NOVA SCOTIA
Environment

Comment Index

Goldboro Gold Project

Publication Date: August 2, 2022

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Nova Scotia Mi'kmaq

Number	Source	Date Received
1	Native Council of Nova Scotia	July 8, 2022
2	Kwilmu'kw Maw-Klusuaqn Negotiation Office (KMKNO)	July 14, 2022

Public

Number	Source	Date Received
1	Anonymous	June 10, 2022
2	Anonymous	June 10, 2022
3	Anonymous	June 10, 2022
4	Anonymous	June 11, 2022
5	Anonymous	June 11, 2022
6	Anonymous	June 11, 2022
7	Anonymous	June 11, 2022
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9	Anonymous	June 13, 2022
10	Anonymous	June 13, 2022
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NOVA SCOTIA
Environment and Climate Change

Barrington Place
1903 Barrington Street
Suite 2085
Halifax, Nova Scotia
Canada B3J 2P8

Date: June 30, 2022

To: Candace Quinn, Environmental Assessment Officer

From: Peter Labor, Director, Protected Areas and Ecosystems

Subject: **Goldboro Gold Project**

The Protected Areas and Ecosystems Branch have reviewed the Environmental Assessment for the Goldboro Gold Project.

The project does not have any direct impacts on Protected Areas so we have no comments.

Date: July 6, 2022

To: Candace Quinn, Nova Scotia Environment & Climate Change

From: Beth Lewis, Consultation Advisor
Nova Scotia Office of L'nu Affairs

Janel Hayward, Consultation Advisor
Natural Resources & Renewables

Subject: **Signal Gold Environmental Assessment Registration**

Nova Scotia Office of L'nu Affairs (OLA) and Nova Scotia Department of Natural Resources & Renewables (NRR) has reviewed the Signal Gold Environmental Assessment Registration Document (EARD) for Environmental Assessment for the Signal Gold Project Site dated June 10, 2022. The following review considers whether the information within the submission will assist the Province in assessing the potential of the proposed project to adversely impact established and/or asserted Mi'kmaw Aboriginal and Treaty Rights. OLA and NRR staff reviewed all sections of the EARD, particularly Sections 3.3 Indigenous Engagement, 5.0 Environmental Effects.

Section 2.4.3 Closure
On page 42 and in Appendix B, the proponent details the Reclamation and Closure Plan and stakeholder list (page 24).

Comment: The Mi'kmaq should be identified as rightsholders for the Reclamation and Closure Plan. Continued engagement by the proponent with the Mi'kmaq of Nova Scotia on the further development and implementation of the Reclamation and Closure Plan should be considered as a condition of the EA approval.

Section 3.3 Indigenous Engagement
On page 69, Signal Gold outlines issues, concerns, and impacts raised by the Assembly of Nova Scotia Mi'kmaw Chiefs (via the KMKNO). In the **Executive Summary** (page ii and vi) and **Introduction** (page 40), the proponent indicates that an MOU has been signed with the Assembly of Nova Scotia Mi'kmaq Chiefs regarding a process to negotiate a mutual benefits agreement, with the first step focusing on environmental concerns. As well, in **Section 5.7.8 Monitoring and Follow up** (page 310), the proponent proposes ongoing engagement with the Mi'kmaq regarding follow-up programs and monitoring.

Comment: A mutual benefits agreement can provide a path to address specific accommodations for a project, however, it may not fully accommodate for any potential adverse impacts to Aboriginal and Treaty

Rights. The MBA is with ANSMC, which represents 10 of the 13 communities in consultations. Sipekne'katik, Millbrook, and Membertou do not consult as part of the Assembly and may seek separate agreements. Continued engagement efforts with communities outside of the ANSMC should be considered as a condition of the EA approval.

Section 5.11 Indigenous Peoples

Included in the EARD is a Mi'kmaq Ecological Knowledge Study (MEKS) from 2017 (MEKS). The proponent anticipates an updated MEKS to be completed in 2022. In addition, the proponent identifies that potential mining operations will limit Mi'kmaq traditional land and resource use. It was further identified (page 509) that members of Paqtnkek, Millbrook, and Sipekne'katik are known to have been involved in resource harvesting in the area. The MEKS study area from 2017 identified trout fishing areas, harvest areas, and hunting areas from historic and recent past, as well as some current use.

Comment: Completing the updated MEKS should be considered as a condition of the EA approval.

Section 5.12 Culture and Heritage Resources

On pages 517 and 522, the proponent outlines that there were 11 areas of moderately elevated potential for Mi'kmaq and ancestral archaeological resources identified within the project area. Of these sites, it is expected that five could potentially be impacted by the project.

Comment: It is expected that Signal Gold follow the recommendations outlined in the ARIAs that have been reviewed and approved by CCTH. Ongoing engagement with the Mi'kmaq during implementation of the ARIA recommendations should be considered as a condition of the EA approval.

Section 5.8 Fish and Fish Habitat

Page 320 (and Appendix H) identifies two wetlands that support fish, specifically Brook Trout and American Eel, in Gold Brook Lake. The proponent has identified that through engagement efforts with the Mi'kmaq, that they have concerns related to fish and fish habitat, especially Brook Trout and American Eel (page 322). Concerns relate to direct and indirect impacts to these species and their habitats, as well as concerns related to relocation during rescue efforts

Comment: Brook Trout and American Eel are identified species of significance to the Mi'kmaq. Potential impacts to fish and fish habitat may potentially have an adverse impact to Aboriginal and Treaty Rights. The proponent provided possible mitigations on page 340 and these should be considered for terms and conditions of the EA approval.

Section 5.9 Terrestrial Environment

Surveys on Mainland Moose were completed between 2017 and 2021. The proponent also identifies that a technical report will be completed in 2022 regarding the completed surveys. On page 376, the proponent identifies that the project area is located within a mainland moose concentration area and contains several Special Management Practice moose patches. The project area overlaps with mainland moose core habitat. However, the proponent further states on page 456, that based on biophysical surveys, limited signs of moose were observed and that impacts to moose populations are predicted to be low.

Comment: Provincial data indicates the project has the potential to impact mainland moose populations. Proponent should refer to the Mainland Moose Recovery Program to determine potential impacts and possible mitigations. An outline of possible mitigations to potential mainland moose impacts should be considered a condition of the EA approval.

NOVA SCOTIA
Environment and Climate Change

Barrington Place
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Canada B3J 2P8

Date: 08-Jul-22

To: Candace Quinn, Environmental Assessment Officer

From: Sean Gillis, Environment Inspector, ICE – Antigonish

Manager Review and Approval – Marc Theriault

Subject: Goldboro Gold Project, Guysborough County, Nova Scotia

Scope of review:
This review focuses on the following mandate: Required Environmental Approvals/Notifications

Technical Comments:

- An Industrial Approval will be required which may incorporate other designated activities.
- A Dangerous Goods Approval may be required for the storage of fuels and chemicals.
- Watercourse and Wetland Alteration Approvals will be required.
- A Water Withdrawal Approval will be required.
- Domestic wastewater will have to be disposed of properly. Section 2.8.1.6.1 discussed the construction of two onsite sewage disposal systems.
- Approvals/Notifications for domestic water treatment and wastewater treatment will be required and possibly a Public Drinking Water Registration.
- Any proposed Water Treatment Plant will require a certified Operator(s) at the proper level depending on the classification of the facility.
- The work camp may require a food permit and EFHS staff should be consulted to determine permit requirements.
- One positive environmental effect is the information collected on historic tailings and the remediation of historic tailings
- The Project may trigger the Contaminated Sites Regulations and our Contaminated Sites branch in SAS should be consulted to determine applicability.

Summary of Recommendations: (provide in non-technical language)

- *All the necessary supporting documentation for any Approval/Notification applications will be required.*

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IMPORTANT:

- **Always provide a response back to the EA Branch, even if there is "no comment".**
- **The comments will be published on the EA website on decision day (privacy review is NOT conducted on comments from government).**

A) Guiding questions for Technical Comments:

- *Does the EA registration document (including Appendices) provide adequate information to identify the potential environmental effects; therefore, the required mitigation measures? Explain.*
- *Can the potentially significant adverse effects/environmental effects be identified? Explain.*
- *Are the proposed mitigation measures / controls sufficient to address the potential environmental effects? Explain.*
- *Would the Generic EA Mitigations (see attached for reference) address remaining effects?*
- *If there are information gaps, are there any suggested site/project specific mitigations that would allow risks to be mitigated?*
- *Are there any potential positive environmental effects? Explain.*
- *Does the project trigger any environmental approval / permit (Provincial or Federal) other than the EA Approval – which one(s), and what outstanding information and / or conditions could be considered as part of these?*

Risk Assessment			
Identify Gap/Risk	Can it be addressed in another permit/approval or with a T&C?	Define/provide detail	Risk of this approach?

B) Guiding questions for Summary of Recommendations:

- *Describe what outstanding information and/or conditions (if any) can be considered as a part of other approvals / permits required for the project.*
- *If required, provide any suggested site/project specific mitigations that could be included in terms and conditions that would allow risks to be mitigated.*
- *Identify* specific outstanding information needed to address high risk environmental effects (if any) that cannot be mitigated.

Impact Assessment Agency of Canada
Agence d'évaluation d'impact du Canada

Suite 200
1801 Hollis Street
Halifax NS B3J 3N4

Bureau 200
1801 rue Hollis
Halifax, NE B3J 3N4

Date: July 6, 2022

To: Candace Quinn, Environmental Assessment Officer, Nova Scotia Environment

From: Trevor Ford, Environmental Assessment Officer, Impact Assessment Agency of Canada

Subject: Goldboro Gold Project

The federal environmental assessment process is set out in the *Impact Assessment Act* (IAA). The *Physical Activities Regulations* (the Regulations) under IAA set out a list of physical activities considered to be "designated projects." For designated projects listed in the Regulations, the proponent must provide the Agency with an Initial Description of a Designated Project that includes information prescribed by applicable regulations (*Information and Management of Time Limits Regulations*).

The relevant entry in the Regulations for this type of project is:
18(c). *The construction, operation, decommissioning and abandonment of a new metal mine, other than a rare earth element mine, placer mine or uranium mine, with an ore production capacity of 5 000 t/day or more.*

Based on the information submitted to the Province of Nova Scotia on the proposed Goldboro Gold Project, it does not appear to be described in the Regulations. Under such circumstances the proponent would not be required to submit an Initial Description of a Designated Project to the Agency. However, the proponent is advised to review the Regulations and contact the Agency if, in its view, the Regulations may apply to the proposed project.

The proponent is advised that under section 9(1) of the IAA, the Minister may, on request or on his or her own initiative, by order, designate a physical activity that is not prescribed by regulations made under paragraph 109(b) if, in his or her opinion, either the carrying out of that physical activity may cause adverse effects within federal jurisdiction or adverse direct or incidental effects, or public concerns related to those effects warrant the designation. Should the Agency receive a request for a project to be designated, the Agency would contact the proponent with further information.

The proposed project may be subject to sections 82-91 of IAA. Section 82 requires that, for any project occurring on federal lands, the federal authority responsible for administering those lands or for exercising any power to enable the project to proceed must make a determination regarding the significance of environmental effects of the project. The Agency is not involved in

this process; it is the responsibility of the federal authority to make and document this determination.

The proponent is encouraged to contact the Agency at (902) 426-0564 if it has additional information that may be relevant to the Agency or if it has any questions or concerns related to the above matters.

Thank you,

Trevor Ford

Environmental Assessment Officer, Atlantic Regional Office
Impact Assessment Agency of Canada / Government of Canada
Trevor.Ford@canada.ca / Tel: 902-476-7635

Agente d'évaluation environnementale, région de l'Atlantique
Agence d'évaluation d'impact du Canada / Gouvernement du Canada
Trevor.Ford@canada.ca/ Tél. : 902-476-7635

NOVA SCOTIA
Public Works

Date: 7 July, 2022

To: Candace Quinn, Environmental Assessment Officer

From: Environmental Services, Nova Scotia Public Works

Subject: Goldboro Gold Project

The Nova Scotia Department of Public Works (NSDPW) staff have reviewed the Environmental Assessment for the Signal Gold Inc. Goldboro Gold Project and provide the following comments:

General Comments:

1. The proponent has made references to haul route traffic volume assumptions and anticipated tonnage from the mine but there are no associated daily traffic truck volumes that are projected from the mine. This is important information to include. Any weight restrictions for the trucks, particularly spring weight restrictions must be followed on any provincially owned roads on which they may be applicable.

2. Any traffic impacts on Goldbrook Road, or at the intersection of Goldbrook Road and Route 316 must be done through an approved traffic control plan through the local Traffic Authority and in conjunction with the appropriate section of the Nova Scotia Temporary Workplace Traffic Control Manual. This will include items such as signage and any proposed speed reductions.

3. The proponent has identified that approximately 510 metres of Goldbrook Road will need to be widened for this project. This will require a Working Within Highway Right of Way Permit, available from the DPW Area Manager. This should be reflected in the Permits Required section of the report.

Section 2 Project Description, subsection 2.4.2.6 Blasting, page 23.

1. Any requirements for blasting may require road closures if they are in the vicinity and would need the approval of DPW on any DPW owned roads.

Section 5.10.10 Residual Effects and Significance, Table 5.10-18 Residual Effects on Socioeconomic Conditions: Economy, page 499.

1. The proponent has indicated that they are preparing a Traffic Management Plan (TMP), but there is no timeline of when this will be available. The TMP should be shared with the

local DPW office and the Traffic Authority as soon as possible.

2. The TMP should detail any projected traffic volumes resulting from the mine operation, particularly: truck volumes and weights, proposed haul route on provincial roads, traffic control measures (required signage, speed reductions/limits on Goldbrook Road) for approval by the local Traffic Authority. Table 5.10-20 on page 499 of the report should be updated to reflect this. Items 1 and 2 under "General Comments" address some specific issues.

Sincerely,

Environmental Services
Department of Public Works

NOVA SCOTIA
Department of Municipal Affairs and Housing

Maritime Centre, Floor 8 North
1505 Barrington Street
PO Box 216
Halifax, NS B3J 2M4

Date: July 6, 2022

To: NS Department of Environment and Climate Change

From: Department of Municipal Affairs and Housing

Subject: **GOLDBORO GOLD PROJECT**

As requested, the Department of Municipal Affairs and Housing (DMAH) has reviewed the Environmental Assessment Registration Documents provided by Signal Gold Inc. for the proposed Goldboro Gold Project. All of the components considered under DMAH's areas of mandate have been adequately addressed.

Thank you for the opportunity to review the Registration Documents for the above-noted project.

NOVA SCOTIA

Agriculture

60 Research Drive
Suite A
Bible Hill, Nova Scotia
B6L 2R2

Date: July 10, 2022

To: Candace Quinn, Nova Scotia Environment and Climate Change

From: Executive Director, Policy and Corporate Services,
Nova Scotia Department of Agriculture

Subject: Goldboro Gold Project – Environmental Assessment

Thank you for the opportunity to review the update documents for the above-noted project.

The Department of Agriculture has no concerns about this proposal.

NOVA SCOTIA

Communities, Culture, Tourism and Heritage

1741 Brunswick Street
3rd Floor
P.O. Box 456
Halifax, NS
B3J 2R5

Date: July 7, 2022

To: Candace Quinn, Nova Scotia Environment

From: Coordinator Special Places, Culture and Heritage Development

Subject: Goldboro Gold Project

Staff of the Department of Communities, Culture, Tourism, and Heritage has reviewed the Goldboro Project EA documents and have provided the following comments:

Archaeology

Staff reviewed the sections of the EA document pertaining to archaeology. EA document and the recommendations presented by the consulting archaeologists in the various ARIA reports are noted and supported.

