



MARITIME RESOURCES



Hammerdown Gold Project – Environmental Assessment Registration

Pursuant to the Newfoundland and Labrador *Environmental Protection Act (Part X)*

Submitted by:

Maritime Resources Corporation

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Prepared with the assistance of:

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Date: July 6th, 2020

EXECUTIVE SUMMARY

Maritime Resources Corporation (“Maritime”, or the “Company”) is proposing to develop a new gold mine at their 100% owned Hammerdown Gold Project (the “Project”, or “Hammerdown”) located approximately 5 kilometres (km) southwest of the Town of King’s Point and 15 km northwest of the Town of Springdale, Newfoundland and Labrador (“NL”) in the Baie Verte mining district (Figure 1).

The Project is a brownfields mine site with a history of mining operations. Richmont Mines operated the mine from 2000 to 2004 as a small open pit and underground operation. Ore from the mine was processed at the Nugget Pond process plant (“mill”) near the town of Baie Verte, with tailings stored within a permitted impoundment located adjacent to the mill. The mine ceased operations in 2004 due to low gold prices and the site was formally closed with all required rehabilitation and closure activities carried out at that time. Since closure, a number of companies, including Maritime, have conducted exploration and technical programs at the Project. Through this work and investment, Maritime has identified a significant gold resource and has completed a number of technical and environmental studies to support the development of a new mine and Project that follows a similar concept and scope as Richmont’s original mine.

The Project will involve the extraction of gold-rich mineralization from the Property and is envisioned to comprise the following components:

- an open pit and underground mine;
- a waste rock dump and low grade ore stockpiles;
- a mobile crushing and ore sorting plant producing 700 tonnes per day of mill feed; and
- water management features including settling ponds, water diversion and catchment structures and water treatment, as required.

Mill feed will be transported and processed at the Nugget Pond Mill gold circuit, owned and operated by Rambler Metals and Mining Canada Limited (Rambler), for gold doré production and tailings disposal. Maritime will use innovative ore sorting technology at the Project site that will reduce the volume of mill feed going to the Nugget Pond Mill and therefore reduce the amount of traffic on the roads and associated greenhouse gas emissions. All tailings from the process plant will be stored in the existing licensed tailings storage facility at Nugget Pond. No tailings will be stored at the Hammerdown Project site.

The Nugget Pond Mill is located approximately 140 km from the Project site and approximately 6 km west of the recently resettled community of Snook’s Arm in the provincial electoral district of Baie Verte, White Bay. During operations from 2000-2004, the Nugget Pond gold circuit recovered 97-98% of the gold from the Hammerdown mine using a conventional carbon-in-pulp leaching circuit. Since that time, the circuit has been on care and maintenance and is currently idle. Maritime will provide technical oversight and management of the sorting and process plant at the Nugget Pond Mill gold circuit operations.

A mine life of six years is expected for the Project based on current designs and planned production rates. Over the course of the Project, a total of approximately 310,000 ounces of gold is expected to be produced. An initial capital expense of \$57M is expected to construct the Project over the course of 6 to 12 months. At peak capacity the Project, and associated Project components, are estimated to create over 150 direct employment positions.

Maritime does not anticipate any significant adverse effects of the Project on the following environmental and socioeconomic components:

- Vegetation and vegetation species at risk (SAR);
- Wetlands;
- Wildlife and wildlife SAR;
- Avifauna and avifauna SAR ;
- Fish, fish SAR and fish habitat;
- Surface and groundwater resources;
- Atmospheric environment, including noise, air quality and vibration
- Human health and wellbeing;
- Land and resource use;
- Historic and heritage resources; or
- Communities and economy.

Maritime has taken great efforts to design the Project with closure and reclamation in mind from the start and has undertaken environmental baseline studies to inform the design. Geochemical testing is ongoing, but to date results indicate that the majority of waste rock tested is essentially inert with negligible potential for acid generation or metal leaching. This material was tested for suitability as construction aggregate and has met specifications for several products, possibly representing a source of aggregate and income for the local community in the future.

Closure and rehabilitation activities associated with the Project will take place after operations have ceased and will endeavour to rehabilitate the site to as close to its pre-mining condition as practicable. This may include complete demolition and removal of site infrastructure, re-vegetation of disturbed areas, removal of contaminated materials if applicable, water management and reshaping the landscape.

Progressive reclamation activities will also occur over the life of the Project. Any post closure monitoring activities will be carried out in accordance with the overall Reclamation and Closure Plan (RCP) that will be submitted relating to Maritime's operations.

Maritime is committed to developing an economically viable Project in an environmentally sound manner. Maritime continues to engage with local communities and stakeholder groups to provide clear Project related information. Maritime will work to ensure benefits are accrued to the region through local hires and local investment opportunities. To date, Maritime has received letters of support for the Project from the Town of King's Point and the Town of Springdale.

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LIST OF ABBREVIATIONS AND TERMINOLOGY

%	Percent
AAQS	Ambient Air Quality Standard
ABA	Acid Base Accounting
ACCDC	Atlantic Canada Conservation Data Centre
Ag	Silver
Al	Aluminum
ANFO	Ammonium-nitrate Fuel Oil
ARD	Acid Rock Drainage
As	Arsenic
Au	Gold
Be	Beryllium
Bi	Bismuth
BMP	Best Management Practice
BIMP	Blast Management Plan
CAC	Criteria Air Contaminant
CCME	Canadian Council of Ministers of the Environment
Cd	Cadmium
CH₄	Methane
CIP	Carbon in Pulp
CO	Carbon monoxide
CO₂	Carbon dioxide
C of A	Certificate of Approval

COSEWIC	Committee on the Status of Endangered Wildlife in Canada
Cu	Copper
CWCS	Canadian Wetland Classification System
CWS	Canadian Wildlife Service
dBA	A-weighted decibels of sound
DFO	Department of Fisheries and Oceans
DMS	Dense media separation
DP	Development Plan
EA	Environmental assessment
ECCC	Environment and Climate Change Canada
EEM	Environmental Effects Monitoring
EML	Exempt Mineral Land
EMP	Environmental Management Plan
EPP	Environmental Protection Plan
ERP	Emergency Response Plan
ES	Exposed Site
F	Fluoride
Fe	Iron
FAL	Freshwater Aquatic Life
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Emissions Reporting Program
GLC	Ground level concentration
GNL	Government of Newfoundland and Labrador
gpt	Grams per tonne
Ha	Hectares
IPCC	Intergovernmental Panel on Climate Change
IT	Information Technology
kBcm	Thousand banked cubic metres
kg	Kilogram
km	Kilometre
km/hr	Kilometre per hour
kt	Kilotonne
kV	Kilovolt
kVA	Kilovolt Ampere
LOI	Letter of Intent
LOM	Life of Mine
m	Metre
m²	Square metres
m³	Cubic metres
MASL	Metres above sea level

MBCA	<i>Migratory Birds Convention Act</i>
MBGS	Meters Below Ground Surface
MEND	Mine Environment Neutral Drainage
MGGA	<i>Management of Greenhouse Gas Act</i>
ML	Metal Leaching
MinL	Mineral lease
Mm³	Million Cubic Metres
Mn	Manganese
Mt	Million tonnes
mtpd	Metric tonnes per day
MW	Megawatt
NAG	Non Acid Generating
NAPS	National Air Pollution Surveillance
NH₃	Ammonia
NL	Newfoundland and Labrador
NLCDC	Newfoundland and Labrador Conservation Data Centre
NLDFLR	Newfoundland and Labrador Department of Fisheries and Land Resources
NLDMAE	Newfoundland and Labrador Department of Municipal Affairs and Environment
NLDNR	Newfoundland and Labrador Department of Natural Resources
NLDTW	Newfoundland and Labrador Department of Transportation and Works
NL EPA	Newfoundland and Labrador <i>Environmental Protection Act</i>
NL ESA	Newfoundland and Labrador <i>Endangered Species Act</i>
NLOA	Newfoundland and Labrador Outfitting Association
NL OHS	Newfoundland and Labrador <i>Occupational Health and Safety Act</i>
NLTCII	Newfoundland and Labrador Department of Tourism, Culture, Industry and Innovation
NLDTW	Newfoundland and Labrador Department of Transportation and Works
N₂O	Nitrous oxide
NOC	National Occupation Classification
Non-PAG	Non Potentially Acid Generating
NOX	Nitrogen Oxides
NP	Neutralizing Potential
NSF	Newfoundland Snowmobile Federation
O₃	Ozone
oz/t	Ounces per tonne
PAG	Potentially acid-generating
PAO	Provincial Archaeology Office
ppb	Parts Per Billion
Pb	Lead

PDAC	Prospectors & Developers Association of Canada
PES	Potential Explosion Site
PM	Particulate Matter
PM_{2.5}	Particulate matter less than 2.5 microns
PM₁₀	Particulate matter less than 10 microns
PPD	Pollution Prevention Division
QP	Qualified Professional
RAA	Revenue Administration Act
RCP	Reclamation and Closure Plan
RQD	Rock Quality Density
ROM	Run of Mine
S	Sulphur
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
Sb	Antimony
SEOW	Short-eared owl
SO_x	Sulphur oxide
SO₂	Sulphur dioxide
SOCC	Species of Conservation Concern
SOP	Standard Operating Procedure
Te	Tellurium
T/h	Tonnes per hour
TCR	The Climate Registry
TIC	Total inorganic carbon
TMF	Tailings Management Facility
TPA	Tonnes per annum
tpd	Tonnes per day
TPM	Total Particulate Matter
T/m³	Tonnes per cubic metre
TSP	Total suspended particulate
VOC	Volatile organic compounds
WaMP	Water Management Plan
WD	Wildlife Division
WMP	Waste Management Plan
WNS	White Nose Syndrome
WRMD	Water Resources Management Division
XRT	X-Ray Transmission
Zn	Zinc

1.0 INTRODUCTION

1.1 Project Name: Hammerdown Gold Project

Maritime Resources Corporation (“Maritime” or the “Company”) is proposing to develop a new gold mine at their Hammerdown Property (the Property) located approximately 5 kilometres (km) southwest of the Town of King’s Point and 15 km northwest of the Town of Springdale, Newfoundland and Labrador (NL) (Figure 1). The Hammerdown gold deposit is characterized by near-vertical, narrow mesothermal quartz veins containing gold in pyrite. The former Hammerdown gold mine was last operated by Richmont Mines between 2000-2004, producing 143,000 ounces of gold at an average mine grade of 15.7 grams per tonne (gpt) Au through a combination of narrow vein open pit and underground mining. The mine ceased operations due to low gold prices and the site was formally closed with all required rehabilitation and closure activities carried out at that time.

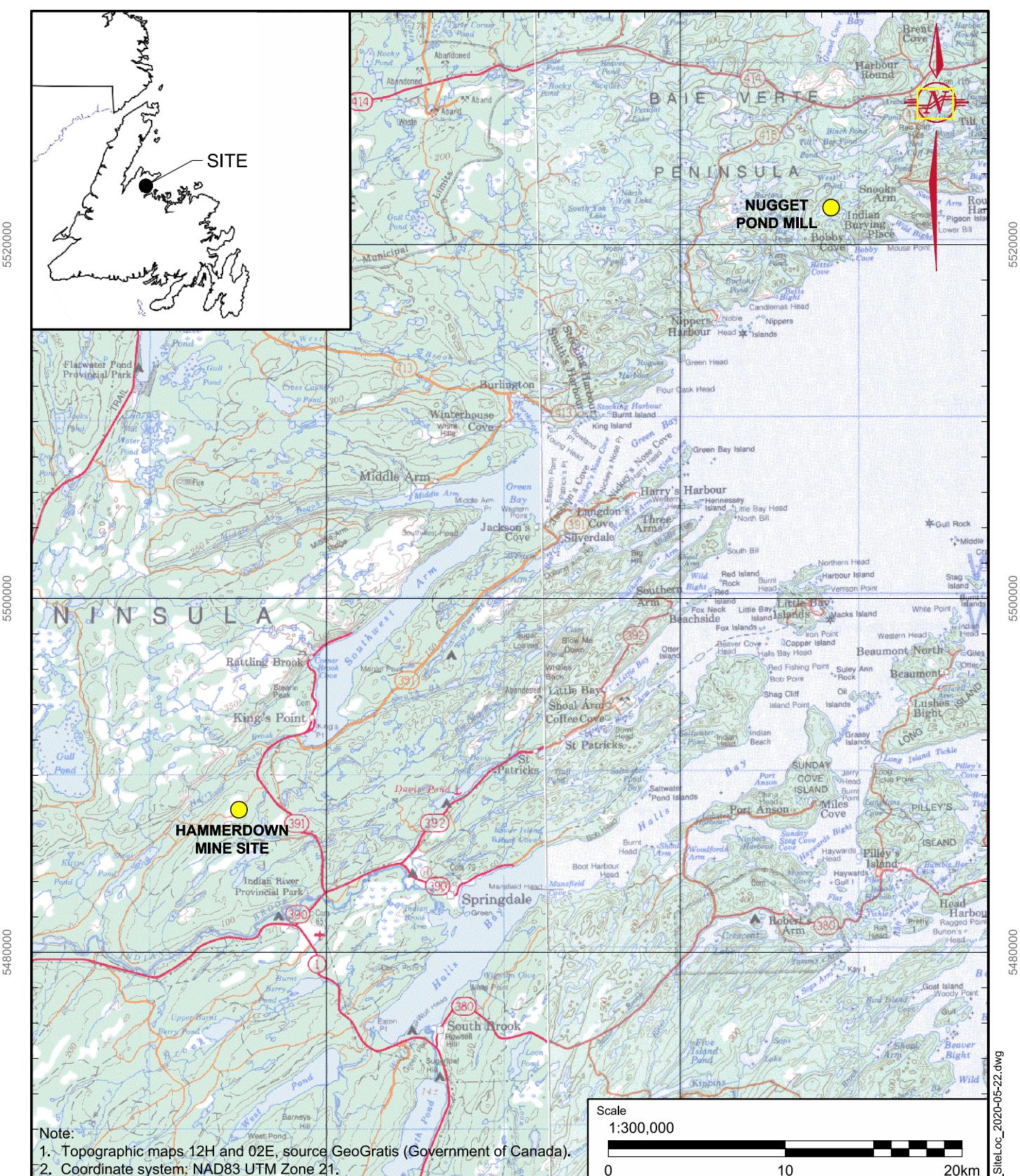
This Project will involve the extraction of gold rich mineralization from the Property and is envisioned to comprise an open pit mine, an underground mine, a waste rock dump, a low grade ore stockpile, a mobile crushing and ore sorting plant, and associated operational infrastructure including water management features. The crushing and ore sorting plant will be designed to produce 700 tonnes per day (tpd) of product feed that would be transported and processed at the Nugget Pond Mill gold circuit, owned and operated by Rambler Metals and Mining Canada Limited (Rambler) for gold doré production. Tailings will be stored in the existing Tailings Management Facility (TMF) at Nugget Pond. The Nugget Pond Mill is located approximately 140 km from the Project site and approximately 6 km west of the recently resettled community of Snook’s Arm in the provincial electoral district of Baie Verte, White Bay. Maritime will provide technical oversight and management of the sorting and process plant at the Nugget Pond Mill gold circuit operations.

A Life of Mine (LOM) plan supporting six years of operations is expected for the Project based on currently planned production rates and estimated gold prices. Progressive reclamation activities will take place during mine operations. Final closure and rehabilitation activities associated with the Project will take place after operations have ceased. Any post-closure monitoring activities will be carried out in accordance with the overall Reclamation and Closure Plan (RCP) that will be in place for Maritime’s operations.

This environmental assessment (EA) registration document has been prepared in relation to the Project, with assistance from GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) of Paradise, NL. The document format follows the guidance for Project Registration under the NL environmental assessment (EA) process (DMAE 2017).

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Project

REGISTRATION DOCUMENT HAMMERDOWN GOLD PROJECT

Drawing

SITE LOCATION PLAN

Drawn By
CHGDate
JUNE 2020Project No.
80044.02Drawing No.
FIGURE 1Revision No.
0

1.2 Proponent Information

Maritime is a mining company that has 100% ownership of the Hammerdown Gold Project near King's Point, NL.

Name of Corporate Body:	Maritime Resources Corporation
Corporate Address:	1900 - 110 Yonge Street Toronto, ON M5C 1T4
Chief Executive Officer:	Mr. Garrett Macdonald, MBA, P.Eng. President and CEO Telephone: (416) 365 - 5321 Email: garett@maritimergold.com
Principal Contact Person for the Purpose of EA:	Mr. Garrett Macdonald, MBA, P.Eng. President and CEO 1900 - 110 Yonge Street Toronto, ON M5C 1T4 Telephone: (416) 365 - 5321 Email: garett@maritimergold.com

1.3 Rationale for the Undertaking

Maritime aims to construct and operate a new gold mine on the site of a former operating gold mine. It is Maritime's view that this Project presents an opportunity to create sustainable economic growth in the region with minimal adverse environmental effects.

The Project will be initiated once all approvals and authorizations are in place. The current design of the proposed Hammerdown Gold Project will see both open pit and underground workings developed with total ore production of approximately 2.1 million tonnes (Mt) and 28.8 Mt of waste rock. Development activity at the mine site will include site clearing, removal of overburden (glacial till), drilling and blasting of the exposed rock, development of underground workings, crushing and sorting of ore material and transportation offsite to an existing processing plant.

The Project will require some new infrastructure onsite (i.e., ore sorting plant, waste rock storage, mine office and maintenance garage) but will use existing offsite milling and tailings storage facilities. Existing all-weather and access roads are in place and will require only minor upgrading. The Project covers a 90 hectare (ha) area at the Hammerdown mine site.

1.4 Environmental Assessment Process and Requirements

The NL *Environmental Protection Act* (NL EPA) (GNL 2002) requires anyone who plans a project that could have a significant effect on the natural, social or economic environment (an "undertaking") to present it for examination through the provincial EA process.

Under the NL EPA definitions, an undertaking includes “an enterprise, activity, project, structure, work or proposal and a modification, abandonment, demolition, decommissioning, rehabilitation and an extension of them that may, in the opinion of the minister, have a significant environmental effect.”

The associated *Environmental Assessment Regulations* (Part 3) (GNL 2003) list those types of projects (potentially including proposed modifications and extensions of same) that require registration and review. These include, for example:

s.33 (2) An undertaking that will be engaged in the mining, beneficiating and preparing of a mineral as defined in the Mineral Act whether or not these operations are to be performed in conjunction with a mine or at mills that will be operated separately shall be registered.

Following public and governmental review of this EA Registration, the Minister of the Department of Municipal Affairs and Environment (DMAE) will issue a decision that will be one of the following:

- Release, with or without conditions;
- Further review, in the form of an Environmental Preview Report (EPR) or an Environmental Impact Statement (EIS); or
- Rejection of the proposed undertaking via a recommendation to Cabinet.

Regarding federal jurisdiction, Maritime provided a brief Project summary to the Impact Assessment Agency (IAA), formerly the Canadian Environmental Assessment Agency (CEAA), in July 2019. The IAA advised Maritime in September 2019 that the Project “does not appear to be a designated project”, i.e., a project or activity that is subject to the federal *Impact Assessment Act, 2019 (the Act)*. Maritime also reviewed the Schedule of Physical Activities under the *Regulations Designating Physical Activities of the Act*, and did not identify any formal federal triggers for this proposed undertaking.

Based on consultation with the IAA and Maritime’s review of the *Regulations Designating Physical Activities*, Maritime has concluded that this Project should not trigger a federal environmental assessment.

2.0 PROJECT DESCRIPTION

The Project involves the construction, operation and decommissioning of an open pit and underground gold mine at a predominantly brownfield mine site near the Town of King's Point, NL. Ore from the mine will be trucked to a crushing and pre-concentration (“sorting”) plant at the mine site at a nominal rate of 1,400 tpd. After sorting, the product would be hauled to the existing Nugget Pond Mill for final processing to gold doré. Rejects from the sorting plant will be used for mine backfill or placed into the open pit for long term closure. The planned mine life is approximately six years, with approximately 2.1 Mt of run of mine (ROM) mineralized material mined and 1.1 Mt of sorted feed processed. Tailings will be stored in an existing tailings storage facility at the Nugget Pond Mill complex. Waste rock from the open pit will be stored in a stockpile located near the Hammerdown deposit. LOM gold production is estimated to be approximately 310,000 ounces, with an average annual production of 52,000 ounces per year. Electrical power for the Project is proposed to be provided by the provincial grid, with its closest point located approximately 1 km from the Project site.

2.1 Site History

Although this part of Newfoundland has been actively explored for more than a century, the Hammerdown area only experienced extensive gold exploration activity starting in the mid-1980s. This work was conducted mainly by Noranda Exploration (Noranda) in conjunction with other mining companies as joint venture partners. One such partnership with Major General Resources Ltd. resulted in the 1988 discovery of two gold deposits, Hammerdown and Rumbullion, and two additional gold prospects, Muddy Shag and Wistaria (Table 1).

Noranda acquired the ground surrounding the Rendell-Jackman copper-gold property by staking and by an option agreement with Shear Exploration in 1986 (WSP 2020). In joint venture partnerships with White Bay Resources and later Springer Resources, Noranda conducted an extensive program of soil sampling, ground geophysics, trenching, and diamond drilling (WSP 2020). That work outlined a cluster of eight gold-in-soil anomalies ranging from 10 to 125 parts per billion (ppb) gold over a 200 m distance near what would later become the Hammerdown-Rumbullion gold deposit. More robust anomalies from other areas surveyed were followed up with limited success but no other work was done near the deposit anomaly. In 1991, Hemlo Gold Mines acquired Noranda's Newfoundland assets, including the Rendell-Jackman property.

Major General acquired the remaining interest in the Rendell-Jackman property from Hemlo Gold in 1993, and conducted drill programs on several of the existing prospects during 1993 and 1994. Encouraging results prompted Major General to expand their land holdings, mainly to the southwest. Their exploration focus shifted to base metals as significant zinc-rich massive sulphide mineralization was expanded at Lochinvar, located approximately 1 km east of Hammerdown though gold exploration still received some attention.

Higher-density check soil sampling conducted in August and September 1995 confirmed and expanded the Noranda gold-in-soil anomaly cluster on the former Shear Option, returning values up to 135 ppb gold. Subsequent diamond drilling of this anomaly in October 1995 resulted in the discovery of the central portion of the Orion gold deposit, approximately 2 km south-southwest of the Hammerdown gold deposit. In November 1995, another cluster of five gold-in-soil anomalies (up to 85 ppb gold) was outlined 250 m along strike to the southwest of the Hammerdown deposit. This anomaly cluster was drill-tested in February 1996 resulting in the discovery of the western segment of the deposit (named Orion West).

Since acquiring the Property in 2010, Maritime has conducted systematic exploration to advance the Project, including additional diamond drilling, surface soil sampling, geophysics, metallurgical testing, and environmental baseline studies. In the spring of 2020, Maritime released the results of a Preliminary Economic Assessment (PEA) of a new development approach for the Project based on a combination of open pit and underground mining with pre-concentration and offsite processing at the Nugget Pond gold circuit, an approach very similar to the original mine plan executed by Richmont Mines between 2000-2004. The Company is now planning to commence a feasibility study and project permitting, targeting a mine start in 2021.

Table 1: Property History Summary

Year	Company	Program	Holes Drilled	Metres Drilled	Notes
1987	Noranda	Soil sampling	-	-	Discovered Muddy Shag Zone
1988	Noranda	Diamond drilling	3	369.4	MS-88-01 to MS-88-03 on Hammerdown along with concurrent trenching program
1989	Noranda	Diamond drilling	22	4,064.5	MS-88-04 to MS-88-25 on Hammerdown along with concurrent trenching program
1990	Noranda	Diamond drilling	26	6,721.5	MS-90-26 to MS-90-49 on Hammerdown along with trenching lead to discovery of Rumbullion zone
1993	Major General	Diamond drilling	34	6,698.3	MS-93-50 to MS-93-83 on Hammerdown/Rumbullion zones
1994	Major General	Diamond drilling	10	1,550.7	MS-94-84 to MS-94-93 on Hammerdown/Rumbullion zones
1994	Major General	Metallurgical testing			Met Testing performed by Lakefield Research
1995-2002	Commander Resources (formerly Major General)	Diamond drilling	45	11,634.9	Drilling on Orion deposit
1998	Les Mines McWatters Inc.	Due diligence	5	779.5	MS94 to MS98 on Hammerdown/Rumbullion zones
1999	Abiting Inc.	Diamond drilling	47	4,512.7	MS101-MS147 "Abiting" was a front for Richmont when purchasing the property
1999-2004	Richmont	Drilling/Mining	531	35,645.5	Drilling/Mining on Hammerdown/Rumbullion deposits

Year	Company	Program	Holes Drilled	Metres Drilled	Notes
2011	Maritime	Diamond drilling	11	3,707.8	Drilling on Orion deposit
2012	Maritime	Diamond drilling	16	2,582.8	MP-01 to MP-16 on Hammerdown/Rumbullion deposits
2012	Maritime	Channel sampling	-	-	37 trenches (total 141.6 m) on Rumbullion deposit
2017	Maritime	Mining	-	-	Re-opening of the mine portal
2018	Maritime	Channel sampling			14 trenches (total 35.3 m) on Hammerdown deposit
2018	Maritime	Diamond drilling	31	1,732.8	Drilling on Hammerdown deposit
2018	Maritime	Land management	-	-	Addition of 3,225 hectares to the Property
2018	Maritime	Mining	-	-	Dewatering permit granted
2019	Maritime	Metallurgical testing	-	-	Sorting test work for pre-concentration of mineralized material; Metallurgical test work on flotation and whole ore leach processes
2019	Maritime	Diamond drilling	27	4,665.0	Drilling on Hammerdown/Rumbullion deposits
2019	Maritime	Airborne geophysics	-	-	Airborne gradient magnetic and VLF EM survey flown over the Property

Photos of the Hammerdown mine operation when operated by Richmont Mines from 2000 to 2004 are shown in Figures 2, 3 and 4.

Figure 2: Underground Mine Portal, 2002



Figure 3: Hammerdown Open Pit, 2002



Figure 4: Hammerdown Mine Support Buildings, 2002



Table 2 summarizes the LOM production records at the Hammerdown Mine from 2000 to 2004 (WSP 2020).

Table 2: Hammerdown Production Summary

Year	Production Source	Tonnes Milled	Head Grade (g/t)	Total Gold Produced (oz)
2000	Open Pit	17,504	15.85	8,597
2001	Underground	53,818	20.72	34,209
2002	Underground	93,451	16.02	47,470
2003	Underground	90,125	13.47	37,797
2004	Underground	35,282	13.52	14,922
Total		290,180	15.74	142,998

2.2 Geographic Setting

Access to the Project is provided by an all-weather gravel access road off of secondary Highway Route 391 (Harry's Harbour Road), which connects to Highway Route 390 (Springdale Road) approximately 7 km to the southeast, and ultimately joins the Trans-Canada Highway approximately 12 km west of South Brook, NL. The overall Project footprint is roughly rectangular with its longest dimension, approximately 2 km, extending southwest to northeast. The Project site is approximately 1 km wide from northwest to southeast at its widest point and is centred at Universal Transverse Mercator (UTM) coordinates 554475 East, 5488890 North (NAD83, UTM Zone 21). A rendering of major Project components is presented in Figure 5.

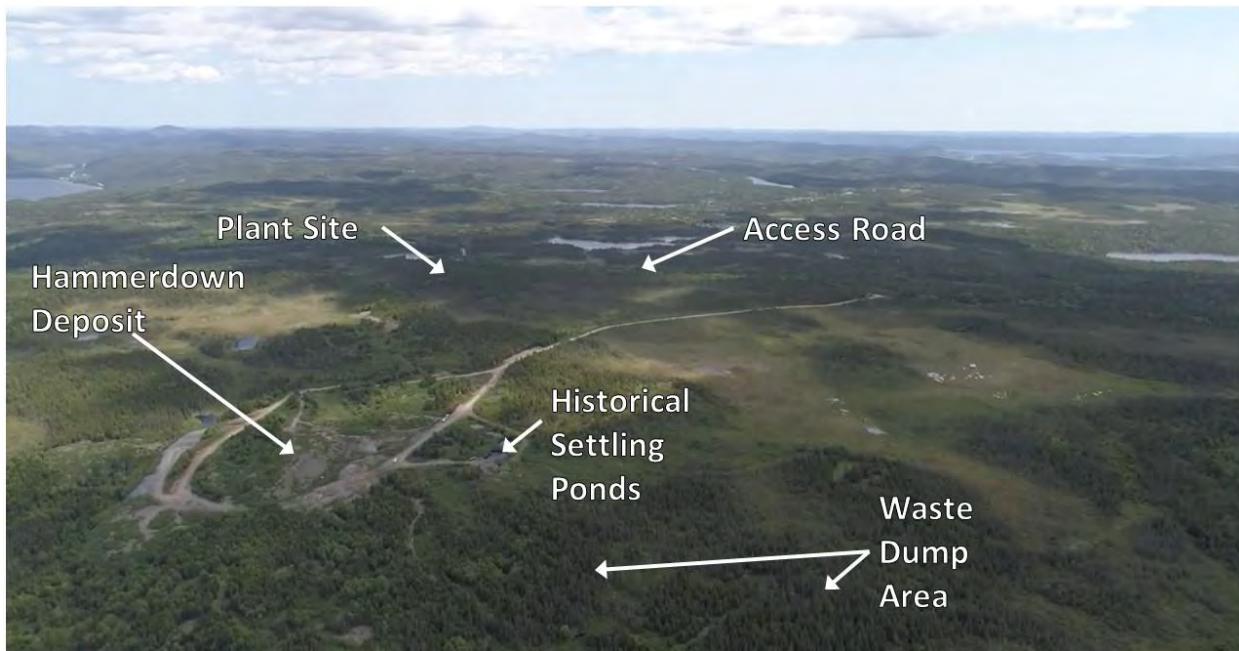
Based on available topographic mapping, the Project is situated along the northern extent of a northeast-southwest trending ridge that rises to a maximum elevation of approximately 255 metres above sea level (masl). The ground surface elevation in the Project area ranges from approximately 190 to 240 masl.

The surface area for the Project is approximately 90 ha and the land to be occupied by active mining features is centred on the footprint of the former Richmont Mines operation (Figure 6). Since it was decommissioned in 2005, the former mine site is still largely clear of vegetation.

Figure 5: Rendering of Major Project Components



Figure 6: Proposed Project Site and Principal Mine Features

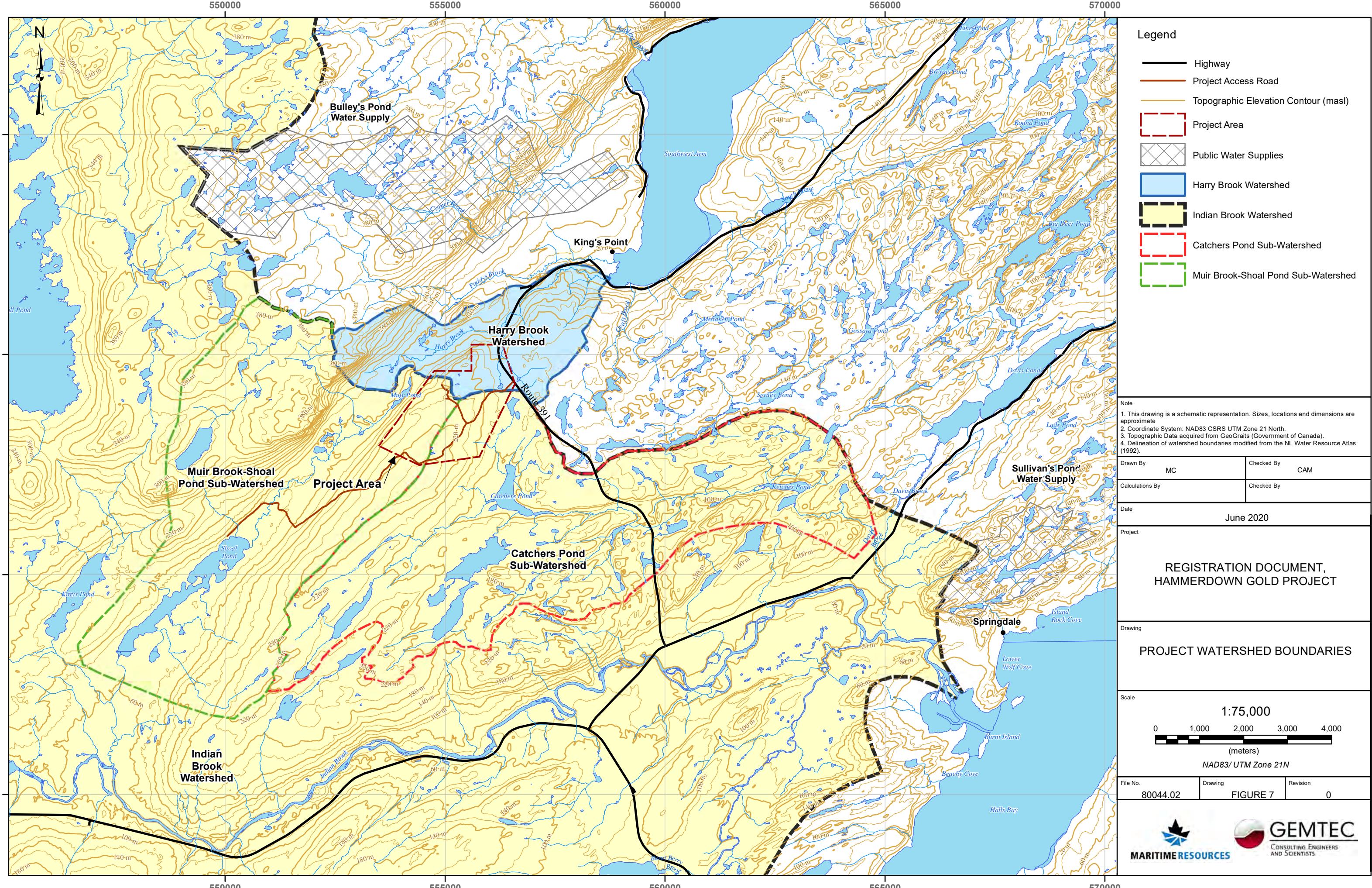


The Project area is located within three drainage catchment areas or watersheds (Figure 7):

- Harry Brook watershed – located to the north of the Project with northeast-directed flow within Harry Brook that ultimately drains into Southwest Arm, Green Bay, approximately 4.5 km to the northeast;
- Catchers Pond watershed – located to the southeast of the Project; and
- Muir Brook-Shoal Pond watershed – located to the northwest of the Project.

The Catchers Pond and Muir Brook-Shoal Pond watersheds are both sub-watersheds within the regional Indian Brook watershed, which ultimately drains into Halls Bay, located approximately 14 km to the south in the community of Springdale.

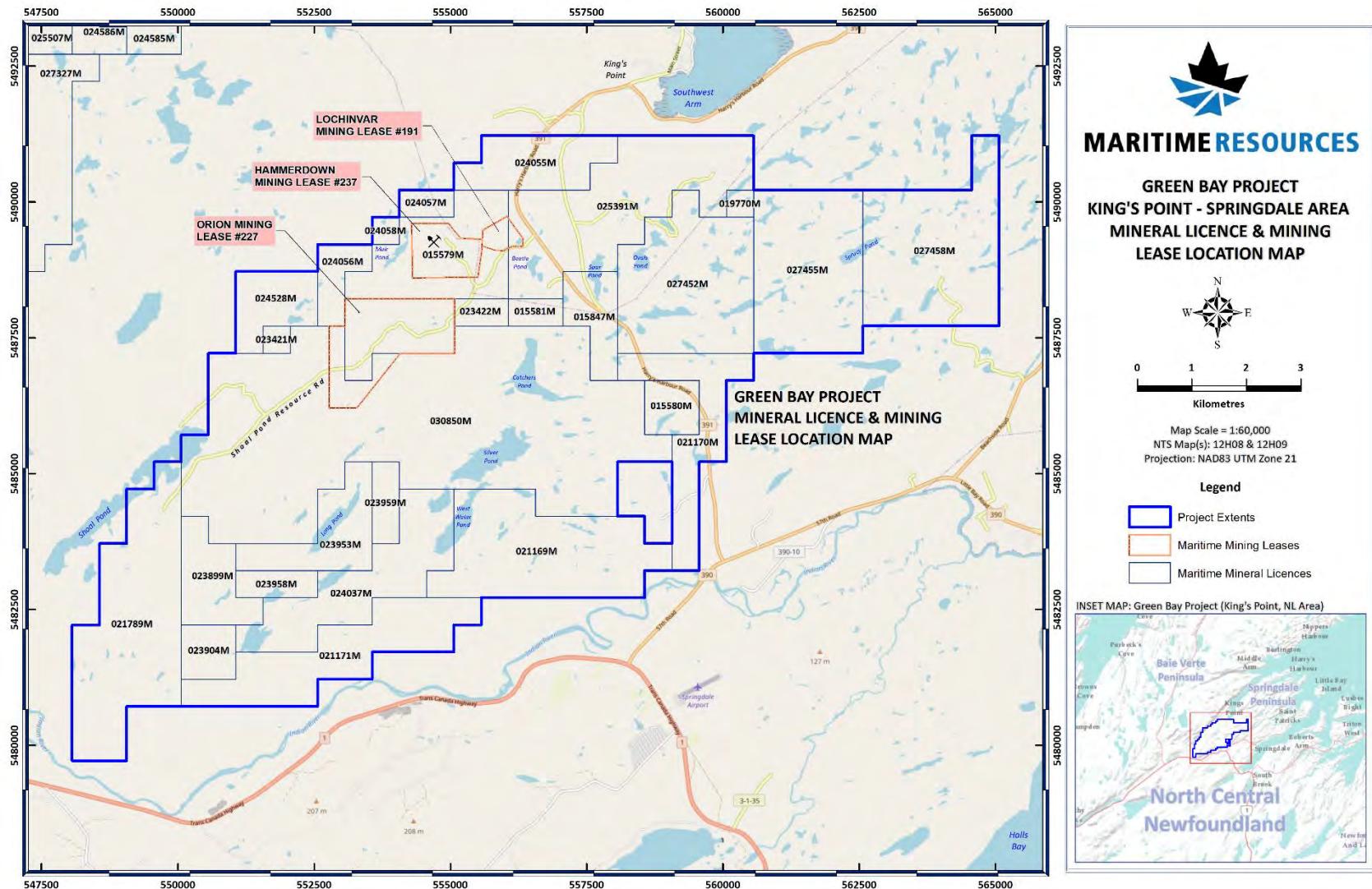
The northern portion of the Project area is moderately sloped to the north, towards the Harry Brook watershed. The eastern portion of the Project area is more steeply sloped to the southeast, and drains into the Catchers Pond sub-watershed. The central, southern and western portions of the Project area generally slope moderately too steeply to the northwest, draining into the Muir Brook-Shoal Pond sub watershed. Overall, drainage from the Project is inferred to be predominantly to the northwest towards a number of interconnected streams and wetlands identified within, and intersecting the northwest boundary of the site, which flow towards Muir Brook-Shoal Pond and ultimately drain into Indian Brook (Figure 7).



2.4 Land Tenure

The Project will take place on land included in existing Mining Leases (MinLs 191 and 237). All leases and licenses for the Property are in good standing. Maritime also currently holds surface rights for the planned footprint of the Project (Figure 8). The property occurs on Crown land outside the municipal boundary of King's Point, and within Maritime's larger Green Bay Property for which the company has a provincial Exploration Approval.

Figure 8: Maritime's Mining Leases and Mineral Licenses



2.5 Alternatives to the Project

Maritime has considered alternative means of carrying out the Project, wholly or in part. The primary alternative considered in the Project's design was the selection of a final process plant.

In the Baie Verte area there are two existing gold process plants, Pine Cove, operated by Anaconda Mining Inc. (Anaconda), and Nugget Pond, operated by Rambler, located at distances of approximately 100 km and 140 km, respectively, from the Project site.

2.5.1 Final Processing

The Nugget Pond Mill processed ore from the original Hammerdown mine from 2000-2004 and achieved high gold recoveries of +97% using a standard carbon-in-pulp gold circuit. The Nugget Pond gold circuit is currently inactive as the mill is solely processing copper ore through a separate copper concentrator. Maritime is proposing additions to the gold circuit to include a new tertiary crushing circuit, fine ore storage and a new 10'x17' 700 kW ball mill. Refurbishment of the existing carbon-in-pulp (CIP) circuit is also proposed. Once completed, the gold circuit will be able to operate completely independently of the copper concentrator, including during any planned or unplanned shutdowns of the copper circuit.

Tailings generated by Hammerdown mill feed would be placed in Rambler's existing, permitted TMF. Rambler also confirmed to Maritime that there is ample capacity in their TMF at the Nugget Pond Mill for all tailings resulting from processing the estimated LOM ore from the Project. Rambler has indicated that the storage capacity of the existing TMF, with some minor modifications to onsite infrastructure, is adequate to manage all anticipated waste (i.e., tailings and effluent) from the Project as well as from Rambler's ongoing operations.

An alternative processing scenario would involve constructing a new process plant and TMF at the Hammerdown site. This option was considered by Maritime and determined to be a less desirable option than processing at the existing Nugget Pond complex for the following reasons:

- Level of environmental disturbance: A new process plant and TMF would impact a relatively large and currently undeveloped area at the Project site. This option would also require new water sources for processing. The Company wishes to limit adverse environmental impacts and utilizing the existing process plant and TMF at Nugget Pond achieves this.
- Capital costs: The capital cost of a new processing plant and TMF at the Project site would be at least five times higher than refurbishing components of the existing Nugget Pond facility.
- Cost Recovery: The expected six year mine life would make it more difficult to pay back the investment of constructing a new process plant and TMF at the Project site.

- Schedule: The time to permit and construct a new process plant and TMF at the Project site would be considerably longer than refurbishing components at the existing Nugget Pond facility.

2.5.2 Operations Alternatives

The Company considered the following operational alternatives relating to mining methods and the use of pre-concentration technology.

- Mining methods: Previous mining at Hammerdown was completed by a small open pit followed by underground mining. Selective cut and fill and shrinkage stoping methods were used to extract ore from the narrow, high grade veins. At the time, gold prices averaged US\$320 per ounce. Richmont utilized a cut-off grade of 8.0 gpt Au for its operations, delivering a mined grade of 15.7 gpt Au over the life of the mine. Current gold prices are substantially higher, averaging US\$1700 per ounce. The higher gold price allows for the economic extraction of lower grade mineralization. Maritime has completed economic analyses and has determined that the Hammerdown deposit is optimally suited to a combination of open pit and underground mining methods. This approach maximizes economic benefit from mine operations, making it a more attractive investment for the Company and its investors who will be funding the mines' development upon receipt of all permits.
- Pre-concentration: Pre-concentration or "ore sorting" is a technology that separates mineralized rock from waste rock by using X-ray or laser scanners together with compressed air jets. Maritime will be using this innovative technology at the Project site and its use will be the first time this process has been used in NL. There are no chemicals used in this process. In this process, ROM ore is delivered from a mine to a crushing plant where it is crushed and screened. Coarse particles measuring 12-50 mm are conveyed to a pre-concentration plant where they are scanned and separated with jets of compressed air based on their scanned results. The desired particles are then combined with the screened ROM fines (-12 mm) and loaded into trucks for delivery to an offsite process plant. Rejected material is stockpiled, loaded and back-hauled to the mine for use as backfill or placed into the mine workings for long term closure. The advantage of pre-concentration is that it removes waste or low-grade material before it is hauled and processed at the offsite Mill. This provides a substantial cost savings and also reduces the number of trucks on the highway. Greenhouse gas emissions are also reduced through having fewer trucks on the road. Additionally, energy and reagent savings can be realized by not milling and processing waste rock. A reduction in the volume of waste processed through the mill also maximizes the volume of space in the TMF, eliminating risk of volume restrictions in the future.

2.5.3 Project Components Location

There are alternatives to the placement of a number of Project components (e.g., waste rock dump location, temporary ore storage area, explosives storage area). In general, Maritime selected and planned the Project development and infrastructure placement to increase use of:

- Existing brownfield sites and existing access roads;
- Areas unlikely to directly or indirectly affect wetlands or other sensitive landscape features located within or outside the proposed mine footprint;
- Areas that met the non-sterilization requirements associated with the Mining Act; and
- Exhausted areas within the Hammerdown open pit and underground mine, where waste rock could strategically be placed.

The Project has been planned to limit potential adverse environmental effects while maximizing socio-economic benefits for the region and for the province as a whole.

Maritime is currently evaluating the development potential of other deposits in the Springdale Peninsula area, notably the Orion deposit and the mineralization located at the Whisker Valley Project. Should the economic outlook be positive relative to these potential projects, Maritime may proceed with additional exploration, technical and environmental work to better understand and de-risk these potential projects with a view to potentially developing them at a later date.

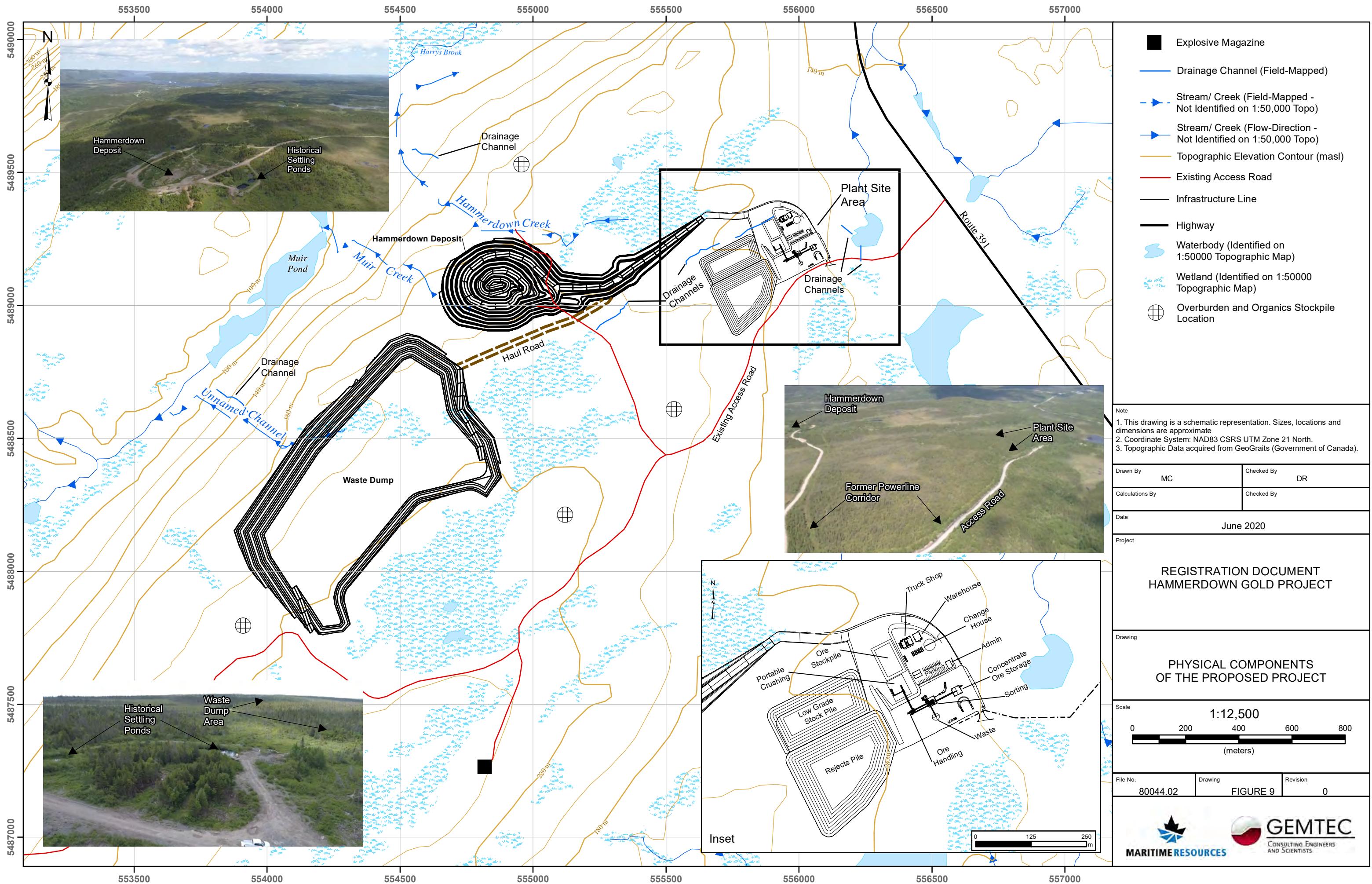
2.6 Project Components

The Project involves permitting, construction, operations, closure and rehabilitation, and post-closure monitoring activities associated with developing and operating an open pit and underground gold mine. The Project includes the following physical components (Figure 9):

- Open pit mine and associated infrastructure;
- Underground mine and associated infrastructure;
- Overburden storage;
- Waste rock stockpile;
- Crushing and pre-concentration plant;
- Rejects Pile;
- Low-grade ore stockpile;
- ROM ore stockpile;
- Concentrate ore storage;
- Upgrades to existing site roads;
- Electrical and communications infrastructure;
- Temporary buildings: administrative, dry facility, maintenance and storage buildings;
- Weigh scale;
- Explosives Magazine;

- Earthworks for various Project site infrastructure construction; and
- Water use and management infrastructure.

Each of these components is discussed in further detail in the following sections.



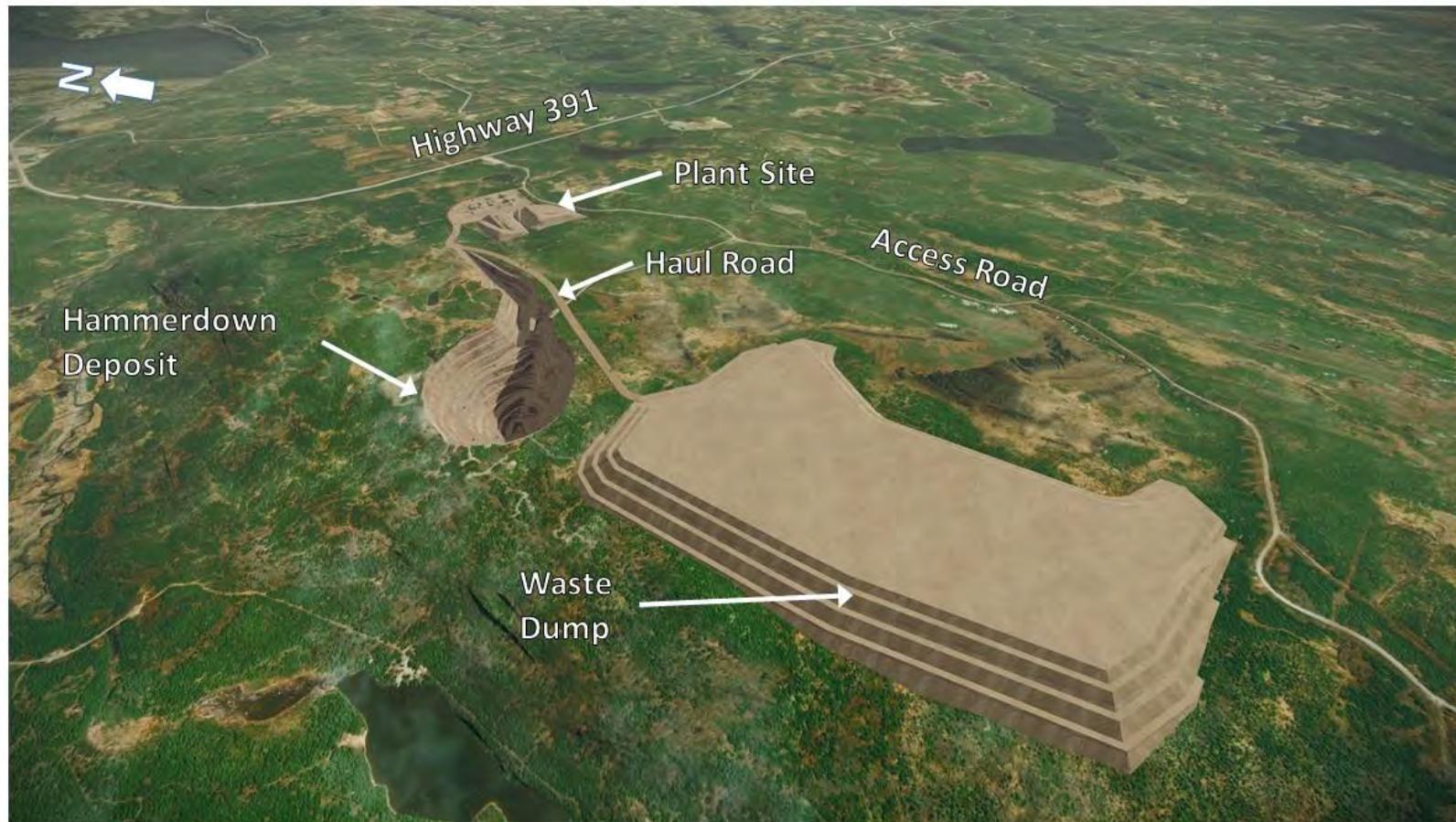
2.6.1 Hammerdown Open Pit Mine

Proposed open pit mine development will consume much of the historic workings from previous underground mining.

The overall operations plan for the Project is to commence with open pit mining down to 125 m below surface, after which open pit mining will pause to allow underground mining to commence. Upon completion of underground mining operations, the open pit mine will re-commence operations and mine to an ultimate depth of 165 m below surface.

The mine design and scheduling is intended to provide a nominal 1,400 tpd of ROM feed to the sorting plant to produce 700 tpd of feed for the gold circuit. At Hammerdown, a total of 1.88 Mt grading 4.23 gpt Au with 28.8 Mt of waste rock is expected to be mined over the LOM (Table 3). Waste rock from the open pit will be stored in a waste rock storage area. A conceptual rendering focusing on the open pit and waste rock storage area is presented in Figure 10.

