factors, potential adverse effects on the Project due to the environment will be mitigated through the monitoring and/or contingency planning. Therefore, the effects of the environment on the Project are not anticipated to be significant.

Project infrastructure will be designed to accommodate the conditions imposed by the natural environment and to accommodate, to the extent possible, expected effects of the climate on the Project. Project activities will include emergency preparedness to ensure rapid, organized response in the event of a severe climate episode.

Any one of these environmental events could affect the continued operation of the Project if they occurred at a sufficient level of severity. They would negatively impact the safe production from the Project as well as incur property damages. In the case of an exceptionally severe event, loss of life would be possible if circumstances arose abruptly and proceeded unchecked. Anaconda will be compiling an Operation, Maintenance, and Surveillance (OMS) document as well as an Emergency Response Plan (ERP). The OMS plan will detail the potential impacts upon the Site operations and infrastructure of the environmental events according to their severity, while the ERP will outline the immediate responses necessary for each of the previously mentioned environmental events.

9 Other Approvals Required

Additional permits required prior to the commencement of production include a Water Withdrawal Permit, Industrial Approval, Mineral Lease, Reclamation and Closure plan, and a Letter of Authority from the Director of Mines of NSDNR.

Baseline water quality measurements and ongoing water quality testing have been completed as part of the requirements for a Water Withdrawal Permit. Approval of the design of the tailings facility is required for the Industrial Approval.

For construction in the area, wetlands will be avoided wherever possible. Where not possible, both Wetland Alteration Approval(s) and Watercourse Alteration Approval(s) will be acquired. These will be obtained once the layout of the Site is finalized and the locations of all infrastructure in the areas described as wetlands/watercourses (as shown in Figure 6-14) are known.

A reclamation bond will need to be submitted to the provincial government, either in cash or equivalent security, matching the full estimated cost of reclamation. The bond is returned as reclamation activities are carried out.

Municipal building permits, on-site sewage permit, MMER documentation, Letters of approval form NS Labour for underground mining, and explosives permits will all be acquired as needed.

Throughout the Project's duration, all applicable provincial and federal regulations and legislation will be followed. This includes but is not limited to:

- 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
- Canada Wildlife Act and Regulations
- Canadian Environmental Assessment Act and Regulations
- Canadian Environmental Protection Act and Regulations
- Fisheries Act and Regulations
- Migratory Birds Convention Act and Regulations
- Transportation of Dangerous Goods Act and Regulations
- Species at Risk Act

10 Funding

The Project will be 100% funded by Anaconda. No public funding, federal or provincial, is required or sought.

11 References

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12 APPENDICES: Reference and Supporting Documents

Appendix 1: Preliminary Hydrology Study

Ecological Baseline Study

Appendix 2: Ecological Baseline Studies (cont.)

Updated Goldboro Resource Estimate Report

Appendix 3: Updated Goldboro Resource Estimate Report (cont.)

Technical Report to Accompany an Application for a Water Withdrawal Approval

Keltic Petrochemicals and LNG Facility – Environmental Assessment (Chapter 8)

Goldboro Project, Preliminary Economic Assessment

Appendix 4: Goldboro Project, Preliminary Economic Assessment (cont.)

Archaeological Resource Impact Assessment

Appendix 5: Archaeological Resource Impact Assessment (cont.)

Leave to Abandon Application for the Goldboro Gas Plant and 26" Gathering Pipeline

Orex Indemnity Agreement

Preliminary Metal Leaching & Acid Rock Drainage Characterization

Goldboro Mining Site, Hydrogeology Investigation

Appendix 6: Goldboro Mining Site, Hydrogeology Investigation (cont.)

Requirements for Construction Near Company Pipelines

130th Annual Meeting – Mining Society of Nova Scotia Presentation

Corporate presentation – June 2018

CIM – Vancouver May 2018 Presentation