Botany

Staff reviewed the sections of the EA document pertaining to botany. Greenhouse gas emissions

- Page 93 – the significance threshold for GHG emissions is better defined than other EAs I've seen, but still overly optimistic.
    - Considering that CO2 contributions to the atmosphere are cumulative, and remain in the atmosphere for several decades (well beyond the lifespan of the project), the threshold should be based on cumulative emissions for the project, in addition to annual emissions, and should seek to reduce those emissions over the lifetime of the project.
    - Since the greenhouse gas emissions of the province are expected to decline over the lifespan of the project, the proportion of those emissions that the project represents will likely *increase*, unless the proponent plans to reduce their emissions in exactly the same proportion as the broader province is. This is not accounted for in the proponent's projection, because the projection used a static average annual value and assumed that their contribution would remain the same relative to 2022 GHG emissions values.
- Page 96 – the proponent defines their GHG contributions as "negligible" in magnitude.
    - This is not consistent with the definitions they provided for categories of magnitude, because the GHG emissions, while below the 1% significance threshold proposed by the proponent, are still well outside of the range of natural variability for NS. The project more correctly belongs to the "low" category, according to the company's own definitions.
    - But referring back to my previous comment (about using annual vs. cumulative emissions for the project), the project is more correctly classified as "moderate",

because of uncertainty surrounding whether the company's contributions will continue to be below their chosen 1% threshold as the province's GHG emissions decline through the next 13 years.

- No estimates for carbon storage or sequestration capacity of the natural landscape are given.
    - While these values would likely be small, relative to the overall impact of the project, their inclusion would likely further increase the GHG footprint of the project relative to what exists on the natural landscape. Consequently, the lack of inclusion of these parameters biases the GHG budget of the project towards appearing to have lower impacts than it does.

Wetlands

- Page 297 (Potential indirect impacts to wetlands) – the proponent could also highlight the expected eutrophication and acidification effects from nitrogenous vehicle emissions. These emissions are known to impact certain species of lichens and vascular plants near roadways.

Lichens & plants

- Page 375 (paragraph 6 & 7) – I think they meant "boreal felt lichen" here, because blue felt lichen does not have modelled polygons that need to be search by field botanists, and Coccocarpia is an indicator for boreal felt lichen, not blue felt lichen.
- Page 433 (and table 5.9-24): This area appears to be a hotspot for blue felt lichen. It appears that a large number of blue felt lichen thalli will be destroyed in this project area, but the specifics are unclear. How many occurrences and thalli will be removed as infrastructure is built? In the table, it says that 178 individuals will be "directly impacted". Does this mean their host trees will be cut and their habitat will no longer be habitat? (i.e., "directly impacted" = 100% mortality?)
    - In the last column, it rates this blue felt lichen impact's magnitude as "Low" within the LAA, based on an estimate of the proportion of blue felt lichen habitat (hardwood swamps) that would be disturbed within the LAA. Since the LAA wasn't surveyed for lichens, I don't think the proponents can actually say this with confidence, and certainly the habitat comparisons are not adequate to serve as a reference point relative to blue felt lichen population size. It would be more appropriate to compare thalli to estimated thalli, or habitat to estimated habitat.
    - Alternatively, the proponents could compare lost thalli to the estimated number of blue felt lichen thalli in the province or country, and the expected provincial annual or decadal loss rates. This should be available in the latest COSEWIC assessment report for the species.
- If losses of blue felt lichen are unavoidable, the following compensation measures would be worth pursuing:
    - Collect representative specimens for museum collections, and for teaching purposes. These could be used for teaching and research purposes, thereby improving conservation outcomes elsewhere in the province.
    - Use the project as a scientific study. 50 occurrences is a great sample size. Let's learn something from this. The study could cover such useful topics as the resistance of blue felt lichen to edge influence, or whether it is locally adapted compared to subpopulations from other regions in Canada.
    - Monitoring and inventory. Continued monitoring of indirectly impacted thalli would be useful to inform future mitigation standards.

- Funding for additional biodiversity inventory in the province, to facilitate protected area planning.
- Integrate lichen transplantation into ecosystem restoration activities in nearby degraded wetlands.

Palaeontology

Staff have reviewed the sections of the EA document pertaining to palaeontology. The project is situated within bedrock of Goldenville Formation. Previous work has found poorly preserved graptolites and trace fossils in the Goldenville Formation. The current project is not expected to come across any significant fossil accumulations. However, if are any questions about potential fossils observed during the work please contact the museum to consider options for documenting the samples.

Zoology

Staff have reviewed the Registration Document, and sections particular to zoology. It is, in general, a reasonable description of the Zoological setting for the site and immediate-adjacent area.

Environmental DNA (eDNA) was used to determine presence/absence of fish species in watersheds associated with the project area. Of particular importance, eDNA analysis was used to assess the presence/absence of Atlantic salmon (*Salmo salar*). While the Bureau Veritas (BV) laboratory could not screen for the presence of Atlantic salmon within their eFish assay, the Marine Gene Probe Laboratory used species-specific probes designed in-house in aim to detect this species.

While eDNA is commonly used in presence/absence studies, there are specific assay validation criteria that should be followed to correctly interpret analysis results. While concluding "presence" requires a relatively straightforward interpretation of the data, concluding "absence" is more complex. Specifically, the crux is separating "absence" from "not detected"; where going from the latter (the data) to the former (the interpretation) requires several tenuous assumptions, some of which can be overcome by conducting and reporting on sensitivity assessments of the assays used. Specifically, it is critical that three things be verified before an assay can be used to accurately determine species absence:

1) the assay must be shown to positively detect the species in question,
2) the assay must have an established limit of detection (LOD). This LOD outlines the threshold at which you might fail to detect DNA within an environment, even if the DNA in question is present,
3) the ability of the assay to positively detect the species in question even if the sample contains a mixture DNA from other species that exist within that environment.

While the Gene Probe laboratory used a positive control to demonstrate that the assay can detect the species in question, the lab results do not provide any validated LOD values or other assay validation background. Therefore, we do not know the sensitivity of the assay.

Using the demonstrated methodology, it is accurate to comment on species presence, but the assay cannot confirm species absence. The document states that "eDNA samples were collected to identify whether fish are present within the historic settling ponds and to provide a second method to determine the presence or absence of Atlantic salmon within the Gold Brook shore direct watershed (1EQ-SD31)". I suggest that the language be changed throughout the documentation to make it clear that the methods used are not able to verify species absence.

For more information:

Thalinger, B, Deiner, K, Harper, LR, et al. A validation scale to determine the readiness of environmental DNA assays for routine species monitoring. Environmental DNA. 2021; 3: 823– 836. https://doi.org/10.1002/edn3.189

Fisheries and Oceans Canada | Pêches et Océans Canada

PO Box 1006, P500
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July 8, 2022

Our file *Notre référence*
18-HMAR-00331

Candace Quinn
Environmental Assessment Officer
Nova Scotia Environment and Climate Change
1903 Barrington Street, Suite 2085
Halifax, NS
B3J 2P8

Subject: DFO comments on the Environmental Assessment Registration Document (EARD) – Signal Gold Goldboro Gold Project

Dear Candace Quinn:

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your request to review the Environmental Assessment Registration Document (EARD) for the proposed Goldboro Gold Project on June 3, 2022. We understand that the proponent is proposing the following:

- The construction, operation, and decommissioning of a conventional open pit mining operation and a 4,000 tonnes per day (tpd) processing facility. Construction is anticipated to start in late 2023, commissioning in 2025, operations until 2035, and initiation of closure in 2036.

- The construction, operation, and decommissioning of an engineered, fully lined tailings management facility (TMF), two open pits (East and West Pits), three waste rock storage areas (WRSAs), till and organic material stockpiles, and associated infrastructure.

- The construction phase will begin with clearing and grubbing of the mill area, TMF, and East and West Pit areas. Stripped till and organic material will be stockpiled and utilized for reclamation activities during the closure phase. Non-potentially acid generating (NPAG) waste rock extracted from the East and West Pits will be used for construction of new roads, modification of existing roads, initial construction of the TMF, and general construction on site. Waste rock not used as construction material will be stockpiled in WRSAs.

- Water management infrastructure, including collection ditches, culverts, settling ponds, and water treatment systems will be also be constructed.

Canada

- During operations, the East Pit will be mined to a bench floor elevation of approximately -128 meters above sea level (masl) and will operate for eight years. The West Pit will be mined to a bench floor elevation of approximately -184 masl and will operate for 11 years. Three WRSA will be developed throughout the operational life of the mine. Following the full extraction of the East Pit, a portion of the waste rock generated during West Pit extraction will be backfilled into the East Pit.

- The closure phase will begin with earthworks and demolition activities and will be completed over an approximate three year period to return the Project Area to a safe, stable, and vegetated state. Progressive reclamation will also be completed during the operations phase to promote early revegetation, assist with erosion and dust control, and minimize the total disturbed footprint. The East and West Pits will be allowed to flood following operations, creating two open waterbodies. The East Pit is expected to be filled in year 19 and the West Pit is expected to be filled in year 35. Surface and groundwater monitoring is planned to continue at select locations within the Project Area throughout the pit filling period and will be terminated once water quality and quantity stabilize, and following consultation with applicable regulators.

DFO has reviewed the EARD, select appendices and acknowledges the extensive supporting documentation that was submitted by the proponent as well. Due to the limited time period allocated to DFO for review and the extent of the material submitted, the Department could not conduct an extensive review of the entire submission package. Our review focused on sections of the EARD, appendices and supporting documents most relevant to the conservation and protection of fish and fish habitat. DFO offers the following comments for consideration:

Section 1.5 Regulatory Overview

- The description of the regulatory trigger for the *Fisheries Act* in Table 1.5-1 is not accurate. An authorization under Paragraphs 34.4(2)(b) and 35(2)(b) of the *Fisheries Act* is required for works, undertakings or activities that are likely to result in the death of fish or the harmful alteration, disruption, or destruction of fish habitat. Refer to DFO's Projects Near Water website for additional information: https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html

- The description of the regulatory trigger for the *Species at Risk Act* (SARA) in Table 1.5-1 is not accurate. A permit under section 73 of SARA is required for activities that are likely to result in prohibited effects to individuals of SARA-listed species at risk, their residences, or their critical habitat as set out under sections 32, 33, and 58 of SARA. Refer to DFO's SARA permitting website for additional information: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/permits-permis/index-eng.html

Section 1.5.2 Other Approvals

- Based on the information provided in the EARD, DFO agrees that a *Fisheries Act* authorization will be required for the project.

Section 2.4 Project Activities

- The EARD states that "*The exact locations and sizes of Project infrastructure will be determined at the detailed design stage*". DFO will require detailed designs and drawings to be submitted with the proponent's application for *Fisheries Act* authorization.

Section 2.4.2.15.2 Settling Ponds

- The EARD describes preliminary plans for the settling ponds, and measures for managing sediment in the event settling pond capacity is reached. All of the sediment ponds, except the southwest pond, will receive secondary treatment (i.e. the use of coagulants, engineered wetlands, etc.). The southwest pond will be discharged directly to Gold Brook. It is unclear how the southwest sediment pond has been sized and whether it was sized to the extent possible.

- It is understood that a 5% climate change factor has been incorporated into the design, but it is unclear what information this factor is based on. With climate change predicted to increase the frequency and intensity of storm events, it is difficult to determine if the settling ponds and sediment management plans are adequate for future storm events.

- The proponents mitigation during a storm event resulting in the settling ponds reaching capacity proposes the use of a vacuum truck to prevent sediment laden water from entering Gold Brook appears to have many moving parts with the possibility of failure or being ineffective.

- Sediment ponds do not typically capture all sediment, especially silts and clays which require long settling periods to settle out of the water column. Based on the description within the EARD, it is likely that some silts and clays will discharge from the southwest settling pond and enter Gold Brook. These particles are known to adversely affect salmonid species (Brook Trout), especially during sensitive life stages.

Section 2.6 Environmental Management Approach

- Table 2.6-1 states that "*A preliminary Fisheries Offsetting Plan was developed to demonstrate offsetting options for any unavoidable losses of fish habitat as a result of the Project*".

- As outlined in Schedule 1 of the *Authorizations Concerning Fish and Fish Habitat Protection Regulations*, the proponent should be aware that an offsetting plan is required to counterbalance the death of fish and the harmful alteration, disruption, or destruction of fish habitat resulting from the project, and not just "*losses of fish habitat*".

Section 5.5.6.3 Simulated Change in Baseflow

- The EARD states "*As shown in Table 5.5-13, the simulated baseflow reduction ranges from 53 to 320% at East Pit EOM, from 50 to 254% at West Pit EOM, and from 34 to 86% at PC.*"
  - What does a 320% reduction in baseflow mean for Gold Brook? Does this mean that all of the baseflow would be lost (i.e., 100%), plus a further reduction in total streamflow equal to 220% of baseflow?
  - During the summer low flow period in Nova Scotia, baseflow has an important role in supporting the flow regimes and water levels required to maintain the ecological functions that sustain fish and fish habitat. Substantial baseflow reductions are likely to change fish habitat in Gold Brook in a manner that directly and/or indirectly impairs the habitat's capacity to support one or more life processes of fish, particularly during the summer low flow period.

Section 5.6.2.1 Watercourse Identification and Characterization

- The qualitative assessment methods used to characterize watercourses and open water features are appropriate and help describe fish habitat in the project area.

Section 5.6.2.2 Surface Water Quantity

- The EARD states: "*Discrete velocity measurements were monitored at five locations: SW-12-21, SW-14-21, SW-16-21, SW-17-21, and Station #6*." The EARD does not explain why these monitoring locations were selected.

Section 5.6.3.2 Watercourses

- It would be helpful to know the approximate length of each watercourse in Table 5.6-2. Watercourse 64 (Gold Brook) in Table 5.6-2 is noted as having an average depth of 11-32 m, which is likely a typo.

Section 5.6.3.3.2 Results of Baseline Surface Water Quantity Monitoring

- The EARD and Appendix F.3 reports flow measurements at the outlet of Gold Brook Lake (SW-12-21) of 12 L/s on May 20, 2021, 5 L/s on June 22, 2021, 3 L/s on July 20, 2021, and 5 L/s on August 19, 2021.
  - To add context to these flow measurements, DFO estimated the mean annual discharge (MAD) per drainage area to be 28.2 L/s/km^2 using data from five

nearby Water Survey of Canada hydrometric stations (Table 1). Based on a drainage area of 9.2 km^2 at the Gold Brook Lake outlet, the MAD would be approximately 259.4 L/s.

- Therefore, the flows measured May-August 2021 would be approximately 1-5% of MAD for Gold Brook. These daily flows are well below the ecological flow requirement guideline in DFO's Framework for Assessing Ecological Flow Requirements.

Table 1. Hydrometric stations used to estimate MAD at the Gold Brook Lake outlet

River	Station ID	Drainage Area (km^2)
Fraser Brook near Archibald	01DH003	10.1
Little Sackville River at Middle Sackville	01EJ004	13.1
Moose Pit Brook at Tupper Lake	01EE005	17.7
Canaan River at outlet of Connaught Lake	01EH006	65.4
Middle River of Pictou at Rocklin	01DP004	92.2

Section 5.6.6 Project Interactions and Potential Effects

- How was the area (m^2) of the direct impacts to watercourses in Table 5.6-10 estimated?

Section 5.6.6.1 Surface Water Quantity

- There are numerous interconnected surface waterbodies and features within the project area that will be affected by the various project components and activities, and the local and regional dynamics of surface water, groundwater, and their interface is a complex system. The modelling exercise undertaken is helpful for identifying potential project effects to surface water quantity and the watercourses/waterbodies at risk of impact from the project. However, it should be acknowledged that the predictions are subject to a moderate to high degree of uncertainty that could have important implications regarding residual effects to fish habitat.

- DFO (2013) provides two guidelines for assessing ecological flow requirements for fish and fish habitat: https://waves-vagues.dfo-mpo.gc.ca/Library/348881.pdf

- Stream flow in Nova Scotia rivers is highly variable and using estimates of the mean monthly and MAD for effect predictions does not capture the variability of fish habitat conditions that fish will actually experience over time in a watercourse. It is important to note that DFO's guidelines for ecological flow requirements specify potential changes in actual flow (i.e., daily time scale) as the basis for the framework, whereas the proponent mostly uses modelled estimates of mean monthly discharge and MAD. The actual flow changes to watercourses in the project area are likely to vary substantially on a daily time scale from the changes presented in Table 5.6-11.

- Given the magnitude of the low flows observed in the project area in 2021 (Section 5.6.3.3.2 and Appendix F.3), the predicted baseflow reductions (Section 5.5.6.3), and the predicted annual flow reductions (Table 5.6-11), it is likely that DFO's guidelines for ecological flow requirements for fish and fish habitat will not be met for numerous watercourses within the project area, including Gold Brook. Since instantaneous flows in Gold Brook and other watercourses are at times well below the 30% MAD guideline under existing conditions, the predicted long-term/permanent alterations to the natural flow regime of these watercourses from project activities represent a high risk of impacts to fish and fish habitat, particularly during low flow periods.