Figure 10: Rendering of Open Pit and Waste Rock Storage Area



2.6.2 Hammerdown Underground Mine

The Hammerdown mineralization targeted for underground extraction is located around and below the remaining historic underground workings. The underground mine design at Hammerdown is based on utilizing narrow vein, longhole, open stoping to extract the mineralized veins, with stope widths varying between 1.5-3.0 m, to an ultimate depth of 252 m below surface

Due to the relatively high grades at Hammerdown, the majority of the underground stopes will be mined by standard longhole stoping methods between an upper and lower stope sill drift, and the stopes will be backfilled with uncemented rockfill. This stoping methodology removes the requirement for unrecoverable sill pillars between stoping levels, and thus maximizes resource recovery of this higher-grade resource. Approximately 76% of the Hammerdown stopes will be mined by the conventional longhole stoping method and the remaining 24% will be mined by blind up-hole methods. The historic ramp access development will be used to provide access to new mining areas and a permanent ramp portal will be accessed from the open pit ramp into the northern wall of the open pit. This location was selected so that any potential destabilization of the open pit due to subsequent underground mining would not affect the main ramp portal.

A second temporary mine portal will be established on the floor of the paused open pit 125 m below surface elevation to provide early access to the existing historic ramp access development.

The primary ventilation arrangement will comprise a single return air raise (RAR) developed in two legs. The ventilation raise arrangement will also serve as a secondary means of egress from the underground mine. A short horizontal ventilation drift connects the top of the raise to the open pit ramp located at that elevation. The primary ventilation fan is located at the top of the ventilation raise arrangement and exhausts into the open pit through the short horizontal connection to the pit wall.

Additionally, several short ventilation raises and associated development have been incorporated into the mine layout to provide local through-ventilation on some new levels to the north of the historic stoping area. Each stoping level will incorporate storage and electrical bays, and a local sump, as well as two production mucking bays to allow truck loading of ROM material to be loaded from each active level and hauled to surface.

Sublevels will be set at 16 m intervals and mineralized material will be extracted and hauled to surface by 20 tonne trucks where it will be transported to the sorting plant by the surface mine fleet. The mine plan anticipates making use of some of the existing underground development below the open pit to provide access to the mineralization. Backfilling of open stopes will be completed using rock fill supplied with crushed, uniform reject material from the sorting plant.

Over the LOM, the total ROM production from the Hammerdown underground workings will be 0.21 Mt of mineralized material grading 7.58 gpt Au (Table 3).

Table 3: Hammerdown Open Pit and Underground Design

Production Summary	
Open pit mineralized tonnes (Mt)	1.88
Open pit average Au grade (gpt)	4.23
Open pit Au ounces contained (oz)	258,100
Strip ratio (waste: mineralized)	15.2
Open pit waste rock (Mt)	28.8
Underground mineralized tonnes (Mt)	0.21
Underground average Au grade (gpt)	7.58
Underground Au ounces contained (oz)	51,500

2.6.2.1 Surface Infrastructure for Underground Mine

Ventilation fans will be installed on return air raises in a pull-type ventilation system. Fresh air will be heated by a propane mine air heater. Propane will be stored in a tank close to the fans. Instruments will be installed in the fresh air raise to detect propane leakage, verify the flow of air, monitor air temperature and detect carbon monoxide.

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

A compressed air system will be installed to support underground activities. The system will supply air to mining equipment and services and will be installed near the mine portals. All the equipment will be skid-mounted to reduce installation costs. To avoid a water loop, the compressors will be air-cooled.

2.6.3 Overburden Handling and Storage

The overburden in the project area consists primarily of till comprising very loose to compact, silty sand with occasional gravel and cobbles, and clay that occurs both as a thin discontinuous veneer as well as more extensive plain deposits. The average overburden thickness is approximately 2.4 m. Along with glacial deposits, poorly-drained organic and peaty soils are common in the Project area, overlying either till or bedrock (GEMTEC 2019d).

Prior to commencing overburden removal from the open pit, waste rock dump and the ore storage areas, the site will be cleared of any brush, shrubs or trees. Trees in the area of the pit and the waste dump will be cut and/or mulched in accordance with applicable guidelines.

The overburden removed will be stored in strategic locations throughout the site and used to rehabilitate various areas of the site, including the waste rock dump during progressive rehabilitation or upon mine closure. Peat, topsoil and mulched vegetation in the development area

will be segregated from the underlying glacial till and stockpiled separately from the glacial till soils.

The locations of the overburden stockpiles are shown in Figure 9. Estimated overburden volumes for the open pit, underground mine, waste dump area and ore stockpile are listed in Table 4. Dumped material is assumed to have a swell factor of 1.30 (i.e., volume increase from in-situ after excavation and dumping).

Based on the results of ongoing Acid Rock Drainage Metal Leaching (ARDML) testing (Section 3.1.9), stockpiles of material with potential for ARDML will be designed appropriately with a means for containment and collection of drainage.

Table 4: Estimated Overburden and Organic Soil Volumes

Open Pit Overburden		Waste Dump Site Organic Soil	Ore Stockpile Site Organic Soil
Till	Organic Soil		
Mm ³	Mm ³	Mm ³	Mm ³
0.432	0.054	0.137	0.024

2.6.4 Waste Rock Management

The waste rock dump, estimated to cover an area of approximately 56 ha, will be designed to accommodate the waste storage requirements of the open pit and underground workings. The overall capacity of the waste rock dump as currently planned is 16.4 Mm³, accounting for material swelling, with additional capacity available to add more lifts. This capacity is more than enough for the anticipated total open pit waste material. Waste rock from the mine workings is expected to have a swell factor of 1.30 and an average specific gravity of 2.84 t/m³.

The dump slopes will be benched and designed/constructed so that an adequate factor of safety for slope stability is provided during operations and at closure. The design of the waste dump will be in lifts of 15 m with a 37° face slope. The overall slope will be 27.2° with a 10 m berm width. The waste rock dump will be progressively reclaimed during mine operations as it increases in height. The facility will have an overall height of approximately 55 m.

ARDML testing carried out on waste rock to date indicates there is no to very low potential for ARDML (SRK 2020). If however ongoing testing indicates there is some ARDML potential, the base of the waste rock pile may have a liner, a composite base and appropriate means of handling and treatment. In addition, drainage control will reduce run-on and provide adequate collection of runoff.

The waste rock dump will be graded, with organic soils and overburden placed to promote natural re-vegetation. Areas where natural re-vegetation may take longer to establish will be seeded to

mitigate against erosion and sedimentation development. Some of these measures may also be implemented during operations as part of a progressive rehabilitation strategy.

Maritime considered a number of factors when finalizing the final footprint of the waste rock storage dump. Based on general regulator consultation and industry best practices, efforts were made to limit adverse impacts to wetland areas as described below.

Drainage from the waste rock storage dump will be collected with a surrounding drainage ditch and settling pond system for sediment control and site water treatment, if required, prior to discharge.

To the extent feasible, all trees within the waste rock dump footprint will be cut or mulched, depending on size, and all organic-rich material (e.g., vegetation and topsoil) will be recovered for use in rehabilitation work.

The measures to limit potential impacts of waste rock contact or runoff on surface water quality during operations will be extended to closure where applicable. Also, where deemed necessary, site-wide security control measures will be implemented to prevent unauthorized access to the waste dump and other areas during operations and after closure.

2.6.5 Ore Storage and Rejects Storage Area

The estimated area of the ore storage area, rejects pile and crushing/sorting infrastructure is approximately 12 ha. The stockpile pad will be prepared using waste rock material, with 500 mm layer of coarse material (>112 mm) as a base and 150 mm of finer material (<112 mm) as a topping layer.

This infrastructure will be located in an area identified by the Department of Fisheries and Land Resources (DFLR) for pre-commercial forest thinning activities. Following release from the EA process, Maritime will be in contact with DFLR representatives to discuss whether any compensation will be required for using this area.

All rejected material from the Sorting Plant will be placed back in the open pit and/or underground workings for long-term closure. Maritime anticipates starting the placement of the sorted rejects back in the exhausted pit or using them during underground development in approximately year three of the mine development plan and continuing to the end of mine life. Over the LOM, there will be approximately 1.1 Mt of sorted rejects generated. However, at the end of mine life, none will remain on the surface. Based on the current plan, the maximum amount of sorted material stockpiled on the surface would be approximately 0.5 Mt (at the end of Year 2).

Ditching will be constructed around the low grade ore stockpile to capture surface runoff for monitoring prior to discharge.

2.6.6 Crushing and Sorting Plant

A two-stage processing approach is anticipated at the Hammerdown mine site whereby the processing facilities will produce a crushed and sorted product that will be loaded out and trucked to feed the off-site process plant.

The pre-concentration process will be innovative, environmentally- sensible and will provide cost savings for the Project. This will be the first time this technology will be applied in the NL mining industry. ROM material will be pre-concentrated at Hammerdown using modern particle sorting technology (X-Rays and optical sensors) to produce feed for the process plant at a rate of approximately 700 tpd. Maritime anticipates that the sorting process will reject roughly 50% of the mined mass as a low gold grade, low sulphide waste rock stream. This process utilizes dry X-Ray and optical sensor-based sorting (Figure 11). It was selected as the preferred method for pre-concentration as it reduces mine dilution, resulting in a higher grade, lower volume mill feed. It also allows a lower mine cut-off grade, enabling Maritime to capture additional resources from the open pit and underground workings. A lower volume mill feed has several advantages, including eliminating costs for unnecessary ore haulage and less mill processing of marginal material. In addition, this pre-concentration process will result in less water use, less effluent and tailings storage requirements at the Nugget Pond Mill, and fewer haul trucks on the highway, resulting in reduced greenhouse gas emissions.

Figure 11: Pre-Concentration X-Ray and Laser Equipment



The pre-concentration processing method will include:

- Contractor-operated crushing and screening circuit;
 - Primary Crushing: A vibrating grizzly feeder and jaw crusher in open circuit, producing a final product P80 of approximately 57 mm.
 - Secondary Crushing: Single-stage cone crusher in closed circuit with a primary single deck vibrating screen, producing a final product P80 of approximately 30 mm.
 - Screening: A primary screen in closed circuit with the secondary crusher followed by a secondary screen that will receive the primary screen undersize to screen out the fines, (this may also be achieved by a single double-deck screen and will be under the contractor's purvey).
- Sorting: Two sorting machines in series acting as a rougher and scavenger will produce both waste material and product.
- Crushed Material Stockpile: Two stockpiles will be produced from the sorting facility: one for product being conveyed to a load-out facility and trucked for further processing, and the other re-handled to either the waste rock or low-grade stockpiles (Figure 12).

This processing technology has been successfully used in a number of operating mines around the world and in Canada including KGHM Sudbury Operations and New Gold's New Alton Mine in Kamloops, BC. A conceptual rendering of the plant site area is presented in Figure 13.

Figure 12: Crushing and Sorting Process Design

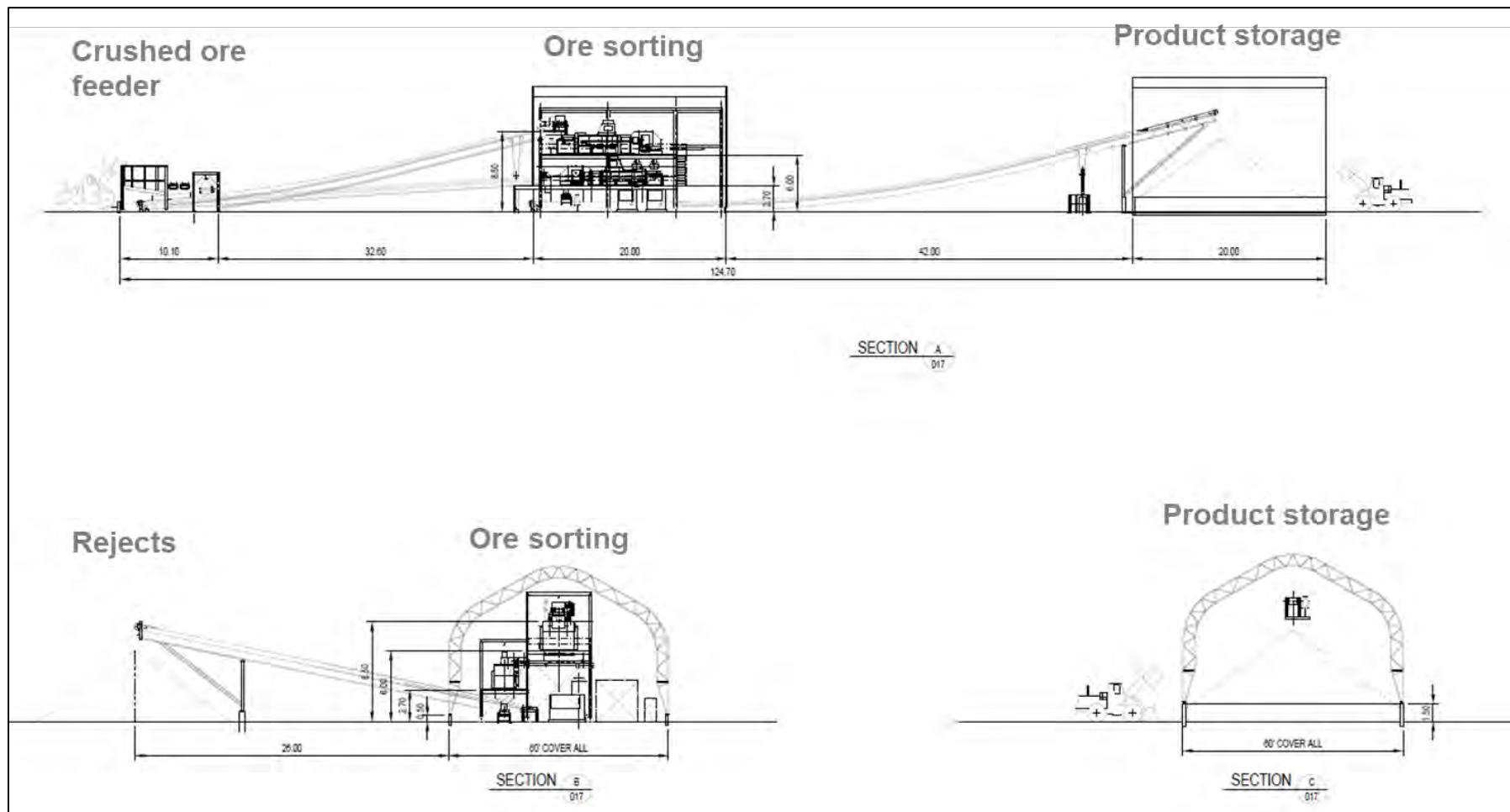
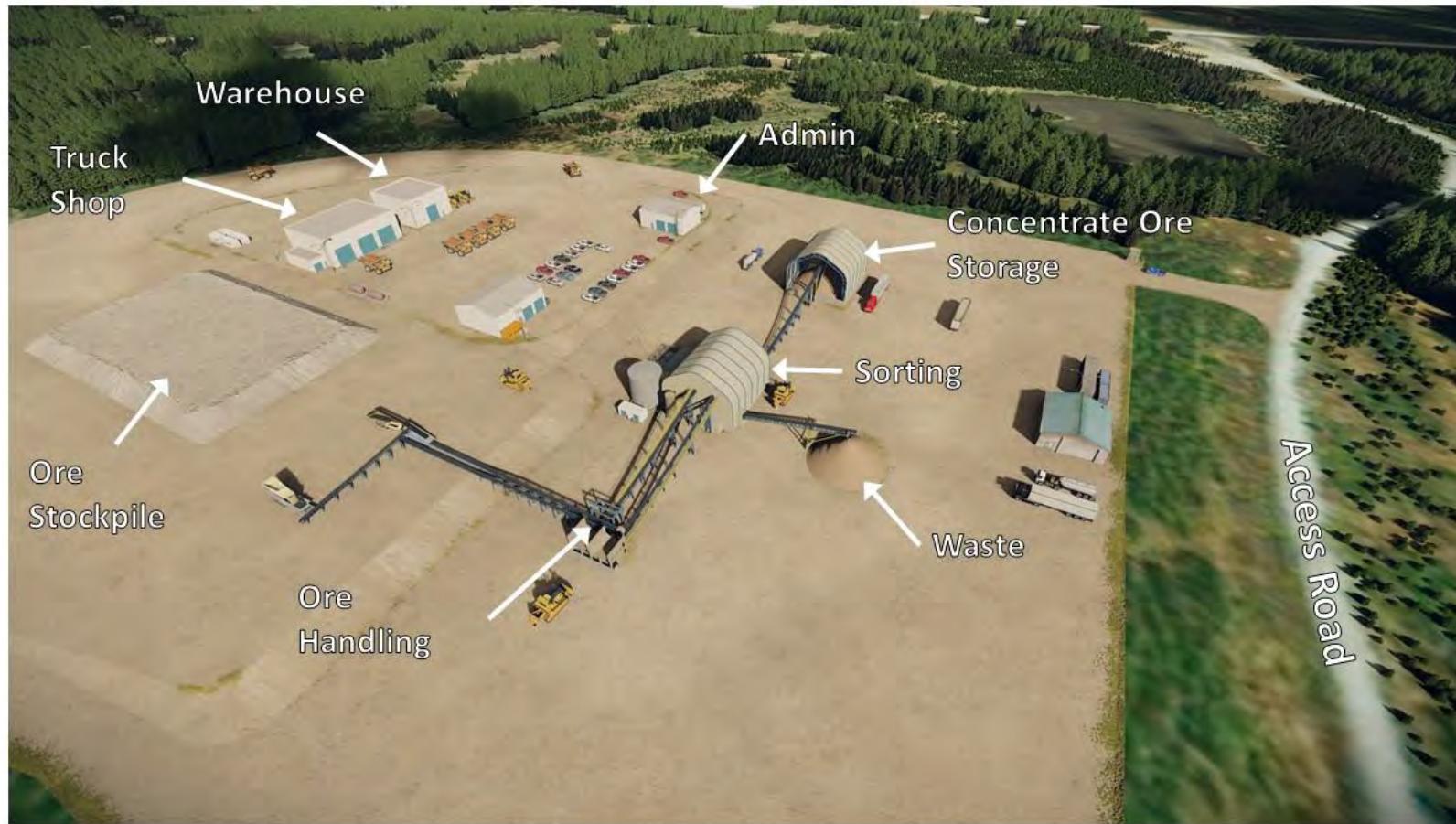


Figure 13: Conceptual Rendering of the Sorting Plant Site Area



2.6.7 Upgrades to Existing Roads and Site Access

There are existing roads at the Project site and the location of new buildings and infrastructure areas were selected to maximize the use of these roads where possible. Most of these roads will require minor upgrades (i.e., partial clearing, minor granular refilling, culverts addition and/or repair) and levelling with a grader to handle the increase in heavy truck traffic while maintaining public access to the area. The existing light vehicle road (Figure 14), leading from Route 391 to the former mine site, will be widened in order to place a center divider to keep mine traffic and public traffic separated. This measure is supported by local cabin owners and the Snowmobile Club members with whom Maritime discussed this planned upgrade. Prior to the start of mining operations in the Hammerdown open pit, an initial haul road will be developed connecting the proposed waste rock dump with the top bench of the planned Hammerdown pit (Figure 9).

Maritime will mitigate the risk of collision between heavy equipment and light vehicles by maintaining conservative road widths and by maintaining a clear line of sight on all roads. There is one intersection where haulage trucks will turn from the Project site road onto Route 391 for ore transport to Nugget Pond Mill. Maritime will also provide and install appropriate signage and lighting where necessary. Maritime will develop and traffic management plan that will be updated and communicated regularly with its employees and contractors.

2.6.8 Electrical and Communications Infrastructure

The power required for the Project will be in the range of 2.5-3.5 MW. Maritime submitted a power assessment application to NL Hydro. Based on the assessment requirements, NL Hydro completed the preliminary line design, which is now undergoing final engineering review and approval for installation. It is understood that the existing capacity of NL Hydro's grid is sufficient to provide the required power to the site. NL Hydro has a substation located at Springdale. The electrical power from the grid will enter the Project site from the junction of Route 391, at a level of 25 kV via a 3-phase aerial powerline, a distance of approximately 1.0 km. A power measuring station will be installed near the entrance of the Project site. The powerline will be installed in the same corridor that was used during the previous mining operation at the site (Figure 14). From the measuring station, a 25 kV powerline will individually feed a main substation and infrastructures on site. A transformer for small and medium loads (up to 500 kVA) will be mounted on wood poles directly on the 25 kV powerline. Power transformers will be mounted on concrete pads and dry transformers will be used whenever possible. At the main substation, a small building will be required for the switchgear, auxiliary equipment and communication equipment.

The electrical power required for the underground facilities and equipment will be fed by cables installed in the ramp at a voltage level of 4.16 kV, 3 phases, 60 Hz. Portable substations will be located in various locations of the mine to convert the voltage from 4.16 kV to 600 Volts. Equipment requiring electrical power will be fed from a portable substation distribution centre and equipment panel. Protection will be provided for electrical failures such as short circuits or ground faults.

Figure 14: Existing Access Road and Electrical Infrastructure Corridor



Other infrastructure to be installed at the Project site includes telecommunications infrastructure and a security system. The external communications services for the Project site will be provided by a local network and will follow the utility powerline. Cable and internet service will be provided to the Project site that will allow the installation of a system for telephone communication for internal and external use, as well as the installation of an automated system for control, fire alarm system, cameras, and security.

A leaky feeder system will be installed by the mine contractor in the underground mine to provide wireless communication to the personnel (via portable radio). The two-way radio will allow surface communication and underground communication with the leaky feeder system. The system can also be used for cameras, data transfer, tracking system, and maintenance systems. Analog telephones will also be installed in dedicated areas for regular communication and emergency communications.

In addition, an information technology (IT) system for the offices will be required. A server with switches and an ethernet network will be installed in the main office trailer and will be connected to the other areas, as required.

2.6.9 Buildings and Weigh Scale

A number of modular buildings (Figure 9) will be installed/constructed in the vicinity of the Sorting Plant to service the mine operations. The following buildings will be required:

- Office and dry facility;
- Garage and warehouse;
- Gate and fence;
- Truck weigh scale; and
- Fuel station.

The mine contractor will provide trailers that will operate as mine offices and dry trailers. The garage and warehouse will be the responsibility of the mine contractor and will be installed at a safe distance from the mine. The garage will include a washing bay and a maintenance bay and will contain a minimum amount of equipment to perform basic maintenance work. When more extensive maintenance or repair is required, the machinery will be transported to shops in Springdale, NL. This building would not include an overhead crane.

The gates will be remotely monitored and operated through camera and automation systems by security personnel. There will be a fence to control access to key entry points at the Project site, the electrical substation, and the explosives magazine.

A portable, heavy duty truck scale will be located on the site access road near the crushing and sorting plant for weighing the ore transfer trucks prior to their departure for the Nugget Pond Mill.

The fuel station will be included in the fuel supplier package and will be the responsibility of the mining contractor to coordinate with the supplier. Fuel will be stored in above ground tanks and all safety and accident mitigation measures required by provincial permitting will be followed. Fuels that may be required at the Project site include diesel, gasoline and propane. The electrical power will be brought to this location to provide power for the lighting, control and motorizations of the fuel station.

2.6.10 Explosives Magazine

The explosives and caps magazines will be included in the explosive supplier package.

The licensed magazine area will be located at the Project site away from key infrastructure and exposed sites (ES) and in accordance with the *Quantity-Distance* standard (NRCAN) (Figure 9). This standard specifies the minimum separation distances between potential explosion sites (PES) and ES. The goal is to reduce the risk to life and property.

Packaged and initiating explosives will be stored in approved magazines which will comply with existing standard, *Explosives – Magazines for Industrial Explosives* (NRCAN/BNQ) and access

to the magazines will be secured and controlled. In this way, explosives will be stored so they do not present a hazard to people or property in the vicinity.

Bulk emulsion matrix will be stored on site in a heated tank approved for that use. Bulk ammonium nitrate storage may also be required depending on the product to be loaded. The location of bulk explosives will be at a distance away from the magazines as required by the Standard.

Explosives will only be handled by personnel who are trained, authorized and licensed. Standard Operating Procedures (SOPs) will be in place to cover all aspects of the use of explosives including: transporting, loading, blast clearance, blast guarding, blast firing, post-blast inspections, secondary blasting, misfires, and any other activities related to blasting.

2.6.11 Earthworks for Site Infrastructure

Earthworks will be required for several site infrastructure components, specifically in the following areas:

- Vehicle parking;
- Fresh water pumping station;
- Crushing/Sorting plant;
- Modular mine office trailers, maintenance and warehouse structures on compacted fill;
- Exhaust raise pads;
- Underground air compressors;
- Explosives magazine and bulk explosives storage area;
- ROM stockpile pad;
- Crushed feed pile; and
- Waste rock dump.

Whenever appropriate, the granular backfilling required for site development will be made using chemically-stable or non-acid generating (NAG) waste rock material from mining operations.

2.6.12 Water Management

2.6.12.1 Water Use and Distribution

There will be various water use requirements at the Project site over the LOM. Maritime plans to source raw water for processing and non-potable domestic use (i.e., flushing toilets) from the settling pond system(s) to be designed for the site. A pumping station will be installed near the settling pond(s) and housed in an insulated container. Water will be pumped from there via a four inch buried HDPE pipe to water storage tanks that will be located close to the crushing and sorting plant. From the water storage tanks, water will be distributed via buried HDPE pipes to the office and dry facility, the garage and warehouse, and will have the capacity to feed the underground supply pumping station. Additional supply will be available for fire-fighting.

Bottled potable water will be supplied to the Project site by local vendors for consumption. A source of potable water for showers and hand washing is still under consideration, but will likely be brought to the site and stored in water storage tanks.

A septic system to service the office and dry trailers will be installed. The system will be installed and operated by a contractor in accordance with all applicable permits and regulations.

2.6.12.2 Water Management

The Project is located in an area where three separate watershed divides intersect (Figure 7). This setting requires careful consideration of surface water management at the site, and the potential effects of site activities on groundwater. To gain a better understanding of the hydrological and hydrogeological regimes of the area, a number of hydrological and hydrogeological baseline investigations have been undertaken since 2016 (Stantec 2017b, GEMTEC 2019e, GEMTEC 2019f). Maritime will develop a Water Management Plan (WaMP) for the Project site based on detailed mine planning and results of those baseline investigations to limit impacts to the surrounding environment and nearby communities.

Water Management Plan

The WaMP will be developed prior to the start of any site-specific construction activities. It will provide site-wide guidance for water management related practices over the life of the Project and will consider key Project interactions and compliance obligations. The WaMP will incorporate best management practices (BMPs) of current industry practice in NL, and will draw on concepts in the document, *Environmental Code of Practice for Metal Mines* (Environment Canada, 2009).

The WaMP will describe management features for water quantity and quality relative to surface water runoff, mine contact water, groundwater, freshwater supply, grey water and discharge to the receiving environment. For this Project 'non-contact water' is defined as surface runoff resulting from natural precipitation that does not come into contact with mine workings or mined materials. 'Mine contact water' refers to any runoff that comes in direct contact with ore, waste rock, or terrain where Project infrastructure components are built and/or where mining activity will occur. The WaMP will apply to all phases of the Project and will be updated as required to reflect the needs of each Project phase.

Some of the guidance documents that will inform the WaMP include:

- *Metal and Diamond Mining Effluent Regulations* (MDMER);
- *NL Water and Sewer Regulations*;
- Canadian Council of Ministers of the Environment (CCME), Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life;
- *Mine Environmental Neutral Drainage (MEND) 2009, Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials*, Natural Resources Canada; and
- *Environmental Code of Practice for Metal Mines* (Environment Canada 2009).

The objectives of the non-contact surface runoff component of the WaMP will be to:

- limit the volume of potentially contaminated surface runoff;
- control suspended solid loading of surface runoff; and
- avoid the introduction of chemical contaminants in surface runoff.

The objectives of the mine contact water component of the WaMP will be to:

- determine that the quality of mine contact water is suitable for reuse as process water or for direct discharge to the environment; and
- determine that mine contact water is compliant with applicable guidelines.

The objectives of the groundwater component of the WaMP will be to document the quantity and quality of groundwater inflows into the open pit and underground workings, and to best manage those inflows.

The objectives of the surface water component of the WaMP will be to manage efficient surface water use for the Project and manage the discharge.

The objectives of the greywater component of the WaMP will be to best manage the collection and appropriate treatment of sanitary sewage and grey water.

The objectives of the discharge to the environment component of the WaMP will be to:

- plan appropriate discharge point(s) to the receiving environment that are situated such that the natural hydraulic conditions of the receiving environment are maintained; and
- monitor the quantity and quality of the discharge in a manner that meets environmental protection objectives.

The WaMP will include, but not be limited to, specifications and requirements of the following activities and infrastructure:

- Fresh water pumping station;
- Collection, diversion and removal of incident precipitation, direct mine contact runoff, groundwater seepage and direct precipitation into the open pit and underground development. Mitigations will be described that address potential equipment failures;
- Settling ponds and associated conveyance systems. Mitigations will be described that address potential equipment failures;
- Details and mitigations relative to the potential and temporary rerouting of three onsite watercourses (Hammerdown Creek, Unnamed Channel and Muir Creek) during Project construction;
- Sewage and grey water systems;

- Ditching around the waste rock dump, pit and other infrastructure to collect and redirect surface runoff to settling ponds to control suspended solids prior to discharge from the site;
- Use of settling ponds or other means for treatment of effluent prior to discharge to the environment should monitoring indicate MDMER exceedances; also monitoring network and sampling points for surface and groundwater quality around the site;
- Diversion of clean non-contact runoff away from areas disturbed by mine activities;
- Strategic ditching around wetland areas to limit obstructions in natural drainage patterns; and
- Strategic placement of discharge points within each of the three catchment areas surrounding the Project to best maintain pre-construction natural hydraulic conditions.

Discharge of excess mine water to the receiving environments will be carried out in accordance with MDMER effluent criteria as well as other mine effluent criteria that may be applicable (e.g., nitrogen species effluent criteria). As the Project advances through permitting and engineering design, additional field investigations will be completed, as required, to further characterize the quantity and quality of the various mine water components in support of a WaMP and the Project water management systems.

Mine water will be pumped from the underground to a settling pond system where it will be partly re-used in underground operations and for other mine processing purposes.

Direct precipitation, surface run-off and groundwater seepage entering the open pit excavation will be captured via an in-pit sump and pumped to a dedicated settling pond system. Final discharge volumes from the settling pond(s) will also be monitored via a measuring station that will be housed in the same structure as the pumping equipment. Similarly, surface and groundwater entering underground workings will be captured by sumps and pumped to the dedicated mine discharge settling pond system for reuse and/or eventual discharge to undisturbed areas.

The footprint for the open pit and underground development, estimated to be approximately 18 ha, will overlap sections of Muir Creek, an intermittent and non-fish-bearing stream that crosses the Project site. Another unmapped, intermittent and non-fish-bearing watercourse (labelled here Unnamed Channel) will be affected by the development of the waste rock storage area. In addition, Hammerdown Creek is in close proximity to the planned mine development and is also intermittent and non-fish-bearing (GEMTEC 2019c). Sections of Hammerdown Creek may also require rerouting if its proximity to the open pit poses a safety concern for pit wall stability. Field studies were conducted on these watercourses in 2016 and 2019 in sufficient detail that the hydrology and habitat components of both are well understood. These studies confirm the above watercourses do not bear fish. Maritime will provide details relative to planned rerouting to the appropriate regulators to fully comply with all permitting requirements. To the extent possible, the watercourses will be returned to pre-development routing at the end of LOM.

2.7 Associated Project Components

2.7.1 Ore Haulage to Offsite Mill

During full time operations, Maritime will transport approximately 700 tpd of pre-concentrated material and fines from the Hammerdown Project site to the Nugget Pond Mill (Figure 15) via 30-40 tonne haul trucks (Figure 16). Truck traffic is anticipated to range between four to eight trucks that each complete two to three roundtrips per day. Maritime has had preliminary discussions with officials from the NL Department of Transportation and Works (NLDTW) relative to a Highway Access Permit, if required. That process will be completed once the EA process is completed. A Highway Access Permit, if required, will be specific to Maritime accessing Route 391 from the Hammerdown property for material transport to the Nugget Pond Mill. Ore haulage will be provided by the contractor and Maritime anticipates this component will require 16 positions.

Figure 15: View of the Nugget Pond Mill



Figure 16: 30 Tonne Haul Truck for Ore Transport to Nugget Pond Mill



2.7.2 Offsite Ore Processing – Nugget Pond

The Nugget Pond Mill was built in 1996 by Richmont Mines and today consists of two processing plants – the first being the original “hydromet” plant, and the second being a newer sulphide flotation plant. The current plant has over 1,500 tpd capacity that is currently treating copper ore from the Ming Mine (Figure 18). Richmont Mines operated the Nugget Pond Mill as a gold plant for over 10 years, processing ore from both the former Nugget Pond and Hammerdown gold mines. The Nugget Pond Mill processed approximately 290,000 tonnes of Hammerdown ore between 2001 and 2004.

Historic gold recoveries on Hammerdown mineralization at Nugget Pond were over 97.0% during past operations. Recent metallurgical test work on new samples from Hammerdown confirmed that gold recoveries of 97.0% can be expected through the whole-ore leach circuit. The Hammerdown sorting plant feed will be transported by road to the Mill where it will undergo the well-established CIP technology (Figures 17 and 18) to recover the gold into a doré product for sale. Additional metallurgical work has been completed and Maritime has determined that a fine grind (80% passing 60 microns) is necessary to achieve the target recovery rate.

Maritime’s consultant had preliminary discussions with officials from the Pollution Prevention Division (PPD) in October and November 2019 relative to any requirements for air monitoring and waste management at any offsite processing plant for Hammerdown ore. Maritime was advised to include a high level description of the offsite milling process in the Registration document and that a more detailed analysis of the final processing components would be achieved through the mill’s permitting process.

As such, all aspects of offsite processing of Hammerdown ore at the Nugget Pond Mill will be addressed in Rambler's updated Certificate of Approval (C of A), Development Plan (DP) and RCP. Although offsite processing is not considered a component of this Project for EA purposes, Maritime is providing the following information in this Registration document for general information and better understanding of the overall mining plan.

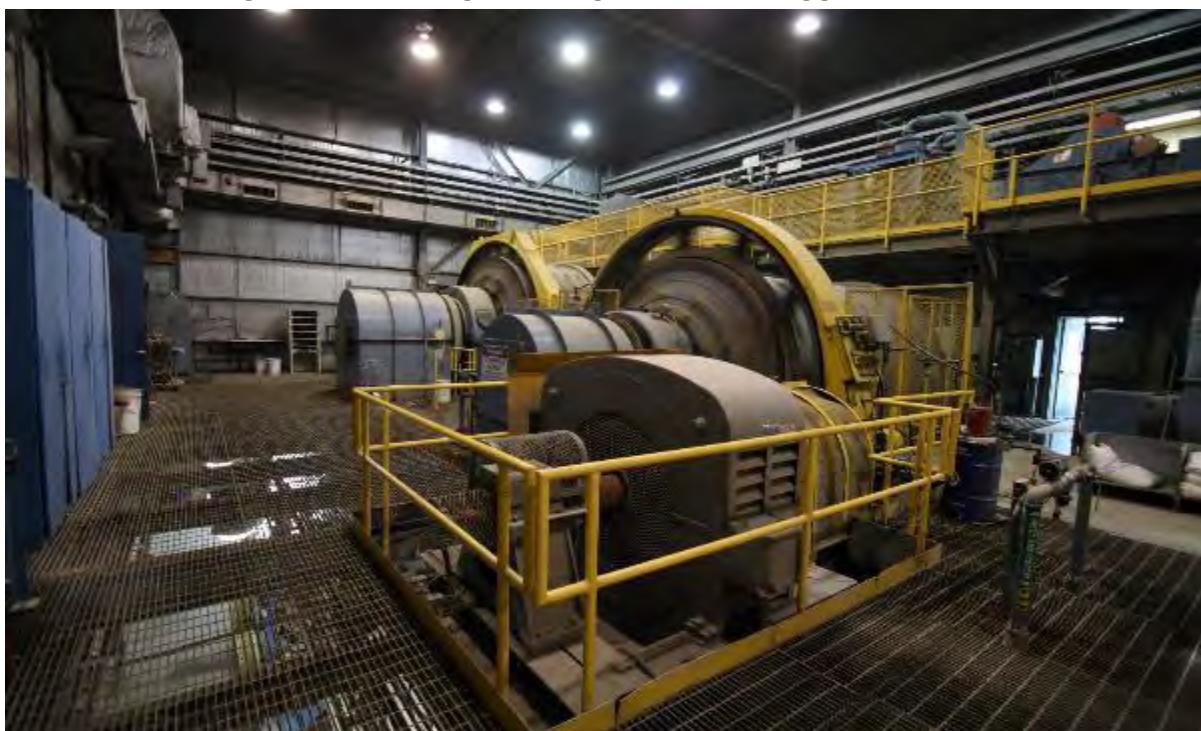
Rambler will complete all required and/or updated permits relative to this additional work as required prior to the processing of any Hammerdown ore.

Preliminary studies show that, although the ore material does have acid-generating and minor metal-leaching characteristics, Maritime does not anticipate any issues related to the short-term storage of ore at the mill site prior to processing due to the observed mineral stability. Nevertheless, the ore storage area will have controlled collection and containment of drainage. All stockpiled ore will be processed.

Figure 17: Existing Gold Circuit at Nugget Pond Mill



Figure 18: Existing Grinding Mill at the Nugget Pond Mill



2.7.2.1 Processing Infrastructure Upgrades

The existing processing of copper feed through the flotation circuit makes use of some hydromet plant unit operations, such as the front-end crushing, feed storage and grinding processes. As such, the hydromet plant will require some modifications to operate independently (Figure 19). The new equipment to be installed is noted below.

- New crushing and stockpiling circuit – some excavation, granular base, compaction, and ground levelling will be required. This work will be constructed on a brownfield site within the yellow outlined area in Figure 19.
- Installation of ball milling equipment using either concrete footings/piers or a monolithic mat foundation. This will be a modular semi-mobile plant (Figure 20 and 21).
- Minor structural steel installation.
- Small extension to mill building to make it safe and weatherproof.
- Refurbishment of some process and mechanical equipment.
- Minor electrical upgrades.
- New tailings lines to transport tailings (to be placed in existing tailings corridor).

Figure 19: Existing Site Infrastructure at the Nugget Pond Mill

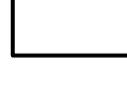
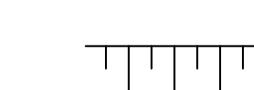
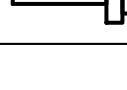




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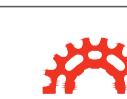
 **HALYARD** ISSUED FOR INFORMATION

LEGEND:

EXISTING BLDG		EXISTING CONTOURS	
PROPOSED BLDG		PROPOSED CONTOURS	
WATER		EMBANKMENT	
NEW EQUIP.			

PLAN VIEW

REFERENCE DRAWINGS		REVISIONS			SIZE	SCALE		Copying of this document and giving it to others, and the use or communication of the contents thereof are forbidden without express written permission, liable to the payment of damages. All rights are reserved in the event of the grant of the registration of utility model or design.	CLIENT
Number	Description	Rev.	Change	Name	Date	A1	1:300		
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						CHECKED BY	2020.03.10	J.CILLIERS	
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 **HALYARD**

 MARITIME RESOURCES

NUGGET POND MILL
PROPOSED SITE LAYOUT

Figure 21: New Portable Crushing Unit for the Nugget Pond Mill (example)



Once upgrades to the Nugget Pond Mill have been completed, the copper and gold circuits will be able to operate independently and should an issue develop with the copper circuit, the gold circuit will be unaffected.

Rambler has an adequately sized area designated as an ore storage area at the Nugget Pond Mill site and is designed such that expansion is possible should there be a surplus of ore arriving at the facility, or if there is a slowdown in processing at the Mill. Any expansion will not result in any vegetation clearing and Rambler estimates that the ore storage area is capable of storing a six week supply of ore.

Tailings from the processing of Hammerdown ore are expected to be easily accommodated within the existing footprint and operational plans at Nugget Pond. Rambler and Maritime estimate that, on average, 3,000 m³ (cubic metres) will be added to the licensed TMF on a weekly basis. When this volume is added to Rambler's weekly tailings production, the total weekly addition will be approximately 9,600 m³. Rambler estimates there is approximately four to five years remaining at this rate before the Camp Pond TMF is filled. Prior to exhausting the Camp Pond TMF, Rambler will engineer a new dam raise on their original permitted TMF in order to achieve another five years of tailings storage capacity. As such, both Rambler and Maritime are confident there is adequate storage capacity in the Nugget Pond TMF for the anticipated six-year Hammerdown LOM.

Rambler does not anticipate any requirement for additional electrical infrastructure at the Nugget Pond facility in order to process the Hammerdown ore. Nor are any additional air or noise emissions anticipated.

Based on the production schedule and the Hammerdown LOM, Maritime anticipates adding approximately 39 positions to the Nugget Pond Mill facility.

2.8 Construction

In addition to the release from the EA process, other regulatory approvals and permits are required prior to the start of construction activities. Maritime will ensure all approvals and permits are complete and applications submitted to the appropriate regulators as soon as possible to ensure an efficient transition to the construction phase.

Construction work will follow guidance and procedures outlined in Maritime's updated Environmental Protection Plan (EPP). Maritime's EPP will outline best management practices to be followed for all construction activities and will be reviewed and approved by government regulators prior to the start of any site-specific activities. Construction work will also adhere to other environmental plans and/or constraints (e.g., WaMP, Waste Management Plan (WMP), Environmental Contingency Plan (ECP), and bird breeding seasons) that are designed to limit potential adverse effects of construction activities.

General construction activities associated with the Project are noted below.

2.8.1 Site Preparation

This work includes the cutting and clearing of vegetation and the removal and storage of organic material and overburden from areas that will be developed. Road upgrades and ditching or other construction-related water and erosion control methods are also included here. This work will be carried out in planned development areas in accordance with cutting and burning permits and according to regulator recommendations relative to bird breeding seasons. Approximately 75 ha will be cleared for the pit and waste rock dump development with a further 12 ha planned to be cleared for the sorting plant and low-grade ore stockpile.

2.8.2 Earthworks

Earthworks involves preparation work for infrastructure in development areas and includes excavation, placement of structural fill and grading to accommodate infrastructure construction or installation. Earthworks relative to pit development drilling and blasting will follow overburden stripping in the pit area and will be coordinated by a mine contractor.

2.8.3 Installation of Major Infrastructure

The crushing and sorting plant will be installed during the construction phase and will follow all recommendations and permit requirements as provided by government regulators.

2.8.4 Other Infrastructure Installation

A number of temporary modular buildings will be installed including the office and dry buildings, garage and maintenance buildings, weigh scale, explosives magazine, gate and fence.

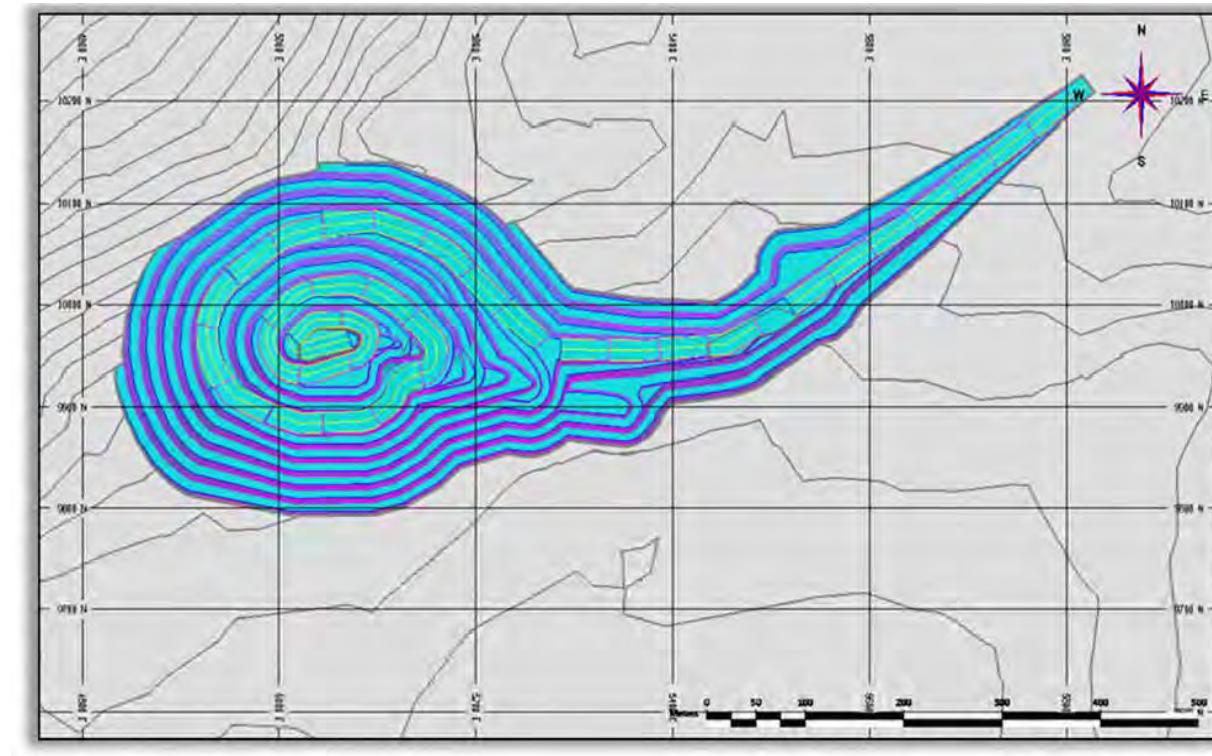
2.8.5 Installation of Utilities

All electrical and telecommunications infrastructure will be installed during this period.

2.8.6 Open Pit Development

Maritime will carry out pre-stripping activities in the open pit area, approximately 18 ha, in preparation for developing the mine. The open pit has a designed depth of 140 m and will be approximately 1,000 m long and 350 m wide. The pit design primarily targets the higher-grade zone in the west part of the pit and results in a fairly circular pit there. The final design is shown on Figure 22, with a 100 m grid system north-south and a 200 m grid system east-west.

Figure 22: Conceptual Hammerdown Open Pit Design



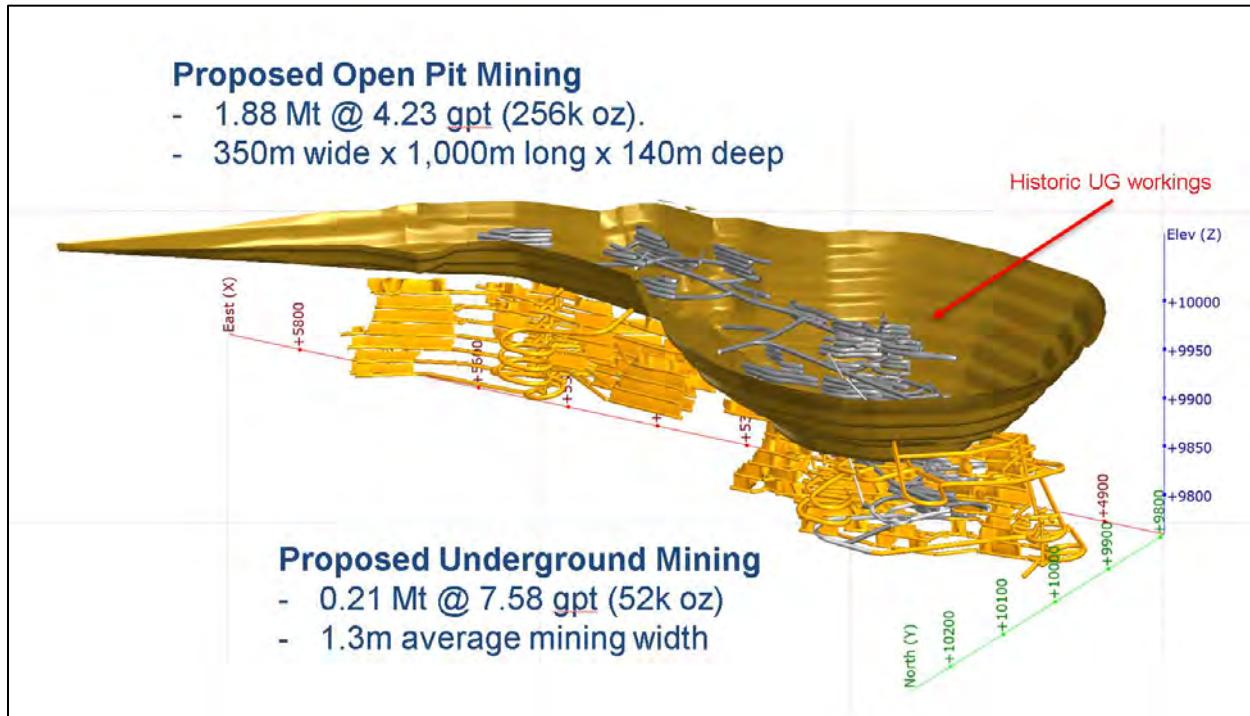
The open pit will utilize 5 m high benches with ramps at a 10% gradient, varying in width from 15.6 m (single lane) to 20.4 m (double lane). Ramps have been designed for 46 t haulage trucks and a mobile fleet of 7.0 m³ hydraulic excavators and 6.0 m³ front end loaders. These machines will be supported by 455 kW tracked dozers and road graders to maintain the pit floor, dump and road surfaces. An access road exiting the pit to the northeast will deliver feed to the sorting plant, and waste rock to the waste rock dump.

2.8.7 Underground Development

Underground development at Hammerdown is anticipated to begin in year 4 and continue for three years. This development will work around the older workings to develop previously unexploited zones. In Figure 23 the open pit workings are paused while the underground is being

exploited and the new ramp and level access and primary ventilation arrangement are developed. Note that some of the historic workings may require rehabilitation and would be evaluated upon re-opening the mine.

Figure 23: Proposed Underground Mine Development



2.9 Associated Project Components

2.9.1 Additions to the Nugget Pond Mill

Additions to the Nugget Pond Mill to prepare it to receive and process ore from the Project site will be undertaken concurrently as other Project related construction activities are underway. This work will be completed in part by contractors and by the existing Rambler workforce and overseen by Maritime personnel. Maritime will work with Rambler personnel to complete the work according to permit requirements specific to the operation of the Nugget Pond Mill.

2.10 Operations

Once the Project has received all required approvals, mining activities will begin. The following summarizes the mining-related operations for the Project:

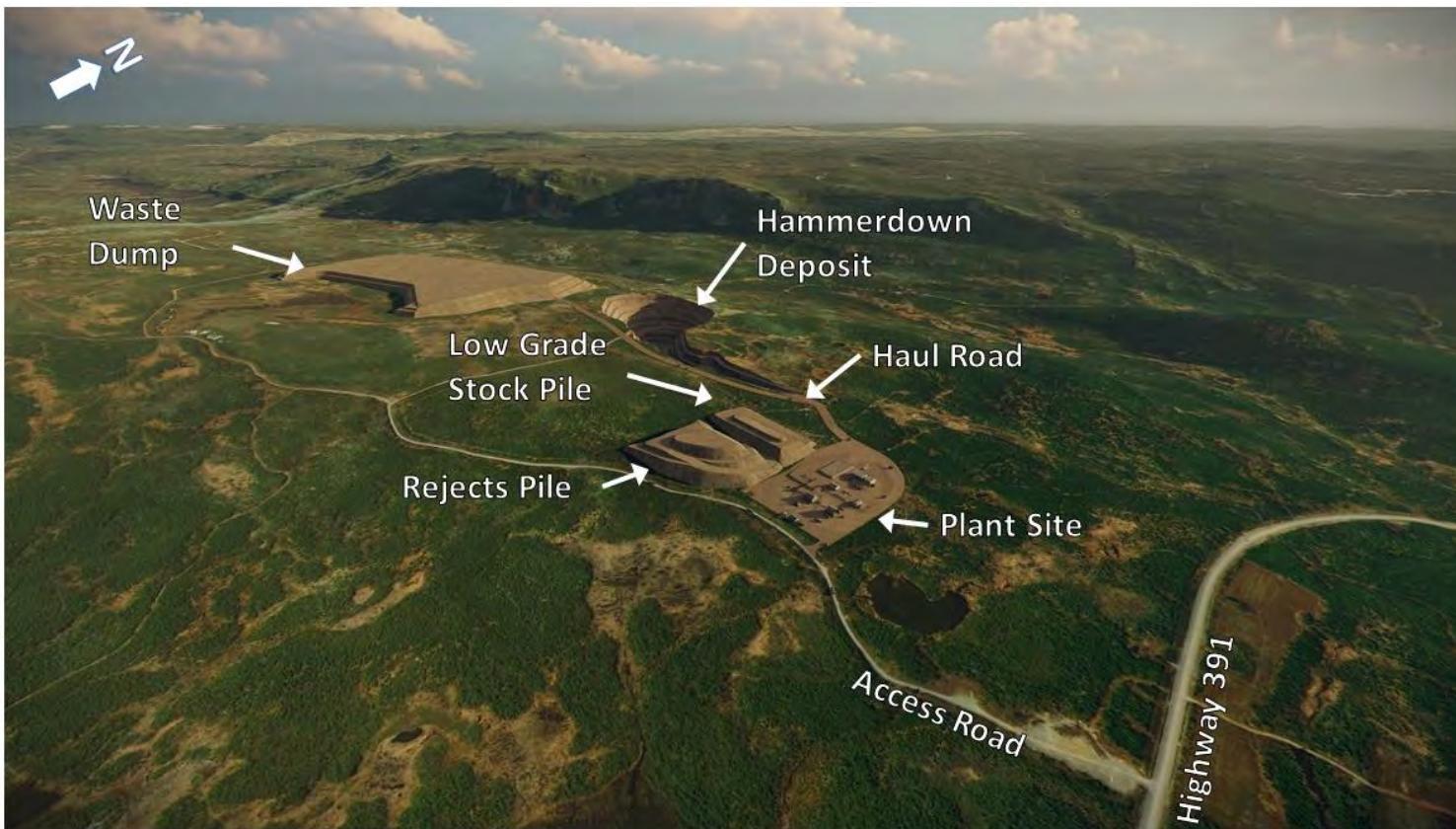
- Open pit mining;
- Underground mining;
- Waste rock dump and low-grade stockpile; and
- Crushing.