Section 5.6.8 Monitoring and Follow-up / Appendix F.3 2021 Surface Water Monitoring Report / Appendix F.11 Water Monitoring Plan

- Watercourses experience high variability in flows and water levels over time. A well designed monitoring program and adequate baseline data is required to detect changes over time, and distinguish between changes resulting from variability in natural conditions and changes resulting from the project. A Before-After-Control-Impact (BACI) study design is one of the best models for environmental effects monitoring programs.

- Stream flow monitoring should be conducted at a good section control in the stream. A section control is a specific cross section in a stream channel, located downstream from a water level gauge that controls the relation between gauge height and discharge at the gauge. Ideal locations include constrictions or riffle habitats where the channel is relatively straight, i.e., flow lines are relatively parallel to the bank, and minimal instream vegetation.

- The stage-discharge curves, equations, and R^2 values and the cross-section measurements were not provided in Appendix F.3. This information would be helpful for review.

- The EARD states: "*The proposed surface water locations, to be monitored during (but not necessarily for the entire duration of) the construction phases are presented in Figure 5.6.15.*", "*The proposed surface water locations to be monitored during (but not necessarily for the entire duration of) the operations phase are presented in Figure 5.6-16.", and "The proposed surface water locations to be monitored during (but not necessarily for the entire duration of) the closure phase are presented in Figure 5.6-17."*
    - It is unclear why surface water monitoring will not be undertaken for the entire duration of the each of the project phases, nor is a rationale given as to why long-term monitoring will not occur. It is not clear as to which locations will be monitored and when. Additional clarity would benefit the review.

- The EARD states: " *Water quality and levels are monitored currently at SW-11-21, which acts as the furthest downstream monitoring location for the Project. However,*

due to the width and depth of Gold Brook, streamflow data collection at this location was not feasible and therefore SW-11-21 will be decommissioned during the construction phase and SW-24-21 (upstream, to a more confined portion of Gold Brook) should be implemented and streamflow monitoring will be incorporated."

- It should be noted that changing the location of monitoring stations during the Project, makes it difficult to identify and characterize project-related effects and reduces the potential for effective monitoring.

- Based on a review of Section 5.6.8 of the EARD, Appendix F.3, and Appendix F.11, it is DFO's view that the proposed monitoring and follow up program for surface water quantity is unlikely to be effective at detecting and characterizing project effects on flows, water levels, temperature, and fish habitat in certain watercourses, including Gold Brook. This is due to the limited pre-impact baseline data available, the lack of an appropriate control station and associated baseline data, and the proponent's plans to decommission and relocate existing monitoring stations during the construction phase. These issues also limit the utility of the predictive modelling in the EARD related to surface water quantity, since the effect predictions cannot be readily validated or verified.

Section 5.7 Wetlands

- Wetlands have the potential to directly and indirectly support fish habitat. The proponent has not assessed whether the direct alteration of 90.6 ha and indirect alteration of 12.9 ha of wetland habitat within the Project Area has potential for effects to fish and fish habitat in either Section 5.7 (Wetlands) or Section 5.8 (Fish and Fish Habitat) of the EARD. Providing an assessment in the EARD would be beneficial for review. An assessment of all potential effects to fish and fish habitat must be provided in an application for *Fisheries Act* authorization.

Section 5.8 Fish and Fish Habitat

- The proponent has defined a significant effect to fish and fish habitat as: "*A Project-related HADD of fish habitat or the death of fish, as defined by the Fisheries Act, that cannot be mitigated, or offset; and an unauthorized Project-related alteration of fish habitat."*
    - With regards to the significance threshold, the *Fisheries Act* authorization process follows the provincial EA process, and there is insufficient information in the EARD to support an application for authorization at this time. Therefore, a determination using the proposed threshold cannot be made at this time. DFO recommends the proponent use a biologically or ecologically based significance threshold for fish and fish habitat, rather than a future regulatory process.

- Although focused on salmonid species in northwestern North America, Sergeant et al. (2022) provides a good summary of the pathways of effects that metal mining can

have on salmonid-bearing watersheds: https://www.science.org/doi/10.1126/sciadv.abn0929

- Based on the information in EARD, there is potential for the project to have population-level impacts on fish in the Goldbrook Lake system.

Section 5.8.2.4 Fish Collection

- The EARD states: "*Quantitative fish collection involves a closed site setup (reach is isolated with barrier nets) and triple passes of electrofishing. This site setup allows for population estimates, and is the preferred method for fish sampling, unless the physical characteristics of the stream do not allow for reach isolation, or if fish abundance is expected the be low."* It is unclear how the proponent determined if fish abundance was expected to be low without first assessing the reach. The proponent should clarify how this was conducted.

- The EARD states: " *Sample filtration occurred in the evening of 13 October 2021*." It should be noted that sampling effort would need to occur over multiple seasons and years to attempt to rule out the presence of a species within a watershed. Sampling in one evening, during one day of the year does not meet this standard.

Section 5.8.2.5 eDNA Sampling

- The EARD states: *"Atlantic salmon are expected to occur in the eastern adjacent New Harbour secondary watershed (1EQ-4), but not within the watershed containing Gold Brook Lake and Gold Brook, based on consultation with DFO"*. It should be clarified that DFO did not indicate to the proponent that Atlantic Salmon are not present within the Gold Brook Lake and Gold Brook system. DFO indicated that Atlantic Salmon were present in adjacent watersheds and so may be present within Gold Brook, and that further investigations would be needed to rule out their presence.

Section 5.8.3 Baseline Conditions

- Within the EARD, the proponent indicated that in-situ water quality and benthic invertebrate sampling occurred to characterize the baseline conditions within the Project Area. However, the proponent has not provided the results of these sampling efforts in a consistent or meaningful way throughout the baseline conditions section. Water quality and benthic community composition and results are discussed for some water bodies but not for others. It is difficult to interpret the results when they are not provided in a consistent manner.

- The proponent makes note that pH results found within the watercourses identified in the Study Area are below the lower CCME Freshwater Aquatic Life (FAL) guideline value of 6.5. While this may be true, the proponent should note

that within Nova Scotia many species of fish, including those found within the Study Area (Brook Trout and American Eel), are able to carry out their life processes at pH levels below the CCME FAL pH guideline. pH values above 6.5 are not common in the Southern Upland Region. pH values below the CCME FAL guideline should not be used as the sole indicator of "poor" aquatic habitat.

Section 5.8.3.6 Summary of Baseline

- The EARD states: "*The lack of identified suitable spawning habitat for brook trout within the PA is likely a limiting feature to overall brook trout productivity.*" Table 5.8-1 indicates that Brook Trout make up a fairly high proportion of the total fish caught within the PA (21.7% or 394 fish). Appendix H.1 indicates that young-of-year (YOY) Brook Trout were commonly captured in a number of watercourses in the project area. Considering this observation and the relatively large spatial extent of the project area, it is likely that suitable Brook Trout spawning habitat is in fact present in the project area, and that it was not identified during baseline surveys. Locations where YOY Brook Trout were captured are likely to be near spawning habitat.

Section 5.8.5.2 Hydrologic and Hydraulic Modelling

- The types of modeling used in the EARD may be sufficient for engineering purposes, but they are not well suited for predicting impacts to fish and fish habitat. The use of Physical Habitat Simulation System (PHABSIM) models may be better suited for this task, but even these models require assumptions that are difficult to evaluate and can underestimate the water needs of fish (Sergeant et al. 2022).

- The EARD states "*Collegeville Auto is the closest climate station to the site with precipitation records that overlap with the monitoring period. The Collegeville Auto climate station is located approximately 43 km from the PA; however, the Deming climate station is more likely to experience representative precipitation patterns as it is closer to the Atlantic coast."* It is unclear which climate station the proponent used. The most representative climate station should be used for model inputs.

- Given the natural variability in flows over time and all of the hydrological alterations in the Project Area, using a model to forecast daily flows in future years is subject to a high degree of uncertainty.

Section 5.8.6.2 Indirect Impacts

- There is high degree of uncertainty regarding the model-based effect predictions in the EARD, and the proponent has not proposed a viable means of accurately verifying the effect predictions through flow or biological monitoring.

- When the assessment predicts that DFO guidelines for ecological flow requirements are unlikely to be met, the assessment introduces modifications to the DFO guidelines without scientific justification (e.g., modelled number of days per year change in low flow).

- Since instantaneous flows in Gold Brook and other watercourses are at times well below the 30% MAD guideline under existing conditions (i.e., approximately 1-5% MAD measured at Goldbrook Lake outlet May-August 2021), and the predicted change in daily flows is greater than +/-10% for many watercourses, the alterations to the natural flow regime of watercourses from project activities represent a moderate to high risk of impacts to fish and fish habitat, particularly to Brook Trout which are sensitive to changes in the nature flow regime. Such alterations to the natural flow regime are likely to result in a harmful alteration, disruption or destruction of fish habitat. The assessment does not adequately consider how the natural flow regime of a river influences the various life stages of fish.

- Table 5.8-9 illustrates the summary of hydrologic modelling results for a normal year. Within the table, a range of predicted flow change is given with no units. The proponent should clarify the units within the text.

- The range of values given for the range of predicted flow change for Gold brook (e.g. GB-DS2 at closure: -28 to 2,220,841) is so large that the predictions offer little value to the effects assessment, and indicate a very large margin of error within the model results. This does not convey confidence that the results of the modeling exercise provide reliable predictions of effects to fish and fish habitat.

- Page 352 of the EARD states:

  "During East Pit EOM, daily flow reductions are predicted to occur between 24-46% along the length of Gold Brook. The reductions in flow are predicted to occur during seasonal high flow periods. Due to a continual release of water from Gold Brook Lake, it is predicted that daily flows will generally increase during the low flow period, and the time of the low flow period will be lengthened by 78 days at the Lake Outlet but shortened by between 265-288 days per year at all subsequent points."
    - These predictions, along with those from other project phases, represent substantial permanent changes in the natural flow regime of Gold Brook, and are likely to result in a HADD.
    - There is also much uncertainty about these predictions. It is unusual for a stream in NS to have more than 265 days per year of low flows (i.e., <30% MAD). For example, flow data from Middle River of Pictou at Rocklin (001DP004) from 1966-2014 indicates flows <30% MAD occurred approximately 35% of the time (128 days per year). Therefore, a predicted reduction of 265-288 low flow days per year is unexpected. The

.../11

discrepancy between the predictions for the Lake Outlet and downstream locations is also unexpected.

- Page 353 of the EARD states: *"Based on guidance provided by DFO (DFO, 2013), the predicted flow reduction that corresponds with high flow periods are not expected to result in effects to fish and fish habitat."*
    - The proponent has not interpreted the DFO Ecological Flow Requirements guidelines correctly. A flow change of +/- 10% daily flows is considered an elevated risk to fish and fish habitat, even during high flow periods.

- It is unclear how the proponent calculated the HADD area resulting from indirect effects for each tributary within the Project Area. The proponent will need to provide these details in their application for *Fisheries Act* authorization.

Section 5.8.6.2.2 Water Quality Effects

- The EARD states "*The baseline temperatures are at times sub-optimal for the growth of juvenile brook trout; although trout were consistently captured throughout the Gold Brook system. Baseline temperatures within Gold Brook are considered to be non-limiting to American eel. Continuous flow from Gold Brook Lake into Gold Brook is expected to maintain the current thermal regime, given that baseflow (cooler water) only contributes 1% of flow at this location during baseline. Furthermore, due to inputs of treated effluent from the TMF into Gold Brook Lake, Gold Brook is predicted to experience a surplus of flow during low flow, effectively shortening the length of the low flow period. Baseline riparian lakeshore conditions are expected to remain throughout the life of the mine.*"
    - The assessment has not taken into account that the TMF will modify the natural thermal regime of Gold Brook Lake and Gold Brook by either cooling or warming water depending on the timing of release of treated effluent into Gold Brook Lake.

Appendix H.3 Conceptual Fish Habitat Offsetting Plan

Due to the limited time period allocated to DFO for review of the Conceptual Fish Habitat Offsetting Plan (the Plan), the Department's review focused on Section 5 of the plan. General comments:

- Overall, DFO requires more detailed information about proposed offsetting measures than what has been provided in the Plan to determine whether the measures are feasible and acceptable, and whether the impacts to fish and fish habitat from the project are likely to be counterbalanced.

- The area of residual HADD from the project is relatively large, and thus the area of habitat offsetting measures required is also large. Developing and implementing an adequate fish habitat offsetting plan to support an application for *Fisheries Act*

authorization, particularly in consideration of the proposed project timelines, is likely the main challenge for the project related to its effects on fish and fish habitat.

- Based on existing information about the project, it is likely that additional area of habitat offsets will be required to address: time lag and uncertainty as set out in DFO's Offsetting Policy. Time lag can be reduced by implementing the offsetting measures before impacting fish habitat. Uncertainty can be reduced by: conducting appropriate field studies to identify habitat issues and improvements and to inform the design habitat offsetting measures, using well-established and effective offsetting measures, and ensuring that the offsetting plan is developed and implemented by qualified professionals with experience and expertise in fish habitat offsetting.

- As set out under Schedule 1 of the *Authorizations Concerning Fish and Fish Habitat Protection Regulations*, an offsetting plan is required for the death of fish and/or the harmful alteration, disruption or destruction of fish habitat, not "the permanent loss of fish habitat" as stated in the Plan. The proponent should refer to DFO's Projects Near Water website for additional information on the regulatory process under the *Fisheries Act* and SARA.

- How was the area (m^2) of fish habitat directly impacted by the Project shown in Table 3 calculated?

- Section 4.1.4.2 and Table 5 - Based on information provided in the EARD, it is likely that the project will result in a HADD of fish habitat in Gold Brook. The Plan must include measures to offset the affected area of Gold Brook.

- How was the area (m^2) of fish habitat indirectly impacted the Project shown in Table 3 calculated?

- The Plan states: "*The lack of identified suitable spawning habitat for brook trout within the PA is likely a limiting feature to overall brook trout productivity.*"

- The rationale behind the proposed offsetting ratios should be provided directly in the Plan instead of/in addition to the EARD. The rationale should include detailed information about how the guiding principles and considerations outlined in DFO's Offsetting Policy were addressed (i.e., habitat productivity, like-for-like or equivalency calculations, time lag, uncertainty, geographic area, etc.).

- Section 5.1.1 of the Plan provides a summary of the Guiding Principles of DFO's Offsetting Policy but does not specify goals and objectives of the proposed offsetting measures. The Plan needs to identify specific, measurable goals and objectives of each proposed offsetting measure. Additional advice on how to establish goals, objectives, and monitoring methods for offsetting measures is available. For example:
    - Assessing the Effectiveness of Habitat Offset Activities in Canada: Monitoring Design and Metrics:

https://publications.gc.ca/collections/collection_2015/mpo-dfo/Fs97-6-3132-eng.pdf
    - A review of functional monitoring methods to assess mitigation, restoration, and offsetting activities in Canada: https://waves-vagues.dfo-mpo.gc.ca/Library/40856720.pdf

- Comments on Table 7:
    - Physical realignment of a watercourse has potential to result in a HADD of fish habitat.
    - Riparian planting may not be an adequate offsetting measure for project impacts to aquatic habitats, but may provide benefits if done in concert with other in-stream habitat restoration and enhancement measures.
    - A livestock grazing plan is not an acceptable offsetting measure.

- GPS coordinates must be provided for the location of all proposed offsetting measures (e.g., upstream and downstream locations).

- The methods used to estimate the area of the proposed habitat offsetting measures have not been provided in Plan. Therefore, DFO is unable to provide comment on the potential area of fish habitat benefiting from the proposed measures at this time. A detailed description of the methods used to quantify the area of each habitat offsetting measure is required.

- Campbells Brook and Unnamed Tributary:
    - It is not clear from the Plan whether fish are present in McLennan Brook at present, or what historic and existing habitat functions it provides.
    - Long-term exclusion of livestock from the stream banks may be difficult to achieve, and therefore the proposal may not be self-sustaining benefits to fish over the long-term.
    - The channel of McLennan Brook appears to be very narrow in the photos, and further narrowing may not provide benefits to fish.
    - Campbells Brook is identified in the Plan as an important salmon spawning and nursery tributary. Therefore, use of in-stream structures to change the riffle habitat to pool habitat may not result in a net benefit to fish and could adversely affect Atlantic Salmon.
    - Additional information about the existing watercourse and proposed habitat restoration and enhancement measures is needed for DFO to determine whether this proposal is feasible or an acceptable offsetting measure for the project.

- Gully Brook and Cove Road:
    - Depending on the location within the Stewiacke River watershed, the proposal may be located within or near habitat essential to the activities of the iBoF Salmon Live Gene Bank (LGB) program administered by DFO Science-Salmon Section. There may be risks associated with altering the current instream habitat to the LGB program and iBoF Atlantic Salmon that are

greater than any benefits the proposed offset project may provide. Additional information is required to determine any interaction with the LGB activities.

- DFO is unlikely to support these proposed offsetting measures for the following reasons:
  - DFO is not aware of any successful off-channel or on-line pond offsetting projects in the Maritime Provinces. Therefore there is high degree of uncertainty associated with the effectiveness of this proposed measure, and concerns about potential adverse effects to fish habitat.
  - If sufficient flow or water quantity in the ponds cannot be maintained, water quality may degrade and impair the habitat's capacity to support salmonids, or fish may become stranded in the pond during low flow periods. A location described as a dewatered agricultural floodplain may not have adequate water supply and flow to provide continuous good quality fish habitat in the ponds.
  - Artificial ponds can be associated with invasive fish species, such as Chain Pickerel, and when directly connected to and/or within the floodplain of the river they can present a risk of these invasive species being introduced into the river. The proposed ponds are more likely to enhance the habitat for invasive fish species than for salmonids (e.g., still water or low flow, warmer temperature, aquatic vegetation). Invasive fish species in the Stewiacke River represent a serious threat to native fish species, including salmon and trout.
  - The locations are not within the same geographic area as the Goldboro Gold Project.
  - The proposed offsetting measures appears to be located within identified critical habitat for iBoF Atlantic Salmon, so a high degree of precaution is required.

- Gays River:
  - In general, Gays River is less ideal for project offsetting measures because it is not in the same geographic area as the project.
  - The benefits to fish of realigning a relatively short portion of the existing river channel to the original channel realignment are not clearly explained in the Plan, and need to be explained in greater detail. If the existing river channel upstream and downstream of the proposed realignment does not follow the historic alignment, then restoring this portion to its historical alignment may not be beneficial. The downstream portion of the proposed realignment creates an abrupt near 90° bend with the existing channel that may be unstable and cause bank erosion, particularly during high flows.
  - Slowing down flows may enhance the habitat for invasive fish species.
  - Additional information about the existing watercourse and proposed offsetting measure is needed for DFO to determine whether this proposal is feasible or an acceptable offsetting measure for the project.

- Advice and recommendations:

- Measures that improve Atlantic Salmon and Brook Trout habitat in nearby watersheds within the Southern Upland Region of Nova Scotia (e.g., St. Mary's, Country Harbour, Musquodoboit) is an appropriate approach for the project offsetting plan.
- The Stewiacke River watershed is less ideal for project offsetting measures because it is not in the same geographic area as the project, and measures could adversely affect identified critical habitat for iBoF Atlantic Salmon and/or DFO's Live Gene Bank program, depending on the specific location and proposal.
- Restoring, enhancing, or creating spawning and cold-water habitats for salmonids is a more suitable approach to offsetting project impacts than shallow ponds in agricultural fields. Other potential measures include restoring low salt marsh and/or creating refuge habitat for migrating salmon in the estuaries of important salmon watersheds.
- Continue to identify and develop opportunities for offsetting measures, and collect additional data and information. Engage with the Mi'kmaq of Nova Scotia, local stakeholders, and watershed groups to identify potential habitat restoration and enhancement opportunities.
- Ensure the offsetting plan is prepared in accordance with DFO's Offsetting Policy and contains all of the required information and steps set out in Part 3.

If you have any questions with the content of this letter, please contact Sean Wilson at our Dartmouth office at 902-499-6397 or by email at sean.wilson@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Chris Burbidge
Senior Biologist
Ecosystems Management-Regulatory Reviews
Maritimes Region

NOVA SCOTIA
Environment and Climate Change

Date: July 8, 2022

To: Candace Quinn, Environmental Assessment Officer

From: Wetland & Water Resources Specialist, Water Resources Management Unit

CC: Director, Water Branch and Manager, Water Resources Management Unit

Subject: Signal Gold Inc. Goldboro Gold Project Environmental Assessment

Scope of Review:
The following review of the Signal Gold Inc (the proponent) Goldboro Gold Project (Guysborough County, NS) Environmental Assessment Registration Document (EARD) (Signal Gold Inc, June 1, 2022) is specific to the mandate of the ECC Wetlands Program within the Sustainability and Applied Sciences (SAS) Division. The review considers whether the environmental concerns associated with wetlands and the proposed mitigation measures to be applied have been adequately addressed within the Environmental Assessment. The recommendations provided below are meant to supplement the actions outlined in the EA submission documents.

Reviewed Documents:
Goldboro Gold Project Environmental Assessment Registration, Signal Gold Inc, June 1, 2022.

Limitations:
Given the timeline for the EARD review, only Part 1 (Section 2: Project Description), Part 3 (Section 5.7: Wetlands) and Appendix G1 (Wetlands Baseline Report), G2 (WESP Results), and G3 (Wetland Compensation Plan) were reviewed.

General Comments:

Summary of Wetland Findings:

222 freshwater wetlands were located with the project area (PA), totalling 329.033 ha or 27% of project area. The wetlands range from 0.010 ha to 72.470 ha in size and consist predominately of soft and mixedwood treed wetlands (71%), although bogs (12%) and fens (4%) have also been identified. 13% of all wetlands are complexes, however they make up 74% of the total wetland area in the PA.

The largest wetland is WL1 (72.5 ha), a wetland complex (swamp, bog, and fen components) associated with Gold Brook.

The PA does not interact with any Ramsar sites, provincial wildlife management areas, provincial parks, nature reserves, wilderness areas, known lands owned or legally protected by conservation land trusts, intact or restored wetlands under the North American waterfowl management plan or protect areas. The nearest protected area is approximately 4km away.

Wetlands of Special Significance (WSS):

Species at Risk (SAR) or evidence of was observed in, or adjacent to, 25 wetlands in the PA. However, the proponent has only identified 22 wetlands as potential WSS. Mobile species in Wetland 42 (Olive-sided flycatcher), Wetland 10 (Mainland Moose evidence adjacent) and Wetland 25 (Canada Warbler) were not considered potential WSS by Signal Gold. Signal Gold stated that Wetland 10 and Wetland 25 did not contain suitable breeding or dwelling habitat, therefore they were not considered WSS.

The *NS Wetland Conservation Policy* defines WSS as "wetlands known to support at-risk species as designated under the federal *Species At Risk Act* or the *Nova Scotia Endangered Species Act"*. The *NS Wetland Conservation Policy* does not differentiate between the status under these Acts in designating a WSS. If the biologist (Signal Gold) determines that wetland 10 and 25 do not provided acceptable habitat for Canada Warbler and Mainland Moose then we can accept that however, this should be confirmed with NRR prior to submitting wetland alteration approval applications. Within the *NS Wetland Policy* there is no mention of mobile verses sessile SAR and all wetlands known to support SAR designate a WSS trigger at this time.

The remaining 23 wetlands would be deemed WSS and contain Blue Felt Lichen (WL1, 12, 17,18, 20, 44, 48, 51, 52, 57, 58, 83, 101, 117, 131, 158, 161, 162, 187), Frosted Glass-whiskers Lichen (WL 194), Olive-sided flycatcher (WL 42, 17), Canada Warbler (WL 20, 117), and Evening Grosbeak (WL48). Signal Gold did not consider Wetland 42 as a WSS because the Olive-sided flycatcher is a mobile species, no other rational was provided as to unsuitable breeding or dwelling habitat; therefore, ECC considers Wetland 42 as a WSS under our Policy.

Of the 22 wetlands deemed to be WSS by Signal Gold, 18 are proposed to be directly impacted by project activities and infrastructure. 7 are proposed for complete alteration by the TMF, WRSAs, or stockpiles whereas 11 will be partially impacted by infrastructure. In total 43.438 ha of WSS, 31% of the total WSS area within the PA, are proposed for direct alteration.

Wetland 42 was not considered a WSS by the proponent and was not included in the total altered area of WSS, even though it meets the definition of a WSS. The proponent has proposed partial alteration for Wetland 42. Wetlands 44, 48, 101 and 131 will be completely avoided by project infrastructure.

The *NS Wetland Conservation Policy* (2011) objective is to "manage human activity in or near wetlands, with the goal of no loss in Wetlands of Special Significance (WSS) and the goal of preventing net loss in area and function for other wetlands". Signal Gold has proposed the alteration of 25 (potentially 23) WSS, this is inconsistent with the *NS Wetlands Conservation*

Policy. The policy allows for alterations to WSS for projects that are considered Necessary Public Function. Necessary Public Function is defined within the *NS Wetland Conservation Policy* as "A service, utility, role or capacity deemed essential to Nova Scotians. Such functions involve projects that provide public service on a provincial scale. They include public transportation projects, public infrastructure, linear pipeline or transportation corridors or electrical supply infrastructure, projects necessary for public safety and the protection of adjacent properties and infrastructure and land transactions authorized through an Order of Executive Council".

Wetland Impacts:

The project will directly impact 112 wetlands of which 56 will be completely altered and 56 partially altered summarized below:

- Direct Impacts
    - Total: 90.599 ha
    - WSS: 43.438 ha
- Indirect Impacts
    - Predicted indirect impacts: 5.375 ha
    - Potential indirect impacts: 12.898 ha (to be monitored)
- Total wetlands to be impacted: 95.974 ha (i.e., total direct + total predicted indirect) (EARD, p.g. 305)

Hydrological modelling was completed as a part of the EARD, which was used to assess potential direct and indirect impacts on wetlands as result of changes in flow or water levels. The proponent used a threshold of 10% change in flow to determine if an impact maybe observed. Downstream wetlands are not anticipated to be impacted due to less than a 10% change in flow. Signal Gold stated that the predicted alteration extent will be refined at the permitting stage and during detailed design, development of water management systems, and engineering.

Based on a high-level review it appears that the number of wetlands to be altered indirectly are underestimated. More wetlands may be indirectly altered other than those identified in the EARD, including potential indirect alterations to wetlands adjacent to the project infrastructure and during operations (pit dewatering); such as, Wetland 1, 7, 8, 12, 17, 27, 74, 229 among others. A detailed Wetland Management and Monitoring Plan to confirm the effectiveness of mitigation and accuracy of modeling are required as part of the standard Wetland Alteration Permit Application.

Mitigation and Monitoring:

Mitigation

The project design and infrastructure layout were revised to reduce impacts to wetlands, specifically WSS, where possible, considering other valued components, engineering constraints etc.

The tailings management facility is the largest single infrastructure impact to wetlands and can not be moved. Infrastructure that can micro sited, like organic material stockpiles and waste rock storage areas, were adjusted to avoid WSS. Including:

- Northeast WRSA was redesigned several times, to re-distribute and increase height of stockpile to minimize footprint on WSS.
- Northeast organic stockpile was designed to avoid direct impacts on two wetlands including one WSS.
- Northeast till stockpile and WRSA was split to avoid direct impacts on watercourse 9 and riparian area.
- Northwest WRSA was redesigned several times, to re-distribute and increase height of stockpile to minimize footprint on WSS.
- Southwest till stockpile was redesigned to avoid WSS.
- Four WSS will be completely avoided

The proponent stated a wetland awareness program will be implemented to clearly identify boundaries of approved areas to be altered and to communicate these and all approval conditions to site personnel. It is recommended this occur on a weekly basis during construction and that wetlands boundaries should be clearly marked in the field so unintentional alteration does not occur.

Where wetland impacts can not be avoided, wetland compensation projects will be undertaken. A preliminary wetland compensation plan was provided within the EA submission and will be refined through the standard permitting process.

Specific mitigations during operations were not identified (i.e., Pit Dewatering) which have the potential to effect wetland function. Wetland monitoring will be required in the standard permitting process to confirm the effectiveness of mitigation during construction, operations, and closure.

Monitoring

Wetland monitoring is planned to verify the accuracy of the predicted environmental effects, effectiveness of mitigation measures, and the need to implement additional environmental control measures in response to observed issues. The monitoring plan is required as part of the standard environmental permitting process. Signal Gold has committed to monitoring during baseline/preconstruction and throughout the construction and operational phases. If required monitoring will be completed during the closure phase.

Signal Gold has also planned to monitor all wetlands that are predicted to have direct or potential indirect impacts from the project. Including: all partially altered wetlands, wetlands

with predicted or potential indirect impacts, and additional avoided wetlands if up or downgradient impacts to contiguous hydrological features may result in indirect impacts.

It is also recommended that the monitoring program should also include assessments on wetland hydrology, wetland vegetation, and observations of direct and indirect impacts.

Monitoring will likely be a requirement of all the project phases. If monitoring shows that additional impacts to wetlands have or are occurring, additional compensation will be required.

Conclusion and Recommendations:

The Goldboro Gold Mine project will directly impact a minimum of 43.338 ha of wetlands of special significance. Even though Signal Gold attempted to reduce impacts on WSS, total of 25 (potentially 23) WSS were not able to be avoided. Further consultation with NRR and NSECC on the designation of wetlands 10 and 25 is recommended to determine their WSS status in advance of wetland alteration approval applications.

The *NS Wetland Conservation Policy* (2011) objective is to "manage human activity in or near wetlands, with the goal of no loss in Wetlands of Special Significance (WSS) and the goal of preventing net loss in area and function for other wetlands". Based on a review of the project, there is a predicted loss of WSS which is not consistent with the *NS Wetland Conservation Policy.*

The proponent stated, "A significant adverse effect on the Wetlands VC was defined in Section 5.7.6 as: A Project-related effect that results in an unmitigated or uncompensated net loss of wetland habitat, including WSS, as defined under the NSECC Wetland Conservation Policy (NSE, 2019), and its associated no-net loss policy. An adverse effect that does not cause a permanent loss of wetland habitat, in consideration of wetland functions, WSS and proposed mitigation/compensation, is not considered a significant adverse effect. The predicted residual environmental effects of Project construction, operations and closure on wetlands are assessed to be adverse, but not significant (as defined in Section 5.7.5.3)" (pg. 311). ECC characterises a large amount of direct alteration to wetlands, including WSS as a significant effect.

Environmental Assessments consider the wider ecosystem and community affects of a proposed undertaking. If it is determined by the Minister that the project is allowable due to the full range of impacts and benefits, then the proponent would proceed with applications for approval for proposed wetland alterations. Even though the project has been approved by the Minister the proponent will still need to justify why impacts to wetlands, particularly WSS, are unavoidable and unmitigable. The proponent will need to consider all opportunities to minimize the impacts to wetlands, including the changes to the project footprint, mitigations to minimize indirect impacts, and will be required to demonstrate through a monitoring program acceptable to the ECC that minimization and mitigation is effective. If monitoring indicates additional unapproved impacts to wetlands, these will be addressed through additional mitigation and possibly compensation.

Regardless of the impacts on WSS, the following additional recommendations are provided for consideration and are a requirement of the standard wetland alteration approval application:

- It is recommended that the proponent prepare and submit a *Wetland Management and Monitoring Plan* for ECC's review and acceptance. This plan should be developed in consultation with the ECC Wetland Specialist. This document should include:
    - Details and designs for proposed on-site mitigation measures specific to the protection of remaining wetlands or portions of wetlands, including measures for sediment and erosion control, maintenance of groundwater hydrology, vegetation management, stormwater management, and water quality management.
    - A detailed ecological and hydrological monitoring plan for:
        - The remaining portion of the partially altered wetlands.
        - The wetlands immediately adjacent of the Project development, to determine whether indirect impacts are occurring.
        - Baseline monitoring should occur prior to construction.
    - An Adaptive Management framework related to wetlands.
    - An outline of the measures to be implemented for rare species protection within remaining wetlands, consistent with any NRR management plan requirements that may be requested.
- It is recommended the proponent prepare and submit a detailed Wetland compensation Plan for ECC's review and acceptance. This plan should be developed in consultation with the ECC Wetland Specialist.
- Should the Project be approved, the proposed activities will be subject to the ECC Wetland Alteration Approvals process prior to any wetland impacts. The NSE-approved *Wetland Management and Monitoring Plan and Wetland Compensation Plan* will be a key piece of supporting information for this approval application. The proponent should utilize Nova Scotia's Wetland Alteration Application's Guided Template for the permit applications.