The planned production schedule during operations is outlined in Table 5 and a conceptual rendering of key operations infrastructure is presented in Figure 24.

Table 5: Planned Production Schedule for the Project

	Development/ Construction	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Open Pit (kt)	52.13	585.57	660.16	473.18	0	0	111.75
Underground (kt)	0	0	0	0	36.68	141.07	31.56
Total	52.13	585.57	660.16	473.18	36.68	141.07	143.31

Figure 24: Conceptual Rendering of Key Operations Infrastructure



2.10.1 Open Pit Mining

The open pit mine production rate will be approximately 470 kt tonnes per annum (tpa) over four years of operations or 1,290 tpd of concentrated ore. Mining of mineralized material and waste will be carried out by contractors. Access to the waste rock dump may be via intermediate ramps.

ROM mineralized material will be placed in a stockpile and fed into a crusher using a front-end loader. All ROM mineralized material will be crushed to 80% passing 60 microns and placed in a feed stockpile adjacent to the crushing and sorting plant.

Mining will be carried out using conventional open pit methods, including drilling using conventional production drills, blasting using ANFO (ammonium-nitrate fuel oil) and loading and hauling operations performed with hydraulic shovel, front end loader and rigid frame haulage trucks. The production equipment will be supported by bulldozers, graders and water trucks. Maritime will oversee the overall mining operation carried out by the mining contractor(s).

2.10.2 Underground Mining

The production of the underground mine is assumed to range from approximately 30-140 ktpa over three years or approximately 50-200 tpd of concentrated ore. Underground mining will include the following activities:

- Lateral development;
- Vertical development;
- Production drilling; and
- Blasting using ANFO and bulk emulsion.
- Use of stationary equipment including:
 - Main fan and propane heating system;
 - Secondary fans for ventilation;
 - Air compressor; and
 - Mine dewatering pumps at various locations.

2.10.3 Waste Rock Dump

The waste rock dump will receive all non-process feed materials from the open pit and underground workings.

2.10.4 Crushing and Sorting Plant

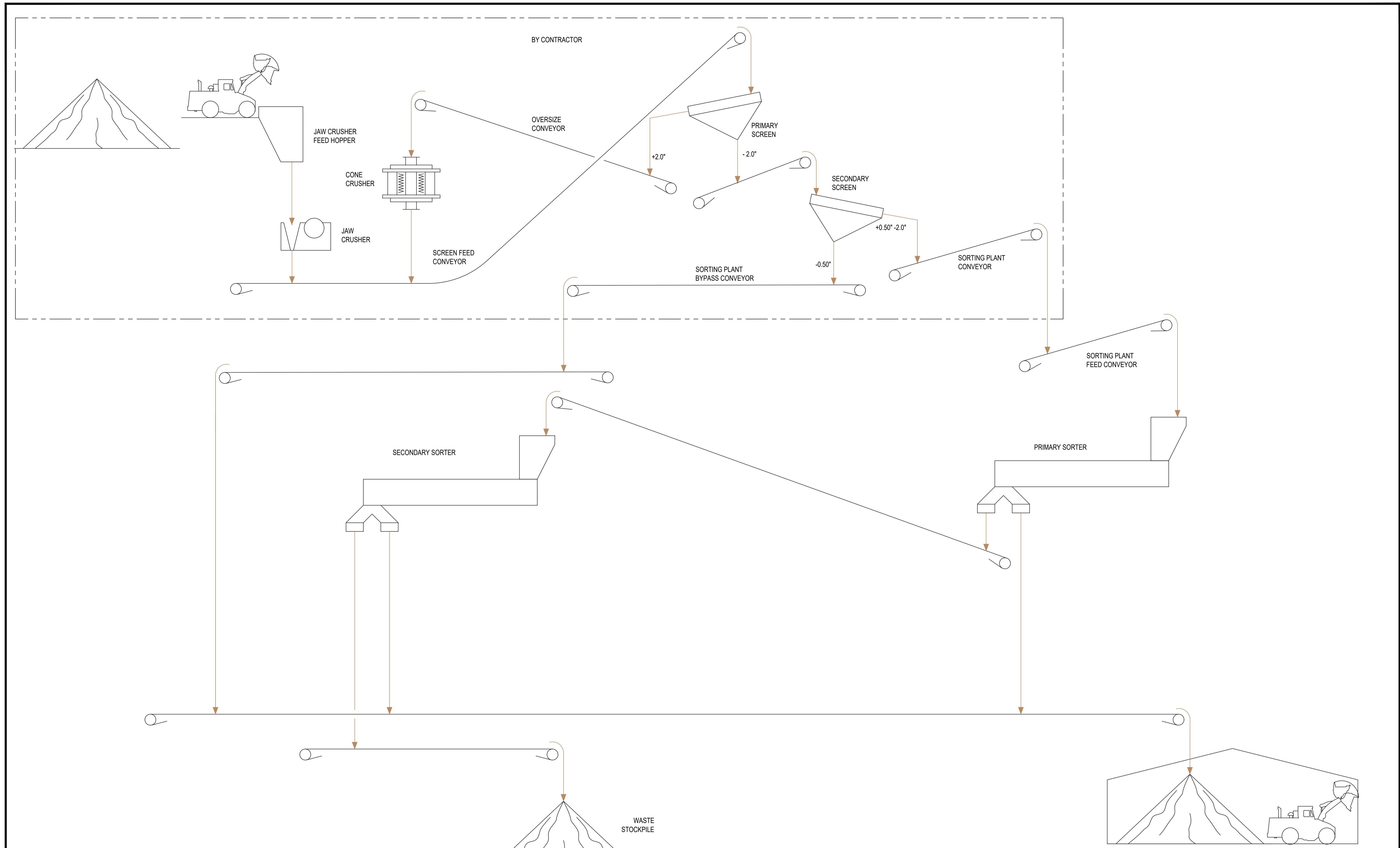
Material will be delivered from the mine to feed the crushing plant that consists of two stages of crushing. The plant will process between 54-83 tonnes per hour (t/h) of material and produce a final screened product size (P_{80}) of approximately 30 mm.

The sorting of the mineralization will consist of two stages using machines with X-Ray Transmission (XRT) and Laser sensors. The sorting circuit will reject approximately 50% of the

sorter feed material while maintaining gold recovery of 90-94%. With a recombining of the screen undersize fines, the overall gold recovery is expected to range between 93.0-95.8% at an average of 94.6% with 25-36 t/h of concentrate product produced (Figure 25 and Figure 26).

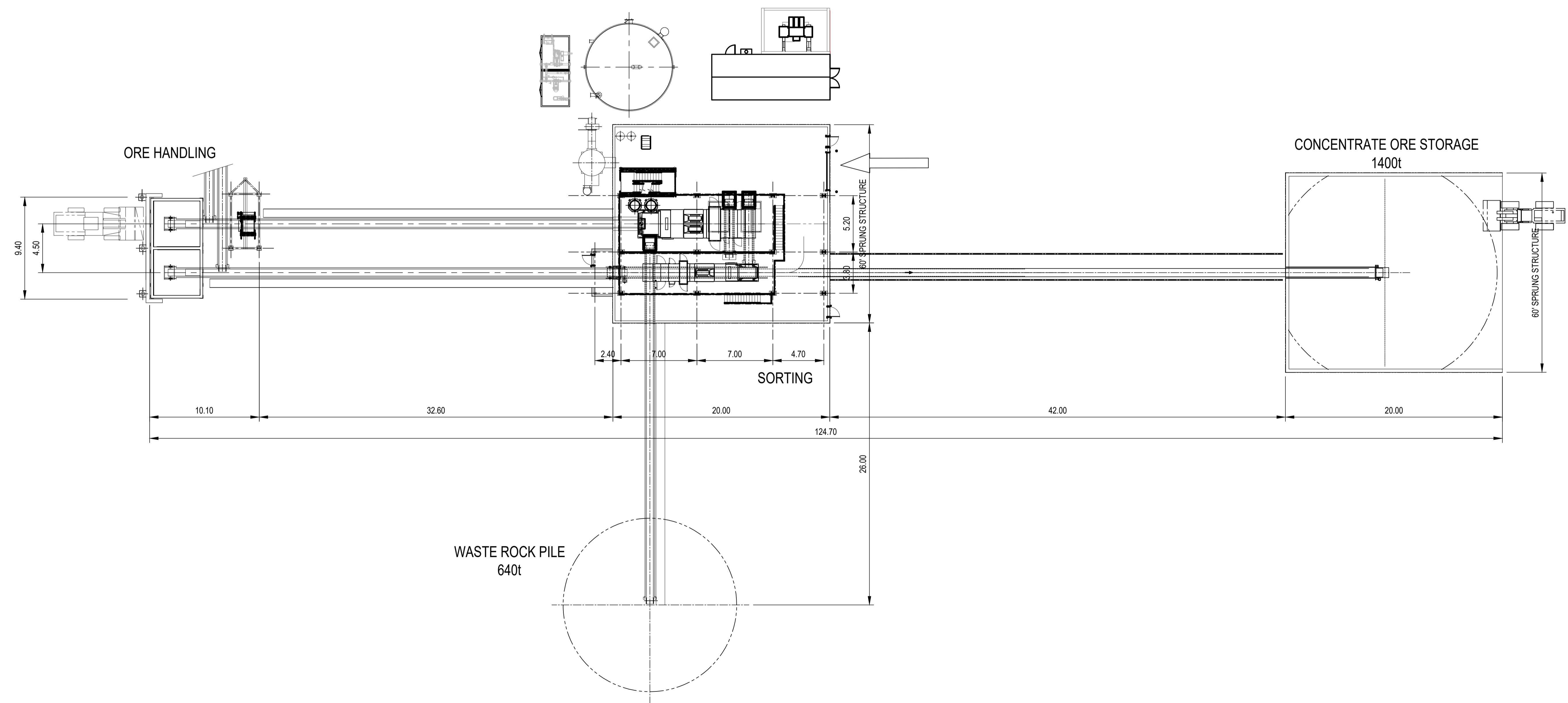
The pre-concentration process uses water only and no chemical processes or chemicals are used in any of the crushing and sorting methods.

Over the LOM, the mine is expected to deliver a total of 1.05 Mt of sorted mill feed grading 8.67 gpt Au to the Nugget Pond mill for final processing and tailings storage.



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DWG. NO.	REFERENCE DRAWINGS	REV. No.	ISSUED FOR	REVISION DESCRIPTION	DR.	CHK.	APP.	DATE	A	INFORMATION	ISSUED WITH PRELIMINARY ECONOMIC ASSESSMENT (PEA)	LR	-	SF	2020.03.11	SECTION: PROCESS FLOW		TITLE: HAMMERDOWN GOLD PROJECT
																SCALE:	DATE	
																DESIGN. BY:		PROCESSING PLANT OVERALL PROCESS FLOW DIAGRAM
																DRAWN BY:		MARITIME RESOURCES
																CHECK. BY:		canenco
																APP. BY:		PROJECT NUMBER MRC-HAM-001 DRAWING NUMBER FIGURE 25 REV. A



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DWG. NO.	REFERENCE DRAWINGS	REV. No.	ISSUED FOR	REVISION DESCRIPTION	DR.	CHK.	APP.	DATE	A	INFORMATION	ISSUED WITH PRELIMINARY ECONOMIC ASSESSMENT (PEA)	LR	-	SF	2020.03.11	MARITIME RESOURCES	canenco	PROJECT NUMBER MRC-HAM-001	DRAWING NUMBER FIGURE 26	REV. A

2.11 Waste, Emissions and Discharges

The wastes, emissions and discharges associated with this Project are indicated below along with standard and relevant practices and mitigation measures to limit and manage them.

- Surface Water Management:
 - Maritime will implement its WaMP to ensure appropriate control of contact water at all areas of the operation. Surface runoff and runoff from infrastructure will be directed to a settling pond system via drainage ditches, as necessary and feasible. Maritime will put in place appropriate sediment and erosion control measures. A sump at the lowest elevation of the open pit and at various levels in the underground workings will pump water to a dedicated settling pond system, as needed. Overflow from the settling pond system will be directed to natural drainage. Any liquid discharges from the Project will comply with the provincial *Water and Sewer Regulations* and the federal *Metal and Diamond Mining Effluent Regulations*.
 - Water collected from the ore stockpiles, waste rock dump, and the open pit and the underground development will be sent to the settling pond system(s) prior to release from the Project site.
 - The settling pond system(s) will serve as the primary water treatment facilities. If monitoring indicates the effluent from the settling pond system(s) does not meet regulatory guidelines or permit conditions, additional water treatment measures will be implemented, as required, prior to discharge to the environment.
- Noise and vibration will be generated from the operation of vehicles, heavy machinery, construction and clearing equipment and the use of explosives in the development of the mine. The main mitigation will be to provide a safe distance between the source and any receptors and to follow measures listed in Maritime's Blast Management Plan (BIMP).
- Fugitive dust emissions will be controlled by adjusting the crushing rate and the blast size and, if necessary, the application of water obtained from the raw water system or the sedimentation pond. To reduce the generation of dust, the working areas and laydown areas will be covered with blasted rock. Dust generated by truck movement along the site roads will be reduced by speed control, proper truck loading, application of water to suppress and proper road maintenance. Calcium chloride could also be used to control dust emissions if required.
- All solid waste generated during construction and operations will be properly collected and stored until such time that it can be transported to a provincially approved waste disposal facility. Where possible, waste materials will be recycled and/or reused. Waste storage will include measures to minimize the attraction of wildlife. Provincial Regulations that may apply to waste management or disposal at the Project site, include: the *Waste Diversion Regulations* and the *Waste Management Regulations*.

- Grey water and sewage waste will be handled with a sewage treatment plant to be installed and operated by a contractor and will follow all permit requirements.
- Fuel combustion – All vehicles and equipment will be equipped with proper exhaust systems and emissions will be reduced through proper maintenance and inspection. Practices to reduce idling will be implemented where practical. Maritime will have a maintenance garage on site for minor vehicle maintenance.
- Hazardous waste – waste oil and filters will be removed from the site for proper disposal and recycling. In addition to petroleum products, there will be small amounts of solvents for parts cleaning stored on-site. Maritime will have an ECP and a WMP that outlines appropriate handling, storage and disposal methods for these products. The handling, transportation, storage and use of explosives will be conducted by a licensed contractor employing trained and qualified personnel.

2.11.1 Greenhouse Gas Emissions

During the construction and operations phases of this Project, GHGs will be emitted from the combustion of diesel fuel used in various equipment, including generators, pumps, mining vehicles, haul trucks, and other heavy equipment, and from the use of explosives (Table 6). Additional information is presented in sections 5.1.1.1 and 5.1.2.1. Note that some small generators will only be used during the construction phase. Although electrical power will be provided through the provincial grid for the operation of the crushing and sorting plant, Maritime estimates that approximately 35 million litres (L) of diesel could be consumed on site throughout the construction and operations phases. Maritime estimates that approximately 96,708 tonnes of CO₂e (Table 15) will be generated over the life of the Project (seven years including construction). GHG emissions will be mitigated over the life of the Project through the following means:

- Use of electricity provided by the provincial grid;
- Reduce idling of mining vehicles and equipment to reduce amounts of fuel consumed;
- Planning efficient waste rock and ore haulage to reduce the amount of fuel consumed; and
- Maintaining engines in proper working order.

Table 6: Estimated Total Life of Project Diesel Use

Diesel Source	Construction Diesel Use (L)	Operations Diesel Use (L)		Life of Project Diesel Use (L)
		Open Pit	Underground	
Equipment	3,277,000	20,555,000	10,320,000	34,152,000
Explosives	49,000	504,000	7,000	560,000
Total	3,326,000	21,059,000	10,327,000	34,712,000

Note: Volumes are rounded to nearest thousand

2.12 Possible Accidents and Malfunctions

Human health and safety and environmental protection will be paramount considerations for Maritime in the planning and detailed design of the Project. In the construction, operation, decommissioning and maintenance of the Project, established safety procedures specific to human health and environmental protection will be strictly adhered to.

Activities associated with the Project will be conducted in compliance with the NL *Occupational Health and Safety Act (OHS)* and its *Regulations* and workers will receive relevant training as required by the legislation. Specifically, sections dealing with:

- Excavation Work, Underground Work and Rock Crushing;
- General Blasting;
- Access and Egress;
- Underground Operations;
- Confined Space Entry;
- General Mining Requirements;
- Explosives in Mines;
- Open Cut Workings in Mining Operations; and
- Use of Electricity in Mines.

Maritime also accepts responsibility that contractors hired to perform work also comply with this legislation, as per OHS Act s.10. Note that Maritime will have a trained team of firefighters at the Project site during construction and operations.

Maritime will have a site-wide EPP (Section 2.18.1) which details policies and procedures for completing work such that adverse environmental impacts are reduced during Project activities. The existing EPP will be updated and finalized to describe all aspects of construction, operations and maintenance of the Project. In addition, the design, construction and operation of the Project will be carried out in compliance with relevant legislation, regulations, standards and guidelines.

Maritime will prepare an ECP (Section 2.18.3) to address potential chemical and hazardous materials spills, as well as a WMP (Section 2.18.4) that will address waste handling for all aspects of this Project. Each of these plans will play a role during the construction, operation, decommissioning, closure and monitoring phases of the Project and will be updated by Maritime and submitted to the appropriate Regulators for review, as required.

Potential accidental events or malfunctions that may occur include, but are not limited to, the following:

- An accidental spill of chemicals, fuels or other deleterious substances into the terrestrial, aquatic and/or atmospheric environments;

- Equipment failure in the underground workings;
- Pit slope failures;
- Underground mine collapse;
- Failure of settling pond system;
- Electrical malfunctions;
- Malfunction or failure of dewatering equipment;
- Traffic mishaps involving haul trucks, mine equipment and light duty vehicles; and
- Fire and/or explosions at the site.

2.13 Closure and Decommissioning

A RCP is a requirement of the Newfoundland and Labrador *Mining Act*, chapter M-15.1, Sections (8), (9), and (10). Under the *Mining Act*, the RCP is defined as the plan that describes the process of rehabilitation of a mining project at any stage of the project, up to and including cessation of operations and closure. Rehabilitation has been defined as the measures taken to restore the property as close as reasonably possible to its former use or condition, or to an alternative use or condition that is considered appropriate and acceptable by the Department of Natural Resources (DNR). Maritime anticipates submitting the RCP to DNR for review by Q4-2020.

The RCP will align with the main objective of mine rehabilitation which is to restore the site to a satisfactory condition by:

- Restoring the land to as close to natural state as practically possible;
- Minimizing any long-term impact on the environment, including fauna and flora;
- Creating a landscape that is visually acceptable and compatible with surrounding terrain and land use;
- Mitigating and controlling, to within acceptable levels, the potential sources of contamination, pollution, fire risk, and public liability; and
- Providing a safe environment for long term public access.

For most mines, there are three main stages of rehabilitation that occur over its life:

- Progressive rehabilitation;
- Closure rehabilitation; and
- Post-closure and long-term monitoring.

Progressive rehabilitation involves rehabilitation work that is completed throughout mining operations prior to closure, wherever possible or practicable to do so. Such activities may include the placement of a waste rock berm/barricade and signage around the perimeter of any exhausted open pits. There may also be an opportunity to carry out the demolition and removal of disused infrastructure, as well as the re-vegetation of disturbed areas that are no longer in use and

completed areas of the waste dump. Re-shaping of the waste dump or designing it in order to have it blend into the landscape will be considered. In addition, there will be an opportunity to back-haul the rejects and place them in exhausted open pits and/or underground workings.

Closure rehabilitation involves activities that are completed after mining operations cease, to rehabilitate the site to as close to its pre-mining condition as practicable. This may include complete demolition and removal of site infrastructure, re-vegetation of disturbed areas, removal of contaminated materials if applicable, water management, and reshaping the landscape.

Once closure and rehabilitation activities have been completed, post-closure monitoring will be undertaken to confirm that rehabilitation activities have been successful and that any mine discharges meet compliance standards. This may include, for example, the monitoring of slopes for long-term stability, re-vegetation success, and environmental monitoring. Once post-closure monitoring demonstrates that site rehabilitation has been successful, the site can be closed and released by DNR, at which time, an application can then be made to relinquish the property back to the Crown.

Surface water quality monitoring will be carried out as per all regulatory requirements during closure and post-closure activities, as required.

As planning and development continues, Maritime will consider all options and opportunities for optimal rehabilitation and closure and will work to incorporate them into the final plan. The RCP that will be submitted to DNR will include a financial assurance, based on the cost estimate to complete closure activities.

The above noted rehabilitation activities will be further described in the RCP to be submitted to DNR following release from the EA process and as part of the regulatory permitting process.

2.14 Effects of the Environment on the Project

Typically, potential effects of the environment on any project are a function of the project design and the risks of natural hazards and influences of nature. These effects may result from physical conditions, landforms and general site characteristics that may act on the Project such that Project components, schedule and/or costs could be substantively and adversely changed.

While environmental forces such as severe weather and climate change have the potential to adversely affect a Project, good engineering and environmental design, industry standards, and environmental monitoring can mitigate these effects.

The Project has been planned and designed, and will be implemented, with due consideration of the local environmental conditions in and around the Project site.

Topographic features, waterbodies, existing infrastructure and other environmental factors have influenced the placement and design of the Project and its associated components. Weather conditions and wildlife-sensitive seasons will also likely influence the timing of some construction activities.

The primary anticipated effect on the environment is the disturbance of surface water flows, requiring the Company to ensure effective and safe water management throughout the Project site. Considering the Project's location along the divide of three catchment areas, Maritime will design the mine and its water management system such that surface runoff and ultimate mine water discharge are directed proportionally towards the surrounding catchment areas in order to maintain their natural hydraulic conditions.

No specific or special mitigation measures, beyond normal water management (and possible water quality treatment) strategies, are proposed based on determined effects of the environment on the Project.

2.15 Project Reports

A number of baseline study reports that are relevant to the Project are referenced in this Registration document. They are listed below and are available on request.

- Baseline Air Quality Monitoring Report, Hammerdown Underground Gold Mine Re-activation. Final Report. Stantec Consulting Ltd. 2017a.
- Surface Water and Water Quality Baseline Report, Hammerdown Underground Gold Mine Re-activation. Final Report. Stantec Consulting Ltd. 2017b.
- Terrestrial and Aquatic Baseline Program, Hammerdown Underground Gold Mine Re-activation. Final Report. Stantec Consulting Ltd. 2017c.
- Ecological Baseline Report, Hammerdown Gold Mine Development Project, King's Point, NL. GEMTEC Consulting Engineers and Scientists Ltd. 2019a.
- Fish Habitat Assessment, Maritime Resources Corp.'s Hammerdown Gold Mine Development Project. King's Point, NL. GEMTEC Consulting Engineers and Scientists Ltd. 2019b.
- Hammerdown Gold Mine Redevelopment Project: Baseline Hydrogeology Scoping Study, King's Point, NL. GEMTEC Consulting Engineers and Scientists Ltd. 2019c.
- Hydrogeology Baseline Report, Hammerdown Gold Mine Development Project. King's Point, NL. GEMTEC Consulting Engineers and Scientists Ltd. 2019d.
- Hydrology and Surface Water and Sediment Quality Baseline Report, Hammerdown Gold Mine Development Project, King's Point, NL. GEMTEC Consulting Engineers and Scientists Ltd. 2019e.
- Test Pit Soil Investigation for the Proposed Waste Rock Dump, Low Grade Ore Stockpile, Crushing Plant and Administration Building Areas, Hammerdown Gold Mine near King's Point, NL. GEMTEC Consulting Engineers and Scientists Ltd. 2019f.

- A Preliminary Geochemical Characterization on the Hammerdown Gold Project, Newfoundland & Labrador, Canada. SRK Consulting (UK) Limited. 2019.

These studies relate to the biophysical environment of the proposed Project area and describe, amongst others, the land cover classes, the potential for terrestrial species at risk (SAR), wetlands, avifauna, the aquatic environment, hydrology, surface water and sediment quality, and hydrogeology. In general, the Study Area for these reports includes the Project area, the majority of the mining lease area and the surrounding landscape (Figure 27). Sampling methodology and locations specific to each biophysical component are described in greater detail in the individual reports, noted above.

2.16 Labour Force and Occupations

The Project, through its construction and operations phases, will result in positive economic effects for the region and the province. During construction, the Project will create modest temporary employment opportunities in a variety of occupations and the requirement for goods and services during Project construction and operation will provide opportunities for local businesses. These direct economic benefits will be supplemented by indirect benefits through spending by Project employees and contractors.

Over its anticipated 6-12 month construction phase, the Project will require an estimated 107 workers. Once operational, the Project will employ between 126 and 169 persons. The various occupations required for construction and operations of this Project, and their corresponding National Occupation Codes (NOC), are presented in Table 7.

Table 7: Construction and Operations Related Employment

Position Category	NOC Code	Construction	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Open Pit								
Haul truck operator	7521	12	28	40	24	0	0	12
Hydraulic excavator operator	7521	4	8	8	8	0	0	4
Wheel loader operator	7521	4	8	8	8	0	0	8
Production drill operator	7372	12	20	20	8	0	0	8
Dozer operator	7521	12	12	12	12	2	2	4
Grader operator	7521	4	4	4	4	2	2	4
Operations General Foreman	7301	1	1	1	0	0	0	0
Operations Supervisor	8221	4	4	4	0	0	0	4
Blasting technician	7372	1	1	1	0	0	0	1
Health & Safety officer	2263	1	1	1	1	1	1	1
Clerk	1414	1	1	1	1	1	1	1
Mechanic	7312	12	2	2	2	0	0	2
Welder	7237	10	1	1	1	0	0	1
Electrician	7242	5	1	1	1	0	0	1
Maintenance Foreman	7301	3	3	3	0	0	0	2
Subtotal		86	95	107	79	6	6	53
Underground Mine								
Jumbo driller	8231	0	0	0	4	12	12	4
Bolter	8231	0	0	0	4	4	4	4
Scooptram operator	8231	0	0	0	4	16	20	16
Haul truck operator	8231	0	0	0	8	12	12	8
Longhole driller	8231	0	0	0	0	4	4	4
Blasting technician	7372	0	0	0	4	4	4	4
Service operator	8231	0	0	0	12	12	12	12
Mechanic	7312	0	0	0	2	4	4	3
Welder	7237	0	0	0	2	4	4	3
Electrician	7242	0	0	0	1	2	2	1
Maintenance Foreman	7301	0	0	0	3	3	3	3
Operations Supervisor	8221	0	0	0	4	4	4	4
Subtotal		0	0	0	48	81	85	66
Sorting Plant								
Superintendent	8221	0	1	1	1	1	1	1
Clerk	1414	0	1	1	1	1	1	1
Equipment operator	9411	0	4	4	4	4	4	4

Position Category	NOC Code	Construction	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Labourer	7611	0	4	4	4	4	4	4
Maintenance planner	2143	0	1	1	1	1	1	1
Crushing plant operator	9411	0	4	4	4	4	4	4
Subtotal		0	15	15	15	15	15	15
General & Administrative								
Operations manager	0811	1	1	1	1	1	1	1
Senior engineer	2143	1	1	1	1	1	1	1
Planning engineer	2143	1	1	1	2	2	2	2
Blasting / geotech technician	2212	1	1	1	1	1	1	1
Surveying / mine technician	2212	1	1	1	2	2	2	2
Surveying helper	2212	1	1	1	2	2	2	2
Clerk	1414	1	1	1	1	1	1	1
Chief geologist	2113	1	1	1	1	1	1	1
Grade control geologist	2113	2	2	2	3	2	2	3
Sampling technician	2212	2	2	2	4	2	2	3
Human resources officer	0122	1	1	1	1	1	1	1
Accountant	1431	2	2	2	2	2	2	2
Warehouse technician	7452	1	1	1	1	1	1	1
First aid attendant	3413	4	4	4	4	4	4	4
Trainer		1	1	1	1	1	1	1
Subtotal		21	21	21	27	24	24	26
Total Positions		107	131	143	169	126	130	160

Maritime also anticipates 16 positions associated with ore transport from the Project site to the Nugget Pond Mill and the need for up to 39 new part time and full-time positions at the Mill facility.

2.17 Project Schedule

Maritime will initiate construction activities upon receipt of all required permits and although some development work may begin in late 2020, the majority of construction activities will begin as early in 2021 as possible (Table 8). Construction of the Project is expected to occur over a period of 6-12 months and will generally proceed according to the schedule presented in Table 9. Maritime recognizes there may be some constraints relative to the schedules presented below as a result of potential COVID 19 restrictions. Safety precautions will be followed to limit the potential for unplanned COVID 19 setbacks.

Following Project construction, the operations phase will last approximately six years based on currently planned production rates. The Project will operate 12 months a year, 24 hours (hrs) per day, seven days per week on a 12-hour shift basis. Some exploration work is ongoing at the Hammerdown deposit area and if additional resources are identified, there is a potential that the LOM could be extended.

Closure and rehabilitation activities associated with the Project will take place after all economic ore has been removed from the site. Any post closure monitoring activities will be carried out in accordance with the approved RCP in place for Maritime's operations.

Table 8: Preliminary Project Regulatory Approval Schedule

Activity Name	2020						2021 Q1	
	Q3			Q4				
	July	Aug	Sept	Oct	Nov	Dec		
Submission to EA Division								
Public & Government Review								
EA Decision								
Development Plan								
Rehabilitation & Closure Plan								
Environmental Management Plans, e.g., EPP, ECP, WMP, BIMP, WaMP								
Gender Equity & Diversity Plan								
Other required Permitting								
C of A (Construction/Operations)								
Construction Start								

Table 9: Preliminary Project Development Schedule

Activity Name	2021				2022 Q1
	Q1	Q2	Q3	Q4	
Access road widening, site preparation, water management/distribution system					
Mine project facilities and pre-concentration plant construction					
Mine development and pre-stripping activities					
Nugget Pond Mill refurbishment, new crushing & grinding circuit construction					
Mine & processing operations ramp up					

2.18 Environmental Management and Protection

Maritime and its management team are committed to the environment and the local communities in which it works, and to conducting construction and operations in an environmentally and socially responsible manner. These commitments will be achieved through prudent environmental management and the development of a number of environmental management plans that will address environmental and resource management issues, including the EPP, WaMP, WMP and ECP. An umbrella plan, an Environmental Management System (EMS), will also be developed that outlines the key objectives of the previously mentioned plans and outlines the different levels of responsibility for contractors and site personnel relative to these plans. The EMS will also include:

- An environmental policy statement that provides statutory and corporate guidance throughout the Project life. This will include a clear definition of objectives and targets relative to the environmental policy.
- A clear indication of how the organization is structured and resourced to allow for the execution of the EMS. This also allows for a description of how accountability for environmental action across the company is distributed.
- Details of the measures specified for the management of particular environmental components or effects and how stated procedures of environmental policies can be easily translated into day-to-day practices.
- A system of recording performance, including monitoring, checking and auditing, implementation of actions to provide continual improvement and the application of corrective action when necessary.

2.18.1 Environmental Protection Plan

An EPP is an important tool for consolidating environmental protection information and procedures in a document that provides sufficient detail for the implementation of environmental protection measures in the field. Maritime has an EPP that outlines the prevention and mitigation measures to be applied to limit potential adverse environmental effects associated with construction and operations activities at Maritime's Project sites. Prior to Project commencement, Maritime will thoroughly update their existing EPP so that all aspects of environmental protection measures relative to construction and operations activities for the Project are up to date.

The EPP is considered a working document for use in the field by Project personnel and contractors that identifies and provides guidance for avoidance and mitigation of potentially adverse environmental effects of Project construction and operations activities. The EPP, and any revisions or updates, will be provided to all contractors and subcontractors who do work at the Project site. All contractors and subcontractors will confirm they have read and understood the requirements outlined in the EPP.

The EPP includes procedures and measures relative to activities such as vegetation clearing, grubbing, storage and handling of fuel, blasting, quarrying, dust control, waste and sewage disposal, work in or near water, as well as contingency plans for unplanned events such as spills, rehabilitation and compliance monitoring. A copy of Maritime's current EPP is presented in Appendix A.

2.18.2 Water Management Plan

Maritime's WaMP will be in place prior to the start of any site-specific activities and will remain in place up to and including closure planning. The WaMP will describe water management strategies relevant to all Project activities and describe mitigations to limit adverse effects on the environment as a result of changes to surface and groundwater flow.

2.18.3 Environmental Contingency Plan

Maritime will prepare an ECP which will cover all Project components. Maritime will finalize and provide this document to government regulators for review prior to the start of any Project activities. All construction and operations activities associated with the Project will be required to conform to the ECP.

2.18.4 Waste Management Plan

Maritime will prepare a WMP which will cover all Project components. Maritime will finalize and provide this document to government regulators for review prior to the start of any Project activities. All construction and operations activities associated with the Project will be required to conform to the WMP.

2.18.5 Blast Management Plan

Prior to the start of any Project specific activities, Maritime will have a BIMP in place. The BIMP will address aspects relating to the management and monitoring of blasting as it relates to adverse effects associated with vibration, noise and dust emissions.

Typically, the objectives of a BIMP provide a means to:

- Control the blast process from design to implementation, initiation and evaluation.
- Identify the risks and hazard associated with blasting, including control and/or mitigation.
- Implement best practice measures for the management and minimisation of dust and noxious fumes from surface blasting.
- Assure the safety of the public, site personnel and surrounding properties from flyrock.
- Limit the risk of damage to surface infrastructure by controlling blast vibration and flyrock.

The BIMP will be a working document that may be revised periodically so that any changes in the mine construction and operations plan are appropriately addressed.

2.19 Other Required Approvals

In addition to approval under the provincial EA process, the Project may require other permits, approvals and authorizations be obtained prior to the start of any construction and/or operations activities. Table 10 provides a list of existing permits and authorizations and Table 11 a list of potential permits, approvals and authorizations that may be required.

Table 10: Current Permits, Approvals and Authorizations

Permit, Approval or Authorization Activity	Issuing Agency
Surface and Mining Lease	Mineral Lands Division - Department of Natural Resources (DNR)
Mineral Licence	
Exploration Permit	
Water Use Licence - Exploration	Water Resources Management Division (WRMD) - DMAE
Environmental Protection Plan (EPP) - Exploration	Pollution Prevention Division (PPD) and EA Division (EAD) - DMAE

Table 11: Potential Permits, Approvals and Authorizations

Permit, Approval or Authorization	Issuing Agency
Municipal	
Approval to use Municipal Waste Disposal Site	Town of King's Point
Provincial	
Release from EA Process	EAD & Minister – DMAE
Environmental Protection Plan (EPP) – Construction and Operations (Exploration EPP to be updated)	
Certificate of Approval for Construction and Operation	
Certificate of Approval for Generators	
Approval of Environmental Contingency Plan/Emergency Spill Response	
Pesticide Operators License	
Waste Management Plan	
Permit to Construct a Non-Domestic Well	
Culvert Installation	
Water Management Plan	
Fording	
Pipe Crossing/Water Intake	WRMD - DMAE
Real Time Water Quality Monitoring	
Stream Modification or Diversion	
Other Works Within 15 m of a Body of a Water	
Water Use Licence	
Permit to Occupy Crown Land	
Highway Access Permit	Crown Lands Division - Department of Fisheries and Land Resources (DFLR)
Permit to Control Nuisance Animals	Department of Transportation and Works (DTW)
Operating Permit to Carry out an Industrial Operation During Forest Fire Season on Crown Land	Wildlife Division (WD) - DFLR
Permit to Cut Crown Timber	Forestry and Agrifoods Branch - DFLR

Permit, Approval or Authorization	Issuing Agency
Permit to Burn	
Development Plan	
Rehabilitation and Closure Plan	Mineral Development Division, Mines Branch – DNR
Financial Assurance	
Blaster Safety Certification	
Explosive Magazine Permit – one per magazine	
Permits for Underground Use of Diesel Equipment	
Miners Medical	
Potential Restrictions re COVID 19	
Approval for Storage and Handling of Gasoline and Associated Products	
Fuel Tank Registration	
Temporary Fuel cache	
Approval for Used Oil Storage Tank System (Oil/Water Separator)	Government Service Centre – Service NL
Fire, Life and Safety Program	
Application to Develop Land for Septic	
C of A for a Sewage/Septic System	
Building Accessibility Registration	
Propane Use	
Mine Rescue Certification re Mine Rescue Training Standards	Workplace NL
Federal	
License to Store, Manufacture, or Handle Explosives (Magazine Licence)	Natural Resources Canada
Environmental Effects Monitoring (EEM) under MDMER	Environment and Climate Change Canada (ECCC)

Maritime will comply with all terms and conditions of release, will apply for all required permits, approvals or authorizations and will abide by commitments made during the EA process.

As Maritime intends to process material from the Project at Nugget Pond Mill, all Mill permits and authorizations relevant to processing Hammerdown material ore at the facility will be updated by Rambler.

Maritime is committed to employment equity and will provide a Gender, Equity and Diversity Plan to the government of Newfoundland and Labrador (GNL) for review, if required. This Plan will:

- set targets for women in the trades occupations;
- commit to considering the application of plan initiatives to other under-represented groups to increase opportunities for their participation in the mining sector, where possible; and
- be provided to the Deputy Minister responsible for the Women's Policy Office prior to the startup of any work on the Project.

3.0 EXISTING ENVIRONMENT

The Project occurs in the Northcentral Subregion of the Central Newfoundland Forest Ecoregion. A subregion that is characterized by higher summer maximum temperatures, lower rainfall, and higher fire frequency than anywhere else in Newfoundland. Relatively low moisture, coarse soils and the prevalence of black spruce cover types make this subregion particularly susceptible to regeneration failure. Where tree regeneration is lacking, succession to dwarf shrub heath dominated by sheep laurel (*Kalmia angustifolia*) occurs on the nutrient-poor, coarse-textured till that is prevalent throughout much of this area. The rolling to undulating topography, typically below 200 masl, is characterized by shallow, medium-quality till with a soil texture range from sandy loam to loam (NLDFLR, 2019).

The Project will be primarily located on the site of a former gold mine that operated from 2000-2004. Decommissioning of the Richmont Mines operation was completed in 2005 and the footprint that occupied historical mining operations, for the most part, is still largely clear of vegetation regrowth.

The sections below provide an overview of the existing biophysical and socio-economic environments of the Project. The overviews are based on literature reviews and include summaries of baseline surveys completed in support of the Project that were completed in 2016 and 2019.

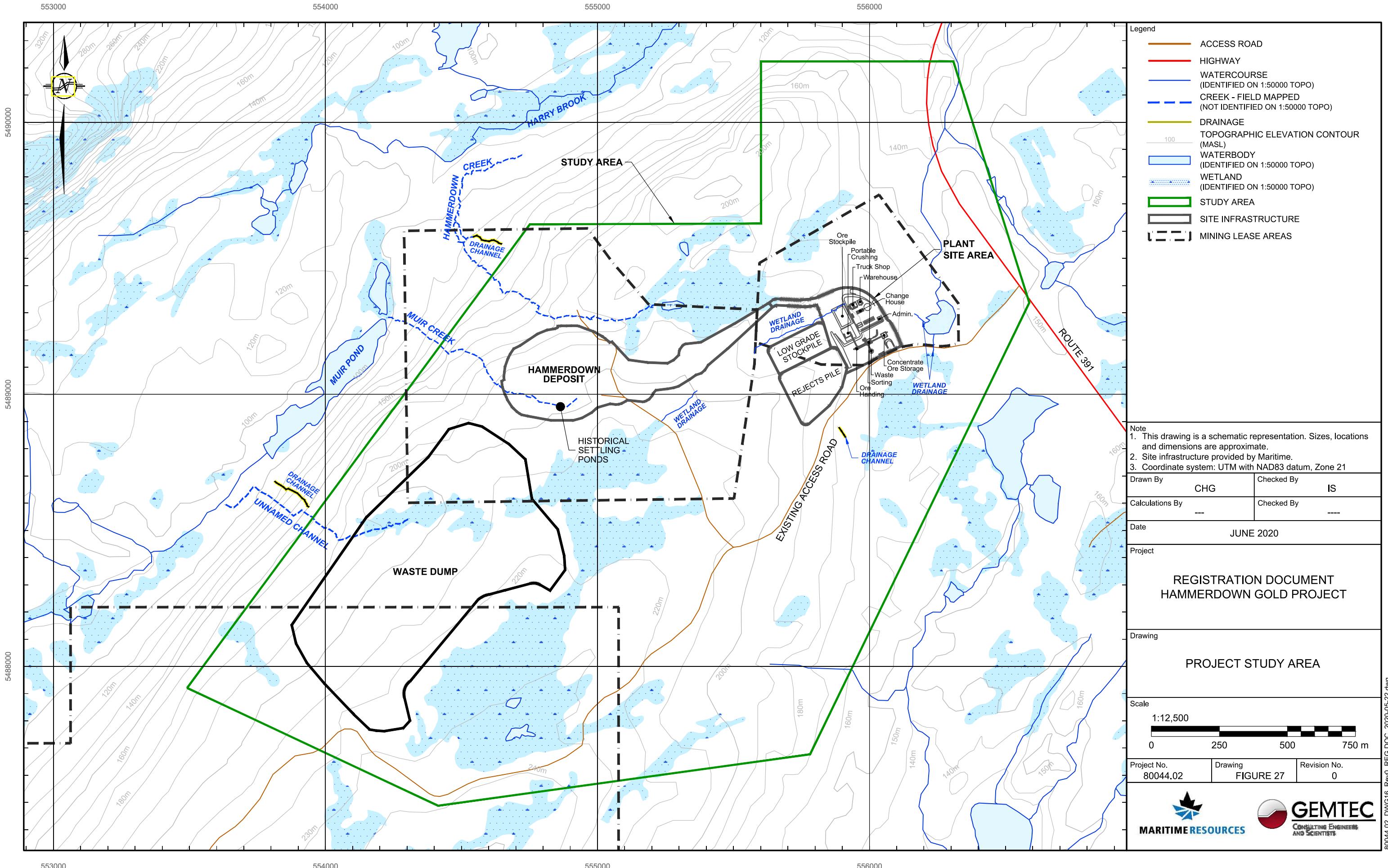
3.1 Natural Environment

The Project is located near King's Point in an area of low industrial activity. A range of environmental studies were carried out in 2016 and 2019 at the Hammerdown deposit area including terrestrial, aquatic, hydrological and hydrogeological studies to better understand the baseline biophysical conditions at the site. This document references both a 'Project Area' and a 'Study Area'. The Project area incorporates all areas where mining activities and infrastructure will occur. This area will receive direct impacts as a result of Project mining activities. The Study Area includes the Project area, the majority of the mining lease area and the surrounding landscape (Figure 27) and generally encompasses the area where most biophysical baseline studies were conducted.

The existing components of the natural environment that are summarized in this document include the following:

- Atmospheric Environment
 - Regional climate;
 - Air quality, with a consideration of effects from Project GHG emissions; and
 - Acoustic environment, with a consideration of effects from Project noise and vibration.

- Terrestrial Environment
 - Vegetation and Soils, including species at risk (SAR);
 - Wetlands;
 - Wildlife, including SAR; and
 - Avifauna, including SAR.
- Freshwater Environment
 - Surface water quality and quantity;
 - Groundwater quality and quantity; and
 - Fish and fish habitat.



3.1.1 Atmospheric Environment

3.1.1.1 Regional Climate

Table 12 shows that the estimated monthly precipitation at the Project site ranges from 72.5 mm to 98.6 mm between May to October, and ranges from 52.4 mm to 82.2 mm during November to April. Monthly average snowfall ranges from 17.1 cm to 59.2 cm in the winter months (November to April). The average annual total precipitation is approximately 932.8 mm (ECCC 2019a and GEMTEC 2019f).

The estimated annual average temperature at the Project site is 3.5°C. The average monthly temperatures from November to April range from -8.5°C to 1.0°C, and the average monthly temperatures from May to October range from 5.5°C to 16.2°C.

Table 12: Estimated Climate Normals at Springdale, 1963-1993

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	18.0	7.7	18.9	30.3	69.6	89.3	89.0	98.6	84.4	82.5	65.1	30.7	684.1
Snow (cm)	59.2	53.4	43.9	22.2	2.9	0.2	0.0	0.0	0.0	2.3	17.1	48.1	249.3
Precipitation (mm)	77.2	61.1	62.8	52.4	72.5	89.5	89.0	98.6	84.4	84.7	82.2	78.4	932.8
Temperature Mean (°C)	-8.3	-8.5	-4.6	1.0	6.3	11.5	16.2	15.5	10.7	5.5	0.9	-4.7	3.5
Temperature Max (°C)	6.3	6.2	9.1	13.8	22.5	27.9	30.4	29.3	24.9	17.6	13.3	8.1	30.4
Temperature Min (°C)	-27.2	-28.6	-24.0	-12.7	-4.9	-2.0	2.3	1.9	-2.1	-5.9	-12.3	-21.1	-28.6

3.1.1.2 Air Quality

There is minimal industrial activity in the area of this Project and the closest National Air Pollution Surveillance Program (NAPS) station is located at Grand Falls-Windsor. NAPS is a cooperative partnership of federal and provincial governments measuring air quality and supporting air quality programs designed to protect human health and the environment. Data from the NAPS Program are included in the Canada-wide Air Quality Database and are published in annual air quality data summary reports.

In 2016, Stantec carried out a baseline air quality program to characterize the existing air quality surrounding the Project site. The program was designed to characterize components of the atmospheric environment surrounding the Project site that could primarily be influenced by the Project (e.g., dust and metal particulates) (Stantec 2017a).

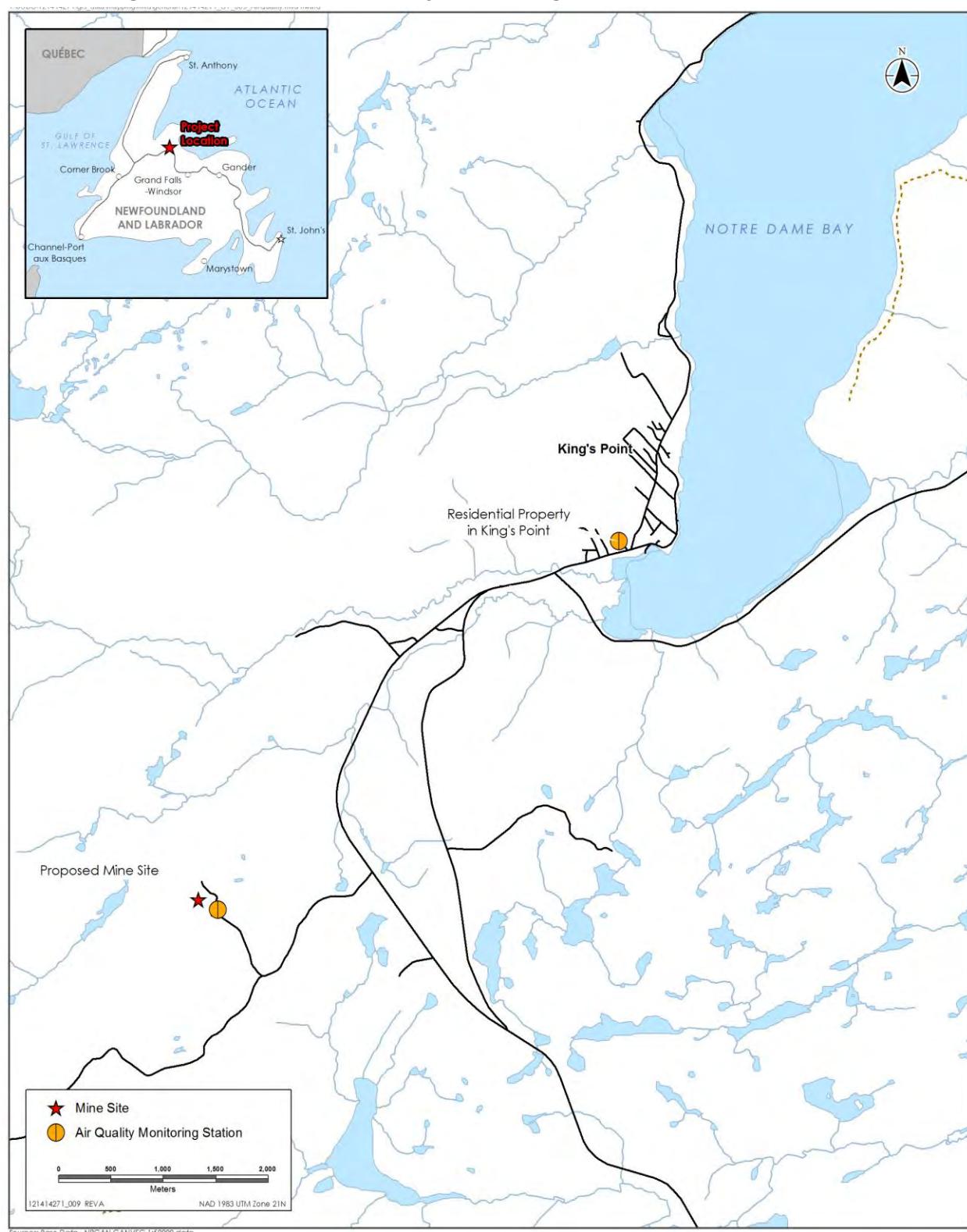
Two baseline air monitoring sites were selected for this study (Table 13 and Figure 28), the Project site and a residential location in King's Point, the nearest area with residential receptors. The results of the monitoring program show that the 2016 air quality for particulate matter and metals is within the ambient air standards of the province. Background concentrations of sulfur dioxide (SO_2), nitrogen oxides (NO_x , NO_2), particulate matter ($\text{PM}_{2.5}$) and carbon monoxide (CO) were not measured directly, but were acquired from the nearest NAPS monitoring station at Grand Falls-Windsor, a distance of approximately 110 km. No exceedances of provincial limits were recorded for NO_2 , SO_2 , CO or $\text{PM}_{2.5}$ at the closest NAPS station in 2015 (Stantec 2017a).

No additional baseline air quality data have been collected since 2016. Consultation with officials with the Pollution Prevention Division (PPD) of DMAE indicated that, given the Project location, the local topography and the limited industrial activity in the area, baseline air quality data was not required at this time.

Table 13: Baseline Air Monitoring Sites

Site No.	UTM coordinates (Zone 21)		Site Description
	Easting (m)	Northing (m)	
1	555,082	5,489,048	Hammerdown Mine Site
2	558,898	5,492,447	Residential Property in King's Point

Figure 28: Baseline Air Quality Monitoring Sites (2016) (Stantec 2017a)



Sources: Base Data - NRCAN CANVEC 1:30000 data

The Project will generate criteria air contaminants (CACs) and greenhouse gas (GHG) emissions during both construction and operations activities. CACs are a set of criteria pollutants that cause smog, acid rain and other health hazards, and include PM_{2.5}, SO₂, NO_x and CO.

Open pit mining operations at the Project site will be typical of many other open pit mining operations and various activities associated with it will generate a number of CACs (Table 14).

Table 14: Open Pit Mining Sources of CAC Emissions

Source of Emissions	Type of Emission
Use of large trucks, equipment and excavators in open pit and underground	PM, NO ₂ , SO ₂ and CO
Blasting	PM, NO _x and SO ₂
Fugitive emissions from open pit	PM
Crushing and sorting of ore	PM
Ore loading for transport to mill	PM
Use of small service trucks onsite	PM, NO ₂ , SO ₂ and CO

Prior to the start of any Project specific activities, Maritime will have a BIMP (Section 2.18.5) in place and this Plan will have specific mitigations designed to limit adverse impacts to air quality as a result of blasting activities.

The crushing and sorting equipment will be electrically powered and enclosed so minimal particulate matter will enter the atmosphere. Dust collection systems will be utilized.

Mitigations such as regular road watering contributes to substantially reducing fugitive dust levels at the Project site and, on nearby Route 391. Estimates of CAC emissions are presented in the Effects Analysis Section 5.0.

All applicable mitigations to limit adverse impacts to regional air quality will be implemented as necessary, during development and operations of the Project.

3.1.1.3 Greenhouse Gas Emissions

Effects from cumulative GHG emissions are global in scale. The GHGs associated with this Project are considered under the Atmospheric Environment component and for this component, Maritime will endeavor to provide accurate accounting of lifetime Project emissions.

Both the federal government, as part of the 2015 Paris Agreement, and the provincial government, as part of The Way Forward on Climate Change (2019), have committed to reducing GHG emissions by 30 percent below 2005 levels by 2030. NL has also joined with other members of the Conference of New England Governors and Eastern Canadian Provinces in adopting a regional GHG reduction target for 2030. The target is to reduce regional GHG emissions by

35 to 45% below the 1990 regional GHG emissions level. Proposed GHG reduction targets are linked to carbon pricing and the 2016 PanCanadian Framework on Clean Growth and Climate Change included commitments to introduce carbon pricing in all provinces and territories.

For industrial facilities, there are three tiers in the NL Management of Greenhouse Gas Act (MGGA):

- Facilities that emit 15,000 tonnes of carbon dioxide (CO₂) equivalent or more of GHG in a year must report their emissions to the provincial government in accordance with the methodology laid out in the *Management of Greenhouse Gas Reporting Regulations*.
- Facilities that emit between 15,000 and 25,000 tonnes of CO₂ equivalent of GHG in a year may apply to be designated as opted-in facilities.
- Facilities that emit more than 25,000 tonnes of CO₂ equivalent of GHG are subject to annual GHG reduction targets.