NOVA SCOTIA
Environment and Climate Change

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Date: July 8th, 2022

To: Candace Quinn, Environmental Assessment Officer

From: Air Quality Protection Advisor, Air Quality Unit (signed by Manager/Director)

Subject: **Goldboro Gold Project (Signal Gold Inc), Guysborough County, Nova Scotia**

Scope of review:
This review focuses on the following mandate: air quality.

Technical Comments:

The EA Registration Document contains an assessment of the air quality impacts of all operations within the site boundary, including proposed mitigation. The assessment includes limited monitoring of TSP and PM_{10} baseline concentrations (including subsequent metals analysis) at three of the nearest residential locations, and dispersion modelling of the anticipated impacts.

S. 5.1.1: note that the *Air Quality Regulations* are not designed to protect the 'health of workers'. They are applicable from the site boundary and protect the public and the environment.

Table 5.1.2: it is not clear why some of the PM_{10} concentrations are higher than the co-located TSP concentrations.

The dispersion modelling assessment used a silt content of 3.9% which is referenced to AP-42. The figure used appears to correlate with the lower limit for a haul road in 'taconite mining and processing'. No justification was provided for why this figure was used.

The dispersion modelling appears to show that 95% mitigation of emissions of TSP is required to meet the standard. The proponent refers to AP-42 to indicate that this is possible and references another source that states that a watering rate of 1.7 litres/m^2/hour would be required to achieve this. The Registration Document does not provide certainty on how this high level of mitigation will be achieved. It is not clear whether the potential for run-off into the surrounding environment has been considered.

Summary of Recommendations:

The proponent should provide further information to support:

- the reported baseline concentrations of TSP and PM_{10}.
- the use of the relatively low silt content of 3.9% instead of, for example, the average for taconite mining and processing which is reported in AP-42 to be 5.8%.
- how the high level of mitigation will be achieved: Where will the water for dust suppression be obtained from and stored? How often, in drier weather, will water be replenished on site? What is the operational plan to ensure adequate coverage of all roads? What is the contingency plan? What are the potential consequences of this methodology for the environment? Has the impact of using chemical suppressants (mentioned in the Dust Management Plan) been assessed for impacts on the environment?

Additionally, the proponent should consider the impact of any changes in the silt content and mitigation methodology with respect to sensitive species in the vicinity of the site, such as the lichen discussed in Appendix I.4.

The proponent should also provide an assessment of the impact of the construction phase on nearby residents including, for example, use of public roads.

Should the project be approved, this information can be requested prior to submission of an IA application and/or as a condition of the IA.

NOVA SCOTIA
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Date: July 8th, 2022

To: Candace Quinn, Environmental Assessment Officer

From: Air Quality Protection Advisor, Air Quality Unit

Subject: **Goldboro Gold Project (Signal Gold Inc), Guysborough County, Nova Scotia**

Scope of review:
This review focuses on the following mandate: noise.

Technical Comments:

The EA Registration Document contains an assessment of the noise impacts of all operations within the site boundary, including proposed mitigation. The assessment includes limited monitoring of baseline noise levels at three of the nearest residential locations and modelling of the anticipated impacts.

The proponent has used both Provincial and Federal Guidance and has used tonal penalties. The assessment is presented in Appendix D.5.

Baseline noise monitoring was co-located with the baseline air monitoring. Noise from the baseline air monitoring equipment may have consequently influenced the baseline noise monitoring.

The assessment indicated that current limits would be complied with at each identified receptor, with the highest modelled noise level reported to be 46 dBA compared with the nighttime standard (to be complied with at the site boundary) of 55 dBA. The sound levels that are predicted to occur at the site boundary would be lower or equal to the nighttime standard.

Predicted changes in the percentage of people highly annoyed (%HA) are predicted to be below the Federal limit of 6.5%.

Blasting, which may occur up to twice per week, is not predicted to impact human receptors, but may impact wildlife. The impact of noise on wildlife is beyond the scope of this review.

The proposed methods of mitigating noise that will be generated by the project is presented in Appendix D.5 and is appropriate for the type of operation.

Summary of Recommendations:

No further information is required with respect to the noise assessment.

NOVA SCOTIA

Fisheries and Aquaculture

PO Box 2223
Halifax, Nova Scotia
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Date: July 10, 2022

To: Candace Quinn, Nova Scotia Environment and Climate Change

From: Executive Director, Policy and Corporate Services
Nova Scotia Department of Fisheries and Aquaculture

Subject: Goldboro Gold Project – Environmental Assessment

Thank you for the opportunity to review the Goldboro Gold Project documents.

The Department of Fisheries and Aquaculture has the following comments:

- The purposed project is not near any known recreational saltwater or commercial harvesting, processing/buying facilities or marine plants harvesting operations. As such, this project will have minimal or no effect on these activities.

- There are two rockweed leases and 8 shellfish leases within 25km of the proposed operation.

- Although mercury (Hg) concentrations in fish tissue varies from site to site, concentrations can be higher in areas associated with gold mining. Therefore, the Department of Fisheries and Aquaculture recommends that the Department of Environment, as a condition of approval, require the proponent to develop and fund a monitoring program for mercury in fish tissue prior to beginning operations and maintain sampling through the end of the project as well as site remediation.

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Date: July 8, 2022

To: Candace Quinn, Environmental Assessment Officer

Cc: Chuck McKenna, Manager, Sustainability & Applied Science (Resource Management Unit)

From: Staff within Sustainability & Applied Science - Resource Management Unit of Nova Scotia Environment and Climate Change

Subject: Reviewer Comments on Goldboro Gold Project – Environmental Assessment Registration Document; June 2022

Introduction

The following reviewer comments have been developed by technical staff within the Resource Management Unit of NSECC based on review of the Goldboro Gold Project – Environmental Assessment Registration Document; June 2022

Comments

- The (Limited) Phase I and II ESA provided with the EARD was limited to the investigation of historic mine tailings found within the proposed mineral lease area for the Project (Crown Lease area(s) only as presented in Figure A1, Appendix A of the Limited Phase I and Phase II ESA; and referenced as PID's 35094366 and 35094325).

  Proponents are expected to conduct a Phase 1 Environmental Site Assessment (ESA) to identify areas of potential environmental concern and contaminants of potential concern within all areas that could be incorporated into the project (including Crown lease areas, private lease areas and/or property(ies) owned by the Approval Holder, as warranted). The Phase 1 ESA is to be completed by a Site Professional, as defined by the Contaminated Sites Regulations, and submitted as part of the registration document.

  Within Phase I ESA, Section 2.5 *Historic Tailings Screening* it states the following: *Based on a review of previous tailings delineations (produced using sampling completed by the Geological Survey of Canada, WSP, and Anaconda), historic*

tailings areas F through Q are not anticipated to be directly or indirectly impacted by proposed Project infrastructure and therefore are not given further consideration at this time. Tailings areas P and Q are recommended to be re-screened using the results of groundwater and surface water modelling conducted for the Project to assess possible changes to flow regime. Five tailings areas, A through E, are located in the vicinity of the Project and are likely to be disturbed by proposed activity. These five areas are the focus of further investigation, however only the near field of the Gold Brook will be investigated where direct impacts may occur through mine development and operation.

It is noted that tailings area E spans both Crown and non-Crown land parcels.

Recommendation: No further request for information pertaining to the Phase I ESA is warranted at this time.

- Section 4 of the Phase I/II ESA states in part….."*Horizontal and vertical delineation of arsenic and selenium impacted soil was not achieved during this program. Further sampling is recommended to better define the horizontal and vertical extent of metals contamination."*

  Section 2.2.2 of the Historical Tailings Management Plan states in part….." *Further delineation of historic tailings within the PA will be completed as part of the NSLI program.*"

  The current Phase 2 Environmental Site Assessment information contained within the EARD does not demonstrate requirements in accordance with Contaminated Sites Regulations:
  - If utilizing natural background values in lieu of Tier I EQS, provide clear distinction of values used (with justification).
  - The horizontal and vertical extent of soil contamination, for each contaminant has been determined and described in text and on a graphical site plan.
  - The horizontal and vertical extent of groundwater contamination, exceeding applicable environmental quality standards has been determined, for each contaminant, and is described in text and on a graphical site plan.
  - Clear justification for means of establishing delineation (chemistry, site profiles, project area boundaries, etc.).
  - a summary of risks posed by contaminants remaining on site and potential risk to receptor(s).

  Recommendation: Should the project be approved, include conditions as follows:

  Prior to project commencement, unless otherwise approved by the Department in writing, the Approval Holder shall undertake the following:

  1. *Using the results of the Phase 1 ESA, retain a Site Professional to conduct a Phase 2 ESA, as defined by the Contaminated Sites Regulations, for all areas that could potentially be incorporated into the project (including Crown lease areas, private lease areas and/or property(ies) owned by the Approval Holder, as warranted) which are known or suspected to have contamination which are likely*

to or potentially could be disturbed during the construction, operation or reclamation of the facility. Any areas with confirmed soil, sediment, groundwater, or surface water impacts above the applicable criteria (ie.Tier 1 EQS and/or natural background) must be delineated to appropriate screening level criteria within all areas that could be incorporated into the project (including Crown lease areas, private lease areas and/or property(ies) owned by the Approval Holder, as warranted).

2. *The Phase 2 ESA shall be submitted to the Department for review and must be deemed acceptable.*

3. *Provide any additional information the Department deems necessary to complete their review of the Phase 2 ESA.*

4. *Retain a Site Professional to prepare a Remedial Action Plan (RAP), as defined by the Contaminated Sites Regulations, for historic contamination impacts within all areas that could be incorporated into the project (including Crown lease areas, private lease areas and/or property(ies) owned by the Approval Holder, as warranted). The RAP shall include, at minimum a performance monitoring plan, requirements for long term risk management, and a proposed timeline of project construction to ensure that all contamination which may be disturbed or mobilized by site activities is managed in accordance with Contaminated Sites Regulations. The RAP shall also consider the potential for changes in surface water drainage, groundwater and effluent discharge which could expose or mobilize contaminants (including historic tailings and/or waste rock) during pre-construction, construction, operation, care and maintenance, or reclamation of the facility.*

5. *Submit the RAP to the Department with the Part V Industrial Approval Application for review and must be deemed acceptable.*

6. *Provide any additional information the Department deems necessary to complete their review of the RAP and Part V Industrial Approval Application.*

- Section 3.3 of Phase I/II ESA states…"*Industrial land use criteria are recommended for areas used for the production, manufacturing, or construction of goods, and which do not permit direct public access. Upon Project development, historic tailings areas A through E will be in the vicinity of mine infrastructure and access to these areas will be restricted to workers."*

  It is unclear from the information provided if the entire project area will be controlled access (i.e., restricted to workers); or if not, what area(s) will be controlled access and by what means.

  Recommendation: Should the project be approved, include a condition specifying intrusive assessment results relating to historic contamination be compared against appropriate screening criteria (i.e., natural background and/or agricultural EQS/PSS beyond controlled access portion(s) of project area, as warranted), to be adequately protective of ecological receptors as well as more sensitive human health receptors (as would be expected post-closure). This could be included as part of Condition 1

outlined in the previous Recommendation.

- Section 1 of the Historical Tailings Management Plan states in part….."*Management of historic tailings within the PA will be completed in accordance with the Nova Scotia (NS) Contaminated Sites Regulations as well as the Ministerial Protocols pursuant to those regulations. External reporting provided to the Nova Scotia Department of Environment and Climate Change (NSECC) will be completed in accordance with the Confirmation of Remediation Protocol (PRO-700). A Remedial Action Plan in accordance with Nova Scotia PRO-600 will also be completed prior to Project development.*"

  Also, Section 3 of the Historical Tailings Management Plan states in part….."*Areas of historic tailings overlapping with Project infrastructure are identified in Figure 6.*"

  Figure 6 suggests main tailings deposition area between two open pits and immediately downgradient will not be impacted by operations.

  Ministerial Protocol PRO-500 *Remediation Levels Protocol*, Section 6 states in part…. "Contaminated sites that are not cleaned-up to acceptable Tier 1 EQS or Tier 2 remediation levels in some cases may be managed through the use of long-term exposure controls documented in a risk management plan. Such controls protect all applicable human and ecological receptors from exposure to contaminants."

  Recommendation: Should the project be approved, include a condition that future iterations of the Historical Tailings Management Plan/Risk Management Plan include procedures/practices to demonstrate protection of onsite receptors (workers) during historic tailings excavation (construction phase); demonstrate adequate risk management of historic tailings remaining in-situ within project area (through administrative/engineered controls, as warranted) to be protective of onsite receptors (operational phase); And, demonstrate adequate risk management (through administrative/engineered controls, as warranted) of historic tailings remaining in-situ within project area to be protective of receptors (reclamation/post-closure stage).This could be included as part of Condition 4 outlined in the previous Recommendation.

- Within Section 2 of the Impacted Water Treatment System appendices (Appendix F-9) it has been assumed that the discharge water at the end of each treatment system must meet MDMER discharge limits. Furthermore, CCME, NSE Tier 1 EQS or site-specific discharge limits (based on a hazard assessment or the 95th percentile of background concentrations) must be met at assessment points in Gold Brook Lake and Gold Brook.

  It is noted that the 95th percentile background concentration provided considers impacts from historic contamination (e.g. As downstream regulatory criteria of 62 ug/L for Gold Brook Lake and 677 ug/L for Gold Brook; vs Tier 1 EQS criteria of 5 ug/L).

  The department may consider appropriate published standards; 95th percentile upper confidence level of established natural/ambient background conditions; or calculated site-specific water quality guidelines for use in setting regulatory limits.

Final determinations of appropriate criteria will be considered at the industrial approval stage.

Recommendation: Should the project be approved, include a condition stipulating provision of additional information as required by the Department for the determination of regulatory limits at the industrial approval stage (e.g., establishment of natural/ambient background concentrations for contaminants of concern in affected media(s), as warranted).

End

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Date: July 8, 2022

To: Candace Quinn
Environmental Assessment Officer, Policy Division

Cc: Director, Water Branch, Sustainability and Applied Science Division (SAS)
Manager, Water Resources Management Unit (SAS)

From: Groundwater Program Staff (SAS)

Subject: Review of Signal Gold Inc., Goldboro Gold Project Environmental Assessment June 2022

Environmental Assessment (EA) reviews from the NSE Sustainability and Applied Science (SAS) Division Groundwater Program staff focus primarily on groundwater resources. This includes the potential for the proposed undertaking/project to adversely affect groundwater resources, including general groundwater quality, quantity, municipal water supplies, local water supply wells and groundwater contributions to stream baseflow, groundwater recharge and wetlands. The review is conducted of materials provided by the proponent during the EA registration process including references to previously submitted material.

Signal Gold Inc. (Signal Gold), formerly Anaconda Mining Inc. is the proponent for the Goldboro Gold Project, a proposed surface gold mine with 4,000-tonne per day extraction capacity as well as associated infrastructure. An ore processing facility will receive extracted ore to produce gold doré bars for approximately 11 years. The construction phase will take approximately 2 years and is expected to commence in 2023/2024 pending permit duration. Progressive reclamation will occur throughout the life of the project with final site reclamation estimated at 3 years after operations cease. A post-closure monitoring period will occur following active closure of the Project. The Project is in Goldboro, Municipality of the District of Guysborough, Nova Scotia.

A summary of the main project components and essential features important in evaluating the effects of the proposed project activities on the site on groundwater resources is provided below. This is followed by comments and recommendations.