Amendments to the MGGA and the Revenue Administration Act (RAA) were passed in December 2018 and allowed for the introduction of a federally mandated price on carbon and finalized the performance standards system for large industrial facilities.

On January 1, 2019, NL's carbon program was implemented and includes performance standards for large industrial facilities and a carbon tax on fuels combusted outside regulated facilities' boundaries. In addition, certain new industrial facilities are required to utilize best available control technologies (BACT). The two key elements of the carbon program are:

- A carbon tax applied to combusted fossil fuels at the federally mandated price of \$20/tonne of CO₂ equivalent in 2020. The tax equates to 4.42 cents per litre of gasoline and 5.37 cents per litre of diesel. However, it will be offset by the respective elimination of the remaining 4-cent temporary gasoline tax and removal of the 5-cent additional diesel tax introduced in Budget 2016.
- A performance standard system for large industrial facilities that emit more than 25,000 tonnes of GHG emissions annually.

The NL carbon program is projected to reduce cumulative GHG emissions by over 0.65 million tonnes between 2019 and 2030.

GHGs such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) can be emitted from a number of natural and anthropogenic sources. The main GHG emissions generated from diesel fuel combustion are CO₂, CH₄, and N₂O. The 2017 total Newfoundland and Labrador GHG emissions expressed as carbon dioxide equivalent (CO₂ eq) was 10.0 Mt CO₂ eq (Environment and Climate Change Canada 2018), an increase of 6.9 % from the 2005 level.

The 2017 total Canada GHG's expressed as CO₂ eq was 714 Mt, a decrease of 2.0 % from the 2005 level (Environment and Climate Change Canada 2018).

Maritime calculated estimates of GHG emissions for this Project (Table 15). Both construction and operations activities associated with the Project will use diesel powered equipment and require the use of explosives. Based on predicted Project activities, the Project will contribute approximately 96,708 tonnes of CO₂e over the life (seven years including construction) of the Project. The average annual equivalent CO₂ emissions of the life of the project are predicted to be 13,815.4 tonnes. More detailed information is presented in Sections 5.1.1.1 and 5.1.2.1.

Table 15: Predicted GHG Emissions over Life of Project

GHG Component	Emissions Factor (kg/L)	Construction (tonnes)	Operations (tonnes)	Over Life of Project (tonnes)	Av. Annual Emissions (tonnes)
CO ₂	2.663	8,856	83,582	92,438	13,205.4
CH ₄	0.003325	11	104	115	16.4
N ₂ O	0.1192	396	3,741	4,138	591.1
CO ₂ e	2.786	9,265	87,443	96,708	13,815.4

3.1.1.4 Noise and Vibration

The Project will occur in an area of low industrial activity and as such experiences low ambient noise levels. To date, Maritime has not undertaken any baseline noise or vibration studies in the area of the Project. Informal discussion with officials from the PPD indicated that baseline noise and vibration studies would not be required given the rural environment, topography and minimal industrial activity in the area.

During the operations phase, the mine will operate seven days per week with 12 hour daily shifts. Blasting of rock and transportation of waste rock and ore will occur on a daily basis for the LOM. Maritime estimates that at full operation capacity, approximately four to eight trucks will be transporting ore to the Nugget Pond Mill on a daily basis.

The Project is located approximately 5 km from the closest community of King's Point and there are several remote cabins in close proximity to the Project site. There will likely be other land users in the vicinity during various Project construction and operations activities as well, (e.g., wood cutters, snowmobilers, berry pickers).

Maritime's BIMP will have specific mitigations designed to limit adverse impacts of noise and vibration as a result of Project activities and blasting on the surrounding environment, local land users and local cabin owners and communities.

3.1.2 Terrestrial Environment

3.1.2.1 Geology, Soils and Topography

The rocks that underlie the Project area consist of late Cambrian to early Ordovician-age subduction zone-related rocks. These rocks have a complex structural history and have been subjected to Ordovician pre- to syn-obduction Taconian deformation, as well as Silurian Salinic and Devonian Acadian orogenesis. Rocks in the area are folded into northeast-trending folds with steep limbs, typically display a strong high-angle foliation, and are cut by major north-northeast-trending and northwest-trending faults; many of which have a thrust component (O'Brien, 2012). The most significant structural features in the area are the Rumbullion Fault and the Captain Nemo Fault, both of which influence the geometry of the Hammerdown deposit. The Rumbullion Fault is northeast-trending and steeply-dipping to the northwest with right lateral movement and separates the Hammerdown vein system to the west and the Rumbullion gold system to the east.

The Captain Nemo Fault is located in the southern portion of the deposit, and is east-southeast tending and moderately dipping to the north with predominantly normal movement that has resulted in down drop of the mineralized zone by several hundred meters (Gaboury et al., 1996).

The Hammerdown Gold deposit is a structurally-controlled, stacked, mesothermal vein-type gold deposit comprising four main mineralized zones, referred to as the Hammerdown, Rumbullion, Muddy Shag, and Wisteria zones. The deposit occurs within an extensive shear zone (referred to as the Hammerdown Deformation Zone) located at the structural contact between the Catchers Pond Group (Western Bay Arm Group) and the Lushs Bight Group. Gold mineralization within these zones occurs in high-grade, sulphide-rich quartz veins, and is interpreted to have formed during early Silurian deformation and felsic intrusions in the region (Gaboury et al., 1996).

GEMTEC completed a geotechnical investigation program at the Project site in 2019 to better understand the subsurface soil conditions at proposed locations for the waste rock dump, the low grade ore stockpile area, the crushing and sorting plant and other temporary infrastructure.

Subsurface conditions were generally described as a layer of organic material (root mat over black peat) up to 0.5 m thick, overlying dense glacial till (grey or brown, silty sand with gravel to silty gravel with sand to well-graded sand with silt and gravel, occasional to frequent cobbles and boulders) varying in thickness from 0.2 m to 3.6 m, overlying bedrock (Figure 29).

Available historical exploration borehole logs indicate an average overburden thickness of approximately 4.5 m. However, GEMTEC's 2019 results indicate a smaller average thickness of only 2.4 m. As the overburden thicknesses in the historical exploration boreholes were inferred based only on the measured depth to first substantial core recovery, GEMTEC considers that the overburden thicknesses measured directly in the test pits during the 2019 program are more reliable (GEMTEC 2019e).

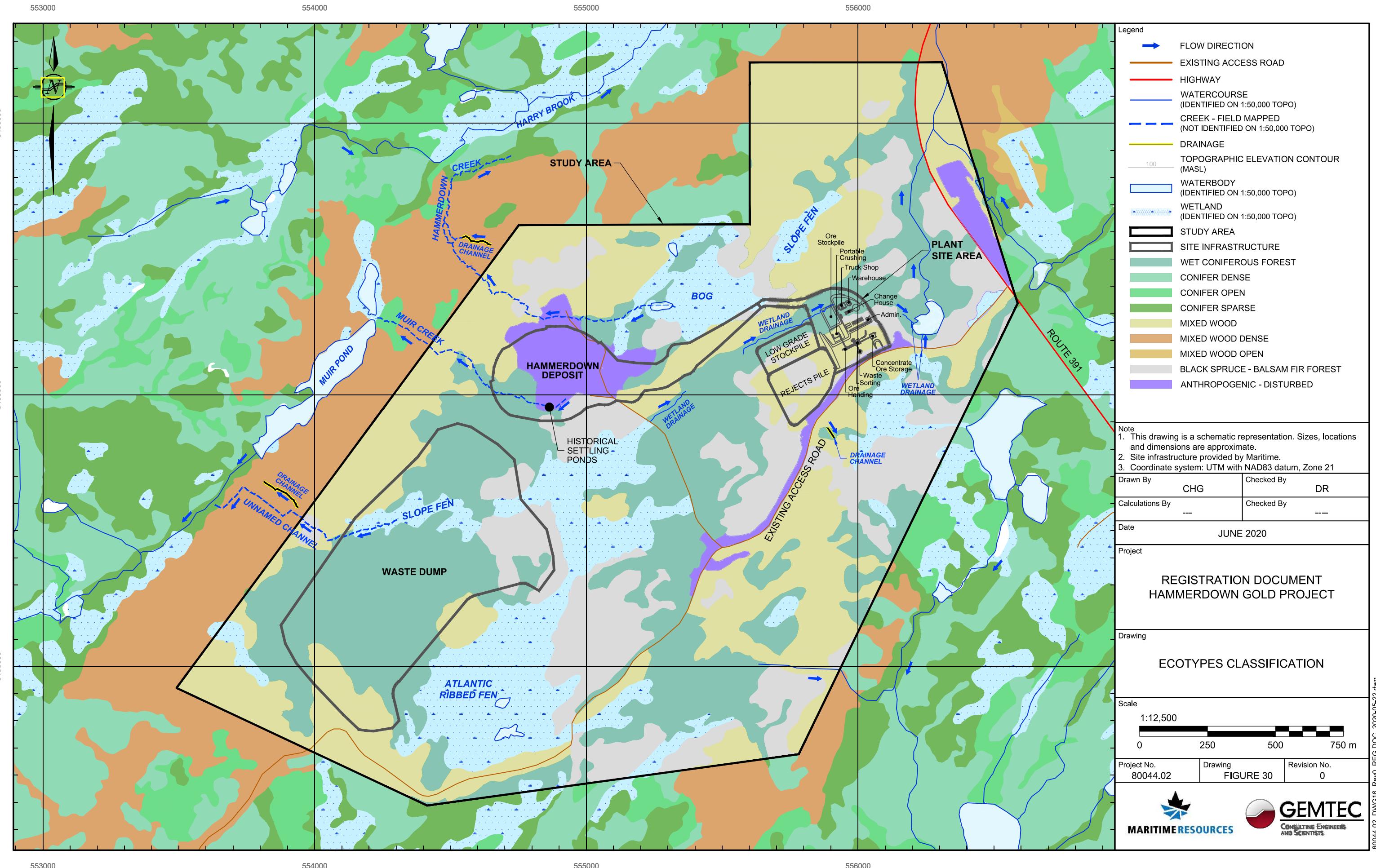
Local ridges and knobs of exposed bedrock occur within the till and other surficial deposits in the Project area and may be partially or fully concealed by thin mat vegetation and sparse forest. Where exposed, bedrock outcrops display glacial striations that indicate a dominantly northeastward-directed ice flow.

Figure 29: Soil Test Pit in the Area of the Proposed Sorting Plant Site



3.1.2.2 Vegetation and Rare Plants

The scope of work carried out for the vegetation and rare plant surveys within the Study Area (Figure 30) included a desktop species at risk (SAR) study and two site visits to identify all encountered vascular vegetation (July 2-10, 2019 and August 6-12, 2019) (GEMTEC 2019 b) The vegetation surveys were conducted during multiple stages of the flowering season to ensure identification of both the early and late flowering plants.



A total of 189 different plant species were identified in 2019 but none were considered rare or were ranked as S1 or S2 plants by the ACCDC. An S1 designation indicates that a species is critically imperilled because of extreme rarity or because of some other factor making it especially vulnerable to extirpation from the jurisdiction. An S2 species is imperilled in the jurisdiction because of rarity due to very restricted range, very few populations, steep declines or other factors making it very vulnerable to extirpation from the jurisdiction. A total of 27 S3 plants were noted during the surveys. An S3 designation indicates that a species is vulnerable in the jurisdiction due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation (GEMTEC 2019b).

The 2019 field studies followed the same general methodology as that used for the 2016 vegetation fieldwork completed by Stantec whereby five separate ecotypes were identified and surveyed within the Study Area. The key differences between the 2016 and 2019 fieldwork were the enlarged Study Area in 2019 and the different mapping database. In 2019, GEMTEC used the NL Forest Inventory Geodatabase rather than the Canadian Forest Service Earth Observation for Sustainable Development of Forests (EOSD) land cover database. The EOSD land cover database is a mapping tool using satellite imagery and was used by Stantec for their 2016 fieldwork. The EOSD land cover database is a useful tool for land cover mapping as it efficiently provides information over relatively large areas. However, the NL Forest Inventory Geodatabase is more descriptive and accurate with respect to species composition and forest stand boundaries. The finer scale of the NL Forest Inventory allows for a more robust study design than using the EOSD.

The ecotype classifications that appear outside the Study Area (Figure 30) were identified using the EOSD database so they differ somewhat from the classifications identified in the 2019 fieldwork.

A complete description of the methodology employed for the vegetation surveys, as well as a complete list of species encountered can be found in the Ecological Baseline Report (GEMTEC 2019b).

The Mixed Wood Forest and Wet Coniferous Forest were the two most abundant land cover classes encountered at 31.5 % and 32.9%, respectively. Various wetland types represented a total of 14.0% and disturbed areas represented only 4.1 % of the Study Area (Table 16).

Table 16: Land Cover Classes within the Study Area

Land Cover Class	Study Area	
	Area (ha)	Percent (%)
Black Spruce-Balsam Fir Forest	83.7	17.2
Wet Coniferous Forest	153.3	31.5
Mixed Wood Forest	159.8	32.9
Anthropogenic / Disturbed Area	19.9	4.1
Wetlands	68.2	14.0
<i>Atlantic Ribbed Fen</i>	37.6	7.7
<i>Slope Fen</i>	6.1	1.3
<i>Low Shrub Domed Bogs</i>	10.2	2.1
<i>Other Unassessed Wetlands</i>	14.3	2.9
Open Water Body	1.2	0.2
Total	486.1	100.0

Note: Land cover classes are based on Newfoundland and Labrador Forest Inventory Geodatabase.

The SAR desktop study identified two species with the potential to occur in the Study Area (Table 16) (GEMTEC 2019b). Boreal felt lichen (*Erioderma pedicellatum*), a SAR identified by the Atlantic Canada Conservation Data Centre (ACCDC) as having the potential to occur in this region, was not found in the Study Area. Boreal felt lichen is listed as a ‘species of conservation concern’ (SOCC) by both the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the federal *Species at Risk Act* (SARA) and listed as a ‘vulnerable’ SAR in NL (Table 17). The preferred habitat for this lichen is usually old forests, or stands with very old trees dominated by balsam fir (*Abies balsamea*; Cameron and Neily 2008, COSEWIC 2002, Maass 1980). No old contiguous stands dominated by balsam fir or black spruce (*Picea mariana*) were identified within the Study Area. In addition, there is no suitable habitat present within the Study Area for low seablit (Suaedacal ceoliformis), typically a maritime plant and a SAR which could potentially occur in the Study Area.

Table 17: Floral SAR with Potential to Occur in the Study Area

Common Name	Scientific Name	COSEWIC	SARA	NL SAR
Low Seablit	<i>Suaeda calceoliformis</i>	-	-	S1S2
Boreal Felt Lichen	<i>Erioderma pedicellatum</i>	Special Concern	Special Concern	Vulnerable

3.1.2.3 Wetlands

Vegetative and hydrologic characteristics of wetlands likely to be directly and/or indirectly affected by Project activities were assessed during the 2019 baseline field studies. In some instances, certain wetlands within the identified Study Area (particularly south of the existing access road), and visible on a 1:50,000 topographic map, were identified but not surveyed. They are included as part of the total Study Area since breeding bird and incidental wildlife surveys were carried out in the general area. These wetlands are recorded as ‘other wetlands’ in the land cover

classification (Table 16 and Figure 30). In consultation with the Water Resources Management Division (WRMD) of the NL Department of Municipal Affairs and Environment (NLDMAE), Maritime understands that the criteria used in the identification of wetlands is to determine whether they appear on a 1:50,000 topographic map as a wetland feature.

The baseline field work completed in 2019 in the Study Area identified only two of the five classes of wetlands as defined by the Canadian Wetland Classification System (CWCS), namely fens and bogs. These two wetland types accounted for all identified wetlands within the Study Area that may be affected by Project activities, and that appear on a 1:50,000 map (Figure 30). Detailed descriptions of the two wetland classes as defined by the CWCS are presented below.

Fens

Fens were the most commonly encountered wetland type and they accounted for most of the peat dominated wetlands surveyed. Two forms of fens were observed during the 2019 field survey: Atlantic ribbed fens and slope fens.

Although all fens have some level of groundwater influence, there were no observed large open water features and/or channels except at the outlets or channelized connections within the fen complex observed during 2019 field studies. This suggests that there are no strong point groundwater or surface water influences on the fens, and that precipitation and to a lesser extent diffuse shallow groundwater inputs are likely the two main sources of water for the fens identified at the Project site.

Atlantic Ribbed Fen

Atlantic ribbed fens have characteristic subparallel, low peat ridges (strings) that enclose elongated shallow pools. The ridges and hollows are oriented perpendicular to the direction of surface flow. Vegetation is characterized by sparse tree cover and a shrub cover composed of a mixture of sweet-gale (*Myrica gale*), shrubby cinquefoil (*Dasiphora fruticosa*), dwarf birch (*Betula michauxii*), leatherleaf (*Chamaedaphne calyculata*), bog laurel (*Kalmia polifolia*), mountain fly honeysuckle (*Lonicera villosa*), speckled alder (*Alnus incana* subsp. *rugosa*), stunted tamarack (*Larix laricina*) and black spruce (*Picea mariana*). Herbaceous species observed in a majority of the sampled fens include Canada burnet (*Sanguisorba canadensis*), three-leaf false solomon-seal (*Maianthemum trifolium*), rough-leaved aster (*Eurybia radula*), bog goldenrod (*Solidago uliginosa*), hooded ladies-tresses (*Spiranthes romanzoffiana*), northern pitcher plant (*Sarracenia purpurea*), buckbean (*Menyanthes trifoliata*) and round-leaved sundew (*Drosera rotundifolia*). The most abundant sedge species in descending order are coastal sedge (*Carex exilis*), few-seeded sedge (*Carex oligopetala*) and slender sedge (*Carex lasiocarpa*). Other common graminoid species include white beak rush (*Rhynchospora alba*), deergrass (*Trichophorum cespitosum*) and tall cotton-grass (*Eriophorum angustifolium* subsp. *angustifolium*).

The average measured peat depth in the Atlantic ribbed fen in 2019 was approximately 1.75 m and this fen accounted for approximately 37.6 ha or 7.7% of the total Study Area (GEMTEC 2019b).

Slope Fen

Slope fens found in the Study Area are similar in vegetation composition to Atlantic ribbed fens however, they occur on sloping terrain and the peat ridges and pools typical of Atlantic ribbed fens are absent. Peat on sloped fens is not well developed, averaging approximately 30 cm thick based on probing depths recorded during field surveys. The total area of this fen within the Study Area is 6.1 ha or 1.3% of the Study Area (GEMTEC 2019b).

Bogs

Bogs are peatlands that have the water table at or near the surface and in general are acidic and nutrient deficient. The dominant substrates of bogs are weakly to moderately decomposed sphagnum and woody peat that may occasionally be underlain by peat derived from sedges. Bogs may be treed or treeless and are usually occupied by various species of sphagnum moss and ericaceous shrubs (CWCS 1997). Bogs are not prevalent in the Study Area, however one bog type wetland, a low shrub domed bog, was identified during the 2019 field surveys.

Low Shrub Domed Bog

Low Shrub Domed Bogs are characterized by relatively deep peat (2-3 m), a prominent domed profile and the absence of tree cover. Shrub cover is generally extensive and included sheep laurel (*Kalmia angustifolia*), northern wild raisin (*Viburnum nudum*), common juniper (*Juniperus communis*), pale bog laurel (*Kalmia polifolia*) and stunted tamarack (*Larix laricina*). The bog surface is hummocky and becomes increasingly dry toward the center. The most abundant moss and graminoid species include sphagnum, reindeer lichens, bog goldenrod (*Solidago uliginosa*), deergrass (*Trichophorum cespitosum*) and tussock sedge (*Carex stricta*). This bog represented 10.2 ha or 2.1 % of the Study Area.

3.1.2.4 Unassessed Wetlands

A portion of the Study Area included unassessed wetlands, particularly those located south of the existing access road (Figure 30), which are unlikely to be affected either directly or indirectly by Project activities. Breeding bird and incidental wildlife surveys were however completed in the general area. The total area of unassessed or 'other wetlands' was 14.3 ha or 2.8 % of the total Study Area.

GEMTEC discussed the results of the wetland field surveys with personnel from the WRMD on August 30, 2019. Overall the WRMD was satisfied with the work completed and indicated that with respect to Project design, minimizing effects to highly functioning wetlands and restricting

effects to one wetland versus affecting multiple wetlands are important steps in minimizing adverse Project related environmental impacts.

3.1.3 Avifauna and Species at Risk

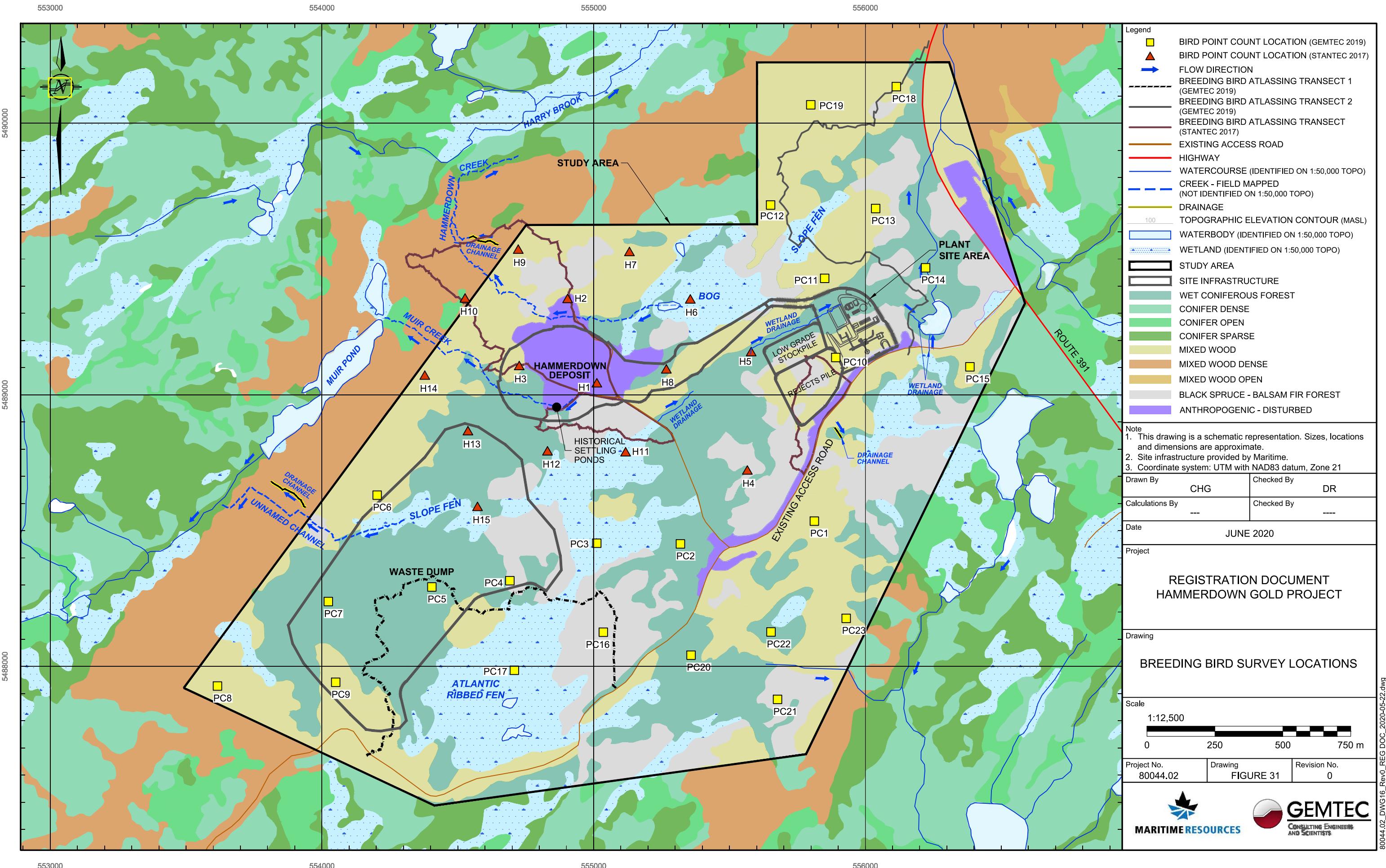
Breeding bird and short-eared owl surveys were conducted within the Study Area in 2019 to understand the baseline avifauna. This work included a desktop SAR Study, a field-based breeding bird survey (July 2-10, 2019), a field-based short-eared owl survey (July 2-10, 2019) and a field survey for SAR and SOCC (July 2-10, 2019 and August 6-12, 2019) (GEMTEC 2019b).

An earlier avifauna survey was conducted in a portion of the Study Area in 2016 by Stantec (Figure 31) (Stantec 2017c). Field surveys carried out in 2019 expanded upon the areas surveyed in 2016 in order to better understand the baseline avifauna in the Study Area. The 2019 surveys followed similar sampling protocols as in 2016 in order to facilitate comparisons and integration of data between the studies.

The federal SARA provides protection to fauna species against extirpation, extinction or endangerment from human activities. Provisions to protect and recover a species come into effect once it has been listed on Schedule 1 of SARA. The federal *Migratory Birds Convention Act* (MBCA) provides overarching protection for individuals and populations of birds and their nests, including songbirds, waterfowl and seabirds, against harm or destruction. The MBCA and associated regulations are administered by Environment and Climate Change Canada (ECCC) through the Canadian Wildlife Service (CWS). Table 18 lists avifauna SAR that have the potential to occur in the Study Area.

Table 18: Avifauna Species at Risk with Potential to Occur in the Study Area

Common Name	Scientific Name	COSEWIC	SARA	NFLD SAR
Red crossbill	<i>Loxia curvirostra percna</i>	Threatened	Threatened	Endangered
Rusty blackbird	<i>Euphagus carolinus</i>	Special Concern	Special Concern	Vulnerable
Short-eared owl	<i>Asio flammeus</i>	Special Concern	Special Concern	Vulnerable
Olive-sided flycatcher	<i>Contopus cooperi</i>	Special Concern	Threatened	Threatened
Gray-cheeked thrush	<i>Catharus minimus minimus</i>	Threatened	Threatened	Threatened



3.1.3.1 Breeding Bird Surveys

Breeding bird surveys were conducted as per the methods outlined by *Birds Canada*. To provide representation of different habitat types, preliminary site selection for the point count locations were identified based on forest and vegetation species composition and the development stage within the Study Area. The point count surveys that were carried out built on work described in the Stantec 2017 report.

In keeping with the 2016 Stantec breeding bird survey protocol, atlassing surveys were also carried out to supplement point count surveys (Figure 31). In 2019, atlassing transects were completed in representative habitats within the Study Area and any evidence of breeding birds such as nests, territorial displays, alarm calling, individuals flushed, mating, and aggressive defending of territories were recorded, if encountered (GEMTEC 2019b).

Incidental bird observations and bird singing were also recorded during the wetland and vegetation field studies. This allowed for a better understanding of bird species diversity within the Study area was captured. The *Ecological Baseline Report* (GEMTEC 2019b) provides details relative to individual survey methodologies as well as detailed results.

A total of 37 bird species comprising of 106 individual records were documented during the point count, atlassing and incidental bird surveys (Table 19). The most numerous species recorded overall, in descending order, are:

- White throated sparrow (*Zonotrichia albicollis*);
- Ruby-crowned kinglet (*Regulus calendula*);
- American robin (*Turdus migratorius*);
- Black and white warbler (*Mniotilla varia*);
- Hermit thrush (*Catharus guttatus*); and
- Black throated green warbler (*Dendroica virens*).

The highest species richness was recorded in Mixed Wood Forest (n=23), Wet Coniferous Forest (n=20), Black Spruce-Balsam Fir Forest (n=16), Wetland (n=7) and Anthropogenic-Disturbed Land (n=1) (Figure 32). Breeding behaviours were observed during the surveys; however, no nests were identified (GEMTEC 2019b).

The observed abundance of these species would be expected given the development stage and species composition of the habitats within the Study area as these species are characteristic of the forest and wetland habitats found there.

No avifauna SAR were detected during the 2016 or 2019 field surveys although there is suitable habitat present for some, including Red crossbill, Rusty blackbird, Short-eared owl, Olive sided flycatcher and Gray cheeked thrush.

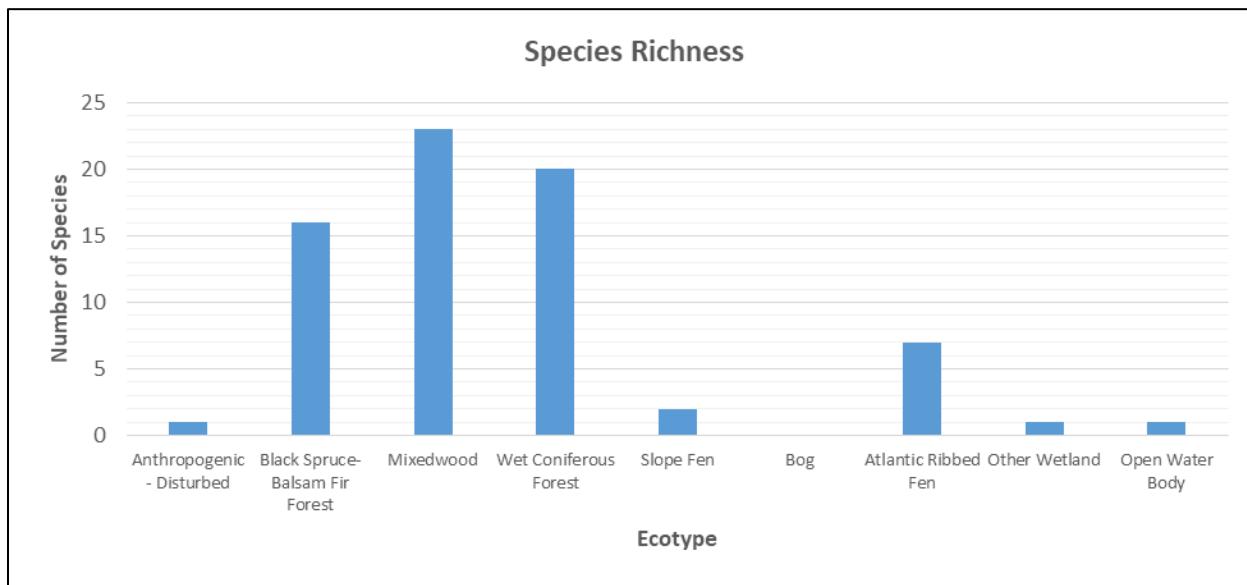
Table 19: Breeding Bird Data, Including Point Count, Area Search and Incidental Surveys

Common Name	Scientific Name	Habitat Type	S-Rank	Highest breeding status [†]	Number Recorded
Ruby-crowned Kinglet	<i>Regulus calendula</i>	AD, WCF, BSBFF, MW, WL	S5B,S5M	PR	8
Yellow-rumped Warbler	<i>Dendroica coronata</i>	MW, WCF, BSBFF	S5B,S5M	PO	3
White-throated Sparrow	<i>Zonotrichia albicollis</i>	BSBFF, WCF, WL, MW	S5B,S5M	PR	9
Fox Sparrow	<i>Passerella iliaca</i>	MW, WCF, WL, BSBFF	S5B,S5M	PO	2
Northern Waterthrush	<i>Seiurus noveboracensis</i>	MW, WCF	S5B,S5M	PR	5
Black and White Warbler	<i>Mniotilla varia</i>	WL, WCF, MW, BSBFF	S5B,S5M	PR	8
Hermit Thrush	<i>Catharus guttatus</i>	MW, BSBFF	S5B,S5M	PR	6
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	MW, BSBFF, WCF	S5B,S5M	PO	5
American Robin	<i>Turdus migratorius</i>	MW, WCF, BSBFF	S5B,S5M	PO	7
Lincoln's Sparrow	<i>Melospiza lincolni</i>	WL, WCF, MW	S5B,S5M	CO	5
Magnolia Warbler	<i>Dendroica magnolia</i>	MW, WCF, BSBFF	S5B,S5M	PR	5
Dark-eyed Junco	<i>Junco hyemalis</i>	MW, WCF	S5	PO	2
Palm Warbler	<i>Dendroica palmarum</i>	BSBFF	S5B,S5M	CO	2
Black-throated Green Warbler	<i>Dendroica virens</i>	MW, BSBFF	S5B,S5M	PO	6
Black-capped Chickadee	<i>Poecile tricapilla</i>	MW, WCF	S5	PO	3
Boreal Chickadee	<i>Poecile hudsonica</i>	WL, WCF, MW, BSBFF	S4	CO	3
Swamp Sparrow	<i>Melospiza georgiana</i>	WL, BSBFF	S5B,S5M	PO	1
Purple Finch	<i>Carpoda cuspipureus</i>	MW, BSBFF	S5B,S5M	PR	3
Red-breasted Nuthatch	<i>Sitta canadensis</i>	MW, WCF	S5	PO	1
Swainson's Thrush	<i>Catharus ustulatus</i>	MW, WCF, BSBFF	S5B,S5M	PO	1
Tennessee Warbler	<i>Vermivora peregrina</i>	WCF	S4B,SUM	PO	1
Wilson's Warbler	<i>Wilsonia pusilla</i>	MW	S5B,S5M	PR	1
Greater Yellowlegs	<i>Tringa melanoleuca</i>	BSBFF, WL	S3B, S4M	PO	2
Wilson's Snipe	<i>Gallinago delicata</i>	WCF	S5B,S5M	PO	1
American Redstart	<i>Setophaga ruticilla</i>	MW	S5B,S5M	PO	1
Blue-headed Vireo	<i>Vireo solitarius</i>	WCF	S3B,SUM	PO	1
Black backed Woodpecker	<i>Picoides arcticus</i>	BSBFF	S4	PO	1
Pine Siskin	<i>Spinus pinus</i>	WCF	S4S5	PO	1
Gray Jay	<i>Perisoreus canadensis</i>	WCF, MW	S5	PR	1
Downy Woodpecker	<i>Picoides pubescens</i>	WCF, MW	S4	PR	2
Common Raven	<i>Corvus corax</i>	WCF	S5	PO	1
Downy Woodpecker	<i>Picoides pubescens</i>	WCF, MW	S4	PO	1
Hairy Woodpecker	<i>Picoides villosus</i>	WCF	S4	PO	1
American Crow	<i>Corvus brachyrhynchos</i>	MW	S5	PO	1
Ovenbird	<i>Seiurus aurocapilla</i>	MW	S3B,SUM	PO	1
Common Loon	<i>Gavia immer</i>	Outside Study Area	S5B, S4N	PO	1
White-winged Crossbill	<i>Loxia leucoptera</i>	MW	S5	PO	1
Savannah Sparrow	<i>Passerculus sandwichensis</i>	WCF, MW	S5B, S5M	PO	2
Total					106

[†] Breeding Status Codes: OB = observed, PO = possible breeder, PR = probable breeder, CO = confirmed

Habitat Codes: MW = Mixed Wood, WCF = Wet Coniferous Forest, WL = WL, BSBFF = Black Spruce-Balsam Fir Forest, AD = Anthropogenic-Disturbed

Figure 32: Breeding Bird Species Richness by Habitat Type



3.1.3.2 Short-Eared Owl Surveys

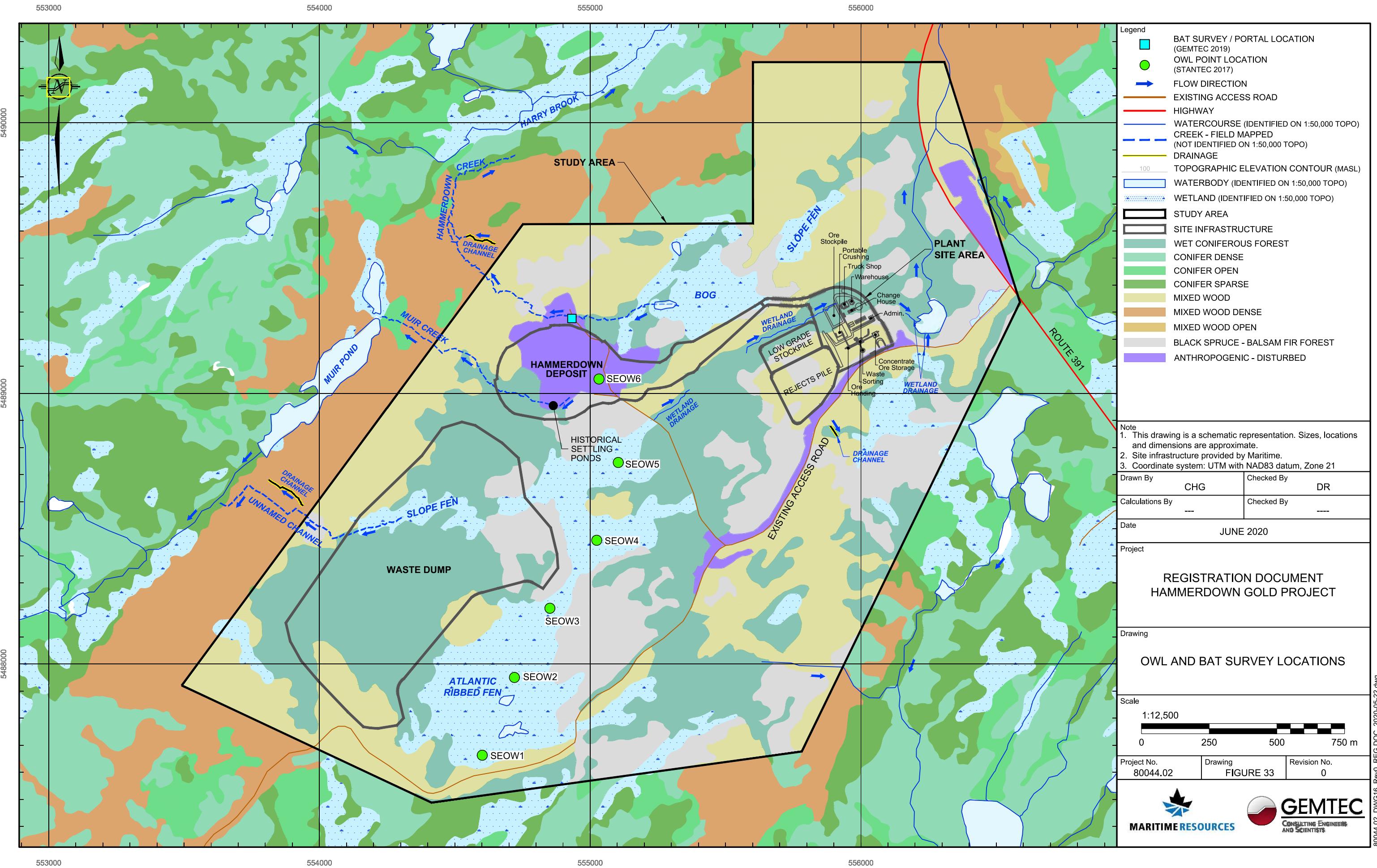
In 2019, targeted short-eared owl (SEOW) surveys were conducted in suitable habitat (open areas such as fens and peat bogs) near areas of proposed mining activities (Figure 33).

SEOW surveys were conducted on July 5 and 6, 2019 and were based on a modified version of the methodologies outlined in a recognized SEOW survey protocol (Saskatchewan Ministry of Environment 2015).

Results from the SEOW surveys are summarized in Table 20. Although surveys were conducted at times when SEOWs are typically most active, none were observed during these surveys nor was any evidence (e.g., auditory detection or pellets) of SEOW presence observed.

Table 20: Short-Eared Owl Survey Results

ID	Date	Point	Temp °C	Wind Speed (Beaufort Scale)	Conditions	Start Time	End Time	Notes
1	July 5	SEOW1	14	1	Sunny/clear	8:18	8:28	Not observed
2	July 5	SEOW2	14	1	Sunny/clear	8:28	8:38	Not observed
3	July 5	SEOW3	13	1	Sunny/clear	8:43	8:53	Not observed
4	July 5	SEOW4	13	1	Sunny/clear	8:57	9:07	Not observed
5	July 5	SEOW5	12	1	Sunny/clear	9:14	9:24	Not observed
6	July 6	SEOW6	13	0	Sunny/clear	8:47	8:57	Not observed



3.1.4 Other Wildlife and Species at Risk

Incidental baseline wildlife surveys occurred concurrently with avifauna, wetland and vegetation surveys in early July and August 2019. During the incidental wildlife surveys, all habitat types were traversed in the Study Area. Particular attention was paid to habitat types of those species listed in Table 21 below.

All direct observations of wildlife, including small mammals, fur bearers, black bear, moose and amphibians were recorded, if encountered. Additionally, all observations of wildlife sign and important wildlife features (e.g., dens, nests, burrows, trails, roost trees, drumming sites, auditory detections, scat, tracks, feeding damage to plants, and indicators of predation) were documented to provide additional information on the presence and distribution of species using the Study Area (Table 21). During 2019 field surveys, only red squirrel was observed directly, all other wildlife species listed in Table 21 were inferred from sign.

Table 21: Wildlife and/or Wildlife Sign Encountered Within the Study Area

Common Name	Scientific Name	S-Rank
Black bear	<i>Ursus americanus</i>	S4
Moose	<i>Alces alces</i>	SNA (Exotic)
Eastern coyote	<i>Canis latrans</i>	S5 (Exotic)
Red squirrel	<i>Tamiasciurus hudsonicus</i>	SNA (Exotic)
American beaver	<i>Castor canadensis</i>	S5
Snowshoe hare	<i>Lepus americanus</i>	SNA (Exotic)
American toad	<i>Bufo americanus</i>	S5
Little brown bat*	<i>Myotis lucifugus</i>	S1
Northern long-eared bat*	<i>Myotis septentrionalis</i>	S1

*only identified to *Myotis* spp.

Other mammals that may be found in the area but were not detected on surveys include Newfoundland marten (*Martes americana atrata*), American mink (*Neovison vison*), ermine (*Mustela erminea*), deer mouse (*Peromyscus maniculatus*), masked shrew (*Sorex cinereus*) and southern red-backed vole (*Myodes gapperi*) (Table 22).

Table 22: Non-Detected Wildlife Likely in the Study Area

Common Name	Scientific Name	S-Rank / NLESA*
Newfoundland marten	<i>Martes americana atrata</i>	Threatened
American mink	<i>Neovison vison</i>	SNA (Exotic)
Ermine	<i>Mustela erminea</i>	S5
Deermouse	<i>Peromyscus maniculatus</i>	SNA (Exotic)
Masked shrew	<i>Sorex cinereus</i>	SNA (Exotic)
Southern red backed vole	<i>Myodes gapperi</i>	SNA (Exotic)
Wood frog	<i>Lithobates sylvaticus</i>	S5 (Exotic)
Green frog	<i>Lithobates clamitans</i>	SNA (Exotic)
Mink frog	<i>Lithobates septentrionalis</i>	S5 (Exotic)

*Threatened under the NL Endangered Species Act (ESA)

Three of these species are SAR but none were observed in the Study Area (Table 23).

Table 23: Potential Wildlife SAR

Common Name	Scientific Name	COSEWIC	SARA	NL ESA
Newfoundland marten	<i>Martes americana atrata</i>	Threatened	Threatened	Threatened
Little brown bat*	<i>Myotis lucifugus</i>	-	Endangered	-
Northern long-eared bat*	<i>Myotis septentrionalis</i>	-	Endangered	-

**Myotis spp.* are listed under the federal SARA, but not under the NLESA

Finally, American toad (*Anaxyrus americanus*) was the only amphibian species detected during surveys. However, wood frog (*Lithobates sylvaticus*), green frog (*Lithobates clamitans*) and mink frogs (*Lithobates septentrionalis*) are known to occur on the island of Newfoundland and may be present within the Study Area.

3.1.5 Bat Surveys

Both the little brown bat (*Myotis lucifugus*) and the northern long-eared bat (*Myotis septentrionalis*) are federally protected SAR under SARA, and both can possibly occur within the Study Area. Both species were given an emergency listing of “Endangered” by SARA in 2014 because of rapid population declines in Canada due to a deadly wildlife disease known as White-nose Syndrome (WNS) (Environment and Climate Change Canada 2018).

Efforts were made to detect the presence of the little brown bat and/or the northern long-eared bat in the Study Area given the existence of a mine shaft/adit associated with mining operations

dating from the early 2000s. The portal was capped in 2005/2006 during rehabilitation and closure activities. However, the cap was removed by Maritime in 2018 to facilitate dewatering activities as part of planned exploration work. Although that exploration work did not take place, the adit cap was not replaced. Given the little brown bat and the northern long-eared bat overwinter in caves in NL, the unsealed portal to existing underground workings presented a potential overwintering site (Figure 34).

The adit gradually descends at a gradient of between 15% starting at a distance of 15 m inside the portal. The below grade portions of the adit are permanently flooded or frozen and are unlikely to be suitable for bat roosting or hibernating.

Echolocation surveys were carried out from August 7 until November 20, 2019 (106 days) at the portal of the former underground workings. An Anabat Swift bat detector, equipped with a shielded directional microphone to protect it from rain and wind exposure, was attached to the exterior of the portal gate (Figure 34). The microphone was positioned outward from August 7 to August 9, 2019 to determine the presence or absence of bats in the vicinity of the portal opening. Preliminary data collected over these nights was manually reviewed by a biologist experienced in identifying bat echolocation signatures and his analysis indicated that bats were present. Subsequently, the microphone was turned inward toward the adit for the duration of the monitoring program, from August 10 to November 20, 2019, to determine if bats were using the adit for roosting and more importantly, as overwintering habitat.

Figure 34: Bat Detector Installation at Existing Mine Portal



The entire dataset from August 7 to November 20 was reviewed but as there were no bat calls detected beyond August 22, 2019. That report only includes an analysis of data collected from August 7 to October 15. In total, there were 14,947 files recorded, but only 45 files were determined to be bat-generated ultrasound. In general, extraneous noise was high with 14,902 of 14,947 files determined to be noise and not generated by bats. In general, extraneous noise files correlated with rainy and/or windy nights as determined from a review of historical weather data from the Middle Arm weather station (Environment and Climate Change 2019). Precipitation and wind can interfere with sensitive electronic ultrasound detection equipment resulting in the creation of noisy files. The mine portal is situated in an upper slope position with a northwest aspect so is highly exposed to weather systems. This likely accounts for the high number of 'noisy' files.

The bat identification was completed manually by an experienced biologist. Echolocation calls recorded were associated with two *Myotis* species of bats (little brown bat (*Myotis lucifugus*), and northern long-eared bat (*Myotis septentrionalis*)) (Table 24). No attempt to identify the calls to species was made because of the difficulty in achieving defensible identification (Broders 2011). Despite this, it was concluded that echolocation calls with characteristics consistent with both northern long-eared bats and little brown bats were detected.

Table 24: Record of Echolocation Calls

Date	Time	MYOT
2019-08-07	23:00	4
2019-08-08	22:00	1
2019-08-08	23:00	1
2019-08-08	00:00	1
2019-08-09	01:00	4
2019-08-10	01:00	1
2019-08-11	00:00	2
2019-08-16	03:00	3
2019-08-17	22:00	4
2019-08-19	03:00	13
2019-08-22	20:00	2
Total		45

MYOT = *Myotis* spp.

Bat calls detected after the directional microphone was pointed inward toward the adit were less intense and more fragmented compared to calls detected when the microphone was pointed outward. This does not suggest that the calls originated from within the adit, but can likely be explained as exterior noise being reflected off interior shaft walls.

It would also be expected that a pulse of high activity (i.e., frequent calls over a short duration) would occur in late autumn if the adit were being used as overwintering habitat (a hibernaculum). This activity is known as swarming but analysis of the echolocation data provided no evidence that this occurred. This strongly indicates that the adit is not being used as a hibernaculum. The adit is permanently flooded at a distance of approximately 15 m from the entrance which also suggests that the temperature and humidity levels within the un-flooded portions of the adit are not suitable as an overwintering site.

In addition to the analysis of echolocation survey data, GEMTEC also conducted bat emergence surveys on August 8 and 29, 2019 at the portal exterior. This survey was conducted at dusk in order to observe the occurrence of any bat emergence behavior at potential roost locations. No bats were observed on either of these dates.

Maritime and GEMTEC personnel returned to the site on several occasions during the winter after the bat detector was removed to obtain pictures. Below are pictures from winter 2020 (Figures 35 and 36).

Figure 35: Portal Exterior, February 2020



Figure 36: Adit Interior, February 2020



The pictures suggest that the adit is permanently frozen for most of the winter at a distance of approximately 15 m from the entrance. This suggests there would be little or no suitable habitat within for overwintering bats.

Results of the bat survey indicate that *Myotis* spp. are using the area for foraging but are not using the mine adit for roosting or overwintering habitat. In addition, no visual identification was made of the *Myotis* spp. so the presence of one or both species cannot be definitively confirmed in the Study Area.

Maritime presented the results of the 2019 bat monitoring to the WD for their consideration in April 2020. Valuable feedback was provided and Maritime has committed to carrying out additional emergence surveys in September 2020 at the adit entrance to gather more data on potential bat activity in the area.

3.1.6 Fish and Fish Habitat Assessment

A desktop study and fieldwork were completed from August 12-14, 2019 at the Project site to better understand the various waterbodies present on, and surrounding, the Project site. The surface water features with connectivity to the Project site were investigated to determine if and how fish could migrate into and out of the surface water features, and to evaluate drainage patterns in the area. A water quality assessment and a fish presence or absence survey through electrofishing was also completed on various waterbodies. The report, Fish Habitat Assessment, Maritime Resources Corp.'s, Hammerdown Gold Mine Development Project, provides details relative to the methodologies followed and the results found (GEMTEC 2019c).

The 2019 desktop study mentioned above revealed that Muir Creek and Muir Brook are part of the larger Indian River watershed that is known to contain five fish species, including brook trout (*Salvelinus fontinalis*) Atlantic salmon (*Salmo salar*), rainbow smelt (*Osmerus mordax*), American eel (*Anguilla rostrata*) and a species of stickleback (*Gasterosteus spp.*) (Porter et al. 1974). Fieldwork completed in 2016 indicated that Muir Brook contains some rearing habitat with limited spawning potential (Stantec 2017c). Since Muir Brook was known to contain fish, it was not electrofished during either the 2016 or 2019 studies.

The *Canada 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”. All surface water features encountered on the Project site were characterised as either watercourses, waterbodies, drainage channels or wetlands (Figure 37).

An aquatic study carried out at the Project site in 2016 by Stantec concluded that it was unlikely fish were present in either Hammerdown or Muir Creek, as habitat assessments conducted in 2016 revealed complete obstructions to fish passage on both creeks (Stantec 2017c). A 2001 assessment also came to that conclusion (JWEL 2001). Electrofishing was carried out on Harry Brook in 2016 and two brook trout were captured (Stantec 2017c). Since no electrofishing was

carried out on the other watercourses in 2016, and as per recommendations from the federal department of Fisheries and Oceans (DFO), GEMTEC completed an electrofishing program in 2019 to provide evidence for the presence or absence of fish within all watercourses in the Project area, namely, Hammerdown Creek, Muir Creek and two other watercourses that were identified during the 2019 field program, 'Unnamed Channel' and 'Wetland Drainage'.

The 2019 field work investigated the identified watercourses, Hammerdown Creek, Muir Creek, Unnamed Channel and Wetland Drainage in order to:

- Document habitat features (bank stability, bank vegetation, bank erosion, vegetation cover, substrate embeddedness, flow velocity and water depth), as per the Stream Habitat Inventory Field Sheet (DNR/DFO);
- Collect water quality parameters/measurements (pH, dissolved oxygen, conductivity and temperature). Field water quality data were obtained using a calibrated YSI multi-meter at selected locations throughout the surface water features ;
- Document fish habitat types present within the surface water features identified;
- Make general observations of any other surface water features that may be affected by the proposed development and that may provide suitable fish habitat; and,
- Execute a live fish sampling program to capture fish in the Project area. This program was a presence/absence fish inventory and did not include the quantification of relative abundance of any observed or captured fish species.

Stream flow velocity was measured using a portable flow meter in Hammerdown Creek, Muir Creek, Unnamed Channel and Wetland Drainage, where depths were sufficient to enable a measurement. The velocity was measured three times at each obtainable location and then averaged.

To assess the water quality at the Project site, four parameters were evaluated: temperature (degrees Celsius (°C)), dissolved oxygen (milligrams per litre (mg/L)), conductivity (microSeimens per centimetre (µS/cm)), and pH (unitless). The rationale and classification system for each parameter is discussed below.