Project Setting and Existing Drinking Water Supplies

- The location of the undertaking is <u>not</u> within a municipal Wellfield Protection Area (WHPA) or Protected Water Area (PWA). The nearest Protected Water Areas are the Canso PWA (43 km), Antigonish PWA (60 km) and Port Hawkesbury PWA (50 km)

- The nearest Municipal Drinking Watersheds are for the Sherbrooke water supply (21 km), Canso water supply (43 km) and the Mulgrave water supply (42 km),

- The nearest Registered Public Drinking Water Supplies are at Isaac's Harbour Villa in Isaac's Harbour (approximately 3 km southwest across the Isaac's Harbour ocean inlet from the proposed Goldboro Gold Mine site,) and at Country Harbour RV Sites (in Isaac's Harbour North, 5 km west of the site).

- The proponent identifies 139 residences within 2 km of the "proposed project infrastructure" (Environmental Assessment Registration Document - EARD p. 7). As there are no municipal or centralized supplies it is most likely that these residences all have an on-site well water supply.

  GHD Limited has identified 21 residential wells (field truthed) in a residential well survey, east of Isaac's Harbour and closest to the proposed Project Area. Eighteen (18) of these were dug wells and 3 were drilled wells. They report the dug wells generally provide adequate yield but are susceptible to water quantity shortages during summer months. The drilled wells in the area are between 35 m and 95 m deep. The residential wells surveyed are within about 0.8 -1.5 km of the Project Area. Raw water samples were taken and well documentation collected, including existing well conditions, water usage and any existing concerns from owners about well yield and/or quality. (EARD p. 188-189 and Appendix F.1 Part 2).

  The nearest residential well to the Project Area (about 0.8 km) along the Goldbrook Road is reported to have been additionally monitored by the proponent since 2018 as part of the monitoring program for the Goldboro Bulk Sample Site Industrial Approval (Approval No. 2018-101368-02) (EARD p. 152).

It has been noted previously that the Well Logs Database Records and any mapping based on these records need to be considered in terms of locational errors/accuracy of the original data. In addition, the Well Logs Database does not contain a complete listing of every water supply well in the province and some areas may contain water supply wells not reported. Field truthing and field surveys for water supply well locations is necessary.

- The Project Area is described as predominantly found within the New Harbour/Salmon Primary watershed (1EQ), and the Gold Brook secondary shore direct watershed (1EQ-SD31) (EARD p. 218).

- Regional (and Project Area) surface water drainage is predominantly to the southeast along several stream channels and shallow lakes, and there are several low-lying wetlands across the PA. The most significant surface water body in the Project Area is Gold Brook Lake. The southern end of Gold Brook Lake is located approximately 100 m north of the proposed pits. Gold Brook Lake drains south-eastward to Seal Harbour Lake and finally discharges to the Atlantic Ocean (EARD p. 157).

  The location in the secondary watershed is relevant as the residential wells along Isaac's Harbour are located in a different secondary watershed (1EP-SD1) and as a result are less directly affected by any potential groundwater impacts in the Project

Area (EARD Figure 5.6-2).

- The proponent has conducted a thorough hydrogeological evaluation of the site study area and has a good understanding of the hydrogeology of the site area including groundwater levels, flow (quantity) and groundwater quality. They use the data collected to describe a Hydrogeologic Conceptual Site Model (CSM). This information is found in the EARD p. 171.

- A groundwater model (MODFLOW-NWT) is subsequently used to numerically represent the Hydrogeologic CSM and allows for model predictions of both groundwater flow and groundwater quality (MT3D-USGS), during and following proposed mining activities.

Project Infrastructure and Groundwater Implications

A number of the proposed project infrastructures have the potential for negative impacts to groundwater quantity or quality. Some of the relevant implications including both potential groundwater impacts, as well as the proposed design mitigations are noted in this section.

- Tailings Management Facility TMF

Tailings management includes deposition of both tailings (including some historic) and potentially acid generation waste rock - PAG1 (this and other designations are as defined in Appendix E.4. p.3-1) - below water cover, which will reduce ML/ARD effects of oxidation (EARD p. 30). It is noted that the proponent is planning to install "*a geosynthetic lining system installed along the TMF basin floor and on the upstream face of the perimeter embankments to minimize seepage exiting the facility*." (p. 15). The final cover proposed for the TMF is stated as "*a closure cover over the tailings and PAG1 material will be a combination of a geosynthetic reinforcement layer, NPAG waste rock (nominal 2 to 3 m thick), till (0.45 m thick), and topsoil (0.15 m thick)*" (p. 44). The design of the facility is relevant to ensuring groundwater is not impacted under, or surrounding, the TMF footprint.

At closure, the TMF is to be capped with dry cover of geosynthetic reinforcement layer, NPAG waste rock (nominal 2 to 3 m thick), till (0.45 m thick), and topsoil (0.15 m thick). This is intended to "maintain the tailings and PAG material in a saturated state to prevent the onset of ARD conditions." (EARD p. 44).

Seepage collection of contact water within the TMF is planned, consisting of internal drains and pumps. Drains will be installed in the foundation along the upstream toe of the TMF embankment and water collected in the seepage collection sumps will be transferred back into the TMF using a pump-back system (EARD p. 31). It is stated that water will only be released to the environment (i.e. Gold Brook Lake) if it meets discharge criteria. Potential water treatment systems for TMF discharge are addressed next.

- Water Treatment Systems (for the TMF)

The proponent states that, "*Based on the predictive water quality analysis completed for the Project, described in Section 5.6 and Appendix F.7, active water treatment is anticipated to*

be required to reduce metals, cyanide, and nitrogen series in effluent discharged from the TMF" (EARD p. 31). This treatment involves a number of steps as needed with planned addition of chemicals to provide oxidation, flocculation/coagulation, clarification, denitrification and polishing. For the "contact water", this helps ensure that no impacted discharge water is released to surface that could secondarily impact groundwater.

- Waste Rock Storage Areas (WRSA)

The development of three (3) Waste Rock Storage Areas (WRSA), "stripped till" storage areas and other material storage areas are planned for the project. The facility design description does not include any base lining, or preparation other than for the removal of topsoil (EARD p.30). The proponent indicates that water from the WRSA drainage/runoff would be directed via lined *contact water* perimeter ditches to settling ponds designated for treatment. (EARD p. 37).

The materials to be deposited in the WRSA include Non-PAG material as well as PAG2 waste rock which may contain Arsenic and other metals. During operations (after year 8) it is anticipated that progressive reclamation of soil cover and revegetation will be used to "to minimize the infiltration and/or oxidation of the waste rock." (EARD p. 44). This is to provide closure conditions.

The potential for seepage impacts from PAG2 and non-PAG materials to affect groundwater quality underlying the WRSA and subsequent discharge into Gold Brook Lake or Gold Brook is significant and does not seem to be directly addressed. This is discussed in a later section.

- Settling Ponds/Polishing Pond

"*Five settling ponds will be constructed to collect and treat contact water prior to discharging to Gold Brook Lake and Gold Brook. …*

The ponds will be lined with an HDPE liner, underlain by geotextile. A layer of sand will be placed on top of the HDPE liner to protect against punctures and a layer of riprap on top of the sand layer." EARD p. 38

Water treatment in the ponds may consist of the use of coagulants and baffling systems prior to discharge.

It is noted that all contact water ditches, [which collect runoff water in contact with any mine infrastructure] directed to the settling ponds "*will be lined with a high-density polyethylene (HDPE) liner, underlain by geotextile, followed by a layer of sand and a layer of riprap to prevent infiltration of stormwater into the surficial groundwater and protect the ditch from erosion*." EARD p. 37. Along with lining of settling ponds, this is an important design feature in mitigating any potential groundwater seepage of collected impacted water.

- Open Pit Excavations

It appears that the two open pits (East and West) will be mined concurrently, but with offset closure dates (the West Pit to close 3 yrs after the East Pit and deposit waste rock into the

East Pit during that time). A total of 142 million tonnes (Mt) of combined ore, non-ore bearing waste rock, and overburden will be extracted. Drilling, blasting, loading, and hauling will be used to mine the open pit material within the East Pit and West Pit. (EARD p. 22). The total ROM material mined is approximately twice as much in the West Pit as compared with the East Pit (Table 2.4-4, p. 23).

The Project Area has an elevation of approximately 60 mASL and the open pit depths will range from 200-250 m below surface. Thus, EOM elevations will be 100-200 m below sea level (East Pit -128 mASL; West Pit -184 mASL, EARD p. 194).

As the two open pits will reach EOM (end of mine) at different times, closure flooding of the pits will begin and end independently. "*The East and West Pits will be allowed to flood creating two open waterbodies with a shallow water wetland border and aquatic habitat. The shorelines will be graded to 5:1 to allow for egress. It is anticipated that the final lake elevations will be similar to that of the elevation of nearby Gold Brook Lake. As described in Section 5.6, the East Pit will be filled in Year 19, which is 11 years after it begins to fill with water, and the West Pit will be filled in Year 35, which is 24 years after it begins to fill with water. The East and West Pits will discharge water to Gold Brook Lake once they are filled*." (EARD p. 43).

During excavation, the open pit walls will be open to groundwater inflow and potential ML/ARD production, however this is not expected to be significant, but likely requires monitoring. Appendix E.4 states "*The excavation of the open pits will expose mine rock material in the pit walls. During operations, pit wall runoff will be captured in the pit sump and sent to the water treatment plant as required*." And, "*When pit dewatering is terminated at the end of mining, the groundwater level will rebound naturally, thereby flooding large portions of the pit walls. West Pit filling is further accelerated by decanting of the TMF water cover. Flooding of PAG pit walls will effectively mitigate ARD from submerged PAG pit wall exposures*." (p. 4-4)

Groundwater Modelling

The Groundwater Modelling Report (Appendix F.2) outlines Signal Gold's presentation of a groundwater numerical flow and solute transport model for the site. As noted earlier the model employed is the USGS developed finite-difference numerical model MODFLOW-NWT with the Groundwater Vistas GUI interface. This is coupled with the model MT3D-USGS for the simulation of solute transport within the flow field.

The groundwater model evaluated groundwater conditions at three milestone event times. Eight years following commencement (completion of East Pit EOM excavation), 11 years following commencement (completion of West Pit EOM excavation) and Post Closure (modelled at long-term steady-state represented as 500 yrs).

The groundwater modelling has generally followed industry-standard methodologies (such as calibration and sensitivity analyses) and a regulator appraisal relative to the BC Ministry of Environment "*Guidelines for Groundwater Modelling to Assess Impacts of Proposed Natural Resource Development Activities*" was conducted during this review to identify any significant groundwater numerical modelling issues.

The model appraisal highlights that the groundwater modelling was generally adequate with a few areas that could be improved for future use. Some of these areas include:

- The distribution of potential horizontal variations of hydraulic conductivity (k) is not described and may not have been incorporated in the model. Only the vertical k is described (Appendix F.2, Figure 5.3). If not already included, incorporating horizontal k distribution variations could result in greater model predictive accuracy.

- Other than project milestone event times, no real temporal analysis was conducted to evaluate potentially changing input conditions. For example, evaluating groundwater flow and solute transport response to periods of annual low flow/high flow, climate change RCP scenarios affecting precipitation etc. The model currently uses average conditions (i.e. presumed average annual).

- No calibration or sensitivity analysis is reported for the solute transport modelling.

- The model is based on a limited data set and no additional current data is presented that could be used for verification of model performance or reliability. This would be helpful to address over time as new data is collected. It was noted in the EARD that the model did adequately represent data from groundwater inflow rates measured in historical Orex and Boston-Richardson workings (EARD p. 173). Validating with new water monitoring data under different conditions, incorporating new fracture set locations (with k's), old mine workings and higher k faults if discovered will all assist in ensuring the groundwater model provides continual improvement of predictions.

Groundwater Potential Impacts and Interactions with other VC

The potential impacts on water quantity from the open pit mining are largely related to water table lowering due to pit dewatering, the discharge of pit water into surface water and the various effects this has on both groundwater levels as well as surface water levels – particularly in Gold Brook and Gold Brook Lake.

The Surface Water Resources Section 5.6 (EARD p. 214), the Water Balance Analysis Summary Report (Appendix F.5) and Assessment of Impacts to the Hydraulic Regime of Gold Brook (Appendix F.6) provide the analysis for the complex interaction of water flows and water levels in surface water at the Project Area. The Water Balance Model was developed using GoldSim software which incorporates surface water data as well as the results of the groundwater model output.

Groundwater effects on surface water quantity is largely derived from the Groundwater Modelling Report (Appendix F.2) predictions of simulated estimates of baseflow and drawdown effects, due to the open pit dewatering. Figures 7.2, 7.3 and 7.4 (in Appendix F.2 Part 2) shows the groundwater drawdown effects from dewatering is predicted to be limited to the immediate surroundings of the West Pit, East Pit and the TMF. The drawdown zones intersect with surface water features of Gold Brook and Gold Brook Lake and result in various and complex predictions related to baseflow reductions. However, the open pit dewatering discharge is to be directed into Gold Brook Lake and therefore the actual water levels in both the lake and brook system become even more complex to predict in combined models and

the results become somewhat unknown in terms of reliability.

It is noted in the report that groundwater baseflow has a cooling effect on the temperature of total flow in the watercourse and thus baseflow could be an important function supporting fish habitat. It is stated that "*Reductions in baseflow as result of the Project may result in changes in temperature in Gold Brook*" (EARD p. 255). However, subsequently in the document it is stated that with regards to "*the fish species present in the brook…As a result, potential changes in temperature through this system during the life of mine are not expected to be harmful to fish"* (EARD p. 358).

In addition, the relatively restricted zones of groundwater depression could have some effects on potential dewatering of wetlands. However, this is dependent on several factors: having wetlands within the zones of groundwater depressions; having a water table expression of the groundwater depression; and of having wetland types that interact directly with the continuous zone of groundwater. It is understood that wetland monitoring to further evaluate and assess effects would be a likely component during operations.

Water quality contributions from groundwater to surface water is another area for review. Having lined infrastructure such as the TMF, seepage collection ditches and settling ponds with water treatment addresses a lot of water quality concerns. However, the unlined WRSA and other material storage areas are predicted in the groundwater modelling to potentially have impacts for some parameters in groundwater. For example, groundwater Antimony and Arsenic simulated concentrations in the WRSA's in Figures 7.18 and 7.19 (Appendix F.2 Part 2) respectively both show exceedances above criteria that appear to interact with Gold Brook Lake and Gold Brook (see also Appendix F.2 Part 3, Figure 7.38 for Arsenic expected to exceed criteria for surface water discharge). Tables 7.1, 7.2 and 7.3 (Appendix F.2) show source zone groundwater concentrations for Arsenic in the WRSA ranging from between 100-430 ug/L throughout operations and into the post-closure period. This exceeds potable criteria and likely background concentrations.

Other parameters in groundwater from the WRSA's also show exceedances in Tables 7.1, 7.2 and 7.3 (Appendix F.2), but these seem limited to the footprint of groundwater under the WRSA. Groundwater criteria exceedances from the WRSA thus have a high potential to increase contaminant flux of these parameters in the Gold Brook Lake. This could have potential related concerns in meeting established compliance criteria for surface water in Gold Brook Lake.

Groundwater Monitoring

Groundwater monitoring results to date are included in Appendix F.1. Monitoring wells were established in 19 locations, with 44 unique well zones. Groundwater chemistry sampling indicates a number of parameters including some dissolved metals exceeding preliminary screening criteria for potability. It is not clear which locations may be considered background versus those in potentially historically contaminated zones. Statistics on potentially exceeding background groundwater quality parameters were not presented in the report.

A water monitoring plan which includes groundwater monitoring well locations is included in the Water Monitoring Plan (Appendix F.11). This also includes frequency (quarterly) and a table/list of groundwater quality monitoring parameters to be sampled.

Groundwater monitoring will be most effective when combined with clear regulatory site criteria and points of compliance. These have not yet been established.

Other Related Approvals

Based on the description of activities provided in the EARD report, the following are additional operational approvals/registrations that may be required for this project. This is not a complete list of approvals potentially required for the project.

- Groundwater withdrawal approval under the *Activities Designation Regulations* (ADR) for groundwater dewatering in the open pits at rates exceeding 23,000 litres/day

- Water withdrawal approval under the *Activities Designation Regulations* (ADR) for separate withdrawals from Gold Brook Lake exceeding 23,000 litres/day for:

    i) site processing fresh water and
    ii) site activity potable water purposes

- Registration as a Public Drinking Water Supply if meeting the definition for a "public drinking water supply" as prescribed in the *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations*

Comments on Groundwater Mitigations Proposed

Proposed mitigation measures for groundwater quantity and quality are presented in Section 5.5.7 Mitigations in the EARD document (p. 205). Much of what is referred to there is related to an environmental management type plan. Collection and treatment of seepage is also included.

Although not mentioned in Section 5.5.7, from a larger perspective, a number of the proposed mine infrastructure design developments should be considered as already partially addressing groundwater concerns.

- The lined TMF facility will address concerns of groundwater seepage of contaminated leachate in that area.

- Lined WRSA seepage collection ditches and settling/polishing ponds will address concerns of groundwater seepage of contaminated mine contact water

- Water treatment systems established in settling/polishing ponds will not only address surface water contamination concerns, but also address groundwater seepage concerns related to the pond footprints

- Open pit wall mine rock and associated groundwater seepage/runoff is identified for collection and potential treatment due to the likely occurrence of ML/ARD effects

- Open pit groundwater that is dewatered will be pumped into the Central Settling pond

for treatment prior to discharge into Gold Brook Lake. This discharge will likely offset most, if not all, of the groundwater quantity captured by the dewatering pumping of recharge that is induced from the lake into the pit. If adequately managed this system may maintain lake water levels and outflow.

Some potential gaps in the proposed groundwater mitigation:

- WRSA area footprints are not lined to prevent infiltration and groundwater modelling by the proponent indicates the potential for some dissolved metals and other parameters to leach and develop groundwater plumes within the Project Area exceeding potable (and other) criteria.

- Several of the WRSA groundwater leachate parameters modelled above show likely interaction with and discharge to Gold Brook Lake and Gold Brook

- Other storage material areas, such as for ROM (Run-of-mine) material for, for which design features are not clear, or provided, may have the potential to produce leachate affecting groundwater

- It is not clear in the submission what site operational groundwater quality criteria are anticipated for compliance purposes within the Project Area and what actions the proponent will take if water quality criteria are exceeded

- Open pit dewatering is predicted to cause localized site water table reductions, thus possibly adversely affecting function in some wetlands. Although this relationship between groundwater and wetlands is discussed, no mitigation measures are identified (not including compensation).

Recommendations

- In order to address concerns about long-term groundwater contamination potentially resulting under the WRSA areas, lining of these areas with a geomembrane layer or other materials, or other equivalent means of preventing groundwater impacts, should be considered and submitted for approval to the Department.

- Other areas of the site, such as the ROM transient storage area (which will include ore, PAG1 and other material), that have the potential for leachate infiltration to groundwater should also include design to mitigate such impacts, as acceptable to the Department.

- A statistical analysis and evaluation of groundwater background/baseline water quality parameters will assist in developing site-specific groundwater quality criteria to be met.

- Clear regulatory site groundwater criteria and points of compliance need to be developed in conjunction with Department review and approval.

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Date: July 08, 2022

To: Candace Quinn, Environmental Assessment Officer

From: Surface Water Quality Specialist, Water Resource Management Unit

Subject: **Goldboro Gold Project – Guysborough County, NS**

This review is based on the surface water quality mandate.

Technical Comments

The EA registration document (EARD) identifies that the project consists of 27 distinct activities distributed across three project phases, and that each of these activities are expected to interact with surface water resources with the potential to cause adverse environmental effects.

Of these, the EARD provided information to characterize potential effects and adequate mitigation measures for the following activities, as summarized in Table 5.6-16:

- Clearing, grubbing, and grading
- Drilling and rock blasting
- Topsoil, till, and waste rock management (construction)
- Haul road construction
- TMF construction
- Collection ditch and settling pond construction
- Watercourse and wetland alteration
- General waste management
- Open pit dewatering
- Petroleum products management
- Site maintenance and repairs
- Tailings management
- Surface water Management
- General waste management (all phases)
- Demolition
- Earthworks

The activities listed above are not considered further in this review.

Ore management / cyanide and reagent management

The EA registration document indicated that mined ore would be processed on-site, and that ore processing involves several inter-related subprocesses, including the use, destruction, and/or removal of several contaminants of potential concern such as cyanide and arsenic. The proponent indicated that many waste products would be directed to the TMF through thickened tailings slurry. The EARD did not clearly identify the fate of several waste products associated with ore processing, including:

- arsenic precipitate,
- cyanide that is not in 'weak acid dissociable' form,
- discharge water from the polishing plant, and
- discharge water from the carbon dewatering screen (associated with tailings thickening).

Consequently, the potential environmental effects of these products are unknown. Confirmation that all ore processing waste products will either be recycled in perpetuity or directed to the Tailings Management facility (TMF) or suitable off-site disposable facilities would allow the risks of potential adverse effects to be mitigated.

The proponent indicated that it is a voluntary participant in the International Cyanide Management Code, and implied that it will seek registration for the proposed mine by the Code. This voluntary activity, if completed, is expected to further mitigate the risks of contamination of surface water quality by cyanide and associated reagents.

Historic tailings

Historic tailings have been identified within and near to the Project Area. The Proponent has indicated that it has "received an indemnification letter from the province releasing the company from any liabilities related to the past mining and milling activities if those areas are not disturbed with new or proposed activities". The Proponent further indicated that Nova Scotia Lands Incorporated is currently undertaking a Phase I and Phase II ESA and remedial action plan for all historic tailings located within the Upper and Lower Seal Harbour Gold Districts, including the Project Area.

The proponent has conducted baseline monitoring of surface water quality around the site and has calculated 95th percentile values based on the baseline monitoring data. As outlined later in this review, the proponent has used the terms baseline and background interchangeably in the document., However, "natural/ambient background" should be differentiated from "baseline" as representing uncontaminated conditions, where baseline reflects existing water quality impacts from historic land use.

Waste rock management

The proponent indicated that precipitation falling on uncovered waste rock, topsoil and till stockpiles may leach Contaminants of Concern (COCs) from the piles, which then may infiltrate groundwater impacting groundwater quality. The proposed mitigation for this risk to groundwater quality was for runoff from the piles to be collected, in HDPE-lined seepage collection ditches, and pumped to the water treatment unit associated with the northwest Waste Rock Storage, prior to entering the settling pond and discharging. The EARD indicated that the mitigation would be incomplete as groundwater COC concentrations may exceed potable criteria beneath and near the associated stockpiles. It is therefore evident that stockpile seepage collection does not eliminate this risk to groundwater. The EARD did not indicate whether COCs introduced to groundwater through this pathway would reach Gold Brook Lake and, if so, the predicted impact, if any, to concentrations in that watercourse. The adequacy of water treatment is addressed elsewhere in this review. The risk of contamination to groundwater/surface water via this pathway could potentially be addressed through stockpile lining. Monitoring of groundwater in proximity of the stockpiles and between the stockpiles and Gold Brook Lake/Gold Brook would be expected to demonstrate that the trends and concentrations of COC are below regulatory limits at compliance assessment points, as accepted by the department.

Water Treatment

In the context of this proposal, there are two separate issues of water treatment:

1) containerized wastewater treatment plants (WWTPs) for human waste,

The EARD indicated that two WWTPs would be employed onsite, with one directing treated effluent towards the Central settling pond, associated treatment system, and discharging to Gold Brook Lake, and the other directing treated effluent to the Southwest settling pond, ultimately discharging to Gold Brook. The EARD did not detail expectations of treatment requirements, system capacity, the level of treatment to be provided by these containerized plants, or predicted impacts, if any, to the receiving environments.

The containerized WWTPs will be required to meet standard terms and conditions for sewage treatment facilities including the establishment of discharge criteria and monitoring and reporting requirements that are protective of the receiving water.

2) water treatment facilities associated with the settling ponds and tailings management facility

The adequacy of proposed water treatment for the mine is predicated on several factors, as follows:

- Identification of all applicable Contaminants of Concern (COCs);
- Identification of appropriate water quality regulatory criteria against which to assess COC concentrations;
- Predicted Exceedance of COCs against guideline values (aka Predictive Water Quality Assessment);
- Effectiveness of treatment process(es) applied

The proponent conducted a water quality baseline monitoring program and identified several constituents, all adopted as COCs, for the purpose of assessing water treatment requirements. The COCs presented by the proponent are adequate to support the assessment of adequate water treatment.

The proponent tabulated several different sets of comparison criteria to assess regulatory limits, including the following:

i. Metal and Diamond Mining Effluent Regulations (MDMER), administered by Environment and Climate Change Canada (ECCC
ii. CCME (Canadian Water Quality Guidelines for the Protection of Aquatic Life)
iii. Tier 1 EQS (Environmental Quality Standards for Contaminated Sites)
iv. Site-Specific Water Quality Guidelines

Site-Specific Water Quality Guidelines (SSWQG) are developed by proponents and submitted to the Department for its consideration. In this case, SSWQG were developed for constituents where baseline concentrations (using the 95th percentile concentration) exceeded CCME and Tier 1 EQS Guidelines or a risk hazard assessment was performed on the receiving water body.

The proponent used two separate methods to develop SSWQOs. One of these methods, used where measured baseline concentrations exceeded CCME and Tier 1 EQS guidelines, defined the SSWQG value as the 95th percentile of the measured values for that constituent during baseline monitoring. These proposed SSWQGs are for the following constituents: Aluminum, Arsenic, Beryllium, and Iron.

The second method used to develop SSWQGs for this proposal was a 'hazard assessment' method. Although the proposal identified the software used to calculate SSWQG - ProUCL – and the rationale for

its use – to consider background concentrations – it did not disclose why this approach was selected instead of the '95th percentile' method for certain constituents, or if the suitability of this specific method for developing SSWQGs. Further, no information was presented about the modeling itself - input data, calibration, sensitivity, validation, etc. This method was applied to generate SSWQGs for five constituents: Cadmium, Cobalt, Lead, Zinc, and Nitrite.

The department may consider appropriate published standards; 95th percentile upper confidence level of established natural background conditions; or calculated SSWQG, for use in setting regulatory limits. Final determinations of appropriate criteria will be considered at the industrial approval stage. It is therefore recommended that should the project be approved, a condition be included stipulating provision of additional information as deemed required by the Department, for the determination of regulatory limits at the Industrial Approval stage.

The proponent used COCs and proposed regulatory compliance criteria, among other factors, to determine if mine effluent may affect the receiving environment and if treatment of this effluent is required during any of the five project stages used for this assessment. This approach, identified by the proponent as the "Predictive Water Quality Assessment" (PWQA), appears to adequately identify and characterize the potential effects to surface water quality. Moreover, the proponent indicates that the approach is predictive and will be refined throughout the course of the project by using new water quality data generated through surface and groundwater monitoring data. This approach is expected to provide strong and adaptive mitigation against potential impacts to water quality, as emerging treatment requirements may be identified before adverse impacts occur.

The proponent proposed different locations for monitoring requirements to assess compliance with MDMER vs. NSECC compliance limits. MDMER limits were deemed applicable at discharge points from treatment plants / settling ponds into Gold Brook Lake and NSECC compliance limits were deemed applicable at different locations – at the outlet of Gold Brook Lake and three distinct monitoring sites downstream within Gold Brook. These proposed compliance assessment locations are reasonable as they accommodate the application of mixing zones in accordance with applicable conservative wastewater guidelines. Water quality guidelines do not apply within the limits of mixing zones.

The PWQA results indicate that exceedances are expected, and consequently treatment will likely be required, for several constituents, at several treatment systems, namely, arsenic, cyanide, mercury, cobalt, copper, nitrate, nitrite, ammonia, and un-ionized ammonia.

The proponent indicated, in Table 4.2 Appendix F.7, that treatment would be required for ammonia for mine operating years 0-12, during periods labelled 'Early Operations, 'Late Operations', and East Pit Filling – 1. In this same table, however, the listed Treatment Requirements for "nitrogen series treatment removal efficiency" were listed as NA (Not Applicable), for the Late Operations and East Pit Filling – 1 periods. Taken literally, this table appears to indicate that the proponent does not intend to treat ammonia during years 9-12. If true, this lack of treatment for an expected exceedance represents a potential adverse effect to surface water quality. Confirmation that all applicable treatment systems will perform required ammonia treatment during years 9-12 will form adequate mitigation to this risk.

The PWQA predicted an exceedance for lead at compliance assessment point Gold Brook DS-2, associated with discharge from the south-east settling pond treatment facility. The proponent indicated that treatment should not be required for lead due to the predicted short-term exceedance (two months), and that the difference between the predicted effluent concentration (1.09 µg/L) and the proposed SSWQG (1.00 µg/L) is within the range of measurement error for this constituent at accredited

laboratories. Preparing for the possible need to treat for lead at the south-east settling pond treatment facility would allow for mitigation of this risk.

The proponent identified conceptual treatment systems for the North, Central, and Southeast Settling Ponds, as well as the Tailings Management Facility (TMF), based on the PWQA results. The conceptual treatment systems were presented as examples of the type of system that could be used to treat predicted water quality concerns associated with the project, not their final design. In all cases, the conceptual treatment systems presented appeared to be capable of treating all predicted COC exceedances such that all water quality compliance limits, for MDMER and NSECC, would always be achieved at all compliance assessment points, for the entire period of their proposed lifespan – between operational years 0-13.

The EARD indicated that treatment would be required to remove metals from site seepage and runoff for five years (operational years 14-18) during the closure period. The proponent identified two passive treatment systems would or could be used to provide necessary treatment: anoxic limestone drains and engineered wetlands. Additional details regarding the design (including treatment capacity) operation, and maintenance of these system, as well as possible monitoring requirements, will be required to mitigate potential impacts to surface water quality.

The proponent presented a proposed monitoring plan in Appendix F.11, which included a scheduled reduction in monitoring frequency within each of the construction, operations, and closure phases. Although compliance monitoring programs often permit reductions in monitoring frequency after an initial period, prescheduling reduction in monitoring frequency may result in loss of data capture before COC concentrations reach stable concentrations within compliance limits. Should initial monitoring results in each mine phase support the proponents desire for a reduction in monitoring frequency, this reduction may be proposed for the Department's approval.

Summary of Recommendations

1. Confirmation that all ore processing waste products will either be recycled in perpetuity or directed to the Tailings Management facility (TMF) or suitable off-site disposable facilities would allow the risks of potential adverse effects to be mitigated.

2. Confirmation that the owner intends to register the proposed mine under the International Cyanide Management Code will support mitigation of potential risks to the receiving environment by excess cyanide and cyanide reagent concentrations in tailings and TMF treatment plant effluent.

3. Confirmation that all applicable treatment systems will perform required ammonia treatment during years 9-12 will form adequate mitigation to this risk.

4. Seepage from waste rock storage areas constitutes a possible contamination risk to groundwater and/or surface water in Gold Brook Lake via groundwater discharge. This risk may be mitigated by lining these facilities to reduce the volume of seepage exiting the facilities Details to be addressed at Industrial Approval stage, including any monitoring and criteria to be met.

5. Designing water treatment facilities to perform required ammonia treatment during years 9-12 of mine operations would address the risk of adverse water quality effects at Gold Brook Lake and Gold Brook. Details to be addressed at industrial approval stage.

6. Designing the southeast settling pond to treat for a predicted lead exceedance would address the risk of an adverse water quality effect at Gold Brook. Details to be addressed at industrial approval stage, including any monitoring and criteria to be met.

7. Water treatment facilities should be designed to treat all constituents that are predicted to exceed applicable compliance limits, for the entire period of the predicted exceedances, such that treated effluent meets these limits at all applicable compliance assessment points. Details to be addressed at industrial approval stage, including any monitoring and criteria to be met.

8. All waste materials generated from the processing of mined ore, which are known or expected to contain contaminants of concern, must be collected and directed to an appropriate on-site treatment facility or transported to an approved off-site disposal facility.

9. For containerized (sewage) wastewater treatment plants, the proponent will be expected to submit design details at industrial approval stage and meet the standard treatment requirements based on a receiving water study as normally is the case. The proposed site specific and regulatory limits for surface water discharges are mitigatable issues to be addressed in detail at an industrial approval stage, including the establishment of detailed monitoring programs, criteria and compliance points.

10. Detailed groundwater/surface water monitoring programs, criteria and compliance points will be established at the industrial approval stage. The approval holder will be expected to demonstrate that passive treatment systems proposed for metal leaching (i.e. anoxic limestone drains, engineered wetlands, or others proposed for use) provide sufficient mitigation of potential impact to surface water quality.