The CCME CWQG for the protection of Freshwater Aquatic Life (FAL) were used as indicators of freshwater quality. Conductivity is not included in the CCME FAL guidelines; therefore, ECCC's target for Canada's freshwater quality in a global context was used for comparison purposes. The three applicable targets are listed below:

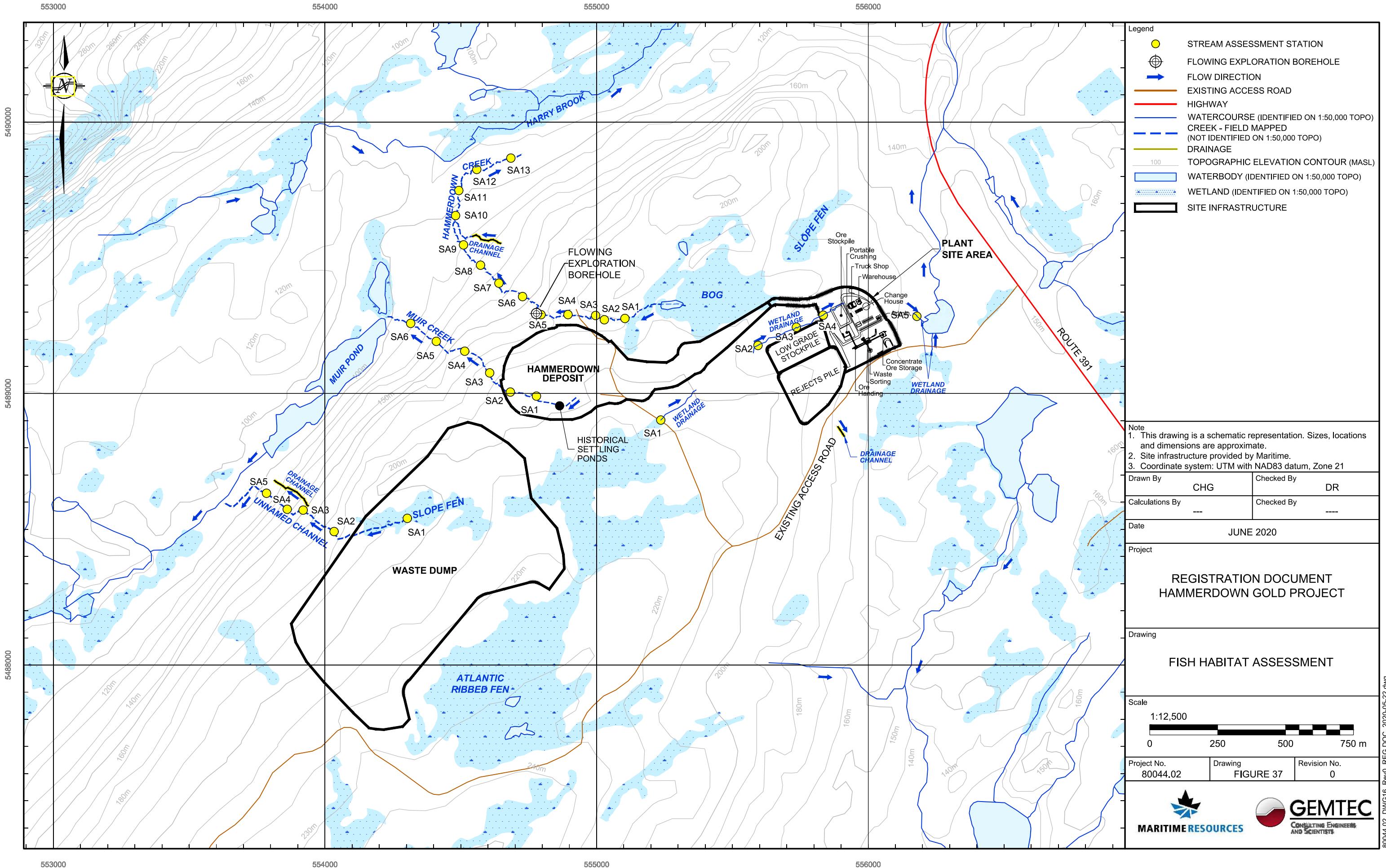
- Dissolved oxygen: > 6 mg/L (CCME, 2018);
- pH: 6.5 – 9 (CCME, 2018); and
- Conductivity: less than 500 µS/cm (ECCC, 2017).

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. Most 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 at the Project site, 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: $\geq 19^{\circ}\text{C}$ as unsuitable.

GEMTEC revisited the Project site in April 2020 to better understand late winter conditions at the site. Marginal flow was noted at Hammerdown and Muir Creeks.

In general three of these watercourses, Hammerdown Creek, Muir Creek and Unnamed Channel, show cobbles and boulders or bare bedrock substrate, which indicates they have substantial flows during spring freshet that winnows away all the fines. The “dry” sections that were encountered during the 2019 field studies represent periods of low flow that are down below the bouldery substrate. Although the channels appear dry in places, the water may just be inaccessible below boulders. These are high-gradient minor tributary streams to the Harry’s Brook drainage with highly variable streamflow. They may however completely dry up in late summer (August, early September), which would make them ephemeral.



3.1.6.1 Fish Habitat Assessment

Hammerdown Creek

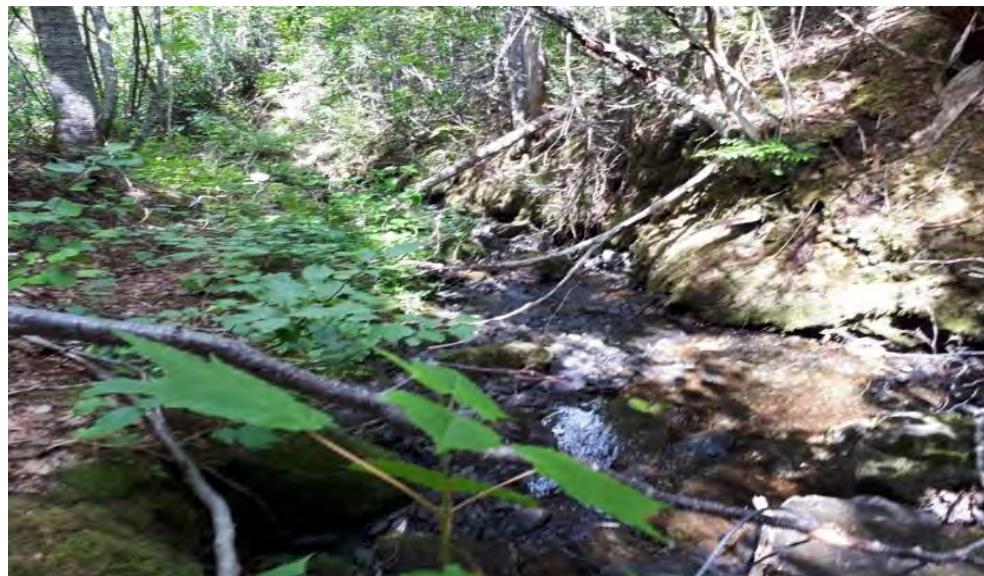
Hammerdown Creek is a drainage channel that originates from an on-site wetland, is approximately 1.2 km in length and generally flows northwest across the Site with two ponded areas located near the inlet.

A total of 13 stream assessments were conducted along the length of Hammerdown Creek (Figure 37). The banks of Hammerdown Creek were rated “fair” to “good” and the water temperatures were rated as “intermediate” to “cool” on the DFO classification scale. Water quality met the CCME FAL and ECCC guidelines at 10 of the 13 stream assessment locations. Water quality at stream assessment locations SA1 and SA3 exceeded the guideline for dissolved oxygen, with concentrations of 3.77 mg/L and 2.98 mg/L respectively, while location SA13 stream was dry.

Hammerdown Creek flows over steep terrain (Figure 38), with substantial elevation changes. Velocity was only measurable in four of the 13 stream assessment locations (SA6, SA7, SA8 and SA10) and ranged from 0.2 m/s to 0.4 m/s (Figure 37). The remaining nine locations were either dry (SA13) or had slowly-flowing water that prevented a velocity measurement. Hammerdown Creek outlets into a wetland and there is no evidence that Hammerdown Creek has any direct connectivity to Harry’s Brook.

The substrate is primarily rock, bouldery rubble and gravel. The average wetted width was 1.05 m and the average water depth along the wetted width was 78 mm (GEMTEC 2019c).

Figure 38: Stream Conditions, Hammerdown Creek (SA7)



Muir Creek

Muir Creek is a drainage channel that originates from an on-site ponded area (historical settling ponds; Figure 39), and is approximately 800 m in length (Figure 37). Generally, it flows northwest across the Site over steep terrain, with substantial elevation changes and natural barriers (Figure 40).

Figure 39: Historical Settling Ponds



Figure 40: Stream Conditions, Muir Creek (SA5)



This stream was assessed at a total of six locations along its length (Figure 37). Muir Creek discharges into a roadside ditch before discharging into Muir Pond (Figure 41).

Figure 41: Muir Creek Discharging into Roadside Ditch



The banks of Muir Creek were rated “fair” to “good” and the water temperatures were rated as “cool” on the DFO classification scale. Water quality met the CCME FAL and ECCC guidelines at two of the four stream assessment locations that contained water. Water quality at stream assessment locations SA1 and SA2 exceeded the guideline for dissolved oxygen, with concentrations of 5.48 mg/L and 3.37 mg/L respectively.

The remaining stream assessment locations were either dry (SA4 and SA6) or had slow-flowing water that prevented taking a velocity measurement. The average wetted width was 1.22 m and the average water depth was 37 mm. Additional information and data are presented in GEMTEC 2019c.

Unnamed Channel

The Unnamed Channel is a drainage channel that originates from an on-site wetland (Figure 37 and 42), is approximately 775 m in length and generally flows west across the Site over steep terrain with substantial elevation changes (Figure 43). Figure 43 illustrates the variable nature of this tributary during spring freshet, water will fill the full bedrock exposed channel and flow with such energy that only cobbles and boulders remain; all fines are washed down to the discharge points near/at Harry’s Brook.

The Unnamed Channel has many portions where water flows beneath overlying boulders and discharges into a small watercourse below stream assessment location SA5.

The Unnamed Channel was assessed in a total of five locations along its length (Figure 37) and water quality parameters were obtained at four of the five locations. The banks of the Unnamed

Channel were rated “fair” to “good” and the water temperatures were rated as “intermediate” to “cool” on the DFO classification scale. Water quality met CCME FAL and ECCC guidelines at four stream assessment locations where water quality parameters were obtained. Stream velocities were only measurable at two of the five stream assessment locations (SA2 and SA3) (Figure 37), throughout the Unnamed Channel and ranged from 0.4 m/s to 0.7 m/s. The remaining three stream assessment locations had slow-flowing water that prevented taking a velocity measurement (Figure 37).

The substrate is primarily bedrock, boulders and cobbles. The average wetted width was 1.19 m and the average water depth was 91 mm. Additional information and data is presented in GEMTEC 2019c.

Figure 42: Stream Conditions, Unnamed Channel (SA1)



Figure 43: Stream Conditions, Unnamed Channel (SA3)



Wetland Drainage

A discontinuous Wetland Drainage channel originating from an on-site wetland is present on the eastern portion of the Site and is approximately 1,100 m long (Figure 37). Portions of the channel are obstructed by overgrown vegetation, therefore, only portions of it could be mapped. Generally, it flows northeast across the Site before discharging into a small pond east of the plant site.

The drainage channel was assessed at a total of five locations along its length (Figure 37). The banks of the Wetland Drainage were rated “poor” to “good” and the water temperatures were rated as “intermediate” to “cool” on the DFO classification scale. Water quality met CCME FAL and ECCC guidelines at three of the four stream assessment locations. Water quality at stream assessment location SA5 exceeded the guideline for dissolved oxygen, with a concentration of 1.46 mg/L.

Flows were too slow to detect at the stream assessment locations (Figures 44, 45).

The substrate is primarily bedrock and rock rubble. The average wetted width was 0.51 m and the average water depth was 125 mm.

Figure 44: Channel Conditions, Wetland Drainage (SA1)



Figure 45: Channel Conditions, Wetland Drainage (SA4)



3.1.6.2 Live Fish Sampling Program

Hammerdown Creek

The upper portions of Hammerdown Creek were electrofished with the backpack electrofisher, including the edges of the two small shallow ponded areas at the beginning of Hammerdown Creek. No fish were captured or observed. Fish are not expected to be present in Hammerdown Creek due to the inlet and outlet being a wetland, the substantial elevation changes, and the highly variable seasonal streamflows in the creek.

Muir Creek

Both the upper and lower portions of Muir Creek were electrofished with the backpack electrofisher, including the edge of the ponded area (historic settling ponds) at the top of Muir Creek. Four settling ponds were established in this location by the previous mining operation. No fish were captured or observed. Fish are not expected to be present in Muir Creek due to substantial elevation changes, highly variable seasonal streamflows and natural barriers to fish passage.

Unnamed Channel

The lower portions of the Unnamed Channel were electrofished with the backpack electrofisher. No fish were captured or observed. Fish are not expected to be in the Unnamed Channel due to substantial elevation changes, highly variable seasonal streamflows and natural barriers to fish passage.

Wetland Drainage

The upper portion of the Wetland Drainage channel was electrofished with a backpack electrofisher. No fish were captured or observed in the upper portion of the channel. However, fish were observed in the lower portion of the channel that outlets into the pond (SA5, Figure 37). Fish are not expected to be in the upper portion of the Wetland Drainage channel due to the presence of natural barriers that prevent fish passage.

3.1.7 Hydrology, Surface Water and Sediment Quality Assessment

An initial field program was completed by Stantec in 2016 to assess the hydrology and surface water quality on and near the Project site (Stantec 2017b). As part of that program, a flow monitoring station was installed on Muir Brook (referred to as Muir Creek in Stantec 2017b) prior to discharging into Shoal Pond, and recorded a flow of approximately $1.12 \text{ m}^3/\text{s}$. This measurement, coupled with measured water levels, was used to predict stream flow rates at various times during the year.

The 2019 baseline program expanded on the 2016 work and characterized the existing hydrology along with stream sediment and surface water quality across the entire Hammerdown deposit area. That baseline work included streamflow analysis and sampling within all three surface water

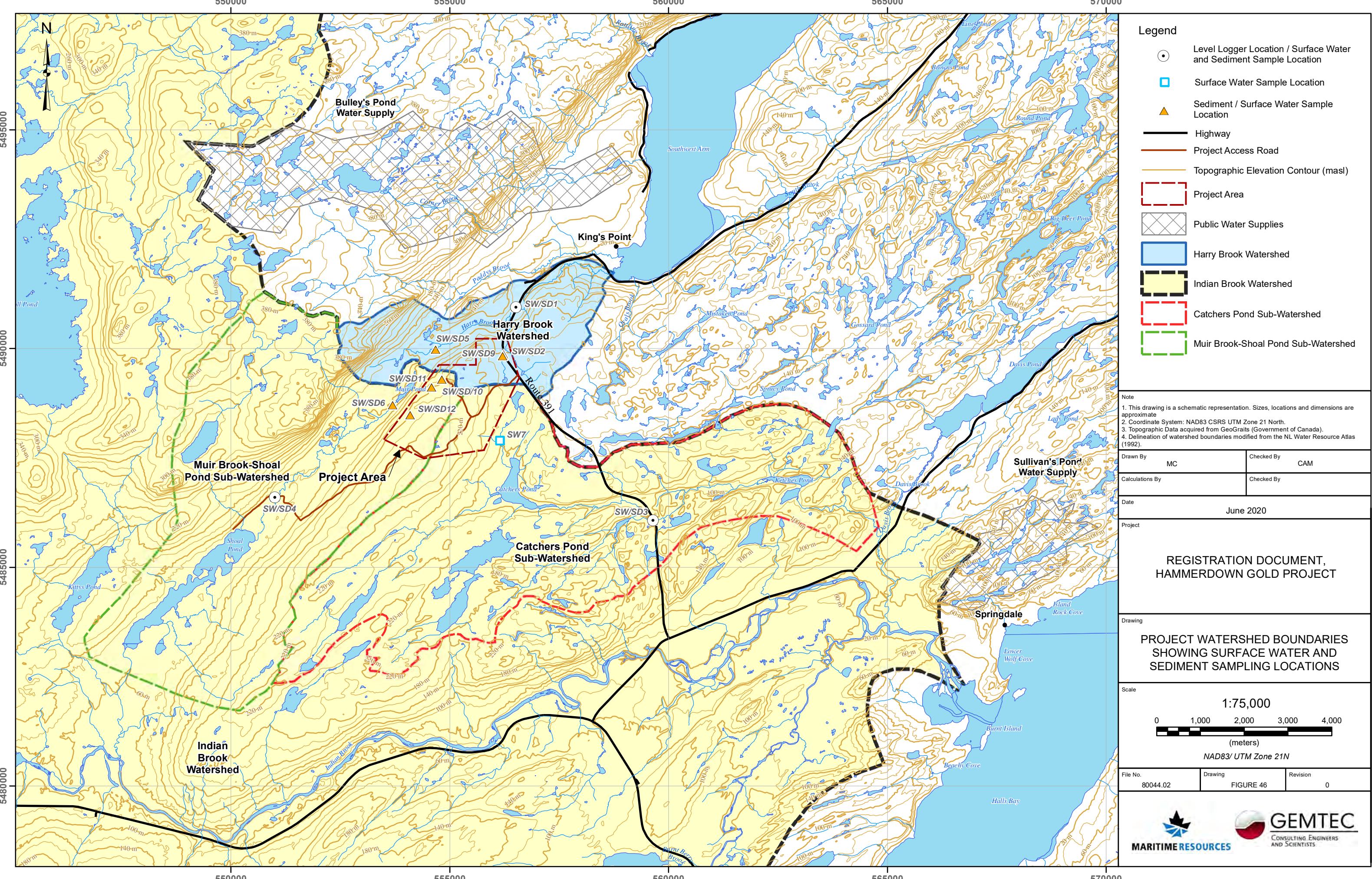
catchment areas (Figure 46) bounding the Project, including 1) Harry Brook watershed, 2) Catchers Pond sub-watershed, and 3) Muir Creek-Shoal Pond sub-watershed.

GEMTEC's 2019 baseline hydrology program was carried out between April 30 - November 24, 2019 and involved the collection of water samples, streamflow measurements and water level measurements at 11 locations along surface water features within and downstream of the Project Area (Figure 46) (GEMTEC 2019f).

GEMTEC returned to the Project site in April 2020 to observe winter streamflow conditions in streams around the Project site. There was very little flow observed in Hammerdown and Muir Creeks, and no flows were observed in the Unnamed Channel or Wetland Drainage Channel. Further, waterbodies were completely snow and ice covered. These results indicate that these three watercourses and the upper portion of the Wetland Drainage Channel are essentially ephemeral features, with seasonal flows primarily during spring freshet and summer and fall frost-free periods.

3.1.7.1 Surface Water Flow and Water Level Measurements

Figure 46 shows existing drainage features and associated streamflow measurement locations in the immediate vicinity of the proposed Project site.



Daily water level measurements were collected at three long-term (LT) monitoring stations, SW/SD1, SW/SD3, and SW/SD4, using dedicated, submersible Solinst® Leveloggers®, pressure transducers. At each LT monitoring station, the transducer was installed vertically within a 2 inch (50 mm) diameter, slotted Schedule 40 PVC pipe that was secured to the inside of a cinder block using cable ties, which was placed directly on the stream bed.

Water velocity measurements were collected using a Global Water Flow Probe® at the three LT monitoring locations, as well as four additional locations: SW/SD2 (SW/SD9), SW/SD5, SW/SD6 and SW7, located upstream from the LT monitoring locations to calculate stream flow rates. To calculate streamflow rates at each station, water velocities and water depths were measured across the channel. For each channel cross-section, the water velocity and water depth were measured at either 0.15 or 0.3 m intervals, then the stream flow rate through the cross-section was obtained by calculating the product of water velocity, water depth, and interval spacing. Streamflow measurements were recorded during four monitoring events: April 30 - May 1, July 5 - 6, August 7, and November 24, 2019. The field measurements and calculated streamflow rates are presented in GEMTEC 2019c.

The streamflow data collected at the four upstream stations SW/SD2, SW/SD5, SW/SD6, and SW7 were used to examine and verify the data quality collected from the respective LT monitoring stations SW/SD1, SW/SD4, and SW/SD3 located downstream of the same watercourse. With flow data and water level measurements collected on the same day, a rating curve was estimated for SD/SW1, SW/SD3, and SW/SD4, that was used to convert water level measurements to flow discharge time-series hydrographs as provided in Figures 47 to 49.

Figure 47: SW/SD1 Water Level Recording and Derived Flow Data

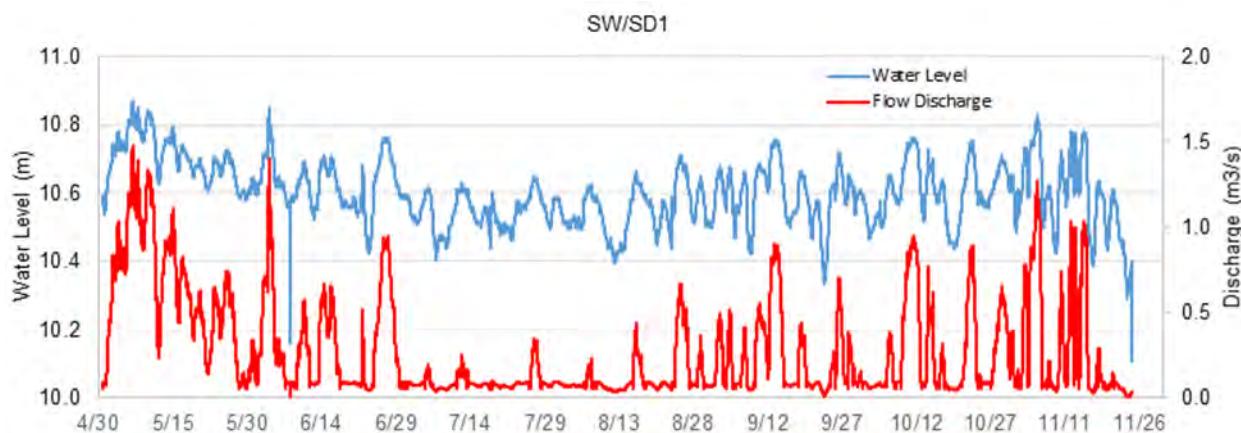


Figure 48: SW/SD3 Water Level Recording and Flow Data

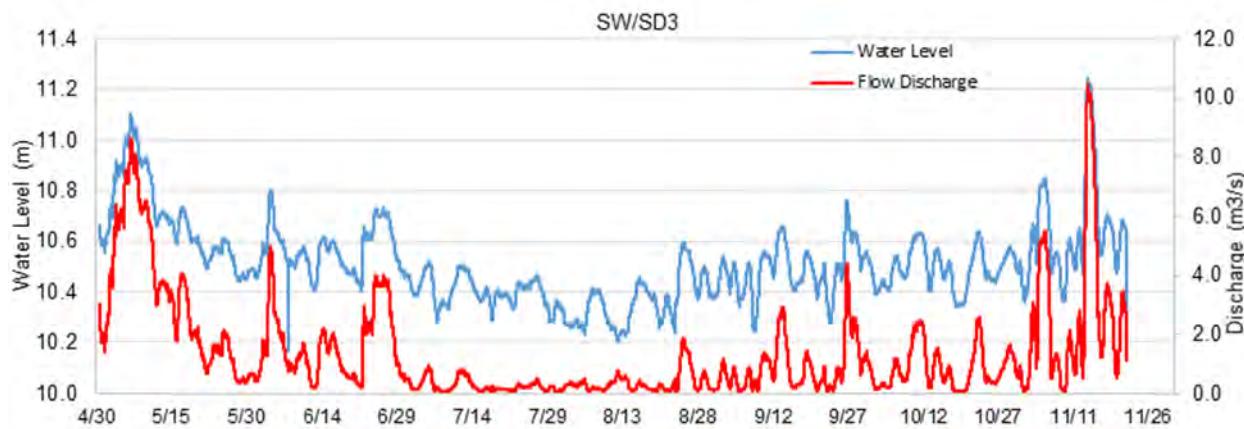
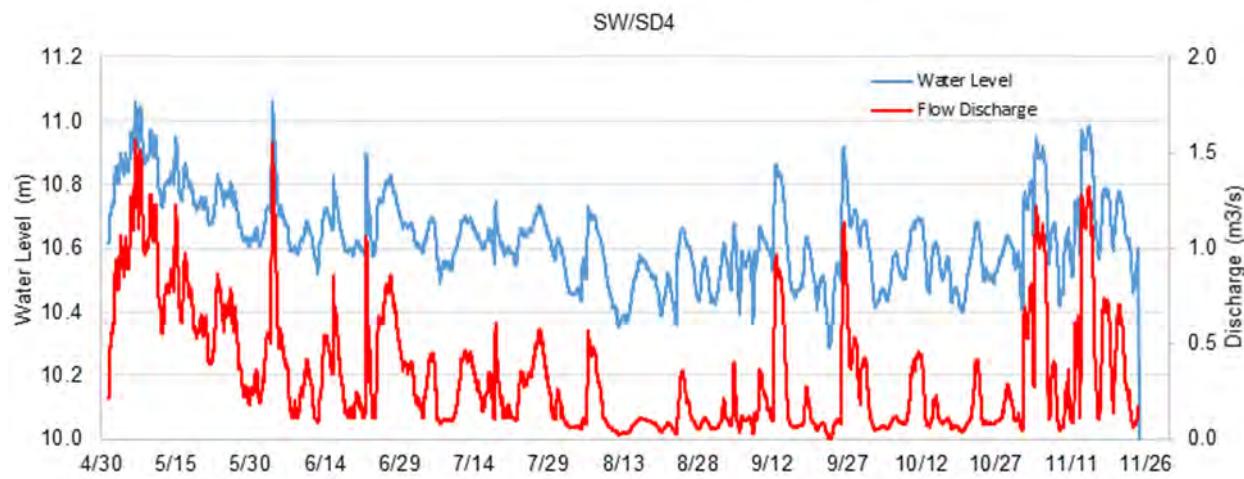


Figure 49: SW/SD4 Water Level Recording and Flow Data



Based on the flow data, runoff depths were obtained for the individual streams above the LT monitoring stations. Runoff is the portion of precipitation that flows into streams by surface drainage and through groundwater, and the run-off depth for each flow station is calculated by considering the stream's watershed area and using the following equation:

$$\text{Runoff Depth} = \frac{\text{Culmulative Flow}}{\text{Watershed Area}}$$

The runoff depths derived using flow data determined for the three LT monitoring stations are provided in Table 25, and are shown in Figure 50 along with that recorded for a number of regional hydrometric stations in the area.

Table 25: Runoff Depths (mm) at the LT Monitoring Stations

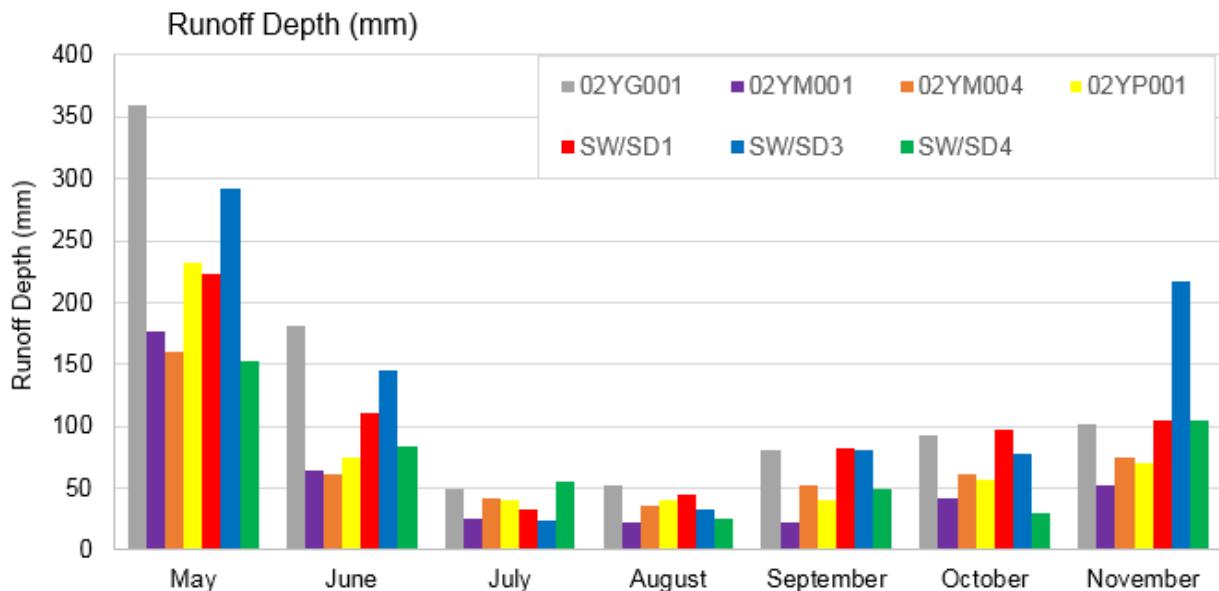
LT Monitoring Station	Runoff Depth (mm)						
	May	Jun	Jul	Aug	Sept	Oct	Nov
SW/SD1 (Harry Brook)	223.56	111.37	33.19	45.31	82.9	97.43	104.39
SW/SD3 (Catchers Pond)	292.53	145.66	23.93	32.43	81.01	77.82	216.75
SW/SD4 (Muir Brook)	153.20	84.09	55.81	24.61	48.69	30.14	104.53

Regional hydrometric data used to determine run-off depths was obtained from ECCC (wateroffice.ec.gc.ca) for the following hydrometric stations:

- Hydrometric Station 02YM001 – located closest to the Project (approximately 10 km to the east), and is situated in Springdale near the mouth of Indian Brook (receiving water from the Muir Brook-Shoal Pond and Catchers Pond drainage catchment areas).
- Hydrometric Station 02YM004 – located at Indian Brook Diversion above Birch Lake; approximately 33 km southwest of the Project site.
- Hydrometric Station 02YP001 – located at Shoal Arm Brook, near Badger Bay; approximately 37 km southeast of the Project site.
- Hydrometric Station 02YG001 – located at Main River at Paradise Pool; approximately 73 km northwest of the Project site.

Based on the position of the Project site in relation to the three surrounding watersheds, Maritime interprets that the majority of surface water runoff at the Project site would drain into the Muir Brook-Shoal Pond watershed (including station SW/SD4). Figure 50 shows that the runoff depth at SW/SD4 is roughly similar to the runoff depth of the regional hydrometric stations, with the exception of Station 02YG001, which is located a substantial distance from the Project site.

Figure 50: Comparison of Monthly Runoff Depths



Given the relatively short monitoring period, spanning only approximately seven months, the baseline hydrology data set was not sufficient to allow direct calculation of an average annual runoff depth coefficient for the Project site. As a nearby comparison, the average annual runoff estimate from Springdale Hydrometric Station 01YM001 is 626.9 mm and the average annual precipitation estimate from Springdale Climate Station 8403700 is 932.8 mm indicating that the average annual runoff coefficient in the Springdale area is approximately 67%. This runoff coefficient value is reasonable for an area with moderate to steep topography and generally shallow soils. By inference, a runoff coefficient of approximately 67% was considered to a reasonable estimate for the Project site.

3.1.7.2 Surface Water and Sediment Quality

A field program to assess selected surface water and sediment samples was carried out during spring, summer and fall 2019. Sampling locations corresponded to flow measurement locations along various watercourses (Figure 46) and Table 26 summarizes the sampling program over the 2019 season.

Table 26: Summary of Surface Water and Sediment Quality Sampling

Sampling event	Surface Water and Sediment Quality Samples Collected
April – May 2019 (Spring)	SW/SD1 to SW/SD6, and SW7
July – August 2019 (Summer)	SW1, SW3 to SW7, SW/SD9, SW10, SW/SD11, and SW12
November 2019 (Fall)	SW1, SW3 to SW7, SW9, SW/SD10 to SW/SD11, and SW12

In-situ field measurements for temperature, dissolved oxygen, conductivity and pH of surface water samples locations are presented in Table 27. Only two marginal exceedances of the CCME FAL guidelines (freshwater, long-term) were noted (slightly acidic pH at SW4 and SW7), shown in bold.

Table 27: Water Quality Field Parameter Measurements

Sample Location	Date	Temperature	Dissolved Oxygen	Conductivity	pH
		°C	mg/L	µS/cm	-
CCME Guideline ¹	-	>6 ²	-	-	6.5-9.0
SW1	30-Apr-19	3.11	16.93	45.0	6.57
	06-Jul-19	13.5	10.51	56.1	7.36
	24-Nov-19	1.0	13.97	33.2	7.62
SW2	30-Apr-19	2.61	23.12	22.0	6.55
SW9	06-Jul-19	15.8	8.94	35.9	7.10
	24-Nov-19	1.0	13.31	18.1	7.48
SW3	30-Apr-19	1.77	23.13	23.0	6.61
	05-Jul-19	18.2	12.42	26.4	7.12
	24-Nov-19	1.0	13.78	18.4	8.32
SW4	01-May-19	3.09	23.80	21.0	6.31
	05-Jul-19	10.0	14.32	24.5	7.03
	24-Nov-19	2.3	13.12	18.2	7.32
SW5	01-May-19	6.90	18.45	26.0	6.59
	07-Jul-19	22.30	9.56	34.0	6.98
SW6	01-May-19	5.12	28.27	26.0	6.50
	07-Jul-19	24.2	8.80	41.3	7.19
	25-Nov-19	2.1	12.26	25.4	7.41
SW7	01-May-19	3.23	23.01	22.0	6.45
	07-Jul-19	12.7	12.79	29.4	6.63
	24-Nov-19	1.8	13.26	18.8	7.24
SW10	27-Aug-19	14.4	9.25	-105.2	8.50
	25-Nov-19	2.2	13.73	38.1	7.71
SW11	29-Aug-19	12.3	10.21	49.8	8.03

Sample Location	Date	Temperature	Dissolved Oxygen	Conductivity	pH
		°C	mg/L	µS/cm	-
	CCME Guideline ¹	-	>6 ²	-	6.5-9.0
	25-Nov-19	0.5	14.14	13.1	7.45
SW12	29-Aug-19	13.7	19.21	38.8	7.23
	26-Nov-19	0.8	13.72	12.5	6.82

¹ Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (freshwater, long-term) (1999 and updates)

² Most conservative value for warm water biota (early life; other life stages require 5.5 mg/L).

°C = degrees Celsius

mg/L = milligrams per litre

µS/cm = microSiemens per centimeter

mV = millivolts

Analytical Results for Surface Water

Complete analytical results for inorganic and metals parameters in surface water samples are presented in the GEMTEC (2019f) report. Key results are presented below.

- The concentration of aluminum exceeded the calculated CCME guideline during at least one sampling event in all surface water locations except SW10 and SW11. Most of these were observed during the spring and/or fall sampling events; only SW6 exceeded the guideline during the summer sampling event.
- Iron exceeded the CCME guideline of 300 ug/L in SW7 (July), and SW12 (August and November), with a maximum concentration of 1130 ug/L in SW12 (August). Note that SW12 was not sampled in July.
- Mercury exceeded the CCME guideline of 0.026 ug/L in SW1 (July and November) and in SW12 (November), with a maximum concentration of 0.043 ug/L in SW1 (July).

Analytical Results for Sediment

Complete analytical results for available metals in stream sediment samples are presented in the GEMTEC (2019e) Report. Key results are presented below.

- Exceedances of the CCME guidelines for arsenic, cadmium, zinc and other elevated metals concentrations were noted for the SD2 sampling location for the April sampling event. In July, field personnel returned to the stream and collected a new sediment sample (SD9) slightly upstream of the SD2 sampling location to confirm that the elevated metals concentrations persisted along the stream. Metals concentrations in SD9 were generally lower than those observed in SD2, but concentrations still exceeded the guidelines for arsenic, cadmium, and zinc.
- The concentration of zinc also exceeded the CCME guideline at location SD12.

3.1.8 Hydrogeology

Based on the proposed Project plan, there groundwater will certainly be encountered during mining activities and there is a potential for changes in groundwater/surface water interactions in and around the mine site primarily due to open pit and underground dewatering activities.

Maritime undertook to characterize the hydrogeological baseline conditions, including groundwater quantity and quality, at the Project site prior to the start of Project activities. GEMTEC undertook an initial desktop review of existing hydrogeological data and information available for the Project site, followed by a baseline hydrogeology field program. The Hydrogeology Baseline Report (GEMTEC, 2019d) details the methods and findings of the baseline hydrogeology program, and characterizes baseline hydrogeological conditions in the Project site area, including estimates of hydraulic parameters for hydrostratigraphic units, groundwater flow directions, groundwater levels, hydraulic gradients and groundwater quality. Details of the baseline hydrogeology program are presented below.

3.1.8.1 Baseline Field Program

GEMTEC's baseline field program was completed over two visits in August and November 2019, and included the following:

- Diamond drilling of six vertical hydrogeological boreholes across the Project site including four shallow boreholes (MW1, MW2, MW3, and MW5) to depths ranging from 3.96 to 6.20 mbgs; and two deeper monitoring wells (MW4 and MW6) to approximately 30 m depth that were paired installations with MW5 and MW3, respectively. The locations of these are shown on Figure 51;
- Detailed borehole logging, including type and thickness of overburden, type of bedrock, bedrock characteristics (rock quality designation or RQD), and occurrence of groundwater in the boreholes;
- Installation and development of 51 mm-diameter PVC, screened monitoring wells within each of the six hydrogeological boreholes to allow measurement of groundwater levels (and determination of groundwater elevations), completion of hydraulic response testing (to determine local hydraulic conductivity, K, around the wells), and the assessment of horizontal and vertical hydraulic gradients within the bedrock and overburden encountered at the Project site;
- Hydraulic conductivity testing comprising rising/falling head (slug) testing in each of the six monitoring wells, as well as packer testing in the two deeper wells;
- Static water level measurements in the six new hydrogeological monitoring wells, as well as within 38 existing, cased exploration boreholes. Suites of static water level monitoring were carried out in the six new monitoring wells during both the August and November, 2019 site visits;
- Installation of water level data loggers in each of the six new hydrogeological monitoring wells for ongoing long-term groundwater level monitoring; and,

- Collection of groundwater quality samples in each of the six new hydrogeological monitoring wells during both the August and November 2019 site visits. In addition, a groundwater sample was collected from a flowing historical exploration borehole MS-39 (GEMTEC sample ID “AW1”) located down-gradient of the proposed pit area, with discharging groundwater observed directly flowing down slope into Harry’s Brook (Figure 51).

3.1.8.2 Baseline Hydrogeologic Conceptual Model

Based on the results of the desktop and field program studies, a Hydrogeologic Conceptual Model was developed for the Project site. Key elements are summarized below.

Hydrostratigraphy

Hydrostratigraphy for the Project site was interpreted from borehole data collected as part of the GEMTEC (2019d) program, as well as GEMTEC’s geotechnical investigation (2019f), and existing geotechnical data and historical exploration borehole logs for the Project provided by Maritime.

The hydrostratigraphic units identified at the Project site are as follows:

- Overburden material – primarily till comprising very loose to compact, silty sand with occasional gravel, cobbles, and clay that occurs both as thin discontinuous veneer as well as more extensive plain deposits; with average thickness of approximately 2.4 m; and,
- Bedrock – consisting of grey, fresh to moderately weathered, and weakly to strongly foliated mixed mafic and felsic volcanic rocks, with some fracturing near surface, but generally becoming less fractured and more competent with depth, as evidenced by geotechnical logging and measured RQD values.

These hydrostratigraphic units constitute an unconfined aquifer in overburden at the Project site, and semi-confined groundwater flow conditions identified at depth within bedrock. The hydraulic conductivity and movement of groundwater through the overburden is controlled by primary porosity, while groundwater flow within the underlying bedrock mainly occurs within secondary porosity, such as fractures, joints, and faults, and varies depending on the frequency and interconnection of these discontinuities.

Hydraulic Conductivity

Analyses of packer test, slug test, and purge recovery data collected in the Project site monitoring wells indicated low hydraulic conductivity values ranging from 8.0E-8 m/s to 7.8E-6 m/s, with a geometric mean of 1.0E-6 m/s in the overburden and shallow bedrock hydrostratigraphic units, and hydraulic conductivity values ranging from 8.7E-11 m/s to 2.5E-7 m/s with a geometric mean of 6.3E-9 m/s in the deeper bedrock (to 30 m depth). The hydraulic conductivity values (Table 28) determined for the hydrostratigraphic units at the Project site are within the typical range of

values in the literature for similar unconsolidated deposit and fractured/unfractured bedrock types (Domenico and Schwartz, 1990). The baseline hydrogeology field investigation was limited to the evaluation of bedrock to a depth of 30 m. However, geotechnical logging information provided by Maritime for drill holes completed in the vicinity of the proposed Hammerdown open pit and underground development indicates that the rock mass remains generally competent with low fracture density and high RQD values (mean values ranging from 94% to 95%) down to the final completion depth of the proposed open pit and underground development (approximately 250 m depth). As such, the deep bedrock at the Project site is expected to have a low bulk hydraulic conductivity similar to that determined for the upper section of bedrock at approximately 30 m depth.

Table 28: Summary of Hydraulic Conductivity Results

Hydrostratigraphic Unit	Hydraulic Conductivity (m/s)	
	Range	Geometric Mean
Overburden and Shallow Bedrock (to approximately 6.4 mbgs)	8.0E-8 – 7.8E-6	1.0E-6
Deeper Bedrock (at approximately 30 m)	8.7E-11 – 2.5E-7	6.3E-9
Overall for all hydrostratigraphic units		1.9E-7

Note: mbgs – meters below ground surface.

Groundwater Levels

Groundwater levels were monitored in the six monitoring wells from August 25 to November 23, 2019 and are summarized in Table 28. Note that this monitoring was restricted to a late summer and fall period. This monitoring period likely represents low groundwater conditions at the site, and it is likely that groundwater levels may rise higher than the highest observed levels presented in Table 29 during or immediately after spring freshet.

Table 29: Summary of Groundwater Level Monitoring (Aug 25 – Nov 23, 2019)

Well ID	Lowest Observed Groundwater Elevation			Highest Observed Groundwater Elevation			Mean Groundwater Elevation		Observed Groundwater Elevation Variability (m)
	Depth (mbgs)	Elevation (masl)	Date	Depth (mbgs)	Elevation (masl)	Date	Depth (mbgs)	Elevation (masl)	
MW1	0.52	194.27	Sep 2, 2019	0.20	194.59	Nov 13, 2019	0.35	194.43	0.32
MW2	0.24	206.41	Sep 2, 2019	-0.02	206.67	Nov 14, 2019	0.11	206.54	0.25
MW3	1.34	202.30	Sep 3, 2019	0.71	202.93	Nov 13, 2019	1.06	202.58	0.63
MW4	1.16	212.58	Sep 3, 2019	0.33	213.41	Nov 16, 2019	0.95	212.79	0.83
MW5	0.32	213.52	Sep 3, 2019	0.09	213.75	Nov 12, 2019	0.17	213.66	0.23
MW6	3.104	200.051	Sep 3, 2019	2.427	200.728	Nov 14, 2019	2.755	200.400	0.677

The well with the highest observed mean groundwater elevation during the monitoring period was MW5 (213.67 masl), while the lowest was observed at MW1 (194.43 masl). Over the monitoring period, the variation of shallow groundwater depths for wells MW1, MW2, MW3, and MW5 ranged from -0.019 mbgs (very slightly artesian; at MW2) to 1.339 mbgs (MW3). In the two deeper wells (MW4 and MW6), that variation ranged from 0.329 mbgs (MW4) to 3.104 mbgs (MW6).

In general, over this three month monitoring period, groundwater elevations tended to rise only moderately in all six monitoring wells, with an average increase of only approximately 0.5 m. Observed day-to-day variability in groundwater elevations showed a rise in response to rainfall events and supports the concept that the overburden and shallow bedrock aquifer is unconfined and directly responsive to infiltration from precipitation.

Groundwater Flow Direction, Gradients, and Linear Velocities

Groundwater (piezometric) contours were derived from baseline groundwater level and calculated elevation data collected in August 2019 from the six monitoring wells and a total of 38 historical exploration boreholes distributed across the site (Figure 51). The Project site is interpreted to be situated along a groundwater divide and an area of groundwater recharge that corresponds to the surface water divide between the Catcher's Pond and Muir Brook – Shoal Pond sub watersheds and Harry Brook watershed along the crest of the topographic ridge (shown as a dark blue dashed line on Figure 51). Groundwater flow is predominantly directed to the west-northwest in the vicinity of the proposed open pit and Waste Rock Dump areas, and to the north-northeast where the topographic ridge slopes northward toward Harry Brook, including in the Sorting Plant area.

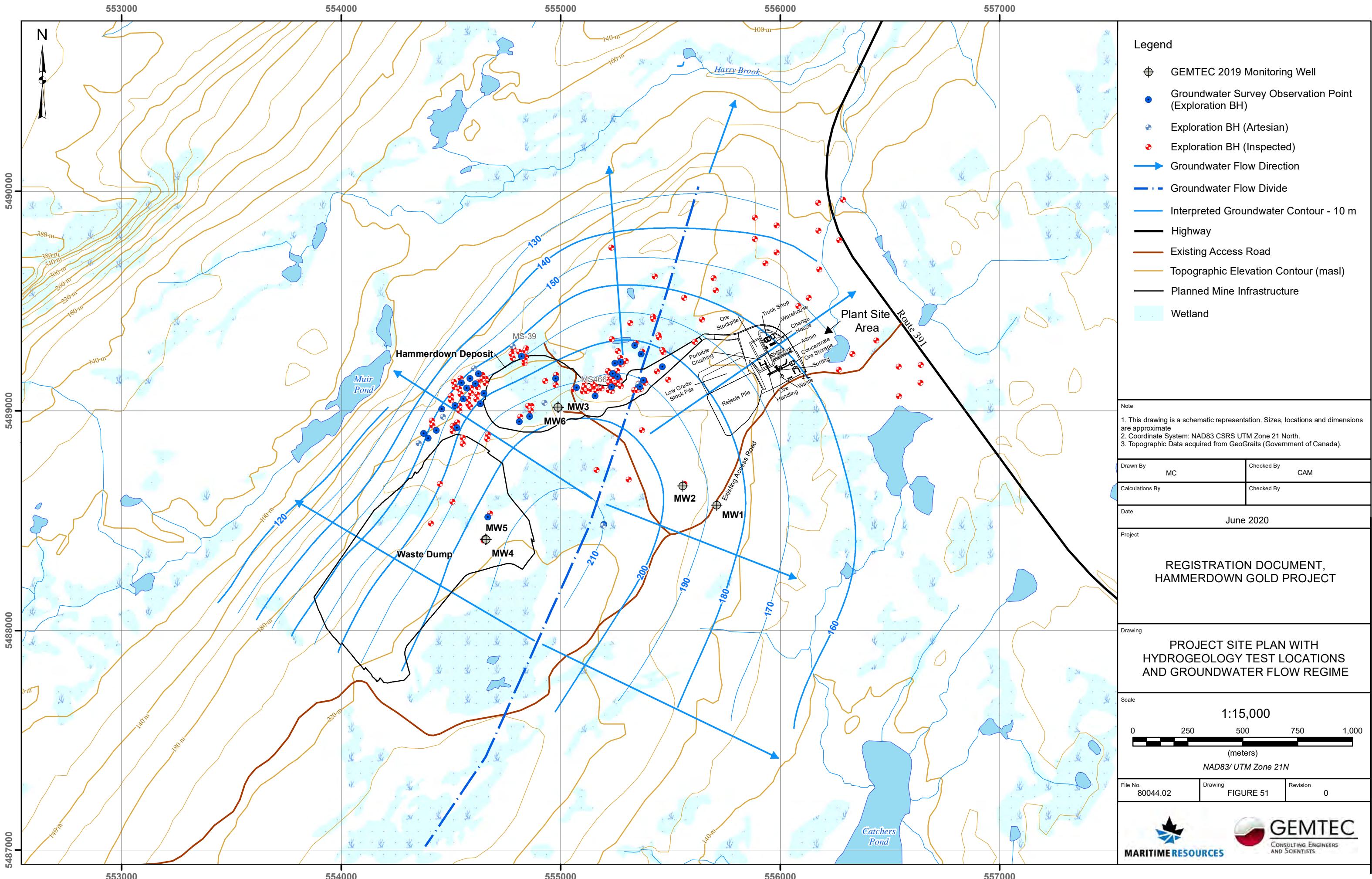
Adjacent to the Sorting Plant area, in the vicinity of the low grade and rejects stockpiles, groundwater flow is inferred to flow southeastwards towards the Catchers Pond drainage system.

GEMTEC expects that the bordering drainage features will be areas of discharge for groundwater flowing from the Project site. An estimate of horizontal hydraulic gradients for groundwater was calculated by dividing the total difference in hydraulic head between two known points (e.g., the change in head between two monitoring wells) by the horizontal distance between those wells. Typical inferred horizontal hydraulic gradients are approximately 9% towards the Harry Brook watershed and 6% towards the Catchers Pond sub-watershed. The gradient towards the Muir Brook sub-watershed is estimated to be steeper, with a maximum gradient of approximately 14%. Refer to Figure 46 for watershed boundaries.

Further, using the horizontal hydraulic gradient estimates, and assuming an overall geometric mean bulk hydraulic conductivity value of 1.90E-7 m/s for the full baseline dataset, and an estimated bulk porosity of 10%, the average linear groundwater flow velocity towards the surrounding watersheds is inferred to be:

- Harry Brook sub-watershed – 1.4E-7 m/s (or 4.5 m/yr);
- Muir Brook-Shoal Pond sub-watershed – 5.7E-7 m/s (or 18 m/yr); and
- Catchers Pond sub-watershed – 1.1E-7 m/s (or 3.5 m/yr).

The vertical component of hydraulic gradient was evaluated at the two locations where a paired well system was installed. MW3/MW6 is located along the southern limit of the proposed open pit in the northern portion of the Project site, and MW4/MW5 is located in the proposed waste rock dump area in the southwest-central portion of the Project site. Vertical hydraulic gradient was calculated by dividing the change in hydraulic head between the paired monitoring wells by the vertical distance between the midpoints of each well's screened interval. The vertical component of groundwater flow was found to be downward at both measured locations, with downward vertical hydraulic gradients of 9% at MW3/MW6 and 1% at MW4/MW5. It should be noted that while artesian conditions (reflecting upward vertical gradients) were observed in a number of exploration boreholes at the Project site (inferred as a recharge area with overall downward flow), these upward flow conditions are thought to be localized and geologically-controlled (possibly by a structural feature at depth), and not to reflect the overall groundwater flow regime of the Project site.

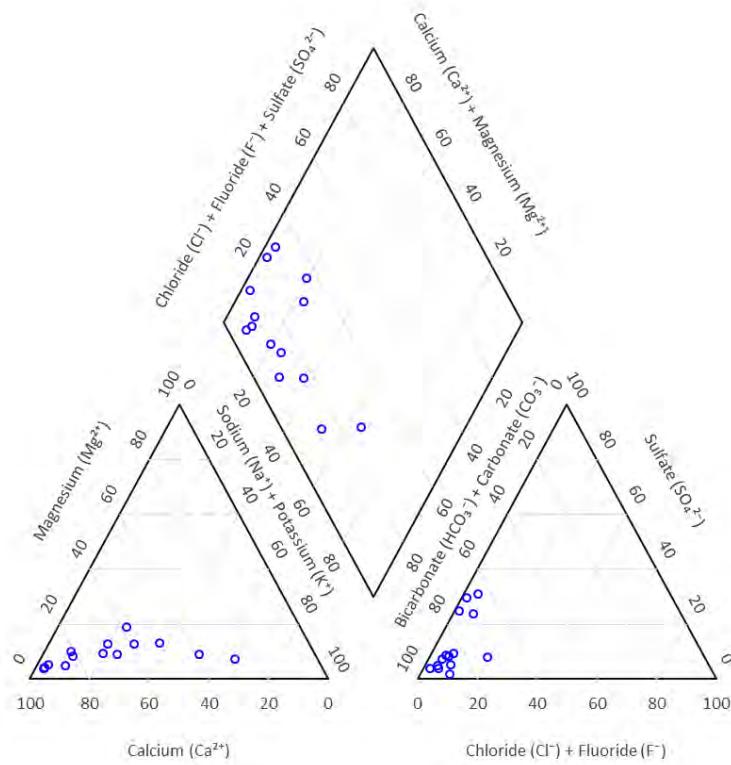


Groundwater Quality

Groundwater samples were collected from the six monitoring wells during both the August 2019 and November 2019 baseline site visits. In addition, a water sample was also collected from a flowing historical exploration borehole (MS-39) during the April 2019 sampling event.

The primary ionic composition of the Project site's groundwater is shown on the Piper trilinear diagram provided in Figure 52. Groundwater in the six monitoring wells and at MS-39 is classified as being predominantly a calcium bicarbonate-type water. Hardness was less than 50 mg/L as CaCO_3 (very soft) in MW1 and MW2, moderately hard in the paired wells MW4 and MW5 (69 to 105 mg/L as CaCO_3), and hard in the paired wells MW3 and MW6, and MS-39 (199 to 271 mg/L as CaCO_3). The water type, and relatively low total dissolved solids and electrical conductivity levels indicate that the groundwater is principally meteoric water that has infiltrated and flowed in shallow, short flow paths to the wells. This is consistent with the setting of the site on a topographic ridge. The pH indicates groundwater that is generally slightly basic (7.15 to 8.30; with the exception of MW1 and MW2, which are near-neutral pH (6.47 to 7.65).

Figure 52: Piper Trilinear Diagram showing August and November 2019 Baseline Data



Analytical results were compared to the CWQG, Protection of Aquatic Life (FAL) (CCME, 1999) and the Guidelines for Canadian Drinking Water Quality (GCDWQ) for the protection of human health (Health Canada, 2019) to further characterize groundwater quality at the Project site. Several exceedances of the CCME FAL guidelines and GCDWQ were noted in at least one or

more samples during at least one of the sampling events for the following parameters: pH, dissolved oxygen, turbidity, true color, fluoride, ammonia, and metals (aluminum, arsenic, cadmium, copper, iron (five sites), lead, manganese, and silver. Water from well MW2 was noted to have the most exceedances and generally higher dissolved metals concentrations than the other wells. The three wells screened entirely in bedrock (MW3, MW4, and MW6) had the fewest exceedances overall, and were the only wells with fluoride exceedances.

Groundwater Users

Within the immediate vicinity of the Project, there are no known permanent dwellings that rely on groundwater as a drinking water source. There are several remote cabins located to the west and northwest of the Project site in proximity to Muir Pond. Communication with cabin owners by Maritime indicates that these properties do not have groundwater wells, but rather rely on surface water, or bottled water for potable use. The closest public potable water supply is the King's Point Bulley's Pond surface water supply, which is located approximately 4 km north of the Project site. The Springdale Sullivan's Pond surface water supply is located approximately 15 km to the east (Figure 46). Given the substantial distances and the number of intervening topographic and hydraulic drainage divides that separate the Bully's Pond and Sullivan's Pond catchment areas from the Project site, GEMTEC does not consider that the Project site is hydraulically connected to these public water supply areas.

3.1.9 Acid Rock Drainage Assessment

ARDML can occur when sulfide-bearing minerals are exposed to air and water. Acidic or low pH water can readily leach metals that are contained in the material, whether ore, waste rock, soil and/or overburden. ARDML will not occur, however, if the host geologic materials contain enough carbonate minerals to neutralize the acid as it is generated (buffering capacity). Therefore, both acid-generating and acid-neutralizing components of mining material must be considered in determining ARDML potential.

Maritime's consultant (SRK Consulting Limited (UK) reviewed available ARDML data from the Project site and reviewed the geology of the area. SRK then initiated a two-phase geochemical characterization assessment to evaluate the ARD and ML potential of waste rock, ore, ore sorting rejects, tailings and soil associated with the Project. The geochemical characterization assessment commenced in 2019 and is still ongoing and comprises both static and kinetic testing of historic drill core of waste rock and ore samples from the Hammerdown deposit, as well as testing of other materials expected to be handled and managed as part of Project construction, i.e., soil. In addition samples of materials representing the ore rejects and tailings obtained as part of laboratory-scale metallurgical test work were also submitted as part of the ARDML geochemical characterization program. The geochemical testing is being undertaken at RPC laboratories in Fredericton, New Brunswick.

Maritime endeavored to obtain and provide a range of samples for testing such that all lithological, alterations and waste management units likely to be involved with the Project's mining operations are captured. A summary of ARDML sampling completed for the Project is provided in Table 30, and includes the results of the initial sampling program completed in 2019 and a summary of a second phase of sampling, planned to end in November 2020, and with the anticipated date for results. The ARDML assessment methodology accounts for both vertical and horizontal material distribution in order to provide a proper characterization of materials.

Table 30: Summary of Completed and Ongoing ARDML Tests

Material	ARD Testing			ML Testing			ARD Potential	Predicted ARD Reactivity Rate	ML Potential	Predicted ML Reactivity Rate
	Type	Sample #	Date Due	Type	Sample #	Date Due				
Waste Rock	static	95	2019	static	95	2019	Very low	Negligible	Very low	Negligible
	kinetic	9	Nov 2020	kinetic	9	Nov 2020				
Ore	static	6	2019	static	6	2019	High	Low	High	Low
	kinetic	3	Nov 2020	kinetic	3	Nov 2020				
Ore Sorting Rejects	static	6	July 2020	static	6	July 2020	not assigned yet*	not assigned yet*	not assigned yet*	not assigned yet*
	kinetic	2	Nov 2020	kinetic	2	Nov 2020				
Soil	static	6	July 2020	static	6	July 2020	not assigned yet*	not assigned yet*	not assigned yet*	not assigned yet*
	kinetic	2	Nov 2020	kinetic	2	Nov 2020				
Tailings	static	5	July 2020	static	5	July 2020	not assigned yet*	not assigned yet*	not assigned yet*	not assigned yet*
	kinetic	2	Nov 2020	kinetic	2	Nov 2020				

*Will be assigned at the conclusion of all testing (SRK 2020).

3.1.9.1 Waste Rock Testing Results

Complete acid-base accounting (ABA) static tests and metal leaching study results are available in SRK's 2019 baseline report (SRK 2019). A summary of these results is provided below by an ARDML-qualified professional (QP) with SRK, in accordance with the MEND (2009) guidelines. The QP's findings with respect to ARDML potential of the various rock types, and mine processed and waste materials (i.e., ROM ore and ore rejects, tailings, waste rock, and soil stockpiles) will inform the requirements for ARDML management as part of mine design, operations and closure, and if required, the management strategy to prevent, control and mitigate potential ARDML issues will be incorporated into Maritime's Development Plan and the RCP.

The results of the preliminary geochemical characterization program can be summarized as follows:

- Sulfide sulfur ranged from 0.003% to a maximum of 7.78%, with an average of 0.61%.
- Sediment and felsic samples generally have the higher sulfur content. The maximum sulfur content is recorded in sample SRK-18425 which has a pyrite content of 10-15%.
- The total inorganic carbon (TIC) content, present as soluble carbonate minerals, ranges from 0.27% to 2.21% with an average of 0.86% for all samples.
- The majority of samples contained higher neutralizing potential (NP) when compared to carbonate content. This reflects the presence of silicate minerals (which are acid-buffering) that contribute to the NP measurement but may not contribute to effective neutralization potential.
- Two sediment samples (SRK-18416 and SRK-18425) were classified as potentially acid-generating (PAG) and two samples (SRK-18419 - Mafic Sediment and SRK-18433 - Felsic) have uncertain acid-generating potential. The remaining samples were considered to be non-potentially acid-generating (Non-PAG). The results of the non acid-generating (NAG) test work are consistent with the ABA results and in addition reflect low level of reactivity for all samples, even those that are predicted to be potentially acid-generating.
- Total bulk concentrations parameters of silver (Ag), arsenic (As), beryllium (Be), bismuth (Bi), cadmium (Cd), copper (Cu), Lead (Pb), antimony (Sb), tellurium (Te) and zinc (Zn) were enriched relative to average crustal abundance in more than one sample.
- In the static leach tests, the pH of leachates generated during the deionized water leach tests were uniformly neutral to moderately alkaline ranging from pH 8.1 to 9.1.
- Based on the screening assessment on leachates generated from the short-term deionized water leach, the following parameters are constituents of concern: fluoride (F), aluminium (Al), iron (Fe), lead (Pb), manganese (Mn) and antimony (Sb).

Although the work completed to date is preliminary, indications are that there is a limited potential for acid generation or metal leaching. The majority of waste rock tested was essentially inert with negligible potential for acid generation or metal leaching (SRK 2019). As such, it is not expected that the waste rock storage area will require a liner; however this will be verified based on the findings of the kinetic testing currently in progress for the waste rock material. Maritime is hopeful that final kinetic test results will be available by November 2020 for the waste rock. This information will be used in later prediction calculations to assess waste rock drainage and pit wall/underground mine seepage quality and to develop mitigation solutions, including the design of an appropriate containment and drainage collection system for the Project's waste rock dump.

3.1.9.2 Ore

At the time of writing, ore material is being tested for ARDML characteristics. Static tests indicate that some of the ore samples, with sulfide greater than 1.6%, have potential to generate net acidic

conditions with some leaching of metals and metalloids. Since the ore material will only undergo pre-concentration processing (crushing and sorting) using water only and no chemical processes or chemicals and will be transported off site to the Nugget Pond mill for final processing and tailings storage, it is not considered as a long -term environmental risk.

Ore will be stockpiled for a limited period (days to weeks) and initial results from kinetic testing indicate that the material does not react quickly, thereby inferring environmental effects are unlikely to occur due to temporally stockpiled ore. However as an operational water management measure, all ore material will be placed on containment and drainage will be controlled. Furthermore, drainage recovered will be used as much as possible for pre-concentration (crushing and sorting) operations to limit the quantity of wastewater requiring discharge.

Additional work is ongoing using kinetic testing on the mineralized halo around the gold veins as this may contain potentially acid-generating material. Testing will be completed on recently drilled core and Maritime will arrange that rock types sampled will cover all lithologies that are likely to be involved with mining at the Project site.

Long-term kinetic testing is underway on the ore (Figure 53) in order to gain a better understanding of the longer-term reaction rates and to determine the potential for longer-term acid generation and/or metal leaching from ore. In addition, kinetic testing is also underway on the mineralized alteration halo around the gold veins as this may contain potentially acid-generating material. This is important to know, since alteration halo material may report to the ore and rejects stockpiles or to the waste rock dump as part of operations.

Figure 53: Sample submitted for ARD Testing (SRK 2019)



A humidity cell test (Figure 54) is a commonly used laboratory weathering procedure to estimate the long-term acid generation behaviour of sulfide bearing materials (ASTM D5744 2007, Technical Committee CEN/TR 16363 2012) (SRK 2020).

Figure 54: ARD – Humidity Cell at RPC Laboratory



In combination with geochemical modelling, humidity cell test results can be used to make conclusions about the drainage chemistry in a mining scenario (SRK 2020). Kinetic testing is carried out over a minimum of 20 weeks and the current program is planned to operate for 40 weeks with interim reports produced at weeks 10 and 20. Maritime is hopeful that final kinetic test results will be available by November 2020 for ore. This information will be used in later prediction calculations to assess ore stockpile drainage and pit wall/underground mine seepage quality and to develop mitigation solutions, including the design of an appropriate containment and drainage collection system for the Project's temporary ore stockpile area, if required.

3.1.9.3 Ore Sorting Rejects

Material representative of the ore sorting rejects from the sorting process are undergoing testing at RPC Laboratories. Given that the sulfides will be removed as part of the ore sorting process. Maritime anticipates the ore sorting rejects material will be inert. Kinetic testing will be initiated

after the static testing and are likely to be complete by February 2021. This information will be used in later prediction calculations to assess ore sorting waste drainage quality and to develop mitigation solutions, including the design of an appropriate containment and drainage collection system for the Project's temporary ore sorting rejects stockpile, if required.

3.1.9.4 Soil Testing

Material representative of mineral soils present in areas where ground disturbance will take place during mining activities (e.g., overburden from waste dump area) is underway. All samples are being analyzed at RPC Laboratories and results will be available for inclusion in Maritime's RCP.

The results of the soil testing will be used in later prediction calculations to assess temporary overburden stockpile drainage quality and to develop mitigation solutions, including the design of an appropriate containment and drainage collection system for the Project's overburden stockpile area, if required.

3.1.9.5 Short-Term Ore Storage and Tailings Management at Nugget Pond Mill

Although the ore material shows acid generating and metal leaching characteristics, Maritime does not anticipate any issues relative to the short-term storage of ore at the mill site prior to processing due to the observed mineral stability. Nevertheless, the ore storage area will have controlled collection and containment of drainage. All stockpiled ore will be processed.

Material representative of tailings from processed Hammerdown ore are being tested at RPC Laboratories as well. Tailings with sulfides will have potential for ARDML but will also have the addition of lime which will buffer any acid generated. Tailings are likely to be geochemically similar to ore and be a slow generator of ARDML. Tailings will be placed in permanent, sub-aqueous containment and managed in Rambler's TMF. Results from RPC will be provided to Rambler to assist with their tailings management.

3.1.9.6 ARD and ML Over the Life of Project

During the construction phase, certain site preparation activities will result in the subaerial exposure of substantial quantities of waste rock, overburden and ore. Project operations will also include exposing, transporting and crushing large volumes of material.

The main mitigation for minimizing ARDML during construction and operations is to manage any water in contact with materials that have the potential for ARDML. Testing to date has indicated a low potential for ARDML from waste rock and slow generation of ARDML from ore due to mineral stability in all mine materials. However, if ongoing testing indicates higher potential for ARDML, standard mitigations will be used, including on-going ARDML testing, avoidance through prediction and mine planning, if possible, and management of ARDML material according to best practices. It should be noted that test work to date indicates high probability of ARDML from ABA testing but low rate of reactivity from leach tests in terms of sulfide oxidation and acid generation

from the ore, and negligible potential from waste rock reflecting stability of the sulfides that occur as coarse stable crystals. In practical terms, the containment of mine-contact surface runoff, the monitoring of effluent and potentially treating effluent prior to discharge to meet MDMER criteria are standard mitigations.

During winter at the Project site, materials at surface will be frozen and sufficiently dry so that no chemical change would be expected, although some physical weathering may occur in fall and spring. Physical weathering can be managed through geotechnical controls such as compaction of waste rock surface and the sloping of waste rock faces to a shallow angle. During spring and summer, with snow melt and rain events, some sulfides can be expected to break down. Based on current results, carbonate and silicate buffering is predicted to exceed any acid generation associated with the waste rock. At present, the behaviour of ore is uncertain and requires further data collection through the kinetic testing program. Initial results indicate that net acid conditions are not expected to occur from waste rock.

3.1.9.7 ARD and ML at Closure

Based on testing to date, no ARDML is expected to occur in overburden or waste rock during operations or at closure and therefore these components should not cause any adverse environmental effects during mine closure and decommissioning. Ore stockpiles are anticipated to be of short duration and unlikely to generate ARDML during the limited exposure period. Ongoing testing of ore sorting rejects, tailings and soils will confirm their ARDML characteristics but it is likely that the soil results will be consistent with preliminary findings with no expectation of ARDML. Ore sorting rejects will be de-pyritized and therefore it is predicted they will not be a generator of ARDML.

The pit will flood after mine closure and discharge is expected to meet MDMER discharge criteria as the major contribution to the pit will be direct precipitation, groundwater inflow and wall rock runoff from benign or low acid generating potential waste rock. Additional analyses, including geochemical modeling, will be carried out prior to closure in order to predict the chemistry of the pit lake. If modeling and monitoring of the water quality indicates the possibility of ARDML processes, Maritime will take steps to apply appropriate mitigations to limit adverse effects to the natural environment both during operations and after closure. In addition, monitoring of the water quality of discharges from the settling pond systems will include parameters associated with ARDML processes including but not limited to pH, metals and sulfates. If monitoring and modeling of effluent discharges, e.g., mine water, mine contact runoff, settling pond system(s) discharge, show potential effects from ARDML, this will be addressed in Maritime's RCP. All kinetic testing results will be available for inclusion in the RCP.

3.1.9.8 Summary

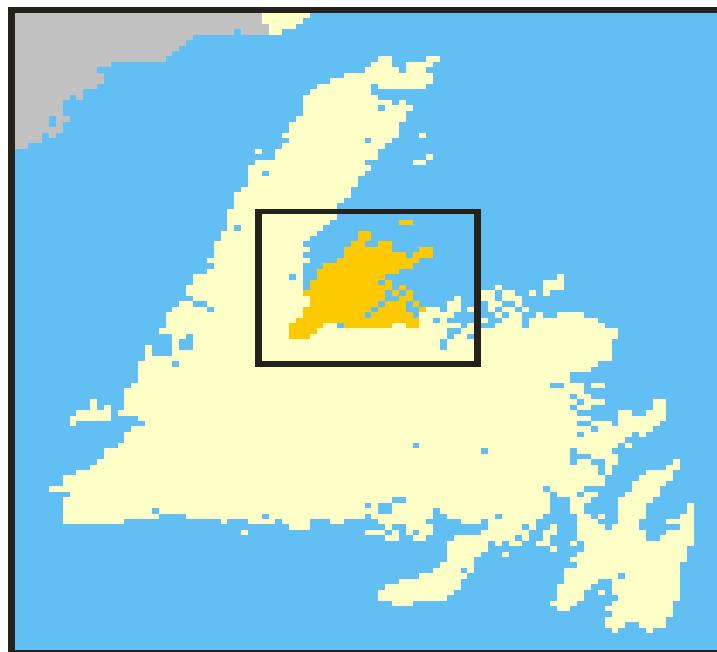
Based on historical data and site-specific information presented above, the ARDML potential of the Project site is expected to be low. Therefore, no adverse environmental effects related to ARDML are expected at the Project site from construction, operations/maintenance or closure activities (i.e., removal of overburden, open pit and underground mining, ore processing, waste rock disposal, and site closure and reclamation activities). Ongoing humidity testing will provide additional information about the ML potential of various materials exposed during the LOM. Volumetrically, waste rock will be the largest waste material produced during the LOM and testing has indicated that most of it is benign (NAG). However, if any sulfide waste is identified, it will be appropriately contained to avoid the release of acidic metal seepage or runoff. Containment could include co-mingling with NAG waste to neutralize any acid-generated or collection and treatment of drainage.

Maritime predicts no significant residual adverse environmental effects related to ARDML at the Project site.

3.2 Human Environment

The King's Point Area includes the towns of King's Point, Harry's Harbour, Jackson's Cove-Langdon's Cove-Silverdale, Nickey's Nose Cove and Rattling Brook (NL Statistics Agency). The Town of King's Point, the closest community to the Project, has a population of approximately 670 (website, Town of King's Point). The King's Point area constitutes Local Area 68, within the Grand Falls-Windsor-Baie Verte-Harbour Breton Rural Secretariat Region and within Economic Zone 11 (Figure 55).

Figure 55: NL Economic Zone 11 (NL Statistics Agency)



3.2.1 Historic and Heritage Resources

Maritime consulted with the Provincial Archaeology Office (PAO) who indicated there is low potential for historic or heritage resources to be found within the Project area.

Although the area has a low probability of historic or heritage resources, Maritime has procedures and mitigations described in their EPP that will be implemented in the event of a discovery of an historic or heritage resource.

3.2.2 Land and Resource Use

Maritime gave presentations to representatives of the Town Councils of King's Point and Springdale in 2019 and 2020 where details of the Project were presented. The Towns raised no concerns and followed up with letters in which they expressed their support for the Project and/or outlined the resources available that could be of benefit to Maritime during Project construction and operations (Appendix B).

Maritime consulted the Provincial Land Use Atlas to assist with determining if there are likely to be any land use conflicts associated with their Project (Figure 56). The Project occurs in a rural area within Forest Management District 9. There is a silvicultural management area located approximately 3 km west of the mining lease and a western portion of the lease area intersects a domestic woodcutting area.

There are three private quarries located 2-3 km to the southeast of the Project site along Route 391. The municipal landfill is located approximately 30 km southwest of the Town in the community of South Brook. The Town also has a number of community gardens and greenhouses

but none that are in close proximity to the Project. The Newfoundland Snowmobile Federation (NSF) maintains a snowmobile trail that passes to the southwest of the Property and follows the existing access road. Maritime engaged with the NSF president in April 2020 and has committed to working with the NSF to create a new snowmobile trail along the access road, with a divider median, to promote safety of all users.

There are three remote cottages to the west and northwest of the Project in close proximity to Muir Pond and Maritime officials engaged with cottage owners in May 2020 relative to the Project. Also, there are two commercial outfitters, Island Safaris and Black Ridge Outfitters who operate in the vicinity of Gull Pond. The closest camp is located approximately 8.0 km to the west of the Project site and the commercial outfitter buffer zone extends to within 100 m of the western boundary of the Hammerdown mining lease.

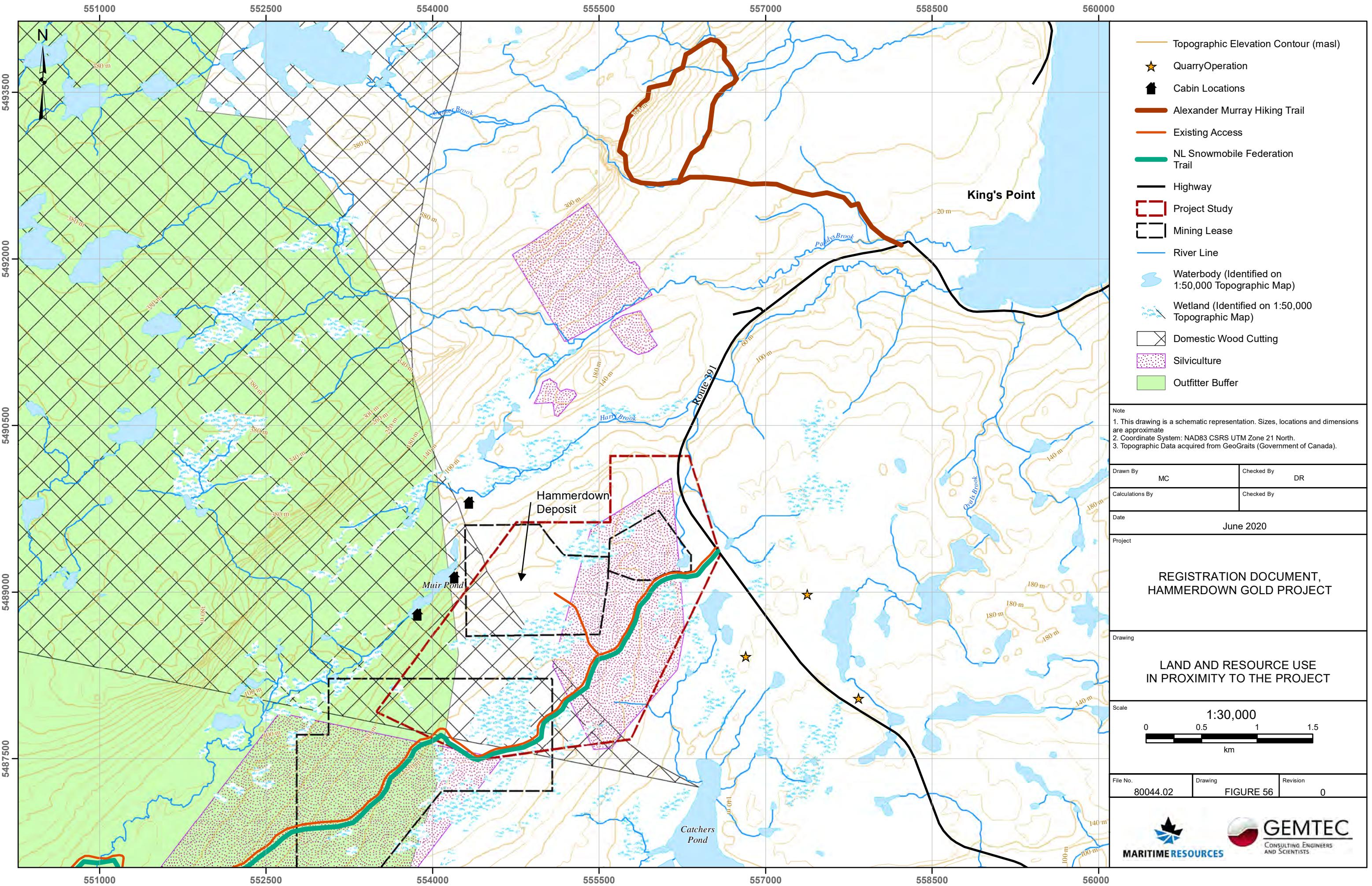
There are no federal or provincial parks or protected areas in the immediate area of the Project. There is an RV park located in the Town and the closest private campground is located The Project is located within Moose and Black Bear Management Area 14 (NLDFLR 2020). There is a popular and well-maintained hiking trail located at King's Point, the Alexander Murray Hiking Trail, but this is far-removed from the Project site.

3.2.3 Human Health and Well-Being

The closest medical clinic to King's Point is in Springdale, approximately 20 km away, and the nearest hospital is located in Grand Falls-Windsor, approximately 110 km away.

A major indicator of well-being is how a person rates their own health status. In 2015-2016, 65.2% (+/- 5.3%) of individuals aged 12 and over in this Rural Secretariat Region rated their health status as excellent or very good. For the province, 62.0% (+/- 1.7%) of individuals aged 12 and over rated their health status as excellent or very good (NL Statistics Agency).

In 2015-2016, the rates of smoking and alcohol consumption in the Grand Falls-Windsor – Baie Verte – Harbour Breton Rural Secretariat Region were on par with the provincial average. Rates of obesity were slightly higher than the provincial average during this period in the Rural Secretariat Region.



3.2.4 Communities and Economy

The closest community to the Project is King's Point, located approximately 5 km to the northeast of the site. The 2016 Census population for Local Area 68: King's Point Area was 965 which represents a decline of 3.0% since 2011 (965 in 2016, down from 995). Over the same period, the entire province experienced a population increase of 1.0% since 2011 (519,715 in 2016, up from 514,535). The median age in the King's Point Area was 52 in 2016 whereas the average income was \$19,400 for the King's Point Area in 2016 compared to \$22,600 for the province (NL Statistics Agency 2016).

The 2016 self-reliance ratio for the King's Point Area was 71.5% and 80.6% for the province. The self-reliance ratio is a measure of the community's dependency on government transfers such as Canada Pension, Old Age Security, Employment Insurance, and Income Support Assistance. A higher self-reliance ratio indicates a lower dependency.

In Local Area 68, during the reference week of the 2016 Census (May 1-7, 2016), the employment rate for those aged 15 years and older was 30.3% (49.5% for NL). During the same period the unemployment rate for Local Area 68 was 37.3% (15.6% for NL). There were 375 (256,855 for NL) individuals participating in the labour force (Table 31).

Most of the main roads in King's Point are paved and the Town offers a range of contracting services such as mining construction, road building and paving, welding and automotive services, fiberglass fabrication, trucking and general contracting. The Town shares a joint volunteer fire department and a fire truck with Rattling Brook, a community located 5 km to the north, and the department boasts approximately 30 members. There is one regional newspaper, the Nor'Wester that is published once weekly.

The Town has a diverse pool of human resources available with a variety of backgrounds, particularly in the mining field. There are also a number of goods and services available in the Town including restaurants, meeting venues, janitorial service, catering service, surveying, grocery and hardware stores, and a gas station.

Maritime anticipates that the Project will have a positive impact on employment and the economy of the Town and surrounding areas.

Table 31: Breakdown of Employment Data, King's Point Area (NL Statistics Agency, 2016)

Occupation	Males (Employed)	Females (Employed)	Males (% of Total)	Females (% of Total)
Business, finance and administration	..	20	..	~100.0%
Health	..	20	..	~100.0%
Education, law and social, community and government services	10	30	25.0%	75.0%
Sales and service	20	45	30.8%	69.2%
Manufacturing and utilities	15	..	~100.0%	..
Trades, transport and equipment operators	50	..	~100.0%	..
Natural and applied sciences	10	..	~100.0%	..
Management	15	..	~100.0%	..

4.0 CONSULTATION

Consultation is a legislated component of the NL EA process whereby this Registration document will be available for public and regulatory review. Maritime has endeavored to engage substantially with public and regulatory bodies prior to document submission and has also endeavored to provide as much detail as possible in this document to ensure stakeholders can understand and provide relevant commentary on the Project during the EA process. Maritime and their representatives will be available throughout the EA review period to address any additional questions that may arise.

4.1 Regulatory Consultation

Maritime and their consultants completed consultation meetings with provincial and federal government officials at different stages during Project planning and prior to the submission of this Registration document. Specifically, consultation occurred with the provincial WRMD, the PPD, the WD, the PAO, the DTW, the DNR, the EA Division, the provincial Climate Change Branch (CCB), the federal DFO and the federal IAA.

Maritime understands that this Project will require permitting in the post-EA phase and this process will allow for additional consultation between Maritime and relevant regulatory departments and agencies. Maritime will apply for and adhere to all required permits and other authorizations for Project construction and operations.

4.2 Public Consultation

Maritime met with the Town Council of King's Point in June and November 2019 and with the Chief Administrative Officer of Springdale in May 2019 to present preliminary details of the Project. A third meeting with the Town Council of King's Point was held on June 18, 2020 when Maritime gave a presentation on the Project. In addition, community meetings for both King's Point and Springdale will be held once the Registration document has entered the EA process.

In June 2019, Maritime coordinated with the Principal of Valmont Academy in King's Point for students from grades two to six to plant 500 - 10 inch tree seedlings at the Project site (Figure 57). Areas outside the open pit design were selected with a view to creating a park area in the future after mine closure.

On November 14, 2019 Maritime partnered with the Prospectors & Developers Association of Canada (PDAC) to deliver the Mining Matters educational program at the Valmont Academy in the Town of King's Point. Mining Matters is a charitable organization dedicated to educating young people to develop knowledge and awareness of earth sciences, the minerals industry, and their roles in society. The organization provides current information about rocks, minerals, metals, mining and the diverse career opportunities available in the minerals industry. Mining Matters offers educational resources that meet provincial curriculum expectations, created by educators and earth science experts.

Maritime's "Safety, Health, Environmental and Social Policy" (Appendix C) outlines their commitment to the communities in which they work and endorses the definition of Corporate Social Responsibility as proposed by the World Bank: *'the commitment of business to contribute to sustainable economic development – working with employees, their families, the local community and society at large to improve the quality of life, in ways that are both good for business and good for development'*.

In June 2019 and again in June 2020 Maritime presented bursaries to graduating students of the Valmont Academy in the Town of King's Point in a ceremony attended virtually by the local MHA, the Honourable Brian Warr. This will be an annual event and is one way Maritime supports communities in which they operate.

Maritime has also engaged in direct consultation with a number of community and non-governmental organizations such as the Newfoundland and Labrador Outfitters Association (NLOA), the NSF and with various local cabin owners. Maritime also began producing and distributing a quarterly community newsletter aimed at providing information to public stakeholders on their activities and progress relative to the Hammerdown Gold Project (Appendix D). A number of copies of the first edition were delivered to the Town of King's Point office in April 2020 and mailed to the local residents of King's Point, Harry's Harbour and Rattling Brook. The newsletter was also provided to regulators and is featured on Maritime's corporate website. Maritime will continue to consult with local communities and stakeholders about its planned activities in the area as the Project advances. In addition, ongoing public consultation occurs through forums such as the Baie Verte Mining Conference and the Mineral Resources Review Conference.

Figure 57: Tree Planting with Students from Valmont Academy, King's Point



The provincial EA review process will provide an opportunity for public review and commentary on this Project. Through the provincial EA review process, Indigenous organizations that may be affected by the Project will have an opportunity to provide commentary via the public review process.

5.0 ENVIRONMENTAL EFFECTS AND ANALYSIS

5.1 Natural Environment

The Natural Environment is comprised of relevant components of the biophysical environment that may interact with the Project, including vegetation, soils, wetlands, avifauna, wildlife, fish and fish habitat, air quality, and surface water and groundwater resources.

5.1.1 Construction

Project construction will involve site preparation activities as detailed in Section 2.7 of this report covering an overall area of approximately 90 ha. Approximately 20% of the Project area is brownfield, which means less than 75 ha will require clearing. Maritime will implement a number of mitigation measures to limit or avoid adverse environmental effects as a result of Project-related construction activities. Construction activities will be completed using small- to mid-sized, standard construction equipment, and Maritime will endeavor to limit the duration of onsite construction (6-12 months). In addition, Maritime will provide their existing EPP and other relevant environmental plans to contract personnel involved in the construction phase for review and implementation. Whenever revisions are required to the EPP, Maritime will complete them in a timely manner and communicate them to all relevant Project personnel. Maritime will also require that contractors comply with all regulations and permits relative to the Project construction activities.

5.1.1.1 Air Quality

All applicable mitigations to limit adverse impacts to regional air quality will be implemented as necessary during development and construction phases of the Project.

Fugitive Dust

Measures such as regular road watering and a truck wheel washing station will be implemented to contribute to reducing fugitive dust levels at the Project site, and on nearby Route 391 during construction related activities. If conditions require it, Maritime will also keep sections of Route 391 swept to reduce fugitive dust effects as a result of Project vehicle traffic. Maritime also requires all company and contractor vehicles and Project equipment to be in good and safe operating conditions, with vehicle emissions within established limits of Schedule F of the NL Air Pollution Control Regulations, 2004.

GHG Emissions

GHG emissions will be generated from Project construction activities by diesel fuel combustion, gasoline combustion and blasting activities that use diesel-based blasting agents. In order to

estimate the volume of GHG emissions during the construction phase, Maritime compiled the following information:

- List of equipment (Table 32) to be used during the construction phase;
- Calculation of anticipated volume of equipment fuel usages;
- Fuel consumption rates of each pieces of equipment to be used;
- Emission factors;
- Anticipated duration of various Project construction activities; and
- Applied appropriate emission factors.

Table 32: Equipment Type and Estimated Diesel Usage during Construction

Equipment Type	Power	Number of Pieces of Equipment Anticipated
Haul truck	551 kW	3
Hydraulic excavator	578 kW	1
Wheel loader	396 kW	1
Production drill	242 kW	3
Dozer	337 kW	3
Grader	163 kW	1
Light Plants	6 kW	4
Pumps	10 kW	2
Site Dump Truck	208 kW	1
Support Excavator	270 kW	1
Water Truck	208 kW	1
Lube/Fuel Truck	208 kW	1
Total annual diesel – equipment (L)		3,276,938
Total annual diesel -explosives (L)		48,678
Total annual diesel (L)		3,325,616

Estimates of the total carbon emissions expected over the construction period for the Project are presented in Table 33. This exercise was completed using guidance provided by the Climate Change Branch (pers.com. 2019). Known fuel consumption rates for equipment and vehicles were used in these calculations. Emissions factors for the explosives mix to be used at the Project were also factored into the final calculations.

Table 33: Predicted GHG Emissions during Construction

GHG Component	GHG Emissions (tonnes)
C0 ₂ (tonnes)	8,856.12
CH ₄ (tonnes)	11.06
N ₂ O (tonnes)	396.41
C0 ₂ e (tonnes)	9,265.17

*Based on a predicted volume of diesel to be used of **3,325,616 L**

Blasting Activities

Prior to the start of any Project specific construction activities, Maritime's BIMP will be in place and will have specific mitigations designed to limit adverse impacts to air quality as a result of blasting activities. Blasting activities will only be undertaken by a certified contractor in accordance with appropriate regulations and will avoid periods of high winds.

5.1.1.2 Noise and Vibration

During the construction phase, noise will be generated by the following activities:

- Various earthworks;
- Overburden removal by heavy equipment;
- Vegetation clearing, using chainsaws;
- Excavating and blasting;
- Equipment mobilization and road upgrades;
- Infrastructure installation and construction; and
- Vehicle traffic, both heavy equipment and light duty.

Blasting activities will result in high noise levels of short duration. Maritime's BIMP will establish blast perimeter limits that provide a safe distance from the location of the blast to any personnel working at the Project site. Local land users, cabin owners, and communities will also be notified of the blasting schedule with mitigation measures implemented, as required.

The closest residential neighbourhood is located 5 km away in King's Point and noise and vibration effects as a result of Project construction activities will be substantially attenuated by the rugged topography and the distance between Project activities and receptors. Maritime will be monitoring blast vibrations in King's Point and at nearby residences to determine what effects blasting will have. This monitoring will help Maritime adjust their blasting practices to reduce adverse impacts, if required. As such, Maritime does not anticipate any adverse effects to residents or commercial entities in King's Point relative to noise or vibration as a result of construction activities. There are several remote cabins in close proximity to the Project site and Maritime will work with cabin owners and provide them with details of their BIMP and planned blasting activities to reduce the potential for adverse effects as a result of blasting activities. Maritime does not anticipate any significant adverse effects to the remote cabins in the vicinity relative to noise and vibration as a result of Project activities.

5.1.1.3 Vegetation and Soils

Maritime's EPP, BIMP and other relevant environmental plans will be provided to and reviewed by any contract personnel involved in the removal of soils and vegetation. Maritime will also require that contractors comply with all regulations and permits relative to the removal of soils and vegetation.

Although a portion of the Project site is a brownfield mine site, there will be a need to strip certain areas of vegetation and organic soils to accommodate the installation and/or construction of Project infrastructure such as the waste rock dump, ore storage pile and the crushing and sorting equipment. Some of these areas are undisturbed and some are revegetated brownfield. Maritime will only carry out clearing that is essential for Project construction activities and will work to complete all essential clearing in as short a time period as possible. Stripped organics will be used where possible to carry out progressive and closure rehabilitation. Standard erosion prevention measures, as outlined in the EPP, will be implemented prior to the start of specific construction activities.

If any raptor nests are located, there will be no vegetation clearing within 800 metres during the nesting season or within 200 metres during the remainder of the year.

Where possible, stripping and grubbing activities will be carried out to avoid periods of intense precipitation and prior to the start of breeding bird nesting activity. Areas with exposed soils will be limited and stabilized with riprap, rock and/or filter fabrics as necessary to prevent and reduce soil erosion and sedimentation into local waterbodies. Where possible, Maritime will maintain vegetated buffer zones around waterbodies to protect them during construction.

The land cover types that will be primarily affected by the Project are Wet Conifer Forest, Mixed Wood Forest and Disturbed Areas, none of which are limited in the region (Figure 30). Given the absence of rare plants noted there during two site visits, the Project is not expected to result in residual adverse environmental effects to vegetation or vegetation SAR.

5.1.1.4 Wetlands

Maritime completed field surveys of the Study Area and identified all wetlands that could be directly or indirectly impacted by the Project (Figure 30). No listed or rare plant species were located in any of the wetland types identified. Prior to finalizing the footprints of various Project components, Maritime reviewed locations of identified wetlands and planned project infrastructure to:

- Limit impacts to multiple wetlands by clustering Project components within a single wetland where possible; and
- Limit development in undisturbed wetland areas.

Maritime recognizes the importance of maintaining the functionality of wetlands across the landscape and where Project development may disturb wetlands, mitigations will be implemented that reduce effects to drainage patterns outside the Project footprint. The WaMP will detail appropriate mitigations such as the construction of appropriate channels/ditching to reduce impacts to affected wetland systems. In addition, where possible, Maritime will maintain a minimum 30 m naturally-vegetated buffer between wetlands and development activities.

5.1.1.5 Avifauna and Species at Risk

For any vegetation clearing required during 2021, Maritime will endeavor to complete this work outside of the regional bird breeding season, May 1-August 15. Maritime does not anticipate any negative interactions between Project construction activities and avifauna. If clearing is required during the regional bird breeding season, Maritime will support the following mitigations outlined in their EPP specific to avifauna:

- Monitoring for bird nests will be conducted in advance of site clearing during the breeding season, May 1-August 15, and efforts will be made to avoid trees with nests during that time. Non-intrusive surveys for nests will be conducted in accordance with s.2.2.3.1, “*Specific considerations: Related to determining the presence of nests*”, from the document, *Incidental Take of Migratory Birds in Canada*, (Canadian Wildlife Service, EC 2014).
- The MBCA protects most bird species and their nests, with the exception of the following groups: certain game birds (e.g., grouse, quail, pheasants and ptarmigan), raptors (e.g., hawks, owls, eagles and falcons, cormorants, pelicans, crows, jays and kingfishers), and some species of blackbirds (e.g., starlings, mynas).
- Should a nest of a migratory bird be found, the following steps will be taken (in accordance with guidelines outlined in the MBCA):
 - all activities in the nesting area should be halted until nesting is completed and the young have left the vicinity of the nest;
 - any nest found should be protected with a buffer zone appropriate for the species and the surrounding habitat until the young have left their nest; and
 - nests should not be marked using flagging tape or other similar material as these increase the risk of nest predation.
- Raptors, although not protected under the MBCA, are protected under NL’s *Wild Life Act*. No bald eagles, ospreys or other raptors were observed or detected during 2019 field work but in accordance with provincial guidelines, should a nest of a raptor be found, Maritime will endeavor to follow the following guidance:
 - a buffer zone of 800 m should be maintained while the nest is active;
 - after the young have left their nest, a buffer zone of 200 m should be maintained; and
 - if work within the appropriate buffer zone cannot be avoided, the DFLR should be contacted for advice on how to limit disturbance of the nest.

No avifauna SAR were detected during the 2016 or 2019 field surveys although there is suitable habitat present for several (e.g., red crossbill, rusty blackbird, short-eared owl, olive sided flycatcher and gray cheeked thrush). The Mixedwood and Wet Coniferous Forest accounted for approximately 64% of the forested habitat within the Study Area and these two forest habitats are generally important habitats in NL for a variety of forest dwelling passerine species. Mixedwood

forest habitats are also stop over and resting habitats for many migratory passerine species. While forest habitat is recognized for its importance for these wildlife values, this habitat type is not rare or limited in extent in the vicinity of Project area. The loss of habitat as a result of Project construction activities is not expected to impact any avifauna species at a population level, and the habitat conditions that will be lost are widely available in the surrounding area. Furthermore, the proposed mitigation measures will reduce adverse effects to the extent that the Project is not expected to result in any significant residual effects to avifauna or avifauna SAR. If required by regulators, additional mitigations can be applied to avoid effects on avifauna and avifauna SAR.

If any raptor nest is found during construction activities, Maritime will report the location to the WD.

5.1.1.6 Wildlife and Species at Risk

A number of measures will be implemented during the construction phase of the Project to reduce the potential for interactions between Project activities and any wildlife that may occur in the area:

- Construction areas will be kept clear of garbage;
- Construction personnel will not hunt or harass wildlife while on site;
- Pets will not be permitted on the construction site;
- Equipment and vehicles will yield the right-of-way to wildlife;
- Equipment will be muffled, if possible and feasible;
- Where possible, a minimum 30 m naturally-vegetated buffer will be maintained between surface waterbodies and Project activities; and
- Any nuisance animals will be dealt with in consultation with the NL WD.

No wildlife SAR were encountered during field studies at the Project footprint. Project activities will result in limited loss of terrestrial habitat. The loss of habitat is not expected to impact any wildlife species at a population level, and the habitat conditions that will be lost are widely available in the surrounding area. Furthermore, the proposed mitigation measures will reduce adverse effects to the extent that the Project is not expected to result in any significant residual effects to wildlife, SAR or wildlife habitat as a result of Project construction activities.

5.1.1.7 Surface Water Resources

Safeguarding the water quality and quantity of surface water resources within the Project area and affected by Project activities will require specific mitigations during the construction phase. Maritime will follow all protocols outlined in their EPP specific to work in and around water bodies and wetlands during the construction period for the Project. Where possible, Maritime will maintain a minimum 30 m naturally vegetated buffer along surface waterbodies to protect sensitive riparian and aquatic species, and their habitat.

A number of construction-related activities could have adverse impacts on surface water resources. Blasting and excavation work could impact surface water runoff through erosion and sedimentation, and blasting residue (mainly nitrates, and petroleum hydrocarbons) could result in water quality effects. Maritime will make efforts to limit blasting events and earthworks during periods of heavy precipitation or during period of high winds that have the potential to deposit fugitive dust in the aquatic environment. Site run-off will be directed to the settling pond system(s) to reduce sedimentation effects as a result of Project activities, and potential water quality effects will be monitored and managed using standard procedures, and treatment prior to discharge, as required. In addition, Maritime will obtain all required permits and abide by all permit conditions relative to construction activities.

5.1.1.8 **Groundwater Resources**

Groundwater resources include domestic, commercial, and industrial groundwater supplies, and the groundwater component of freshwater ecosystems. Maritime has a good understanding of the groundwater resources at the Project site as a result of desktop and groundwater field investigation programs completed in 2016 and 2019. There are no users of groundwater resources (domestic, commercial, municipal, or industrial groundwater supply wells) identified within several kilometers of the Project, and no on-site water supply wells are planned for the Project. As such, the assessment of potential effects of Project activities on groundwater resources presented below for the construction phase of the Project, as well as the subsequent section (Section 5.1.2.9) relating to the operations phase, are focused specifically on hydrological interactions with nearby surface water and wetland features, with an emphasis on groundwater levels.

There are a number of activities during construction (e.g., site clearing grubbing, initial excavation (pre-stripping) in the open pit, earthworks for construction of plant infrastructure and other supporting site buildings, road upgrades, installation of water and erosion control infrastructure, and buried infrastructure and pipelines) that could potentially interact with local groundwater resources at the Project site. Short-term interactions with shallow overburden groundwater levels may occur during initial grubbing and site preparation; however, the effects are likely to be local and limited to the immediate vicinity of the Project site, and are not expected to affect the adjacent, down-gradient surface water features. Furthermore, there is potential for temporary diversion of shallow groundwater flow and lowering of the water table near excavations for buildings and subsurface infrastructure. The expected water table levels at the Project site range from near surface to 1.4 mbgs. Excavation and dewatering during site preparation has the potential to affect shallow groundwater. These effects are expected to be temporary and the water levels are anticipated to rapidly return to normal after completion of the excavation or construction.

Potential changes to groundwater quality during the construction phase will be related to turbidity from excavation, accidental fuel releases, and blasting residue from mining activities (mainly

nitrates, and petroleum hydrocarbons. These changes in groundwater quality are expected to be negligible, local and manageable through application of standard practices.

The most substantive interaction with groundwater resources associated with the Project is dewatering activities that will be required to maintain dry conditions in the open pit excavation and underground mine. While dewatering activities will likely commence during the construction phase associated with initial pit excavation, they will be most predominant during the operations phase. These conditions are further discussed below in Section 5.1.2.9.

To address potential effects to groundwater resources related to various construction phase activities Maritime will employ standard mitigations relative to maintaining groundwater quality and quantity at the Project site including:

- Designing and construction of diversion ditches to manage surface run-off and drainage; and,
- Excavation drainage water control using a settling pond.

A groundwater monitoring plan will be developed upon release of the Project from the EA process and prior to commencing any Project development activities, and will be submitted to authorities as required. The groundwater monitoring plan will include monitoring of groundwater levels and groundwater chemistry in the Project site area, as well as overall down-gradient areas within the Harry Brook, Muir Brook-Shoal Pond, and Catchers Pond watersheds to detect changes in groundwater levels, flow direction, and chemistry. Groundwater monitoring will be ongoing from the onset of Project construction activities, and any deviation from established baseline groundwater quality and/or quantity will be noted and appropriate mitigation measures applied in a timely manner.

5.1.1.9 Fish and Fish Habitat

Standard mitigations relative to minimizing adverse impacts to fish and fish habitat during the construction phase will be implemented. Where possible, a minimum 30 m naturally vegetated buffer will be maintained around waterbodies, and erosion protection procedures as described in the EPP will be followed to prevent sedimentation and/or erosion of waterbodies in and surrounding the Project area.

A water quality monitoring program will be implemented prior to the start of, and for the duration of the construction phase, to understand the water quality on and leaving the site such that effects to fish habitat downstream of the Project site are limited.

5.1.2 Operations

Maritime predicts the duration of mining operations at the Hammerdown deposit to be between five and six years' operating 24 hours per day and seven days/week. During the operations phase of the Project, there will be variable interactions with the biophysical environment (e.g., vegetation, wetlands, wildlife and SAR, avifauna, fish and fish habitat and surface water and groundwater resources). Operational activities will be characterized primarily by the mining of ore from both an open pit and underground development, and movement of ore and waste rock within the Project boundaries, the operation of the crushing and sorting plant and the storage and loading of pre-concentrated ore for transport to the Nugget Pond Mill.

5.1.2.1 Air Quality

As indicated in Section 5.1.1.1, all applicable mitigations to limit adverse impacts to regional air quality will be implemented as necessary during the operations phase of the Project.

5.1.2.2 Fugitive Dust

Measures such as regular road watering, vehicle wheel washing and road sweeping will be implemented to contribute to reducing fugitive dust levels at the Project site, and on nearby Route 391 during operations. Maritime will require all company and contractor vehicles and Project equipment to be in good and safe operating conditions, with vehicle emissions within established limits of Schedule F of the NL Air Pollution Control Regulations, 2004.

Blasting Activity

Maritime's BIMP will be in place during operations to mitigate adverse impacts to air quality as a result of blasting activities. Blasting activities will only be undertaken by a certified contractor in accordance with appropriate regulations and will avoid periods of high winds.

GHG Emissions

As during the construction phase, GHG emissions will be generated from Project operations activities by diesel fuel combustion, gasoline combustion and blasting activities that use diesel-based blasting agents. In order to estimate the volume of GHG emissions during the construction phase, Maritime compiled the following information (Table 34 and 35):

- List of equipment to be used during the operations phase;
- Calculation of anticipated volume of equipment fuel usages;
- Fuel consumption rates of each piece of equipment to be used;
- Emission factors;
- Anticipated duration of various Project construction activities; and
- Applied appropriate emission factors.

Table 34: Open Pit Equipment and Estimated Diesel Usage during Operations

Equipment Type	Power	Number of Pieces of Equipment Anticipated					
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Haul truck	551 kW	7	10	6	-	-	3
Hydraulic excavator	578 kW	2	2	2	-	-	1
Wheel loader	396 kW	2	2	2	-	-	2
Production drill	242 kW	5	5	2	-	-	2
Dozer	337 kW	3	3	3	0.5	0.5	1
Grader	163 kW	1	1	1	0.5	0.5	1
Light Plants	6 kW	4	4	4	4	4	4
Pumps	10 kW	2	2	2	2	2	2
Site Dump Truck	208 kW	1	1	1	1	1	1
Support Excavator	270 kW	1	1	1	1	1	1
Water Truck	208 kW	1	1	1	1	1	1
Lube/Fuel Truck	208 kW	1	1	1	1	1	1
Total annual diesel-equipment (L)		5,371,126	6,292,568	4,728,908	624,301	624,301	2,913,946
Total annual diesel-explosives (L)		191,642	198,502	99,603	-	-	14,359
Total annual diesel (L)		5,562,768	6,491,070	4,828,512	624,301	624,301	2,928,304

Estimates of the total carbon emissions expected over the operations period for the Project are presented in Table 36. This exercise was completed using guidance provided by the CCB (pers.com. 2019). Known fuel consumption rates for equipment and vehicles were used in these calculations.

Table 35: Underground Mine Equipment and Estimated Diesel Usage during Operations

Equipment Type	Power	Number of Pieces of Equipment Anticipated					
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Jumbo - 2 Boom	110 kW	-	-	1	1	1	-
Jumbo - 1 Boom	55 kW	-	-	-	2	2	1
Bolter	111 kW	-	-	1	1	1	1
7.0t Scooptram	150 kW	-	-	1	2	2	2
3.5t Scooptram	72 kW	-	-	-	2	3	2
Haul truck	242 kW	-	-	2	3	3	2
LH drill (electric)		-	-	-	1	1	1
Explosives Loader	69 kW	-	-	1	2	2	2
Fuel and lube truck	111 kW	-	-	1	1	1	1
Scissor lift	103 kW	-	-	1	3	3	2
Grader	118 kW	-	-	-	1	1	1
Boom truck	103 kW	-	-	1	1	1	1
Toyota Truck	96 kW	-	-	4	4	4	4
8 Man Toyota	60 kW	-	-	1	1	1	1
Toyota Mechanics Truck	96 kW	-	-	1	1	1	1
Toyota Rescue Truck	96 kW	-	-	1	1	1	1
Sanitation Truck	69 kW	-	-	1	1	1	1
Total annual diesel-equipment (L)		-	-	1,658,597	3,054,722	3,194,334	2,412,504
Total annual diesel-explosives (L)		-	-	1,352	2,086	3,111	580
Total annual diesel (L)		-	-	1,659,949	3,056,807	3,197,445	2,413,084

Table 36: Estimate of GHG Emissions during Operations

GHG Component	Emissions Factor (kg/L)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
CO ₂ (kg)	2.663	14,813,650	17,285,718	17,278,770	9,802,790	10,177,309	14,224,116	83,582,353
CH ₄ (kg)	0.003325	18,496	21,583	21,574	12,240	12,707	17,760	104,360
N ₂ O (kg)	0.1192	663,082	773,735	773,424	438,788	455,552	636,693	3,741,275
CO ₂ e (kg)	2.786	15,497,871	18,084,120	18,076,850	10,255,566	10,647,384	14,881,106	87,442,897
Emissions Summary (tonnes) during Operations								
CO ₂	83,582.35 tonnes							
CH ₄	104. 36 tonnes							
N ₂ O	3,741.28 tonnes							
CO ₂ e	87,442.90 tonnes							

Maritime does not anticipate the use of any diesel generators for power at the Project site. Rather, current Project planning includes the installation of a power pole and associated electrical infrastructure to provide electricity to the Project site.

The crushing and sorting equipment will be enclosed so minimal particulate matter will enter the atmosphere as a result of its operation.

Maritime does not anticipate significant residual effects to the atmospheric environment as a result of Project operations.

5.1.2.3 Noise and Vibration

During operations, there will be sustained noise from the open pit and underground mining activities, the crushing and sorting plant operation and from on and offsite haulage vehicles. Maritime was advised by DMAE officials that no baseline noise work was required at the Project site at this time, given its location, topography and distance from receptors. Maritime is confident that the impacts of noise on receptors in the nearest community located >5 km away will be minimal. Maritime has also committed to implementing a BIMP whereby a safe blasting radius will be established and will follow a schedule that will be made available publicly. Blasting will be intermittent over the life of mining operations and Maritime will work with cabin owners and provide them with details of their BIMP and planned blasting activities to limit adverse effects experienced due to blasting activities. Maritime anticipates minimal adverse effects of vibration and noise on residential receptors located in King's Point or on local cabin owners.

5.1.2.4 Vegetation and Soils

During operations, adverse effects on vegetation and soils will be minimal. All required stripping will have occurred during the construction phase and there will be no additional soil or vegetation disturbance. Stockpiled organics may be redistributed during the operations phase in progressive reclamation activities and as such, Maritime anticipates no adverse effects to vegetation and/or soils during the operations phase.

5.1.2.5 Wetlands

Where possible, a 30 m naturally-vegetated buffer will be maintained between Project infrastructure and wetland areas. However, this may not be possible as the open pit and waste rock dump may be expanded into a wetland area as operations advance. Open pit and waste rock dump development will be started during the construction phase and may continue throughout the LOM until the proposed pit and waste dump limits have been reached.

Dewatering activities as part of operation of the open pit and underground development have the potential to affect wetlands through lowering of groundwater levels (as described in more detail in Section 5.1.1.9). Although impacts to the Project site's wetlands are expected to be minimal given that they are fed primarily by precipitation, monitoring of water levels in the wetlands will be carried out and mitigations applied as appropriate.

In consultation with the WRMD, appropriate ditching may be constructed to provide environmentally sound drainage patterns during the operations phase that promotes appropriate water management throughout the site. Any strategic ditching will be described in Maritime's WaMP. If any wetland vegetation clearing is required, this work will be completed outside of bird breeding seasons and will follow all mitigations outlined in Section 5.1.1.5 above.

5.1.2.6 Avifauna

It is unlikely that any clearing will be required during the operations phase, but if this occurs, Maritime will follow all mitigations outlined in Section 5.1.1.5. If no vegetation clearing is carried out during the operations phase, Maritime does not anticipate any adverse environmental effects to avifauna. It is expected that any avifauna species previously using the affected habitat will have relocated to adjacent undisturbed areas before operations activities commenced. As described in Section 5.1.1.5, if any raptor nests are encountered during operations activities, the WD will be notified.

5.1.2.7 Wildlife and Species at Risk

Maritime does not anticipate any disruption to wildlife or wildlife SAR as a result of operations activities. Existing mitigations relative to wildlife sightings and management during the operations phase will reduce the potential for adverse impacts to wildlife or SAR during the LOM.

5.1.2.8 Surface Water Resources

Maritime will have a WaMP in place prior to the start of any operations activities. The WaMP will detail how surface water affected by Project activities will be managed on and off the Project site, and will describe how settling pond systems for mine discharge and other mine components, including the waste and temporary materials storage stockpiles, will be used for water retention and testing prior to water discharge to the environment. The settling pond system(s) will serve as the primary water treatment facilities. If monitoring indicates the effluent from the settling pond

system(s) does not meet water/effluent quality regulatory guidelines or permit conditions, additional water treatment measures will be implemented, as required. Maritime will only release water to the environment if water quality analyses indicate discharge water is within acceptable limits.

Furthermore, water will be discharged such that it maintains the natural hydraulic conditions of the receiving environment. In addition, the WaMP will outline a plan for strategic ditching around infrastructure to direct runoff to the settling pond systems. Any development within a wetland area may require temporary ditching. At the end of operations, Maritime will, to the extent possible, restore original drainage patterns to its pre-development state as much as possible.

A portion of Hammerdown Creek, Unnamed Channel and Muir Creek may require rerouting as a result of the open pit development. None of these watercourses are fish-bearing and all three consistently experience intermittent flow or no flow periods yearly. Maritime has committed to ensuring that drainage facilitated by these watercourses will be maintained through the construction of appropriate drainage channels. Where possible, Maritime will maintain a 30 m naturally-vegetated buffer between Project infrastructure and watercourses.

In addition, dewatering activities as part of operation of the open pit and underground development have the potential to affect surface water resources through lowering of groundwater levels (as described in more detail in Section 5.1.1.9). Although impacts to the Project site's surface water resources are expected to be minimal given anticipated limited extent of groundwater drawdown effects due to the low hydraulic conductivity of the bedrock, monitoring of water levels in the Project site's surface water bodies will be carried out and mitigations applied as appropriate.

5.1.2.9 Groundwater Resources

The primary groundwater resources-related activity during the operations phase of the project is dewatering activities associated with operation of the open pit and underground mine.

Dewatering activities have the potential to result in changes in groundwater recharge, water table levels and flow directions, and affect nearby surface water sources and wetlands. In particular, a lowering of groundwater levels could potentially result in a reduction in local stream flows (from reduced groundwater base flow contribution) and limit any groundwater influence on wetland water sources.

During the operation of the open pit and underground mine, there will be a requirement for the gradual lowering of water levels in the overburden and bedrock as mining proceeds down to the final base level of the open pit, through to the final base level of the underground development. This will result in a substantial drawdown in groundwater levels that will diminish with distance outwards from the mine, forming a cone of drawdown, the extent of which is referred to as the radius of influence.

The shape of the cone of drawdown and its maximum radius of influence resulting from mine dewatering is expected to be variable and is largely controlled by the hydraulic conductivity and anisotropy of the bedrock material. In the case of the low hydraulic conductivity bedrock identified at the Project site (geometric mean of 6.3E-9 m/s), the resulting cone of drawdown due to dewatering is expected to be localized in extent and characterized by a steep hydraulic gradient towards the mine. Given the anticipated limited extent of drawdown effects at the Project site due to mine dewatering activities, the lowering of groundwater levels and potential effects on surface water sources and wetlands associated with the Project's operations and dewatering activities are not expected to be significant, and if any, are likely to be limited to local areas adjacent to the open pit and underground development.

This prediction of only localized drawdown effects and lowering of groundwater levels at the Project site due to dewatering is supported by anecdotal evidence obtained through communications with staff of the former Richmont mine operation (from 2000 – 2004), that indicate that the former mine was generally dry with very minor groundwater inflows, and required only periodic pumping using a single 20 HP pump and 4 inch water line. Furthermore, it was reported that no impacts to water levels were observed in the surface water bodies and wetlands at the Project site over the life of the operation, with several streams at the site continuing to serve for compliance water quality monitoring during the former mining operation. These observations suggest that drawdown effects from the former mine's dewatering activities were minimal and do not appear to have had any impact on surface water resources.

Following cessation of operation of the open pit and underground mine, the mine excavation will begin to flood with a combination of groundwater, runoff from pit walls and direct precipitation. During this period, the local groundwater flow will continue to be towards the pit; however, as the water level rises in the open pit and underground workings, the water table will gradually recover toward pre-mining levels. Once the open pit and underground mine have flooded to equilibrium, the local groundwater flow system is expected return to approximate pre-mining conditions.

As the Project advances through permitting and detailed engineering design, requirements for dewatering will be determined, and supporting investigations including additional hydrogeological studies will be completed. These hydrogeological studies will further characterize the hydraulic conductivity of the overburden and bedrock in the vicinity of the open pit and underground mine and allow for better estimation of the extent of drawdown effects at the Project site. Based on these analyses, any surface water features and wetlands identified within the predicted radius of influence will be further assessed and monitoring, and mitigation measures will be implemented to maintain the hydraulic conditions of these features.

Minimizing the amount of groundwater inflow in the open pit and underground development will reduce the effects on groundwater resources quantity from dewatering activities. This will be done through the regular monitoring of the pit walls and underground workings for measurable

groundwater inflows; with a contingency plan for management of anomalous fracture-related groundwater seepage (e.g., grouting).

The groundwater quality changes associated with mine dewatering, ore storage and overburden stockpile and the waste rock dump, are expected to be measurable but are anticipated to be limited in area and can be managed through application of standard mitigation measures. Seepages from the waste rock and ore storage piles accumulated in or transmitting through the stored materials, either horizontally through the containment dams into overburden and shallow fractured bedrock, or through the bottom of the storage facility, could affect groundwater chemistry. Groundwater mounding from precipitation and infiltration is not anticipated in the waste rock or ore storage sites due to the expected high permeability of the coarse-grained materials. Assuming that the waste rock and ore storage pads are constructed with low permeability bases (using liners or compacted glacial till of low hydraulic conductivity), the majority of the effluent would be expected to exit as toe seepage, which would be collected in the wastewater control system, and the effect on groundwater resources from potential seepage is anticipated to be negligible.

Furthermore, other sources of groundwater seepage effects include blasting residue from mining activities (mainly nitrates, and petroleum hydrocarbons), chemical storage sites (e.g., explosives magazine), vehicle parking and repair facilities. Potential sub-surface effluents from these sources will be monitored and managed using standard procedures.

The WaMP to be prepared for the Project will describe the water management system to be utilized at the site and include particular details relating to the management of water from the mine dewatering activities and collected seepage from the ore storage and overburden stockpiles and the waste rock dump. In general, collected seepage from these areas will be pumped to settling pond system(s), and will be tested prior to discharge to a vegetated area at least 100 m from any waterbody. The WaMP will outline details of how this will be managed.

In addition, a groundwater monitoring plan will be developed upon release of the Project from the EA process and prior to commencing any Project development activities, and will be reported to authorities as required. The groundwater monitoring plan will include monitoring of groundwater levels and groundwater chemistry in the Project site area, as well as overall down-gradient areas within the Harry Brook, Muir Brook-Shoal Pond, and Catchers Pond watersheds to detect changes in groundwater levels, flow direction, and chemistry. Groundwater monitoring will be ongoing from the onset of Project construction activities, and any deviation from established baseline groundwater quality and/or quantity will be noted and appropriate mitigation measures applied in a timely manner.

The routine handling of fuel and chemicals during construction and operations phases can locally affect groundwater resources; however, these events can be mitigated with standard emergency response and clean up protocols. Employee training and an environmental emergency response

plan for immediate clean-up of small fuel and chemical spills will be implemented, as further described in Section 5.1.3.

5.1.2.10 Fish and Fish Habitat

The downstream aquatic environments of the Project (Harry's Brook and Muir Brook) are considered fish habitat. Maritime has designed the Project and has mitigations and planned monitoring in place so that the quality and quantity of water exiting the site will not adversely affect this downstream environment. As such, no negative environmental effects are predicted to either fish or fish habitat as a result of Project operational activities.

5.1.2.11 Summary

Maritime does not anticipate that the Project will have significant adverse environmental effects on key components of the natural environment due to careful planning, monitoring and continued implementation of mitigation measures. All operations activities associated with the Project will be carried out according to all regulatory requirements. Maritime predicts that the operations phase of the Project will result in minimum additional disruption to the area.

5.1.3 Accidental Events during Construction and Operations

Spills or releases of hazardous substances due to accidents or malfunctions of vehicles and equipment are possible during all Project phases. Such accidental events have the potential to result in adverse environmental effects to soil, water and the atmospheric environment.

The likelihood of occurrence of an accidental spill or release of hazardous substances, and the extent of resulting environmental effects, is reduced through adherence to SOPs and applicable mitigation measures throughout all Project phases. Fuel and other hazardous materials will be securely stored and vehicles and equipment will be refueled at designated areas. Emergency spill response kits will be located onsite at all times.

Potential accidental events or malfunctions during Project construction and operations such as a fire, a fuel or chemical spill could affect vegetation, water quality, air quality, soils or other aspects of the Natural Environment in or around the Project area. The resulting environmental effects of such incidents would depend on the nature and magnitude of the event.

Maritime will develop and maintain several environmental management and emergency response plans that will aid in avoiding and/or mitigating potential accidental events.

5.1.4 Summary of Environmental Effects Analyses – Natural Environment

Table 37 provides a summary of expected interactions between Project activities and various components of the natural environment and includes a conclusion relative to the potential for adverse residual environmental effects.

Table 37: Environmental Effects Analyses – Natural Environment

Environmental Component	Project Phase & Potential Interaction			Key Considerations and Proposed Mitigations	Residual Effects
	Con	Ops	Potential Interactions		
Terrestrial Environment					
Vegetation and Soils	X		<ul style="list-style-type: none"> Clearing and grubbing required for waste rock dump, ore storage, crushing and sorting equipment etc. 	<ul style="list-style-type: none"> Compliance with regulations and permits Accident event prevention and response Follow EPP Only necessary clearing will be carried out Progressive rehabilitation will be carried out wherever possible 	NS
Wetlands	X	X	<ul style="list-style-type: none"> Interruption of drainage pattern within wetland(s) possible Potential loss of portion(s) of functioning wetland(s) Excavation of organic material may be required Dewatering activities as part of operation of the open pit and underground development have the potential to affect wetlands through lowering of groundwater levels 	<ul style="list-style-type: none"> Compliance with regulations and permits Accident event prevention and response Follow EPP The WaMP will describe how drainage will be maintained outside affected wetlands Reduce impacts to multiple wetlands by clustering Project components within a single wetland where possible Limit development in undisturbed wetlands, to the extent possible Optimized site plan to reduce direct impacts to multiple wetlands. Water level monitoring in site water bodies and wetlands. Managed through reintroduction of discharge water as required. 	NS
Avifauna and SAR	X	X	<ul style="list-style-type: none"> If site preparation occurs during bird breeding season, there may be adverse impacts Operations may impact avifauna presence and use of the area by avifauna 	<ul style="list-style-type: none"> Compliance with regulations and permits Accident event prevention and response Carry out work outside bird breeding season Surveys to be completed if work is to be done during bird breeding season and Follow EPP 	NS
Wildlife	X	X	<ul style="list-style-type: none"> Potential interactions with construction and operations personnel and equipment during Project activities 	<ul style="list-style-type: none"> Compliance with regulations and permits Accident event prevention and response Follow EPP Construction and operations areas will be kept clear of garbage 	NS

Environmental Component	Project Phase & Potential Interaction			Key Considerations and Proposed Mitigations	Residual Effects
	Con	Ops	Potential Interactions		
				<ul style="list-style-type: none"> • Facility personnel will not feed, hunt or harass wildlife while on site • No pets will be permitted at site • Equipment and vehicles will yield the right-of-way to wildlife and • Any nuisance animals will be dealt with in consultation with WD 	
Bats (<i>Myotis</i> spp.)	X	X	<ul style="list-style-type: none"> • Two SARA listed species are likely using the Project area for foraging but not for roosting or hibernating 	<ul style="list-style-type: none"> • Compliance with regulations and permits • Reporting procedures in place • Additional emergence surveys will be done in September 2020 as recommended by the WD • Any Project activity that will result in adverse impacts to the existing adit will be completed prior to September 	NS
Atmospheric Environment					
Noise and Vibration	X	X	<ul style="list-style-type: none"> • Typical construction activities leading up to mining commencement, e.g., heavy equipment, blasting etc. will generate localized noise and vibration • Typical mining operations, e.g. blasting, trucking, crushing, sorting, etc. will generate localized noise and vibration 	<ul style="list-style-type: none"> • Compliance with regulations and permits • Accident event prevention and response • Substantial distance (>5km) from residential areas • Onsite workers will follow OHS requirements re personal protective equipment • No high levels of noise predicted • Local topography will attenuate effects of noise and vibration • A BMP will be in place and shared with local cabin owners and the community 	NS

Environmental Component	Project Phase & Potential Interaction			Key Considerations and Proposed Mitigations	Residual Effects
	Con	Ops	Potential Interactions		
Air Quality	X	X	<ul style="list-style-type: none"> Construction and operations activities may generate fugitive dust and other particulate matter 	<ul style="list-style-type: none"> Compliance with regulations and permits Accident event prevention and response Substantial distance (>5 km) from residential areas No substantially high levels of emissions are predicted Mitigations for fugitive dust control will be implemented Follow EPP Mitigations for construction and operations activities will continue Dust Collection system will be implemented Regular road watering and road sweeping all Project related vehicles and equipment will be in good and safe operating condition additional mitigations can be implemented should there be indications of a reduction in air quality 	NS
GHG Emissions	X	X	<ul style="list-style-type: none"> NL has set GHG emission target reductions for the province and industrial activities Project mining equipment will generate GHG emissions through fossil fuel combustion 	<ul style="list-style-type: none"> Compliance with regulations and permits Accident event prevention and response Maritime will monitor emissions on an ongoing basis Maritime will submit GHG emission estimates to the CCB Maritime will use alternate energy sources where possible 	NS
Freshwater Environment-					
Surface Water Quantity and Quality	X	X	<ul style="list-style-type: none"> Potential accidental spills Potential sedimentation from surface water discharge Groundwater from mine discharge, and drainage from waste rock, and other material storage stockpiles may affect surface water bodies quality Changes in water levels in surface water and wetlands from mine dewatering activities 	<ul style="list-style-type: none"> Compliance with regulations and permits Accident event prevention and response Design mitigation (erosion and sediment control plan, spill containment, etc.) Any water discharges will be to settling ponds and then to vegetated areas located an adequate distance from waterbodies Water level monitoring in site water bodies and wetlands. Managed through reintroduction of discharge water as required. Water quality monitoring prior to discharging Follow EPP 	NS

Environmental Component	Project Phase & Potential Interaction			Key Considerations and Proposed Mitigations	Residual Effects
	Con	Ops	Potential Interactions		
Groundwater Quantity and Quality	X	X	<ul style="list-style-type: none"> Changes in groundwater quantity (water levels) may effect surface water features and wetlands, mainly through operations phase dewatering activities Local changes in shallow groundwater quality near the ore and overburden stockpiles, and waste rock dump, Local changes to groundwater quality due to potential accidental spills 	<ul style="list-style-type: none"> Best management practices Continuous monitoring of groundwater levels to track distance drawdown effects of groundwater around mine due to dewatering Monitoring of water levels in site surface water bodies and wetlands; along with continuous monitoring of precipitation to allow separation of groundwater-specific effects Final Project discharge released to maintain the hydraulic conditions of adjacent surface water features and wetlands, as required. Reduce pumped water from the mine through control of perimeter surface runoff, and excessive groundwater seepage through open fractures in mine walls Water management and water quality monitoring of mine discharge and seepage from ore storage and overburden stock piles and waste rock dump Accident event prevention and response plans 	NS
Fish and Fish Habitat	X	X	<ul style="list-style-type: none"> Potential accidental spills Potential sedimentation from surface water discharge in proximity to nearby waterbodies Possible downstream effects 	<ul style="list-style-type: none"> Follow EPP Accident event prevention and response Compliance with regulations and permits Any water discharges will be to settling ponds and then to vegetated areas located an adequate distance from waterbodies 	NS

Environmental Component	Project Phase & Potential Interaction			Key Considerations and Proposed Mitigations	Residual Effects
	Con	Ops	Potential Interactions		
Potential ARDML Effects	X	X	<ul style="list-style-type: none"> Potential impacts to surface water and groundwater if any of: ore, ore sorter rejects, waste rock or soil are found to be acid generating or metal leaching 	<ul style="list-style-type: none"> Static tests have been completed on waste rock. Results indicate negligible effects anticipated Static and kinetic tests ongoing on ore, ore sorter rejects and soil Potential ARDML drainage issues from the waste rock and stockpile areas will be managed through the WaMP and if necessary, treated as required to meet regulatory discharge criteria All ARDML testing and results will be available for inclusion in Maritime's RCP. The RCP will provide in depth discussion on, ARDML mitigations wherever appropriate, in the short and long term. 	NS
Key: <ul style="list-style-type: none"> X Potential Project Interaction (by Phase) N No likely adverse residual environmental effect NS No significant adverse residual environmental effect S Significant adverse residual environmental effect P Positive residual environmental effect 					

5.1.5 Cumulative Environmental Effects

Cumulative effects can be defined as changes to the environment from an action, project or activity in combination with other existing or future projects and activities. The cumulative effects assessment (CEA) considers likely environmental effects associated with the Project, after the application of appropriate mitigation measures. Maritime considered all previously described components of the environment in the CEA.

There is limited industrial development occurring in the area of the Project. Table 38 summarizes known enterprises and their locations relative to the Hammerdown Project.

Table 38: Projects/Enterprises Considered in the CEA

Project / Enterprise	Status	Location	Relative to Hammerdown
Nugget Pond Mill	In operation	Snook's Arm	>140 km
Ming Mine	In operation	Ming's Bight	~115 km
Pine Cove Operations (pers. Comm. 2020)	In operation	Point Rousse, near Baie Verte	~100 km
Coastal-Vokey, Boat Manufacturing	In operation	King's Point	5 km
Green Bay Fibre Products Ltd.	In operation	King's Point	5 km
Forestry operations, pre-commercial thinning	Seasonal and ongoing	King's Point/Springdale area	Wide radius of the site

None of the listed projects in Table 38 will interact cumulatively with this project from a terrestrial or aquatic perspective. Nor are there are no other projects ongoing in close proximity to the Project that could interact cumulatively with the Project.

When the predicted annual GHG emission levels over the life of the Project are compared to provincial and national levels, it is apparent that Project level GHG emissions are not substantial. Maritime does not anticipate any adverse cumulative effects as a result of Project activities.

The water quality of discharges or runoff from the Project will be managed via a site-wide WaMP. Sampling and monitoring will provide information on discharges and their compliance with federal and provincial requirements. Drainage patterns outside the Project area will not be adversely impacted and data collected in the field (Stantec 2016b and GEMTEC 2019f) indicates that surface water discharged from the site will not contribute to substantially increased flows in any onsite or offsite watercourse. To the extent possible, pre-project hydrologic and hydrogeologic conditions will be re-established after project completion. Maritime predicts that any changes to

surface or groundwater flows in the Project area as a result of Project activities, will return to normal or near-normal at closure.

The operations phase of the Project will not result in any tailings storage and no adverse impacts are anticipated to water quality of surface or groundwater resources in and around the Project site. As such, Maritime predicts no adverse cumulative effects on any fish-bearing water bodies or productive fish habitat in the Project footprint or downstream of the Project footprint.

The Project will not affect listed or rare species, and will not have any effect on overall biodiversity in the region including the endangered *Myotis* spp. or other wildlife. Nor is the Project likely to contribute measurably to any overall, negative cumulative environmental effects to the avifauna, wildlife or SAR in the region.

Maritime concludes that overall, there will be no significant adverse cumulative effects to the biophysical environment as a result of Project construction or operations activities.

5.2 Human Environment

5.2.1 Historic and Heritage Resources

The Project is not expected to result in adverse environmental effects to heritage resources during either the construction or the operations phases. Although the area has a low probability of historic or heritage resources, Maritime has procedures and mitigations described in their EPP that will be implemented in the event of a discovery of an historic or heritage resource.

5.2.2 Land and Resource Use

The Project is not expected to result in any land use conflicts. The Project will occur in a rural area over rugged terrain. Maritime believes there is a low probability for any land use conflicts relative to recreational activities in the area since it is unlikely that hikers, hunters, and berry pickers would regularly use this area. Maritime has discussed the Project with officials from the Town of King's Point and Springdale and no concerns were raised relative to potential land use conflicts.

The Newfoundland Snowmobile Federation (NSF) maintains a snowmobile trail that passes approximately to the southwest of the Property but the Project will not directly or indirectly impact the use of this trail. Maritime has identified several cabins that occur in the general vicinity but there are none that occur within the Hammerdown mining lease. The locations of the remote cabins identified will be considered when Maritime is designing their BIMP and Maritime will work with cabin owners to limit adverse effects as a result of Project operations. In addition, there is an outfitter that operates approximately 8 km to the northwest of the Project site but neither the mining lease nor the Project footprint overlap with the established outfitter buffer zone.

5.2.3 Human Health and Well-Being

Maritime does not anticipate that the Project will have adverse impacts on human health or wellbeing during the operations phase of the Project. Operations activities will be guided by established practices and applicable sections of the Occupational Health and Safety Regulations (OHS). Maritime will support requirements relative to ensuring the health of company personnel and contractors working on the Project are maintained.

Given the anticipated increase in prosperity in the region, Maritime predicts an increase in positive effects on human health and wellbeing as a result of Project operations.

5.2.4 Communities and Economy

The Project will contribute in a positive way to the local communities and their economies through direct employment and other procurement opportunities. Maritime is confident the Project will have positive socio-economic effects in the region and for the province as a whole for many years to come.

5.2.5 Summary of Environmental Effects Analyses – Human Environment

Table 39 provides a summary of expected interactions between Project activities on various components of the human environment and includes a conclusion relative to the potential for adverse residual environmental effects.

Table 39: Environmental Effects Analyses – Human Environment

Socio-economic Component	Project Phase & Potential Interaction			Key Considerations and Proposed Mitigations	Residual Effects
	Con	Ops	Potential Interactions		
Historic and Heritage Resources	X		<ul style="list-style-type: none"> • Ground disturbance 	<ul style="list-style-type: none"> • Localized and short-term construction activity • Low potential for historic and heritage resources • Standard precautionary and reporting procedures <p>PAO advised low probability of resources in this area</p>	N
Land and Resource Use	X	X	<ul style="list-style-type: none"> • Outfitters in the vicinity • Snowmobile trail in proximity to the Project • Local cabin owners near the Project site • Recreational activities in the area, e.g., hunting, berry picking 	<ul style="list-style-type: none"> • Limited public use of the area surrounding the Project • Maritime produces a quarterly newsletter that provides updates, and planned upcoming stages, of the Project • Maritime has a BIMP in place that provides advance warning to local land and resource users of planned blasting activities 	N
Human Health and Well-Being	X	X	<ul style="list-style-type: none"> • Possible incidents and accidents affecting human health 	<ul style="list-style-type: none"> • Distance from, and minimal interaction with communities • Accidental event prevention and response plans • Will follow provisions of <i>OHS Regulations</i> applicable to Project • Will follow all recommendations of the Chief Medical Officer of Health in NL relative to Covid 19 	N
			<ul style="list-style-type: none"> • Increased regional prosperity 	<ul style="list-style-type: none"> • Can contribute to improved sense of wellbeing and higher standard of living 	P
Communities and Economy	X	X	<ul style="list-style-type: none"> • Employment and business opportunities 	<ul style="list-style-type: none"> • Positive effects (direct and indirect) 	P

Key:

- X Potential Project Interaction (by Phase)
- N No likely adverse residual environmental effect
- NS Not significant adverse residual environmental effect
- S Significant adverse residual environmental effect
- P Positive residual environmental effect

5.2.6 Cumulative Effects Assessment

The cumulative effects assessment relative to the Human Environment can be defined as changes to the socio-economic environment as a result of an action, project or activity in combination with other existing or future projects and activities. The CEA considers potential socio-economic effects associated with the Project.

There is limited industrial development occurring in the area of the Project and as discussed in Section 3.2.4, the unemployment rate for Local Area 68 was 37.3% during a reference period in 2016 (NL Statistics). Table 40 summarizes known enterprises and their locations relative to Hammerdown. Given the potential to create in excess of 150 positions through Project and Project related components over the LOM, there will be positive cumulative effects as a result of the addition of this Project to the area.

Table 40: Projects/Enterprises Considered in the Cumulative Effects Assessment

Project / Enterprise	Status	Employment	Location	Relative to Hammerdown
Nugget Pond Mill	In operation	~45	Snook's Arm	>140 km
Ming Mine	In operation	~225	Ming's Bight	~115 km
Pine Cove Operations (pers. Comm. 2020)	In operation	90	Point Rousse, near Baie Verte	~100 km
Coastal-Vokey, Boat Manufacturing	In operation	~6	King's Point	5 km
Green Bay Fibre Products Ltd.	In operation	~6	King's Point	5 km
Forestry operations, pre-commercial thinning	Seasonal and ongoing	unknown	King's Point/Springdale area	Wide radius of the site

6.0 ENVIRONMENTAL MONITORING AND FOLLOW-UP

Maritime has and will continue to develop strong environmental, health and safety management systems and associated plans, practices and procedures in place for this Project during construction, operations and the decommissioning phases. Any potential environmental or human health effects that may be associated with the Project will be addressed and mitigated through the application of established practices and procedures. Any potential effects can be further addressed through specific permitting requirements and compliance standards and guidelines that will apply to the Project.

Once operational, the Project will be subject to regular inspections and maintenance as required. In addition, all water and/or effluent returned to the environment will be subject to federal and provincial regulations.

Maritime will develop monitoring protocols as required, and in consultation with government regulators.

During the decommissioning phase, Maritime will carry out monitoring and inspections as required. Details specific to decommissioning, sampling and discharge procedures will be outlined in Maritime's RCP that will be submitted to DNR for approval prior to the start of any construction activities.

7.0 SUMMARY AND CONCLUSIONS

The key components of the proposed seven year Project spanning construction, operations and closure include an open pit and underground mine, crushing and sorting equipment, ore storage area, waste rock storage and water management infrastructure. Other components of the Project include necessary and associated infrastructure such as modular office and dry buildings, garage, warehousing and truck weigh scales. The Project does not require an onsite mill as final processing and tailings disposal will occur at the existing Nugget Pond Mill and tailings storage facility. The Project provides a technically feasible, environmentally- and socially-responsible means of mining a known gold deposit at a site that has a history of mining operations. The commissioning of the Project will provide a new source of sustained employment opportunities and economic benefits to the region for years to come.

The Project will be planned and implemented in accordance with Maritime's environmental and health and safety policies, plans and practices, to promote safe and responsible construction and operations. This approach will avoid and reduce any negative environmental effects of their activities while maximizing socio-economic benefits.

The Project will be constructed and operated in accordance with applicable provincial and federal legislation and regulations. Maritime is committed to obtaining all required permits and

authorizations and ensuring any conditions associated with environmental assessment release are met.

Maritime does not anticipate any significant adverse effects of the Project on the following environmental and socio-economic components:

- Atmospheric environment;
- Vegetation and soils;
- Wetlands;
- Avifauna and SAR;
- Wildlife and SAR;
- Surface water quality and quantity;
- Groundwater quality and quantity;
- Fish and fish habitat;
- Historic and Heritage Resources;
- Land and resource use;
- Communities and economy; or
- Human health and wellbeing.

Maritime has consulted, and will continue to consult as required, with all relevant government and community organizations throughout the EA process. Maritime will continue to consult as required through all stages of the Project life, including during the decommissioning phase.

In summary, the Hammerdown Gold Project represents a unique opportunity for Maritime, the local communities and the Province to realize significant economic benefits through the responsible development of a known gold deposit with a history of successful operations. Exploration potential for additional gold resources is considered excellent at the Hammerdown Gold Project and surrounding area. Maritime intends to utilize the proceeds from the development and operation of Hammerdown to fund exploration in the region with a goal of proving up new resources that could extend the life of the Hammerdown Gold Project.

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APPENDIX A

Maritime's Existing Environmental Protection Plan



GREEN BAY PROPERTY
ENVIRONMENTAL PROTECTION PLAN

Version: 1.0

Date: January 30, 2018

GREEN BAY PROPERTY

Environmental Protection Plan

January 30, 2018



GREEN BAY PROPERTY
ENVIRONMENTAL PROTECTION PLAN

Version: 1.0

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GREEN BAY PROPERTY
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LIST OF APPENDICES

Appendix A	List of Abbreviations and Acronyms
Appendix B	Controlled Copy Distribution List
Appendix C	Spill Report Form
Appendix D	Revision Request Form
Appendix E	Revision History Log



1.0 INTRODUCTION

Maritime Resources Corporation's (Maritime) Green Bay Property, which includes the Hammerdown gold deposit, covers an area of approximately 52 km² and is located approximately 5 km southwest of King's Point, and 15 km northwest of Springdale in central Newfoundland, adjacent to the Baie Verte Peninsula.

Exploration has occurred in the vicinity of the Green Bay Property since the 1980s. The Hammerdown gold deposit was previously mined by Richmont Mines between 2000 and 2004. The mine was decommissioned in 2005-2006 and the site was cleared of surface infrastructure, culverts were removed and the portal was closed. Although decommissioned, the footprint for most of the site is largely still clear of vegetation regrowth.

All site activities undertaken by Maritime at their Green Bay Property, either continuing or new, are the subject of this Environmental Protection Plan (EPP).

1.1 Purpose of the EPP

The purpose of the EPP is to outline potential environmental concerns and protection procedures related to the work activities carried out on the Property. This plan also outlines practical procedures required for all personnel (i.e., Maritime employees, contractors and suppliers) to reduce or eliminate potential adverse environmental effects, as well as instructions for addressing planned and unplanned activities or events associated with ongoing or new site work. Maritime will implement best management practices to aid in the mitigation of any concerns identified.

1.2 Objectives of the EPP

To ensure all activities are carried out in an environmentally responsible manner, this EPP has the following objectives:

- confirm commitments in order to reduce adverse environmental effects;
- document environmental concerns and identify appropriate protection measures;
- provide a reference document for personnel when planning and/or conducting site specific activities;



- provide direction to personnel in the event of accidental events;
- communicate changes to the EPP through the revision process;
- provide a reference to, and instructions for, Maritime to understand applicable legal and other requirements relative to appropriate environmental mitigation measures;
- provide a reference for Project personnel and regulators to facilitate the monitoring of EPP compliance;
- provide a means for Project personnel and regulators to recommend improvements to the EPP; and
- provide direction at the corporate level for ensuring commitments made in policy statements are implemented and monitored.

Any deviation from the procedures and commitments outlined in this EPP must be discussed with, and approved by Maritime.

1.3 Organization of the EPP

This EPP has been developed for specific activities to be conducted in support of the work carried out on the Property. This EPP contains the following sections:

- **Section 1.0** introduces the EPP. It outlines the overall purpose, objectives, organization, roles and responsibilities of those involved and environmental orientation requirements;
- **Section 2.0** provides a description of potential site activities;
- **Section 3.0** lists the permits, approvals and authorizations that may be required for the work, and provides an overview of compliance monitoring;
- **Section 4.0** describes potential environmental concerns and environmental protection procedures associated with work activities;
- **Section 5.0** outlines the contingency plans for potential unplanned and accidental events;
- **Section 6.0** outlines the procedures for revising the EPP;
- **Section 7.0** provides a list of key personnel and regulatory contacts;
- **Section 8.0** lists references cited in the EPP, as well as a number of sources of further information; and
- **Section 9.0** contains a signature page for employee and contractor sign-off.

Supporting information and documents are provided in the appendices:



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- **Appendix A** is a list of abbreviations and acronyms;
- **Appendix B** is a Controlled Copy Distribution List;
- **Appendix C** is a Spill Report Form;
- **Appendix D** is a Revision Request Form; and
- **Appendix E** is a Revision History Log.

1.4 Roles and Responsibilities

This section outlines the roles and responsibilities of all parties involved with on-going and any new activities on the Property.

1.4.1 Chief Operating Officer or Designate

Maritime's Chief Operating Officer (COO) or designate will provide overall leadership and support of the EPP during all activities carried out on the Property. Specific responsibilities will be to:

- provide final approval for the EPP and any subsequent revisions;
- monitor and inspect all work associated with the site work activities;
- liaise with relevant government agencies and stakeholders as required;
- distribute the EPP and any revisions to all controlled distribution representatives identified on the list in Appendix B;
- direct and/or manage reviews of the EPP on an as-needed basis, and
- maintain overall document control.

1.4.2 Project Manager

Maritime's designated Project Manager will report directly to the COO and manage all activities carried out on the Property. Specific duties will be to:

- act as Maritime's on-site representative responsible for environmental protection;
- hold initial orientation sessions for contractors and any other personnel to be involved in site activities;
- confirm on-site employees, contractors and sub-contractors are familiar with, and implement all aspects of the EPP including revisions, and its procedures;



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- communicate proposed work activities with the COO to ensure all applicable approvals, authorizations and permits can be obtained in a timely manner;
- monitor or designate a representative to monitor site work and any environmental protection measures for compliance with the EPP, and all regulatory requirements and commitments;
- report to the COO any incidents of environmental non-compliance;
- support and/or manage periodic reviews of the EPP, and
- contact the appropriate regulatory agencies in the event of an environmental emergency.

1.4.3 Other Site Personnel and Contractors

All contractors, subcontractors and site personnel involved in Project work activities on the Property will:

- review and become familiar with all procedures contained in the EPP, including any revisions;
- follow and implement commitments noted in the EPP, including any regulatory conditions outlined in approvals, authorizations and permits;
- immediately report concerns, including any spill or other event that may have an adverse effect on the environment, to Maritime's Project Manager or designate;
- carry out clean-up, reclamation or restoration work as directed by Maritime's Project Manager or regulatory agencies; and
- provide feedback to Maritime's Project Manager regarding any changes they feel would improve the EPP.

1.5 Orientation

Through ongoing orientation and awareness training, Maritime will confirm that all personnel understand their roles and responsibilities, their specific work activities, as well as the potential environmental effects of proposed site activities. All workers will receive an orientation from an immediate supervisor prior to the start of any new activity and thereafter on an as-needed basis. All new personnel arriving at the site will also receive an orientation, to be given by Maritime's Project Manager or designate.



2.0 SITE ACTIVITIES

The types of activities that may be carried out include: geological mapping, prospecting, trenching, geophysical surveys (ground or air), geochemical sampling (water, soil, rock), line cutting, drilling, blasting, hydrogeological studies (well drilling and pump testing), underground mine workings dewatering, and on site environmental sampling and monitoring.

Access to the sites will be via existing access roads and trails. If additional access trails are required during site work activities, a route will be selected to ensure minimal disturbance to the existing environment. Maritime will adhere to all requirements outlined in applicable permits, approvals and/or authorization during all site work activities.

The EPP will be revisited and reviewed with respect to ongoing site activities, as required.



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3.0 REGULATORY REQUIREMENTS

3.1 Potential Approvals, Authorizations and Permits

Regulatory approvals, permits and authorizations may be required for certain site activities. Conditions or expiry dates should be considered as elements of this EPP and all personnel should be familiar with and adhere to all relevant permits and approvals.

A general list of permits, approvals and/or authorizations that may be required for exploration work on the Green Bay Property are presented below in Table 3.1. Note that other permits, approvals and/or authorizations will be required as the project moves into development related activities.

Table 3.1 Potential Permits, Approvals and/or Authorizations

Department/Agency	Permits, Approvals and/or Authorizations	Element
Federal		
Department of Fisheries and Oceans (DFO)	Authorization for works in fish bearing waters	Installation of bridges and/or culverts, water discharge
Natural Resource Canada	Authorization for explosive magazine license	Explosive magazine
Transport Canada	Permit to store, handle, and transport dangerous goods	Storage, handling, and transportation of fuel, explosive and chemicals
Provincial		
Department of Fisheries and Land Resources (DFLR), Forestry Branch	<ul style="list-style-type: none">• Cutting permit• Permit to burn• Operating permit	Clearing for trails, drill pads
DFLR, Crown Lands Division	Permit to Occupy Crown Lands	Land Disturbance on Crown Lands
Department of Natural Resources (DNR), Mineral Lands Division	Exploration Approval	Any Exploration Work



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Department/Agency	Permits, Approvals and/or Authorizations	Element
Department of Municipal Affairs and Environment (DMAE), Water Resources Management Division (WRMD)	Permit to Alter a Body of Water <ul style="list-style-type: none">• Fording• Bridges• Culverts• Site Drainage	Activities for work near or within a waterbody
	Water Use Licence	Water utilization
DMAE, Pollution Prevention Division (PPD)	Certificate of Approval	Underground mine workings dewatering
DFLR, Wildlife Division	Authorization to control nuisance animals	Exploration activity
Service NL	Certificate of approval for storage and handling of gasoline and associated products	Storage, handling and transportation of fuel
	Temporary Fuel Cache	Fuel Storage
	Building Accessibility and Fire and Life Safety	On-site buildings
Service NL, Occupational Health and Safety (OHS) Division	Approval of underground mine plan	Working underground

3.2 Environmental Compliance Monitoring

3.2.1 Site Inspections

Site inspections will be conducted by company personnel before, during, and after any site disturbances related to activities performed by Maritime, or contractors on behalf of Maritime. For site inspections conducted prior to any site work activity, site details including vegetation, general terrain and topography, and drainage patterns will be recorded. Photographs should be taken during each site inspection. The required frequency of site inspections performed during site activities will be determined by the Project Manager or designate and will depend on the duration and type of activity being performed.



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Regular site inspections will aid in the implementation of the environmental protection measures that are specified in this EPP and that will be specified in the applicable contracts and other relevant permits, approvals and/or authorizations.

Any environmental issues or concerns should be reported to Maritime's Project Manager or designate.

3.2.2 Monitoring

Monitoring will also confirm that all exploration activities comply with applicable regulatory requirements and that mitigation measures are being employed effectively. Maritime's Project Manager or designate will be responsible for on-site environmental compliance monitoring during all exploration activities.

Compliance monitoring will be required for various site activities (e.g., monitoring of site drainage). Federal and Provincial government compliance standards that may apply to site activities include, but are not limited to, those listed in Table 3.2. Personnel will comply with all relevant permits, approvals, authorizations and legislation while conducting Project work.

Table 3.2 Environmental Compliance Standards

Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
Federal			
Fisheries Act, Deleterious Substances	Run-off from site to receiving waters	Fisheries and Oceans Canada and Environment and Climate Change Canada	Any deposited substance or discharge must not be deleterious (i.e., must be acutely non-lethal). Liquid effluents that enter freshwater or marine waters must comply with the Act.
Species at Risk Act	Mortality of endangered species or other species under federal authority	Environment and Climate Change Canada	Measures must be taken to avoid or lessen adverse effects on species at risk and that effects are monitored. Mitigation measures must be consistent with recovery strategies and action plans for species.



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Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
<i>Migratory Birds Convention Act</i>	Mortality of migratory birds, and any species under federal authority	Environment and Climate Change Canada, Canadian Wildlife Service (CWS)	<p>CWS should be notified about the mortality of any endangered migratory bird in the project area, including passerine (songbirds), seabird and waterfowl species. Harmful substances (e.g., oil, wastes, etc.) that are harmful to migratory birds must not be deposited into waters that are frequented by them. Nests, eggs, nest shelters of migratory birds must not be disturbed or destroyed.</p> <p>Notice should also be given about the mortality of any endangered species (under federal regulation).</p>
<i>Transportation of Dangerous Goods Act and Regulations</i>	Handling and transporting of dangerous goods	Transport Canada	If the materials are transported and handled fully in compliance with the regulations, a permit is not required. A Permit of Equivalent Level of Safety is required if a variance from the regulations is necessary.
<i>Canadian Environmental Protection Act (CEPA)</i>	Activities that have the potential to interact with the environment and human health	Environment Canada	CEPA provides framework for setting environmental quality objectives, guidelines and codes of practice, pollution prevention plans, regulation of toxic substances, controlling pollution of other wastes and environmental emergency plans
<i>Explosive Act and Regulations</i>	Storing, transporting, and using explosives	Natural Resource Canada	Natural Resource Canada sets the requirements, prohibitions and safety precautions that apply to those working with explosives.
Provincial			
<i>Environmental Protection Act</i>	Exploration	PPD-NLDMAE	All waste material shall be considered, prior to disposal, for reuse, resale or recycling. All waste materials, associated with exploration shall be disposed at an approved waste disposal site.
	Exploration	PPD-NLDMAE	All activities associated with exploration are subject to the Air Pollution Control Regulations. Materials as stipulated in the Regulations cannot be burned in the open.
	Site drainage	PPD-NLDMAE	All waters discharged from sites must comply with the Environmental Control Water and Sewage Regulations.



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Legislation/ Guidelines	Activity Requiring Compliance	Responsible Agency	Comment
	Storage, handling and disposal of gasoline and other fuels	Service NL	Petroleum storage and handling is subject to the Storage and Handling of Gasoline and Associated Products Regulations. Refer to Section 5.1 of the EPP for the Fuel and Hazardous Material Spills Contingency Plan.
	Disposal of used oil	Service NL	The storage and disposal of used oil is subject to the Used Oil Control Regulations.
	Handling and storage of hazardous materials	Service NL	Activities involving the use of designated hazardous materials are subject to Workplace Hazardous Materials Information System. WHMIS outlines procedures for handling hazardous materials and provides details on various hazardous materials.
<i>Dangerous Goods Transportation Act and Regulations</i>	Transporting dangerous goods to the site	Department of Transportation and Works	Transporting goods considered dangerous to public safety must comply with regulations.
<i>Historic Resources Act</i>	General site work activities.	Cultural Heritage, Provincial Archaeology Office (PAO), Department of Tourism, Culture, Industry and Innovation	All archaeology sites and artifacts are considered the property of the Crown and must not be disturbed. Any archaeology materials encountered must be reported to the PAO.
<i>Forestry Act</i>	Cutting, burning, operating	NLDFLR, Forestry Branch	Cutting, clearing of trees for trails, drill pads etc must comply with the Act.
<i>Minerals Act</i>	Exploration	DNR, Mineral Lands Division	All exploration work must comply with the Minerals Act.
<i>Lands Act</i>	Permit to occupy Crown Lands	DFLR, Crown Lands Administration Division	Any land disturbance on Crown Lands must comply with the Act.
<i>Occupational Health and Safety Act & Regulations</i>	Exploration	Service NL	All activities should comply with the <i>Occupational Health and Safety Act and Regulations'</i>



3.3 Rehabilitation of Work Sites

Once site work activities have been completed, Maritime will begin rehabilitation of sites no longer in use.

Where applicable, the general rehabilitation process will include the following:

- terrain, soil and vegetation disturbances will be limited to that which is absolutely necessary;
- where possible, overburden and excavated rock will be stockpiled separately and reserved for later rehabilitation work;
- surface disturbances will be stabilized on an ongoing basis to limit erosion and promote natural revegetation;
- natural revegetation of surface disturbances will be encouraged and active revegetation will be pursued where this is deemed critical, and where terrain and soil conditions permit;
- Maritime will incorporate environmental measures in any tender documents, and require contractors to conduct their work in accordance with this EPP;
- dismantling and removal of all temporary surface infrastructure (site trailers, portable lavatories, fuel drums, etc.);
- handling of any hydrocarbon and/or hazardous materials according to provincial and/or federal handling requirements (TDG etc.);
- general ground surface contouring to establish permanent drainage patterns, minimize erosion, and aid in safety of the public;
- replacement, where appropriate, of stockpiled overburden, or other suitable materials to encourage natural revegetation; and
- revegetation where natural revegetation does not occur, or if site conditions such as erosion necessitates such action.

3.4 Reporting

3.4.1 Internal Communication

Environmental performance or concerns associated with any site work activity will be communicated internally as required. The Maritime Project Manager is responsible for communicating policies, procedures, legal, and other requirements to Project personnel. Project personnel will communicate all environmental incidents to Maritime's Project Manager as per the Reporting Procedures.



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3.4.2 External Communication

When required, Maritime will, through the Project Manager, report on environmental issues relating to Project activities to the Newfoundland and Labrador Department of Municipal Affairs and Environment (NLDMAE). Environmental issues which may be communicated include, but are not necessarily limited to:

- excessive dust;
- erosion;
- location of historic resources;
- wildlife encounters, and
- permits and authorizations.

Any spills of petroleum products or other hazardous materials will be reported to the:

Environmental Response 24 Hour Report Line (Coast Guard Traffic Centre, St. John's)
(St. John's: **709-772-2083** or Other Areas: **1-800-563-9089**).

Refer to Section 4.14 for the definition of reportable spills on-land versus in freshwater environments. Other compliance reporting required by permits, or through compliance requirements not listed above, will be submitted to the NLDMAE.



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4.0 ENVIRONMENTAL PROTECTION PROCEDURES

This Section provides a description of environmental protection procedures for the following anticipated site work related activities:

- 4.1 Surveying
- 4.2 Buffer Zones
- 4.3 Laydown and Storage Areas
- 4.4 Clearing Vegetation
- 4.5 Grubbing
- 4.6 Erosion Prevention
- 4.7 Water Supply
- 4.8 Watercourse (Stream) Crossings
- 4.9 Exploration Drilling, Water Well Drilling, and Pump Tests
- 4.10 Trenching
- 4.11 Pumps and Generators
- 4.12 Dewatering Work Areas and Site Drainage
- 4.13 Equipment Use and Maintenance
- 4.14 Storage, Handling and Transfer of Fuel and Other Hazardous Material
- 4.15 Propane
- 4.16 Waste Disposal
- 4.17 Sewage Disposal
- 4.18 Hazardous Waste Disposal
- 4.19 Vehicle Traffic
- 4.20 Dust Control
- 4.21 Noise Control
- 4.22 Drilling and Blasting

When required, this EPP will be revised to include new or amended environmental protection procedures so that site work activities are completed properly and that the significant environmental aspects of the site are well managed.



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4.1 Surveying

Potential Environmental Concerns

Surveying activities could potentially disturb wildlife species, vegetation and historic resources.

Environmental Protection Procedures

Vegetation Removal

- a) Width of survey lines will be limited to that which is necessary for line of sight and unobstructed passage.
- b) Whenever possible, cutting lines to the boundary between treed and open areas will be avoided.
- c) Trees and shrubs will be cut flush with the ground wherever possible.
- d) Cutting of survey lines will be kept to a minimum. Where possible, alternate areas not requiring cut lines will be used.
- e) All trees not exactly on transit lines shall be left standing.
- f) No attempt to harass or disturb wildlife will be made by any worker (refer to Section 5.2).
- g) Vehicles will yield the right-of-way to wildlife.
- h) There will be no cutting in areas designated as sensitive without notification and approval of the Project Manager.
- i) Any historic resource discoveries will be reported to the Provincial Archaeology Office (see Section 5.4).
- j) All sites where surface disturbances are planned or may occur will be inspected and monitored prior to, during, and after the work.

Travel, Access and Surveying

- k) All-terrain vehicles (ATVs) will not be allowed off the right-of-way except as approved by the Project Manager or as dictated by permits. The use of ATVs will be restricted to designated trails, thus minimizing ground disturbance. ATV use will comply with the Motorized Snow Mobile and All-Terrain Vehicle Regulations, 1996 under the *Motorized Snow Mobile and All-Terrain Vehicle Act* and the Environmental Guidelines for Stream Crossings by ATV issued by the NLDMAE.



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- I) No attempt to harass or disturb wildlife will be made by any worker.
- m) No motorized vehicles will enter the areas designated as sensitive without notification and approval of the Project Manager or as dictated by permits.



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4.2 Buffer Zones

Potential Environmental Concerns

Buffer zones are boundaries of undisturbed vegetation maintained along water bodies. Without adequate buffer zone vegetation, streams, ponds and lakes can potentially become laden with silt from run-off. Vegetation also provides cover for fish in various aquatic environments.

Environmental Protection Procedures

A minimum buffer zone of 15 m or as dictated by permits of undisturbed natural vegetation is to be maintained between work areas and water bodies. Where possible, additional buffer widths will be maintained according to the guidelines shown in Recommended Minimum Buffer Zone Requirements for Activities near Watercourses in Table 3.3.

Table 3.3 Recommended Minimum Buffers for Activities near Watercourses

Activity	Recommended Buffer Width
Development around watercourses in urban or other developed area	15 m depending upon site specific considerations
Resource roads or highways running adjacent to water bodies	20 m + 1.5 X slope (%)
Piling of wood and slash - Grubbing	30 m
Placement of Temporary Site Trailers - Fuel storage	100 m

Source: Gosse, M.M., A.S. Power, D.E. Hyslop, and S.L. Pierce. 1998. Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador. Fisheries and Oceans.



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4.3 Laydown and Storage Areas

Potential Environmental Concerns

Laydown areas may be necessary for storing and maintaining equipment and supplies during site work activities. Potential erosion and run-off of sediment into nearby water bodies must be prevented.

Environmental Protection Procedures

- a) Existing laydown and storage areas will be used where feasible.
- b) Any new laydown, maintenance or storage areas required will only be established within the Project boundaries.
- c) Establishing any new laydown or storage areas will follow the procedures for vegetation clearing/grubbing (Section 4.4 and 4.5) and erosion prevention (Section 4.6).
- d) External storage areas will be placed on level terrain and kept free of ponding or run-off.
- e) Drainage from areas of exposed soil will be controlled by grade or ditching and directing run-off away from water bodies.
- f) Laydown and storage areas no longer required for site work activities will be rehabilitated.
- g) Fuel will be stored, handled and transported according to Section 4.14.



4.4 Clearing Vegetation

Potential Environmental Concerns

Vegetation clearing (e.g., trees, shrubs, etc.) may be required in advance of some site work activities. Potential concerns include uncontrolled burning of slash, stockpiling vegetation in or near watercourses and wildlife disturbance.

Environmental Protection Procedures

- a) Clearing activities will comply with the requirements of all applicable permits, including the Permit to Burn.
- b) Clearing or removal of trees will be kept to a minimum.
- c) Clearing will consist of cutting to within 15 cm of the ground or as dictated by permits and disposing of all standing trees, as well as removing all shrubs, debris and other vegetation from the area.. These materials will be stacked clear of on-going site work activities for future rehabilitation. The *Environmental Protection Guidelines for Ecologically Based Forest Resource Management* (1998) will be followed.
- d) If merchantable or usable timber is encountered, it will be removed by a local contractor.
- e) Disposing of cleared un-merchantable timber, slash and cuttings by burning will comply with the *Forest Fire Regulations* under the *Forestry Act*, Environmental Code of Practice for Open Burning and the Permit to Burn (from the Newfoundland and Labrador Department of Fisheries and Land Resources). At no time will a fire be left unattended.
- f) Slash and any other material or debris related to site work activities will not be permitted to enter any watercourse, and will be piled above spring flood levels.
- g) Chain saws or other hand-held equipment will be used in clearing vegetation except where alternative methods or equipment is approved by Maritime and applicable permits, such as mechanical harvesters. The use of mechanical clearing methods, such as excavators, will not be permitted except where it can be demonstrated that there is no merchantable timber, and where the resulting terrain disturbance and erosion will not result in the loss of topsoil or the sedimentation of nearby waterbodies.
- h) A minimum 15 m buffer zone of undisturbed vegetation will be maintained between the development area and all other waterbodies (Section 4.2).



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- i) Timber shall be felled inward toward the work area to avoid damaging any standing trees within the immediate work area.
- j) Workers will not destroy or disturb any features indicative of a cultural or archaeological site. Such features should be avoided until a report has been made to the Provincial Archaeology Office and clearance to proceed has been received.
- k) Where feasible, vegetation clearing will be scheduled to avoid disturbance during the critical bird nesting period.
- l) The disturbance of wetlands will be avoided outside the work area. If site work activities require crossing or disturbing wetlands, appropriate permits and approvals will be in place.
- m) All sites where surface disturbances are planned or may occur will be inspected and monitored prior to, during, and after the work as described in Section 3.2.



4.5 Grubbing

Potential Environmental Concerns

The principle concerns associated with grubbing and disposal of related debris are the potential adverse effects on freshwater ecosystems and water quality through the release of sediment into watercourses, as well as the potential for disturbing historic resources.

Environmental Protection Procedures

- a) Grubbing of the organic vegetation mat and/or the upper soil horizons will be restricted to the minimum area required.
- b) Nests, eggs, nest shelters of migratory birds or other wildlife must not be disturbed or destroyed. As well, efforts will be taken to complete any clearing in these areas outside of the bird breeding season.
- c) Should additional clearing be required, and it is not possible to undertake clearing outside of the breeding season and a nest is found, the following mitigative actions will be taken:
 - the nest site and neighbouring vegetation should be left undisturbed until nesting is completed; and
 - construction activities should be minimized in the immediate area until nesting is completed.
- d) If grubbing or disposal of debris is to occur within 15 m of a waterbody a permit will be obtained.
- e) Any surplus of such material will be stored or stockpiled for site rehabilitation and revegetation purposes. Topsoil and organics should be stored in low (1 to 2 metres high) stable piles (Gosse et al. 1998). The location of the stockpiles will be recorded and accessible for rehabilitation purposes.
- f) Measures will be implemented to reduce and control runoff of sediment-laden water during grubbing, and the re-spreading and stockpiling of grubbed materials. Where grubbed materials are re-spread or stockpiled, as many stumps and roots as possible will be left on the ground surface to maintain soil cohesion, dissipate the energy of runoff and promote natural revegetation. Erosion control measures will be implemented in areas prone to soil loss (Section 4.6).
- g) The length of time that inactive grubbed areas will be left exposed to the natural elements will be minimized to prevent unnecessary erosion. Mitigations such as the placement and maintenance of silt curtains will be used to prevent erosion from exposed areas.
- h) Grubbing activities will adhere to the buffer zone requirements outlined in Section 4.2.



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- i) Water quality monitoring of run-off may be required by the PPD of NLDMAE to ensure no adverse effects on the receiving environment.
- j) Discovery of historic resources will be handled according to the procedures outlined in Section 5.4.



4.6 Erosion

Potential Environmental Concerns

Eroded material could potentially cause siltation in water bodies, potentially impacting habitat for aquatic and terrestrial animals.

Environmental Protection Procedures

- a) All work relating to site work activities will be conducted according to the conditions set out in the permits, approvals and authorizations obtained from applicable regulatory agencies.
- b) The primary means for controlling erosion is to avoid activities that may contribute to erosion. The disturbance of new areas will be minimized.
- c) Drainage ditches will be stabilized if required (e.g., lining with vegetation or rock, terracing, interceptor swales, installation of rock check dams) to reduce soil erosion. Any such measures will be properly inspected and maintained following installation.
- d) All areas of exposed erodible soil will be stabilized by back-blading, grading and/or compacting, or installing other means of protection.
- e) If an inspection reveals that silt is entering any waterbody, further mitigative measures will be implemented, such as temporary drainage ditches, siltation control (settling) ponds, ditch blocks/check dams or sediment dam traps, to intercept run-off. The necessary or appropriate measures will be determined in the field.
- f) All work, laydown and storage areas will be monitored for erosion and appropriate repair action taken as necessary.
- g) Existing or new siltation control structures used will be monitored for excessive accumulation of sediment. Accumulated sediment will be removed from control structures to gain full effectiveness of the systems. Effluent from control structures will be released to flow overland for appropriate filtration prior to entering any waterbody.



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4.7 Water Withdrawal and Supply

Potential Environmental Concerns

Environmental concerns related to water withdrawal and supply includes potential detrimental effects to the habitat in and around the potentially affected waterbody.

Environmental Protection Procedures

- a) The water intakes must have an appropriate screen to prevent damage to fish. Guidelines for the screening of water intakes are provided by Department of Fisheries and Oceans (DFO).
- b) Also see Section 4.11 Pumps and Generators and 4.12 Dewatering Work Areas and Site Drainage.



4.8 Watercourse (Stream) Crossings

Potential Environmental Concerns

The potential environmental concerns associated with stream crossings and culvert installations include potential direct disturbances to and/or mortality of fish, and potential loss of fish habitat resulting from sedimentation and removal of habitat and stream bank vegetation. An evaluation of soil erosion potential will be conducted at each of the stream crossings. This assessment of potential erosion risk will assist in the development of specific erosion stabilization methods and effective sedimentation control practices on a site-specific basis.

Environmental Protection Procedures

No work below the high water mark of any surface water feature will be conducted without the prior notification of, and assessment by, the Project Manager. Stream crossings will be constructed in compliance with the required Permit for Culvert Installation from the Water Resources Management Division of NLDMAE, and any other approvals required from NLDMAE and DFO. If fording is required, a Fording Permit will be obtained from NLDMAE and the conditions of the permit will be strictly followed.

The following measures will be implemented to minimize potential impacts of stream crossings:

- a) Between September 15 and June 15 (sensitive fish life stages) or other times specific to the region, stream crossing during site work activities will be undertaken under the direct supervision of the Project Manager.
- b) Avoid the entry of deleterious substances including, but not limited to, materials such as sediment and fuel to watercourses and waterbodies during watercourse crossing work.
- c) In locations of fish habitat, where culverts are required, application will be made to NLDMAE and DFO. The culverts will be constructed according to all permit specifications and in accordance with the Environmental Guidelines for Culverts from the NLDMAE. The following measures will also be implemented:
 - i) install culvert(s) in accordance with good engineering and environmental practices;
 - ii) unless otherwise indicated, all work should take place in dry conditions, either by the use of cofferdams or by diverting the stream;



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- iii) installation of cylindrical culverts shall be counter sunk only where necessary to protect fish habitat such that the culvert bottom is one-third the diameter below the streambed in the case of culverts less than 750 mm outside the diameter; for culverts greater than 750 mm outside diameter, the culvert bottom shall be installed a minimum of 300 mm below the streambed;
- iv) in multiple (gang) culvert installations, install one culvert at an elevation lower than the others;
- v) the natural low flow regime of the watercourse will not be altered;
- vi) a culvert will not be installed before site specific information such as localized stream gradient, fish habitat type and species present have been evaluated. Culverts are to be installed using the guidelines provided in Gosse et al. (1998);
- vii) riprap outlets and inlets to prevent erosion of fill slopes;
- viii) use culverts of sufficient length to extend a short distance beyond the toe of the fill material;
- ix) use backfilling material that is of a texture that shall support the culvert and limit seepage and subsequent washing out;
- x) align culverts such that the original direction of stream flow is not significantly altered;
- xi) remove fill and any related debris from the culvert area to a location above the peak flow level to prevent its entry into the stream;
- xii) fill material shall not be removed from streambeds or banks; except when installing a culvert when removal of material is necessary for the foundation;
- xiii) culverts should be marked to indicate their position under the snow.
- xiv) minimize and restrict the use of heavy equipment in and near watercourses; where possible, an excavator will be used from shore rather than a bulldozer in the watercourse. Where it is absolutely necessary to do so, instream work will be performed by rubber tired vehicles (Gosse et al. 1998) only and will only be done with prior notification of Maritime's Project Manager, in compliance with applicable regulatory agencies;
- xv) as required, cofferdams of non-erodible material shall be used to separate work areas from the watercourse when excavating for culverts and footings; and
- xvi) cofferdams shall be removed upon completion of the work and the streambed returned as closely as possible to its original condition.

d) When fording any watercourse, the NLDMAE Environmental Guidelines and any applicable permits will be adhered along with the following:

- i) areas of spawning habitat will be avoided;



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- ii) crossings shall be restricted to a single location and crossings made at right angles to the watercourse;
- iii) equipment activity within the watercourse shall be minimized by limiting the number of crossings;
- iv) all equipment will be mechanically sound to avoid leaks of oil, gasoline and hydraulic fluids;
- v) no servicing or washing of heavy equipment will occur adjacent to watercourses; temporary fuelling, servicing or washing of equipment in areas other than the main fuel storage site will not be allowed within 30 m of a watercourse;
- vi) stabilize the entire fording area using vegetation mats, corduroy roads or coarse material (125 mm diameter or greater), when the ford area is not natural bedrock, or is easily disturbed by fording. When the substrate of the ford area is not subject to easy disturbance by fording, or coarse material is not easily available within the lease boundaries, fording under existing substrate conditions may occur under the direction of the Project Manager;
- vii) fording activities will not decrease the depth of the watercourses to less than 20 cm. Where the existing depth is less than 20 cm, that depth shall be maintained;
- viii) fording activities will be halted during seasonal or precipitation related high flow periods; and
- ix) stabilize all bank sections which contain loose or erodible materials; if banks must be sloped for stabilization, no material shall be deposited within the watercourse; sloping shall be accomplished by back-blading and the material removed shall be deposited above the high water mark of the watercourse.



4.9 Exploration Drilling on Land, Water Well Drilling and Pump Tests

Potential Environmental Concerns

The potential environmental concerns with exploration drilling, water well drilling and pump tests are potential surface disturbances, disposal of drilling fluids and cuttings, potential siltation, generation of dust, noise and the potential impacts on terrestrial habitats, air quality, aquatic ecosystems and historic resources.

Environmental Protection Procedures

- a) Potential drilling sites in sensitive areas should be inspected prior to any drill site preparation by the Site Manager.
- b) Vegetation will be cleared following the procedures detailed in Section 4.4.
- c) Waste oil will be removed from the drill site and properly disposed of.
- d) Water applications will be used to control dust where necessary. The use of water for dust control or lubrication during drilling will be undertaken in such a manner that runoff will not enter watercourses.
- e) Water used will remain on the drill site. A Water Use Licence will be issued as part of the Approval for exploration activities. Every effort will be made to prevent turbid water from entering any watercourse.
- f) Cuttings from drill activities will not be removed from the site; they will remain in the immediate location of drilling activities; while taking all required buffer zones into consideration.
- g) Drilling equipment will have muffled exhaust to minimize generated noise.
- h) Fuel will be stored, handled and transported according to Section 4.14.
- i) Garbage and solid waste will be removed from the drill site and deposited in an approved waste disposal area.
- j) Due to the nature of drilling activities (i.e., quicksnaps and couplings) oil drops and leaks may occur and every attempt possible will be made to clean up the area. All rigs will be equipped with oil absorbent material in case of a leak or spill and spill kits will be kept available in case of a hydrocarbon spill.
- k) Drilling of water wells must be conducted in compliance with the *Water Resources Act* and *Well Drilling Regulations*.



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- I) Completed exploration drill holes will retain casing and remain open for future probing. If a completed drill hole is producing water, it will be temporarily capped or indefinitely sealed with appropriate material to allow for any necessary future downhole testing. When all test work on the holes has been completed, then the casing will be removed.



4.10 Trenching

Potential Environmental Concerns

Where excavation for a trenching program is undertaken, potential runoff of sediment-laden water could result in effects on freshwater fish habitat and water quality.

Environmental Protection Procedures

The following measures will be employed to minimize the potential impacts of trenching.

- a) The topsoil and excavated overburden and bedrock are stored in separate stockpiles for later use during rehabilitation.
- b) Any material unsuitable for future rehabilitation is disposed of in a disposal area approved by the Project Manager or designate.
- c) Dewatering of trenches will make use of measures to minimize and control the release of sediment laden water through the use of filtration via various measures, including but not limited to erosion control devices, settling ponds, straw bales, geotextile or other devices. Water quality monitoring of run-off or discharges may be required by the PPD of NLDMAE to ensure no adverse effects on the receiving environment.



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4.11 Pumps, Compressors and Generators

Potential Environmental Concerns

A variety of water pumps, hoses, compressors and generators may be in use in many areas of the site and the support and supply for site trailers. Environmental concerns associated with any potential accidental spills or chronic leaks include contaminating waterbodies.

Environmental Protection Procedure

- a) To reduce fire hazards, fuel should not be stored immediately adjacent to generators, and the fuel storage area should be well ventilated. Fuel should not be stored within 100 m of waterbodies (Gosse et al. 1998).
- b) All fuel storage containers are to have spill trays beneath with a potential capacity of 110% of volume. They should also be in a covered and secured area.
- c) Drip pans are placed underneath pumps and generators located near waterbodies.
- d) Hoses and connections on equipment located near waterbodies should be inspected routinely for leaks and drips.
- e) All leaks will be reported immediately to the Project Manager.
- f) In addition to spill kits located at fuel storage tanks additional spill kits are located at designated central storage location(s). Personnel who deal with fuelling, fuel transfer and pumps and generators are trained in the use of the kits.



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4.12 Dewatering Work Areas and Site Drainage

Potential Environmental Concerns

The major concern associated with dewatering and site drainage is potential siltation and direct fish mortality and/or habitat destruction for freshwater species.

Environmental Protection Procedures

- a) Site water will be discharged to vegetated areas to reduce any potential effects on watercourses.
- b) Discharged water will follow natural surface drainage patterns.
- c) Water from dewatering the underground mine working will be pumped to a series of settling ponds that can provide adequate retention time to allow any suspended solids to be removed prior to final discharge to the environment. Water from the settling ponds will be discharged to a rockfill ditch that will create an evenly distributed flow to the natural vegetation.
- d) Monitoring of site run-off will be conducted as per provincial requirements following effluent quality standards.
- e) If silt is entering any waterbody, filtration or other suitable measures, such as silt fences, settling ponds and dykes will be used to remove silt from, and reduce the turbidity of, water pumped from work areas before discharging.
- f) If monitoring indicates regulated water quality standards are exceeded, Maritime will develop additional protocols in consultation with applicable regulatory agencies.



4.13 Equipment Use and Maintenance

Potential Environmental Concerns

A variety of vehicles and heavy equipment may be used during site work activities. Potential environmental concerns associated with operating and using such equipment include potential air emissions, accidental spills and hydrocarbon leaks that may contaminate on-site water bodies.

Environmental Protection Procedure

- a) Equipment maintenance and fuelling activities will be performed at sites designated by the Project Manager and in compliance with applicable regulations.
- b) Drip pans will be placed underneath pumps, fuel storage, and generators.
- c) Hoses and connections on equipment will be inspected routinely for leaks and drips.
- d) Only minor repairs and maintenance (e.g., lubrication) of 'non-mobile' equipment will be performed on-site. All major repairs are to be performed at a location outside of the project area, where possible.
- e) All fuel or oil leaks will be repaired and reported immediately to Maritime's Project Manager.
- f) All fuel and other hazardous materials will be handled according to the procedures in Section 4.14.
- g) In addition to spill kits located at fuel storage tanks additional spill kits will be located at designated central storage location(s). Personnel who deal with fuelling, fuel transfer and pumps and generators will be trained in the use of the kits.



4.14 Storage, Handling and Transfer of Fuel and Other Hazardous Material

Typical hazardous substances that may be used on site include, but are not limited to:

- petroleum, oil and lubricants;
- chlorinated and non-chlorinated solvents (e.g., cleaner-degreasers);
- flammable gases (e.g., acetylene);
- waste petroleum products (e.g., used engine oil);
- corrosives (e.g., battery acid); and
- glycol (e.g., antifreeze).

Potential Environmental Concerns

The primary concern with using hazardous substances is a potential uncontrolled release to the environment through spillage, and subsequent adverse effects on terrestrial and aquatic habitat and species, soil, groundwater quality, and human health and safety.

Environmental Protection Procedures

- a) The *Workplace Hazardous Materials Information System (WHMIS) Regulations* under the *Occupational Health and Safety Act* will apply to all handling and storage of hazardous materials. All relevant current Material Safety Data Sheets (MSDS) will be readily available for the site.
- b) All necessary precautions will be taken to prevent and reduce the spillage, misplacement or loss of fuels and other hazardous materials. In the event of a reportable spill on-land or a spill, regardless of size, in the freshwater environment, the **Environmental Emergencies 24-Hour Report Line** will be contacted as noted in the contact list in Section 7.0.

A spill is defined as reportable, depending on the class and quantity of dangerous goods involved, which varies between applicable Regulations:

- Reportable spill quantities for hazardous materials are listed in the *Transportation of Dangerous Goods Act*.
- A reportable hydrocarbon spill is defined as loss of gasoline or associated products in excess of 70 litres in the *Storage and Handling of Gasoline and Associated Products Regulations*.
- A spill, regardless of size, that may enter the freshwater environment, must be reported according to the *Fisheries Act*.



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- c) A copy of the Contingency Plan (located in Section 5.1) for fuel and hazardous material spills will be readily available.
- d) All fuel storage systems will be registered and comply with the *Storage and Handling of Gasoline and Associated Products Regulations*.
- e) Only workers who are qualified and trained in handling these materials as stated in the manufacturer's instructions and government laws and regulations will handle fuel and other hazardous materials.
- f) Operators will stay present during the entire refuelling operation. At no time should it be left unattended.
- g) Fuel and other hazardous materials should be stored at least 100 m from any surface water (Gosse et al. 1998).
- h) Handling and fuelling procedures will comply with the *Storage and Handling of Gasoline and Associated Products* and any additional requirements put forth by applicable regulators in order to limit potential contamination.
- i) Fuel storage areas and non-portable transfer lines will be clearly marked or barricaded so that they are not damaged by moving vehicles. The markers will be visible under all weather conditions. Barriers will be constructed in compliance with the *Storage and Handling of Gasoline and Associated Product Regulations*.
- j) Waste oils, lubricants, and other used oil will be retained in a tank or closed container, and disposed of in accordance with the *Used Oil Control Regulations*. Spill trays will be used and substances will be stored in a secured area.
- k) Fire and spill response materials will be kept nearby.
- l) Any soil contaminated by small leaks of oil or grease from equipment will be disposed of according to the *Environmental Protection Act*.
- m) All storage tank systems will be inspected on a regular basis by the operator as per the *Storage and Handling of Gasoline and Associated Products Regulations*. This involves, but is not limited to, gauging or dipping, reconciliation of records and the proper maintenance of reconciliation records for the applicable timeframe noted within permits and regulations.
- n) Contracted fuel suppliers will, before transporting or positioning fuel or oil, provide Maritime with a copy of their fuel and hazardous material spills contingency plan.
- o) Transportation of hazardous and dangerous materials shall be conducted in accordance with applicable regulations. Transportation documents shall be retained in a retrievable filing system and stored for the duration of the undertaking.



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- p) Smoking will be prohibited within 10 m of a fuel storage area.
- q) Fuelling or servicing of mobile equipment will be conducted in designated areas and should not occur within 100 m of any body of water (Gosse et al. 1998).
- r) Drum storage areas will not be located within 100 m of a water body (Gosse et al. 1998). Drums containing hydrocarbon or other hazardous materials will be transported, stored, handled and disposed of such that spillage or leakage does not occur. Maritime must approve the location of drum storage areas.
- s) Small quantities of hazardous material (drums, cans and other containers under 20 L volume) will be stored in a secure location protected from weather and freezing, as well as vehicle traffic.
- t) Where hazardous materials are to be stored outdoors, a designated area will be established, graded and fitted with an impermeable membrane covered with local soil and surrounded by an earth berm.
- u) Decommissioning of any temporary storage tank system will be conducted according to the *Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products*.
- v) Hazardous waste will be moved to an appropriate hazardous waste storage area (refer to Section 4.18 for disposal). These areas are constructed in compliance with all applicable legislation.



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4.15 Propane

Potential Environmental Concerns

There are potential risks associated with propane storage and use. Propane is a flammable substance and poses potential threat to human and animals. In the liquid form, propane could potentially cause frostbite on skin contact. Propane containers could potentially explode if exposed to heat or fire.

Environmental Protection Procedures

- a) Propane storage tanks will be installed and used as per manufacturer's specifications.
- b) Tank maintenance schedules will be set and followed.
- c) Tanks will be free of corrosion and damages.
- d) Areas surrounding propane storage tanks will be well ventilated and free of any possible ignition sources, and combustible materials.



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4.16 Waste Disposal

Potential Environmental Concerns

Waste (e.g., domestic and industrial wastes, grey water, paper, cardboard and wood), if not properly controlled and disposed of, will be unsightly and could potentially cause human safety and health concerns. It could also attract wildlife leading to the potential for human-wildlife conflicts.

Environmental Protection Procedures

- a) All solid waste will be handled according to provisions under the provincial *Environmental Protection Act*.
- b) All solid waste materials shall be considered, prior to disposal, for reuse, resale, or recycling.
- c) Solid waste produced by site personnel and operations will be collected and disposed of at an approved facility, with permission obtained from that facility.
- d) Waste accumulated on site prior to disposal will be confined, so that it does not pose an environmental or health hazard.
- e) Work areas will be kept clear of waste and litter to reduce the potential for attracting wildlife and reducing potential interactions with wildlife (see procedures in Section 5.2 for handling wildlife encounters).
- f) Any waste that may attract animals (i.e., food) will be stored in covered, wildlife-proof containers.
- g) Burning of waste is not permitted without appropriate permits.
- h) All hazardous wastes generated will be handled according to the procedures for handling fuel and hazardous materials (Section 4.14).



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4.17 Sewage Disposal

Potential Environmental Concerns

The release of untreated sewage is a potential concern to human health, drinking water quality, and freshwater and marine ecosystems.

Environmental Protection Procedures

- a) The sewage from portable toilets will be delivered to a licensed contractor and disposed of in compliance with the Newfoundland and Labrador Department of Health guidelines, the *Lands Act*, *Waste Management Regulations*, 2003 under the *Environmental Protection Act* and the *Environmental Control Water and Sewage Regulations*, 2003 under the *Environmental Protection Act*.
- b) Portable toilets or pit privies will be located a distance of at least 25 m from any work site in a direction away from bodies of water. Pit privies will be backfilled upon abandonment.



4.18 Hazardous Waste Disposal

Potential Environmental Concerns

The primary concern with disposing of hazardous substances is the potential for an uncontrolled release to the environment through leakage or accidental spillage, and subsequent adverse effects on terrestrial and aquatic habitat and species, soil, groundwater quality, and human health and safety.

Environmental Protection Procedures

- a) All hazardous waste will be handled according to provisions under the provincial *Environmental Protection Act*. Waste classified as "hazardous" or "special" that cannot be disposed of in regular landfill sites will be sent for disposal to a licensed hazardous waste management company.
- b) All necessary precautions will be taken to prevent and reduce the spillage, misplacement or loss of fuels and other hazardous materials. In the event of a spill on-land or in the freshwater environment, refer to the Contingency Plan (Section 5.1).
- c) A copy of Maritime's Contingency Plan will be present at hazardous material storage sites and fuel transfer locations.
- d) Hazardous waste materials will only be handled by workers who are qualified and trained in handling these materials as stipulated in government laws and regulations.
- e) Waste accumulated on site prior to disposal will be confined, so that it does not pose an environmental or health hazard.
- f) Waste material will not be disposed of on-site or in a body of water.
- g) Burning of waste is not permitted.
- h) Where hazardous waste materials are to be stored outdoors, a designated area will be established, graded and fitted with an impermeable membrane covered with local soil and surrounded by an earth berm.
- i) Waste oils, lubricants, and other used oil will be retained in a tank or closed container, and disposed of in accordance with the *Used Oil Control Regulations*.
- j) Any soil contaminated by small leaks of oil or grease from equipment will be disposed of according to provisions under the *Environmental Protection Act*.
- k) All hazardous wastes generated by alternative treatments will be handled according to the procedures for handling fuel and hazardous materials (Section 4.14).



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4.19 Vehicle Traffic

Potential Environmental Concerns

Vehicular traffic can potentially result in fugitive dust, emissions and noise. Maritime is committed to the proper operation and maintenance of its vehicles to reduce adverse environmental impacts.

Environmental Protection Procedures

- a) All vehicle and equipment use, including the use of ATVs, will be restricted to designated routes within and between work, laydown, maintenance and storage areas.
- b) All vehicles and equipment will be properly maintained to meet emission standards.
- c) Travel in areas outside designated work areas will not be permitted.
- d) All vehicles and equipment will yield to wildlife (see procedures in Section 5.2 for handling wildlife encounters).
- e) All vehicles and equipment will yield to people, if present, and reduced speeds will be maintained on all roadways.
- f) Chasing and/or harassing wildlife with vehicles and equipment will not be permitted.
- g) Maintaining and refuelling vehicles will be restricted to designated areas (See Section 4.14).
- h) Heavy equipment (e.g., dump trucks and front-end loaders) will only be used in work areas.
- i) Access roads will be monitored for signs of erosion and appropriate action will be taken to repair roads, when necessary.
- j) As required, the contractor will implement dust suppression measures such as watering the roads.



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4.20 Dust Control

Potential Environmental Concerns

The environmental concerns associated with dust include potential human health effects and potential effects on aquatic ecosystems and vegetation.

Environmental Protection Procedures

- a) Dust from site work activities will be controlled using water. In the event of excessive dust, water will be applied to travel and work surfaces.
- b) Waste oil will not be used for dust control, but other agents such as calcium chloride may be used with the approval of the appropriate regulatory agencies.



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4.21 Noise Control

Potential Environmental Concerns

A variety of noises associated with site activities can potentially cause negative effects on wildlife resources in terms of their distribution and abundance.

Environmental Protection Procedures

Measures will be implemented wherever possible to minimize potential impacts arising from a variety of noise sources.

- a) Adherence to all permits, approvals and/or authorizations.
- b) All vehicles and generators will have exhaust systems regularly inspected and mufflers will be operating properly.



4.22 Drilling and Blasting

Maritime's contractor will be responsible for the transportation, storage, and use of explosives.

Environmental Concerns

Potential environmental concerns associated with on-land blasting include destruction of vegetation zone, noise disturbances to wildlife, effects to fish and aquatic animals, disturbance of historic resources, dust generation, and the potential introduction of silt and ammonia into water bodies.

Environmental concerns related to drilling are potential surface disturbances, disposal of drilling fluids and cuttings, potential siltation, generation of dust, noise and the potential impacts on terrestrial habitats, air quality, aquatic ecosystems, and historic resources.

Environmental Protection Procedures

General Blasting Environmental Protection Procedures:

- a) The contractor will conduct all blasting work in compliance with the appropriate permits and/or approvals and authorizations. All blasters will have a Blasters Safety Certificate and all blasting will be conducted in adherence to safe work procedures and applicable legislation.
- b) The contractor will obtain the appropriate approvals for all explosive magazines.
- c) The contractor will handle, transport, store and use explosives and all other hazardous materials in compliance with all applicable laws and regulations of Occupational Health and Safety Act and the Dangerous Goods Transportation Act.
- d) The contractor will use blasting patterns and procedures which minimize shock or instantaneous peak noise levels.
- e) The contractor will not blast in the vicinity of fuel storage facilities.
- f) Where necessary, runoff from blasted areas will be monitored and sampled at discharge sites.



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- g) The contractor will coordinate and schedule blasting activities to minimize the number of blasts required. In order to minimize the seismic effect, blasting patterns and procedures will be used to reduce the shock wave and noise.
- h) The contractor will use explosives in a manner that will minimize damage or defacement of landscape features, trees and other surrounding objects by controlling through the best methods possible (including time-delay blast cycles) the scatter of blasted material beyond the limits of activity.
- i) If birds or wildlife are detected in the area, described blasting will only proceed when wildlife have left the area, or when consultation with Wildlife Division has occurred.



5.0 CONTINGENCY PLANS

Contingency plans to address accidents and unplanned situations have been developed, and will be modified as required throughout ongoing site work activities.

The following contingency plans have been developed:

- Fuel and Hazardous Material Spills;
- Wildlife Encounters;
- Forest Fires, and
- Discovery of Historic Resources.

Notwithstanding these contingency plans, a policy to implement preventative measures as the first line of defence against the possibility of accidents will be adopted.

5.1 Fuel and Hazardous Material Spills

Potential Environmental Concerns

Fuel and hazardous materials can potentially be damaging to vegetation, soil, surface water, ground water, wildlife, aquatic organisms, historic resources and human health and safety.

Environmental Protection and Response Procedures

In case of a fuel or hazardous material spill, the following procedures will apply.

- a) The individual who discovers the leak or spill will make a reasonable attempt to immediately stop the leakage and contain the flow, if safe to do so. Spill kits are located at fuel storage tanks and at designated central storage location(s).
- b) Spill location, type of fuel or hazardous material, volume and terrain condition at the spill site will be determined and reported immediately to the Project Manager, who will report it immediately to the applicable regulatory agency.
- c) In the event of a reportable spill on-land, or any spill regardless of size that may enter a waterbody frequented by fish, must be reported immediately to the **Environmental Emergencies 24 Hour Report Line 709-772-2083 or 800-563-9089**. (Refer to Section 4.14 for the definition of reportable spills on-land versus in freshwater environments.) The spill occurrence shall be documented on the Spill Report Form in Appendix C.



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Required information may include but is not limited to:

- i) name of reporter and phone number;
- ii) time of spill or leak;
- iii) time of detection of spill or leak;
- iv) type of product spilled or leaked;
- v) amount of product spilled or leaked;
- vi) location of spill or leak;
- vii) source of spill or leak;
- viii) type of accident - collision, rupture, overflow, other;
- ix) owner of product and phone number;
- x) if the spill or leak is still occurring;
- xi) if the spill or leaked product is contained, and if not, where it is flowing;
- xii) wind velocity and direction;
- xiii) temperature;
- xiv) proximity to waterbodies, water intakes, and facilities, and
- xv) snow cover and depth, terrain, and soil conditions.

d) The Project Manager will act as the "On-Scene-Commander" for the purposes of cleaning up a fuel or hazardous materials spill. The Project Manager will be familiar with spill clean-up procedures and mobilization procedures of the clean-up equipment and will have full authority to take necessary and appropriate action without unnecessary delay.

The overall responsibility of coordinating a clean-up and maintaining this contingency plan current and up-to-date will be the Project Manager.

Personnel will be trained on the procedures to follow in case of fuel and hazardous material spills as well as information related to necessary line of communication required. Maritime will develop a personnel responsibilities list before the start of site work activities.

A complete list of spill response equipment will be generated and distributed on-site before the start of any site work activities.



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- e) In reaching decisions on containment and clean-up procedures, the following criteria will be applied:
 - i) minimize danger to workers and public;
 - ii) protect water supplies;
 - iii) minimize pollution to watercourses;
 - iv) minimize area affected by spill, and
 - v) minimize the degree of disturbance to the area and watercourses during clean-up.
- f) The Project Manager or COO will act in consultation with the regulating authorities to:
 - i) assess site conditions and environmental impacts of various cleanup procedures;
 - ii) assess potential for fuel recovery versus burning;
 - iii) deploy on-site staff to mobilize pumps and empty 215 L drums or other appropriate storage containers to the spill site;
 - iv) deploy on-site staff to build containment dykes and commence pumping contaminant into drums;
 - v) apply absorbent as necessary;
 - vi) dispose of all contaminated debris, cleaning materials and absorbent by burning, if appropriate, or by placing it in an approved land-fill site, and
 - vii) take all necessary precautions to avoid the incident in the future.
- g) The Project Manager will be responsible for the preparation of a written report which will be sent as soon as possible, but no later than 30 days after the spill, to Maritime's COO and from there, to the applicable regulatory agencies.



5.2 Wildlife Encounters

Potential Environmental Concerns

Wildlife encounters pose a potential risk for stress or injury to both the wildlife and site personnel. Control measures and environmental protection procedures have been put in place to reduce this potential risk to wildlife and humans.

As a protection measure, hunting, trapping or fishing is not permitted on any work site.

Environmental Protection and Response Procedures

All personnel and contractors are responsible to see that the following procedures and rules are implemented and adhered to:

- a) Site and working areas will be kept clean of food scraps and garbage.
- b) Waste will be collected for disposal in appropriate containers and routinely transferred to the approved location or facility.
- c) No attempt will be made by any worker at the project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot.
- d) Equipment and vehicles will yield the right-of-way to wildlife.
- e) All personnel should be aware of the potential for encounters with bears, coyotes, caribou, moose, etc. Any wildlife sightings will be recorded. Personnel are to report any bear sightings to the Project Manager. The Project Manager will notify the COO to report any bear sightings and to assess actions for follow-up.
- f) The Project Manager will be responsible for all actions in response to nuisance animals (e.g., bears) in the work area and will advise the COO, if required, for further action.
- g) Under provincial wildlife regulations, the displacement and release of any animal is the sole jurisdiction of the NFLR and is to be undertaken only under appropriate supervision.
- h) If the nest of any raptor, or other birds are encountered, work in the area is to be halted until the Project Manager and/or COO is contacted and has had the opportunity to contact the Wildlife Division and appropriate mitigation is applied.



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5.3 Forest Fires

Potential Environmental Concerns

Activities related to site work could potentially result in a fire, which could spread to the surrounding area. Such events could potentially be damaging to vegetation and wildlife, air and water quality, human health and safety, and Maritime assets.

Environmental Protection and Response Procedures

Maritime and their contractors will take all precautions necessary to prevent fire hazards when working at the site. These include but are not limited to:

- a) Disposal of all flammable waste on a regular basis.
- b) Maritime or their contractor will provide sufficient firefighting equipment to suit its labour force and fire hazards. Such equipment will be in good working order, comply with, and be maintained to the manufacturer's standards.
- c) Maritime or their contractor will ensure all personnel are trained in the use of such equipment.
- d) In the event of a forest fire, Maritime or the contractor will take immediate steps to contain or extinguish the fire, if safe to do so.
- e) Maritime's Project Manager will appoint a supervisory staff member as "On-Scene-Commander" for fighting any forest fires, if safe to do so.
- f) Fires should be reported immediately to:
 - i. the Project Manager and COO; and
 - ii. Forestry Division, 24 hr Forest Fire Emergency Line at (866) 709-3473.
- g) The following information will be provided:
 - i. name of the reporter and phone number;
 - ii. time of detection of the fire;
 - iii. size of the fire; and
 - iv. location of the fire.



5.4 Discovery of Historic Resources

Potential Environmental Concerns

Historic resource material that is disturbed, destroyed or improperly removed from a site represents a potential cultural loss of information and history that could otherwise be handled and interpreted in an efficient and appropriate manner.

Environmental Protection and Response Procedures

- a) If suspected archaeological material is encountered, stop all work in the immediate area of the discovery until authorized personnel from Maritime, having consulted with the Provincial Archaeology Office, permit resumption of the work.
- b) Mark the site's visible boundaries. Personnel will not move or remove any artifacts or associated material unless the integrity of the material is threatened.
- c) The Project Manager will report the find with the following information to the Provincial Archaeology Office, Department of Tourism, Industry and Innovation in St. John's, and comply with the instruction provided:
 - i) nature of the find;
 - ii) precise descriptive and map location and the time of the find;
 - iii) nature of the activity resulting in the find;
 - iv) identity of the worker(s) making the find;
 - v) present location of the material, if moved, and any protective measures initiated for the material and the site, and
 - vi) extenuating circumstances.

6.0 EPP CONTROL REVISIONS

This EPP will be revised as necessary to reflect site-specific environmental protection requirements, and allow updates as work progresses or changes. All EPP holders may initiate revisions by forwarding proposed revisions to the Project Manager and/or the COO. The following information will be provided on the Revision Request Form (see Appendix D) for all revision requests:



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- section to be revised;
- nature of the revision;
- rationale for the revision (i.e., environmental safety, worker safety etc), and
- who submitted the revision request.

Approval for revisions will be required from Maritime. When the PM and/or COO approves a revision request, details of the revision will be distributed to all EPP holders and will be documented in the Revision History Log (Appendix E). Each revision will be accompanied by:

- revision instructions;
- list of sections being superseded; and
- an updated Table of Contents indicating the status of each section in the EPP.

When EPP holders receive a revision, they will, in a timely manner:

- read the text of the revision;
- check the control sheet to confirm that all the listed pages have been received;
- remove and destroy the superseded pages from their copy of the EPP;
- insert the revised pages in the proper place in their copy of the EPP;
- page check the EPP, using the updated table of contents to confirm the EPP is complete and current;
- enter the revision number and date entered on the Revision History Log;
- incorporate the revision into the area of responsibility, as appropriate, and
- confirm that their personnel are familiar with the revisions.



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7.0 CONTACT LIST

Canadian Coast Guard
Environmental Response
24-Hour Report Line
St. John's 709-772-2083
Other Areas 1-800-563-9089

Environment and Climate Change Canada

Environmental Protection Branch
Glenn Troke
Environmental Assessment Coordinator
Tel: 709-772-4087 or 709-763-0064

Environment and Climate Change Canada
Canadian Wildlife Service

Kim Mawhinney
Manager, Regulatory Affairs
Tel: 709-772-7456 or 709-690-3382

Department of Fisheries and Oceans

Julie Whiteway
Area Habitat Biologist, Central
Tel: 709-292-5197

Department of Fisheries and Land Resources

24 hr Forest Fire Emergency Line
Tel: 1-866-709-3473 or 709-637-2408

Service NL
Occupational Health and Safety Division
Grand Falls-Windsor Office
Tel: 709-292-4400
Serious Workplace Accidents (24 hrs): 709-729-4444

Department of Municipal Affairs and Environment
Water Resources Management Division
Haseen Khan, Director
Tel: 709-729-2563
Email: hkhan@gov.nl.ca

Department of Fisheries and Land Resources, Wildlife Division
Kirsten Miller
Senior Wildlife Biologist
Tel: 709-637-2353
Email: kirstenmiller@gov.nl.ca

Department of Municipal Affairs and Environment
Pollution Prevention Division
Dan Michelsen, Director
Tel: 709-729-2556
Email: michielsend@gov.nl.ca



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**Department of Fisheries and Land
Resources, Forestry Division**

24 hr Forest Fire Emergency Line

Tel: 1-866-709-3473 or 709-637-2408

**Department of Natural Resources
Mineral Lands Division**

Kevin Sheppard, Director

Tel: 709-729-6425

Email: KevinSheppard@gov.nl.ca

**Department of Fisheries and Land
Resources, Crown Lands Administration
Division**

Western and Labrador Regional Lands Office

Tel: 709-637-2390

**Department of Tourism, Culture, Industry &
Innovation**

Provincial Archaeology Office

Martha Drake

Provincial Archaeologist

Tel: 709-729-2462

Email: mdrake@gov.nl.ca



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8.0 REFERENCE MATERIAL

Canadian Council of Ministers of the Environment. 1994 and updates. Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products.

Department of Environment and Conservation, Water Resources Management Division. Environmental Guidelines for Stream Crossings, Culvert Installation and Fording.

Department of Natural Resources. Estimated 1995. Environmental Guidelines for Construction and Mineral Exploration Companies.

Department of Forest Resources and Agrifoods. 1998. Environmental Protection Guidelines for Ecologically Based Forest Resource Management (Stand Level Operations).

Gosse, M.M., A.S. Power, D.E. Hyslop, and S.L. Pierce. 1998. Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador. Fisheries and Oceans, St. John's, NL.



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9.0 SIGNATURE PAGE

Maritime Resources Corporation

The undersigned certify that they have reviewed, and understand their role and responsibility regarding:

GREEN BAY PROPERTY
ENVIRONMENTAL PROTECTION PLAN

As part of their Orientation.

representing -

Name (Printed)

Company

Signature of above

Date

Name of Manager or Supervisor

-

Manager or Supervisor's Signature

Date



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APPENDIX A

LIST OF ABBREVIATIONS AND ACRONYMS



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LIST OF ABBREVIATIONS AND ACRONYMS

ATV	All-terrain Vehicle
DFO	Department of Fisheries and Oceans Canada
EPP	Environmental Protection Plan
MSDS	Material Safety Data Sheet
NLDMAE	Newfoundland and Labrador Department of Municipal Affairs and Environment
NLDNR	Newfoundland and Labrador Department of Natural Resources
NLDFLR	Newfoundland and Labrador Department of Fisheries and Land Resources
OHS	Occupational Health and Safety
PPD	Pollution Prevention Division
WHMIS	Workplace Hazardous Materials Information System
WRMD	Water Resource Management Division



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APPENDIX B
CONTROLLED COPY DISTRIBUTION LIST



GREEN BAY PROPERTY
ENVIRONMENTAL PROTECTION PLAN

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Date: January 30, 2018

CONTROLLED COPY DISTRIBUTION LIST

Maritime Resources Corp.	Individual or Location



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APPENDIX C
SPILL REPORT FORM



GREEN BAY PROPERTY
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Fuel and Hazardous Materials Spill Report Form

1. Name of reporter and phone number: _____
2. Time of spill or leak: _____
3. Time of detection of spill or leak: _____
4. Type of product spilled or leaked: _____
5. Amount of product spilled or leaked: _____
6. Location of spill or leak: _____
7. Source of spill or leak: _____
8. Type of accident - collision, rupture, overflow, other: _____
9. Owner of product and phone number: _____
10. Is the spill or leak still occurring: YES NO
11. Is the spill or leaked product contained: YES NO

If NO, where it is flowing and what actions are being taken for containment:

12. Wind velocity and direction: _____
13. Temperature: _____
14. Proximity to waterbodies, water intakes, and facilities: _____

15. Snow cover and depth, terrain, and soil conditions: _____

In the event of a reportable spill on-land or any spill regardless of size that may enter a waterbody
frequented by fish must be reported immediately to:

Environmental Emergencies 24 Hour Report Line 709-772-2083 or 800-563-9089.



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APPENDIX D
REVISION REQUEST FORM



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Date: January 30, 2018

SECTION TO BE REVISED:

NATURE OF REVISION:

RATIONALE FOR REVISION:

(i.e., environment/worker safety, etc.)

SUBMITTED BY:

Please submit this request to the Maritime Resources Corporation Project Manager.



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APPENDIX E
REVISION HISTORY LOG



GREEN BAY PROPERTY

ENVIRONMENTAL PROTECTION PLAN

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Date: January 30, 2018

REVISION HISTORY LOG

APPENDIX B

Letters of Support from Towns of King's Point and Springdale



TOWN OF KING'S POINT
P.O. BOX 10
KING'S POINT, NL A0J 1H0
Tel (709) 268-3838 Fax (709) 268-3856
Email: kpcouncil@eastlink.ca

July 2, 2020

To Whom It May Concern:

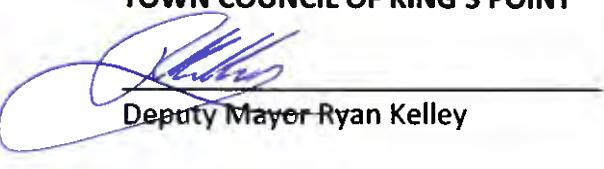
**RE: SUPPORT FOR PROPOSED HAMMERDOWN MINE OPERATION
- MARITIME RESOURCES**

The Town Council of King's Point hereby expresses formal support for the development of Maritime Gold's Hammerdown Mine project, situated adjacent to the town's municipal boundary, and the former site of previous underground mine operations. Since project inception and to present day, Maritime Gold has continued with an outstanding show of support and a willingness to continue to develop a mutually beneficial relationship with positive impact and growth for our municipality and our citizens.

King's Point, like other small rural communities, welcomes the opportunities and benefits that are anticipated from this project development. Direct and indirect employment and stimulation of existing local businesses will certainly have significant impact, both locally and regionally. Additionally, these current challenging economic times and regional impacts of the ongoing pandemic have increased our anticipation for this project to proceed.

As a region with significant mining history, we have much to offer Maritime Resources and ensure success with the Hammerdown Mine project development and operations and look forward to seeing the project seek regulatory approval in the near future.

Respectfully,
TOWN COUNCIL OF KING'S POINT


Deputy Mayor Ryan Kelley



TOWN OF SPRINGDALE

(INCORPORATED IN 1961)

Garrett Macdonald
Maritime Resources
1900 - 110 Yonge St
Toronto, ON
Canada M5C 1T4

June 19, 2020

Dear Mr. Macdonald:

Please accept this letter, on behalf of The Town of Springdale, as support for the Maritime Resources Hammer Down Project located in the Central Region of Newfoundland and Labrador.

The Springdale Town Council identifies with the economic benefit associated with the success of Mining Projects such as Maritime's Hammer Down venture. The Town of Springdale is well positioned to accommodate the growing needs of the mineral exploration community and are excited about Maritime's progress to date.

With a population of 2,971, Springdale provides small-town appeal with big-town services. As the economic and business centre of the Green Bay area, Springdale has been identified as a modernized rural community boasting important critical infrastructure including an industrial park, health care facilities, banking institutions, mining services, commercial rental space, restaurants, and a volunteer fire department.

We look forward to the possibility of working with Maritime Resources on this exciting new venture. The Town Springdale would like to once again pledge their support for Maritime Resources application for registration and permitting of the Hammer Down project.

Sincerely,
Town of Springdale



Dave Edison
Mayor





TOWN OF KING'S POINT
P.O. BOX 10
KING'S POINT, NL A0J 1H0
Tel (709) 268-3838 Fax (709) 268-3856
Email: kpcouncil@eastlink.ca

June 12, 2019

Dear Garett,

RE: Town of King's Point Resource Guide

Our council has put together an outline of resources for your perusal.

I would like to thank you for your consideration and again the meeting with council was very informative.

Yours truly,

TOWN OF KING'S POINT

Mayor Perry Gillingham

Town of King's Point Resource Guide

The following resource guide provides an overview of the opportunities that may prove to benefit Maritime Resources in their development and determination of the feasibility assessment of the Hammerdown Gold Mine. Availing of local services and resources will likely provide a cost-effective approach to mine construction and operation, eliminating indirect overhead which are often associated with non-local service/resource providers.

The Town of King's Point is excited about the opportunity to assist in making the Hammerdown Gold project a successful venture once again, and hope to work with Maritime Resources to maximize the value of the operation for both the company and the citizens of our Town.

Industrial business:

The Town of King's Point is equipped to handle many of the contract services required to establish and sustain the Hammerdown operation. While a 'full service' provider may not exist, there are many smaller companies with adequate experience/resources that may be suitably matched to a small operation such as Hammerdown, offering services for a specific aspect of the operation. Local companies may be able to offer competitive pricing and offer availability on an as needed basis if strategies are considered for optimum contract value, due to proximity of these companies to the operation.

As indicated, below, a wide range of contracting services are available, with some being mine specific. Additionally, other resources, while not specific in nature to mining, may be able to strategically adapt/diversify to the needs of the Hammerdown operation if provided the opportunity.

The following companies are established in the Town of King's Point, and could be competitive contributors to the success of the Hammerdown operation:

- CKS – located in King's Point, Newfoundland, CSJ Mine Services offers surface and underground mining construction services. Our underground construction crews offer jackleg mining, ventilation bulkhead, shotcreting, building pump station, hole grouting, pipeline and many more services.
- J&J Paving/Construction – road building, paving, earthworks, trucking,
- Terra Trak – earthworks, snow clearing, trucking;
- Dawe's Mobile Welding – full service industrial welding and fabrication shop;
- Den's Garage – light vehicle and small engine repair (heavy equipment as well);
- Green Bay Fiber – fiberglass fabrication;
- Coastal Boats - fiberglass fabrication;
- Specialty Fiberglass Ltd - fiberglass fabrication;
- Lawrence Caines Trucking;

- Pelley Contracting – equipment inspections, glass repair, earthworks;

People Resources

Local human resources are available from a variety of backgrounds ranging from Senior Management to technical surveying and other fields. A captive pool from establishing a local workforce can be beneficial for employee retention and general workforce motivation. We have leadership available to help develop good work culture and many people bring skill sets that have been developed from working with large multinational corporations and operations throughout Canada and overseas.

It is important to note that this list does not include people working and living away who may be well suited to any underground position. As a coarse assessment of experience that exists within our town, the following skillsets have been determined based on the knowledge/background/work experience of our citizens.

- Experienced miners(27)
- Experienced management – (6)
- Experienced diamond drillers – (14)
- Experienced trades (mechanics/welders/electrician)–(14)
- Experienced heavy equipment operators –(34)
- Experienced technical services (survey, mill operators, carpenter) - (8)

Goods and Services Providers

It is important to also mention other goods and service providers that exist in the Town which may be able to cater to other direct or indirect needs of the Hammerdown operation. Services to support accommodations, food service, and technical services such as survey and janitorial are also presented for consideration. Additionally, convenience grocery and hardware, gasoline and other consumables are available from local businesses.

Services:

- Trailside Diner- Restaurant, accommodations, possible meeting/conference center
- By the Sea Café – Restaurant, accommodations, possible meeting/conference center
- Janitorial service;
- Salvation Army Home League – catering services;
- Local Women’s Institute – catering services;
- Stephen Burt Surveys;

Goods providers:

- King’s Point Sales and Service – gas station, small confectionary;
- King’s Point Grocery – full grocery and general hardware;

Town of King's Point

Finally, it is important to mention that the Town of King's Point is poised to partner with Maritime Resources and offers the following services/facilities for consideration in the future for mutual benefit:

- Meeting/banquet venue's – Town office, town firehall, school
- King's Point fire protection services;
- RV park – employee families visit/summer accommodations if desired;
- Alexander Murray Trail, community park, ball field – for family days or other company sponsored events;
- Community garden – partnership for progressive reclamation and sustainability initiatives;

In closing, and moving forward in a positive direction, the town of King's Point, despite its small rural population of 650, does have the capability of providing effective resources/services to make the Hammerdown operation a successful one. We trust that as the project moves forward, we continue to build on an effective and mutually beneficial relationship which maximizes the value of the asset for Maritime Resources and the citizens of our Town. As you can appreciate, your plans to develop this operation has the potential to be immensely impactful on the short, and long-term viability of our small rural community, enticing prosperity and possibly growth. Indirectly, your operation has the potential to keep families in our community and consequently maintain the student population in our school, while at the same time building capacity and skills that can be transferrable abroad long after Hammerdown operations cease. Let us work with you to understand the future opportunities and maximize future success.

APPENDIX C

Maritime's Safety, Health, Environment and Social Policy



Safety, Health, Environmental and Social Policy

Maritime Resources Corp. (the “Company”) and its subsidiaries are committed to the wellbeing of our employees, our partners and the communities in which we work. We recognize the importance of ensuring that we develop our businesses by applying the principles of sustainable development. We will use best practices and ensure that, when utilizing the resources and environment in the present, we will not compromise the livelihoods of future generations. We are committed to respecting the social, cultural and economic wellbeing of our partner communities.

The Company endorses the definition of Corporate Social Responsibility as proposed by the World Bank:

Corporate Social Responsibility is the commitment of business to contribute to sustainable economic development – working with employees, their families, the local community and society at large to improve the quality of life, in ways that are both good for business and good for development.

All employees and contractors are responsible for incorporating the actions necessary to fulfill this commitment into their planning and work.

To meet these responsibilities, the Company and its subsidiaries will provide our employees with the necessary resources to:

- Design, construct, operate and reclaim our facilities to meet or surpass applicable regulations and laws.
- Promote active commitment to this policy and enhance their capabilities in its implementation.
- Provide a workplace where open communication between our employees and management on health, safety, environmental and operating practices is encouraged.
- Ensure that effective, realistic systems are in place to minimize risk to health, safety and the environment.
- Communicate openly with the public and government regarding our plans, programs and performance.

- Work cooperatively with government agencies, local communities, suppliers and trade associations to ensure the safe handling, use and disposal of all our materials and products.
- Acquire scientific knowledge and technologies to continuously improve the safe, efficient use of our processes, materials and emergency response systems.
- In the absence of legislation, apply best industry practices to advance environmental protection and to minimize environmental risk.
- Maintain an active, continuing, self-monitoring program to ensure compliance with government and Company requirements.
- Respect and encourage the understanding and acceptance of local culture, language and customs to facilitate long-term benefits for all parties.

President and CEO
December 2019

APPENDIX D

Maritime's Community Engagement Newsletter, April 2020



TOWN OF KING'S POINT, NEWFOUNDLAND & LABRADOR



MARITIME RESOURCES

Community Update

April 14, 2020

IN THIS ISSUE

Positive economic study announced for the Hammerdown Gold Project

On February 29th, 2020 Maritime Resources announced a positive and robust Preliminary Economic Assessment (PEA) for the Hammerdown Gold Project near the towns of King's Point and Springdale NL. The PEA was the result of 2 years of exploration drilling and the completion of numerous technical and environmental studies to help design a robust, sustainable project with room to grow.

Project Concept

The project design calls for a combination of open pit and underground mining of two gold deposits – Hammerdown and Orion. Material would be crushed and pre-concentrated on site before being hauled to the processing plant. The existing gold plant at the Nugget Pond Mill near Baie Verte was selected and is the same plant that processed ore from the original Hammerdown mine in 2000-2004.

Innovation Unlocks Value

A relatively new technology called “pre-concentration” or “ore sorting” will be used at Hammerdown. These sorting machines are designed to separate gold bearing rock from unmineralized rock without the use of chemicals, and sometimes without water. They use X-rays and laser scanners instead to identify mineralized particles that are then separated using jets of

compressed air to concentrate the mass carrying the gold. Test work conducted by Maritime in 2019 showed this technology to be very effective at separating gold carrying mineralization from waste rock.

Project Economics

Garett Macdonald, President & CEO of Maritime adds “The Hammerdown Gold Project has the advantage of high-grade resources, available infrastructure and a skilled local workforce. This new study showed a strong business case for continuing our work to re-open the mine with a few new improvements to ensure its longevity. With a 9 year mine life and 70,000 oz/y of gold production over the initial 5 years, an expected capital investment of \$57M and exploration upside Hammerdown is one of the highest quality gold projects in Canada at the moment”.

Next Steps

Over the next 12 months Maritime will complete a feasibility study for the project and will start project permitting prior to making a production decision. Community and regulatory consultation are key activities that will take place throughout the permitting process. Maritime fully intends to engage all stakeholders as the Project continues to develop.



Hammerdown Gold Project

Maritime continues to make progress at the Hammerdown site. The project is managed by industry veteran Larry Pilgrim, P.Geo., pictured above on the right.



Environmental Baseline Studies

GEMTEC staff Leanne Stein, P.Eng. and Christine Chase, M.Eng., P.Eng. testing water levels and flows near the Hammerdown project.

VALMOT ACADEMY GRADUATES

**Valmont Academy Graduates**

Maritime was pleased to present bursaries to the 2019 graduating class from Valmont Academy. Left to right above – Ryan Kelley, Principal of Valmont Academy, Patrick Carroll, Hailey Noseworthy and Rylie Burt and Larry Pilgrim of Maritime Resources.

FAST FACTS

521,500 oz

Total gold production over the 9 year mine life outlined in the 2020 PEA study

US\$1,720

Current price of gold per ounce, as of April 14, 2020

US\$320

Average price of gold per ounce when the Hammerdown mine last operated between 2000-2004

FOR MORE INFORMATION

Springdale Office: (709) 701-8514

Toronto Office: (416) 365-5321

info@maritimeresourcescorp.com

www.maritimeresourcescorp.com



Winter conditions at the old Hammerdown mine portal. The historic underground workings remain flooded and extensive monitoring for bats has indicated this area is likely not used for roosting or overwintering.

Environmental Baseline Studies

by GEMTEC Consulting Engineers & Scientists Limited

A key part of any resource development project is understanding the baseline conditions within the natural environment before the project is designed. This allows us to include design features that minimize impacts during operations and plan for long term closure before any activity takes place.

Hammerdown is a brownfields site in that it was an operating gold mine between 2000-2004. The mine was closed and fully rehabilitated in 2005.

Throughout 2019 Maritime and its consultant GEMTEC completed a range of environmental baseline studies at the Hammerdown Project to characterize the existing environment, including terrestrial, aquatic, hydrological and hydrogeological studies.

Initial findings from site

- No rare or endangered plant or animal species were observed in the Project area.
- The region is home to typical boreal forest wildlife species such as moose, black bear, coyote, snowshoe hare, beaver and red squirrel.
- Short-eared owl surveys were carried out but none were detected.
- Fish habitat and stream assessments were carried in Hammerdown Creek and Muir Creek, as well as two other small watercourses/drainages located in the Hammerdown deposit area.
- No fish were detected and only marginal fish habitat is present throughout. In addition each watercourse/drainage had several dry portions along its length.
- Hydrology and hydrogeology studies were completed to characterize existing conditions and understand the interaction of surface water and groundwater systems in the Project

Tree Planting at Hammerdown

In 2019 students from Valmont planted over 500 trees at Hammerdown. The site looks great.