11. If requested, reductions in required water quality monitoring frequency below initial (high) levels may be considered by the Department, and approval may be granted pending stable and compliant results.

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Date: July 8, 2022

To: Candace Quinn, Environmental Assessment Officer

From: Melissa Ginn, Regional Environmental Advisor, Transport Canada

Subject: **Goldboro Gold Project**

Transport Canada has reviewed the registration document for the Signal Gold Inc. - Goldboro Gold Project. Since the proposed project does not appear to be located on federal lands, a review pursuant to s.82 of the *Impact Assessment Act* (IAA) is not required.

Compliance with the *Transportation of Dangerous Goods Act (TDGA)* is mandatory when handling and/or transporting any regulated dangerous goods. Additional information on the *TDGA* is available from; http://www.tc.gc.ca/eng/tdg/safety-menu.htm

Transport Canada would like to advise the proponent of CANUTEC, which is the Canadian Transport Emergency Centre operated by Transport Canada to assist emergency response personnel in handling dangerous goods emergencies. This national bilingual advisory centre is specialized in interpreting technical information, providing advice, and emergency response. CANUTEC offers 24-hour emergency telephone service at 1-613-996-6666 or *666 on a cellular phone.

The Navigation Protection Program (NPP) has also reviewed the registration document and provided the following comments:

The proposed project does not appear to have any components on navigable waterways. That being said, it would be suggested that for any portions of the project that would go in, on, across, over or under navigable water, that the proponent use the https://npp-submissions-demandes-ppn.tc.canada.ca/projectreview-outildexamenduprojet to assess their obligation under the *Canadian Navigable Waters Act* (CNWA).

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Date: July 9, 2022

To: Candace Quinn, Environmental Assessment Officer

From: Environmental Health Program

Subject: **Goldboro Gold Project**

The Environmental Health Program has undertaken a review of the Goldboro Gold EARP. The scope of our review was to evaluate the potential for project related activities to impact public health.

HHERA

Table 4.28 on Page 61 oh the HHERA presents predicted PM10 concentrations at the PA, south of the PA, and the village, and compared predicted PM10 values against the AAQC standard of 50ug/m3.

Risks were deemed negligible when predicted concentrations did not exceed the AAQC.

Information presented in Table 4.28 show predicted PM10 values for the location South of the PA, and the Village do not exceed the AAQC value, however the predicted values for South of the PA and the Village were 67 and 54ug/m3, respectively, which clearly exceeds the 50ug/m3 standard.

PM10 exceedances presented in Table 4.28 suggest that the potential for PM10 to impact residential receptors requires further assessment or analysis.

Air

Background air quality monitoring was completed at 3 local residences. Baselines results for all parameters measured were below the applicable guidelines value.

Air dispersion modelling was undertaken for selected residential receptors that may be impacted by emissions. Concentrations of contaminants in air were predicted to meet all applicable standards.

Air quality monitoring will continue over the life of the project to validate model predictions and confirm regulatory compliance.

The proposed approach for assessing and monitoring project related impacts to air, and

potential subsequent impact to human health, is supported.

Light

Section 5.2.1 recognizes the impacts that changes in ambient light can have on the general public. A qualitative assessment was undertaken and identified no sensitive residential receptors given the topography and the presence of vegetation.

The project adopted standards from the Institute of Lighting Engineers to assess acceptable levels of light trespass to nearby receptors. Goldboro was classified as having ambient light levels consistent with a rural community. Based on ILE standards the acceptable level of light trespass at an off site receptor is described as 5 lux pre curfew and 1 lux post curfew (after 11pm).
A light impact assessment was completed to assess project light impacts on nearby residential receptors. Project related light impacts at nearby residential receptors were less than the ILE post-curfew limit of 1 lux.

In the event of complaints related to light trespass the proponent has committed to implementing a light monitoring program to further assess and manage light impacts on human health.

The proposed approach for managing light impacts on residential receptors is supported.

Noise
Baseline ambient sound monitoring was undertaken around the project area including 3 nearby dwellings.

Acoustical modelling was completed to assess noise impacts on human receptors during various phases of the project. Modelling concluded that noise impacts associated with the project will meet provincial and federal guidance.

The proponent has committed to ongoing noise monitoring within the community of Goldboro to establish an operational baseline and ongoing monitoring to ‘confirm noise thresholds are below the prescribed thresholds for nearby residents and compliant with regulations.

The proposed approach for monitoring and manging noise impacts on residents is supported.

Residential Water Wells

Baseline groundwater monitoring was completed to assess groundwater quality and quantity conditions in the area.

A residential well survey was undertaken in the area. Twenty one wells were sampled and tested for general chemistry.

Groundwater modelling results predict that nearby residential wells will not be impacted from project activities.

Ongoing groundwater monitoring will continue throughout the life of the project.

The proponent has committed to maintaining a complaints line where residents can report issues with their well including changes in water quality and quantity. The proponent has committed to investigating all complaints and replacing wells that are deemed to be impacted by project activities.

The approach proposed for assessing, monitoring and investigating potential project impacts on residential water wells is supported.

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Sustainability and Applied Science

MEMORANDUM

To: **Candace Quinn, EA Branch**

From: **Water Resources Engineer, Water Resource Management Unit, Sustainability and Applied Science Division**

CC: **Jennifer Rocard, Manager, Water Resource Management Unit**

Date: **July 10, 2022**

Subject: **Goldboro Gold Project – Environmental Assessment Registration Document Review**

Scope of review:

The scope of this review from the NSECC Sustainability and Applied Science Division Water Resources Engineer is to assess the potential environmental impacts and proposed mitigations of the proposed undertaking on surface water quantity and management and assess them for significance. While comments may also include considerations for impacts on general surface water quality, groundwater, freshwater fish habitat, and wetlands, appropriate technical specialists for these areas should be consulted for specific review and comment. The format of the comments provided below generally follows highlighting direct statements from the submission and supporting documents, with sub-bullets reflecting specific feedback/comments on these statements, where appropriate.

Limitations of Review:

Due to the limited time provided for review and complexity of this file, the comments and conclusions/recommendations below are based upon review of only the most relevant sections/appendices of the current submission related to surface water, specifically the sections within the EA submission and a high-level review of components of Appendices F.3, F.4, F.5, F.6, F.8, and H.2.

Review:

General Design:

- "The Project consists of conventional open pit mining operation and a 4,000 tonnes per day (tpd) processing facility based on a combined gravity and leaching circuit using carbon-in-pulp technology. The Project also includes an engineered, fully lined tailings management facility (TMF), three waste rock storage areas (WRSAs), till and organic material stockpiles, and associated infrastructure." (pg. i)
- "The design of the two open pits (East and West Pits), instead of a single larger open pit, was selected to avoid any direct disturbance to both Gold Brook Lake and Gold Brook." (pg i)
- "Construction is anticipated to start in late 2023, commissioning in 2025, operations until 2035, and initiation of closure in 2036." (pg i)
- "The Maritimes & Northeast Pipeline (M&NP) crosses the western side of the PA. A 40 m offset will be maintained between the M&NP natural gas pipeline and the East and West Pits. Blasting will be completed in accordance with the National Energy Board Regulations for Pipeline Damage Prevention and the NS Blasting Safety Regulations made under the Occupational Health and Safety Act. In addition, Signal Gold has met several times with M&NP representatives to facilitate a cooperative working relationship, coordination of access to the pipeline, and blasting notification procedures." (pg vii)

Water Quality

- "An environmental benefit to the Project is that Signal Gold will remediate any areas of historic tailings directly within the Project infrastructure footprint." (pg ii)
- "Signal Gold is part of a historic tailings working group for this area with Nova Scotia Lands Inc. (NSLI). NSLI is currently undertaking a Phase I and Phase II Environmental Site Assessment (ESA) and remedial action plan for all historic tailings located on Crown land within the Upper and Lower Seal Harbour Gold Districts, which include the PA." (pg ii)
- "Historically, tailings were deposited into streams and wetland areas with no provisions for containment or control of leachates. Consequently, tailings migrated along Gold Brook. Stream water samples collected downstream of the southernmost historic tailings areas have shown elevated levels of arsenic and iron. The PA has been subject to numerous research activities that are well documented. Sampling by the Geological Survey of Canada in 2012 (Parsons et al. 2012) showed elevated arsenic (As) and mercury (Hg) levels within tailings of the Upper Seal Harbour area. Elevated As and Hg are also present along Gold Brook where tailings from mill processing from 1893 to 1910 were deposited within or adjacent to natural watercourses. The main method of gold extraction was via mercury amalgamation that lead to mercury enrichment within the tailings." (pg 12)
- "Runoff from mine pit walls and groundwater seepage will be collected, with water pumped to the water treatment unit associated with the northwest WRSA prior to entering the settling pond and discharging." (pg 205)
- "A near-field mixing zone model was created to determine the extent of the three-dimensional dilution zone around the discharge points where mixing of the effluent (treated mine contact water) and the receiving waters (Gold Brook Lake and Gold Brook) occurs. This is commonly referred to as Near Field Region (NFR) or Initial Dilution Zone (IDZ). The water quality objectives for the receiving water body do not apply within the IDZ, which is the initial portion of a larger effluent dilution zone. The Atlantic Canada Wastewater Guidelines (ACWG) (Environment

Canada, 2006) set limits on the size of the mixing zone which have been adopted for this assessment. The guidelines state that a mixing zone be constrained by the following targets:
- Not to exceed 25% of the cross-sectional area or volume of flow in streams/rivers for all flow regimes equal to or exceeding the 7Q20 flow for the area
- Not to exceed 1/3 of the river width at any transect in receiving stream/river
- Not to exceed beyond a 100 m radius from the effluent outfall in a lake **"** (pg 246)

- "Table 5.2 provides the model results for the NFR in Gold Brook (southeast settling pond outfall). The effluent to ambient flow ratio is less than the required 25% in all cases. The NFR width is also less than 1/3 of the stream width in all cases, which is in accordance with the ACWG. The 7Q20 flows were estimated as described in Section 3, and the calculation should be updated once sufficient data has been gathered to calibrate the daily flows." (F.8, pg 12)
- What has been completed here does not seem to comply with the requirements. The effluent is to be compared against the 7Q20 flow for the area. From Table 4.1, the effluent from the SE settling pond is 0.004 m^3/s. From Table 5.2, the 7Q20 for Gold Brook is estimated at 0.0014 m^3/s. The effluent is much more than the estimated flow in Gold Brook. Unless this can be clarified, I do not have confidence in the conclusions stated in Appendix F.8 that are further reflected in the submission.

Groundwater

- "Locally, structural geology is relatively complex. The bedrock is highly to intensely fractured near surface, with quartz vein intrusions along fault shear zones which crosscut the greywacke and slate strata (Orex, 1990). Three main faults have been identified and mapped in the PA as shown on Figure 5.4-7. Some faults are highly brecciated. Observations within historical mine workings have shown that some large faults have been made impervious by breccia fines and therefore will not conduct groundwater." (pg 133)
- "Gold Brook Lake likely is a location of groundwater discharge (i.e., a groundwater sink)." (pg 157)
- "As shown in Tables 5.5-2 and 5.5-3, the water table at the PA is typically close to ground surface (i.e., averaging 1.9 m below ground surface, in shallow monitoring wells measured in 2021). The bedrock forms a fractured rock aquifer system, which is overlain by a thin overburden aquifer. The groundwater flow system is strongly influenced by topography such that recharge occurs in areas of high elevation and discharge is to low lying streams, rivers, and bogs. Interpreted groundwater elevation contours are presented on Figure 5.5-2 for the overburden/shallow bedrock flow system. Figure 5.5-2 shows that in general groundwater elevations mimic topographic relief and locally groundwater discharges to low-lying surface water features. Gold Brook Lake is likely the most significant surface water body receiving groundwater discharge." (pg 163)
- "At the Project, the primary groundwater source is from groundwater recharge through precipitation infiltration. In some areas it is expected that groundwater will receive recharge from surface water features; however, surface water features overall are expected to receive net discharge from the groundwater flow system." (pg 170)

- "GHD estimated that the site specific average annual recharge is 18.5 percent of average annual precipitation or approximately 260 mm/year. The lower and upper quartiles of the percentages of precipitation contributing to recharge are 17 and 23 percent, respectively. The Project-specific average groundwater recharge estimates of 17 to 23 percent of average annual precipitation corresponds well with the estimated baseflow range of 17 to 21 percent of average annual precipitation presented by Kennedy et al. (2010)." (pg 171)
- "The groundwater flow model was applied to estimate the following impacts at East Pit EOM, West Pit EOM, and PC:
  - The rate of groundwater inflow into the open pits
  - Changes in groundwater elevations
  - Changes in baseflow to surface water bodies
  - Changes in groundwater quality" (pg 193-194)
- "For East-Pit EOM and West-Pit EOM, it is assumed that the infiltration rate over the footprint of the organics, till, and waste stockpiles is unchanged. It is assumed that any surplus infiltration in these areas would be collected by the perimeter drainage system and not report to groundwater." (pg 194)
- "Groundwater inflow rates into the open pit are simulated at East Pit EOM, West Pit EOM, and PC. The simulated volumetric flow from the pit drain cells is summed over the entire East and West Pits to estimate the potential groundwater inflow rates into the open pits. At East Pit EOM the simulated groundwater inflow rates are 1,811 and 1,874 m3/day for the East and West Pits, respectively. At West Pit EOM the simulated groundwater inflow rates are 950 and 2,168 m3/day for the East and West Pits, respectively. At PC the simulated groundwater inflow rates are 474 and 524 m3/day for the East and West Pits, respectively." (pg 198)

Water quantity: Site Drainage and Water Balance

- "All Project water will be directed towards the settling ponds (via an expanding network of surface water ditches or via pumping) prior to discharge into Gold Brook Lake and Gold Brook." (pg 15)
- "The current layout of Goldbrook Road will intercept the proposed open pits and will therefore be realigned and offset at least 30 m from the open pits. Approximately 510 m of Goldbrook Road will require widening, including clearing and grubbing, grading, and granular refilling. An estimated 3,200 m of roads will also be required within the PA. In addition, an estimated of 5,500 m of new public access roads will also be constructed to maintain public access to the adjacent areas beyond the PA." (pg 15)
  - What assessment has been done re: new roads and impact on water resources (e.g., wetlands, drainage)? I could not clearly find this information within the submission
- "Five settling ponds will be constructed to collect and treat contact water prior to discharging to Gold Brook Lake and Gold Brook. Settling ponds will be constructed during the construction phase prior to WRSA development. Ponds will continue to be constructed during the operations phase when new WRSAs and stockpiles are constructed. The location of settling ponds is shown in Figure 2.4-5." (pg 37)
- "The north settling pond will treat the stormwater runoff and waste rock seepage for Total Suspended Solids (TSS) and arsenic using coagulants, prior to discharge to Gold Brook Lake." (pg 37)

    - It is then stated that “The effluent of the settling ponds will be dosed with acid for pH adjustment and then will pass through engineered wetlands for final polishing before discharging to the environment. An engineered wetland is selected as the alternative polishing step for both the north and southeast settling ponds due to the lower flow and available space. The effluent of the engineered wetland at the north settling pond will flow into Gold Brook Lake, and the effluent of the engineered wetland at the southeast settling pond will flow into Gold Brook.” (pg 39)
- “The central settling pond will treat the stormwater runoff, seepage from the waste rock, and West Pit dewatering product for TSS and arsenic using coagulants prior to discharge to the water treatment system. Similarly, the east settling pond will receive runoff from the northeast WRSA, East Pit, and organic material stockpiles and be treated for TSS and arsenic using coagulants, prior to being pumped to the water treatment system in the northwest quadrant associated with the central settling pond.” (pg 37)
    - It is then stated that “In the next step, the effluent in the central settling pond will be conditioned by adjusting its pH (and adding nutrition, if needed) and will feed into a biological treatment system for nitrate/nitrite removal. The effluent of the biological treatment unit will flow into a polishing pond for clarification and final polishing. The effluent of the polishing pond then will be discharged into the Gold Brook Lake.” (pg 38)
- “The southeast settling pond will receive runoff from the southeast WRSA and organic material stockpile. The runoff and seepage are to be treated for TSS and arsenic using coagulants before discharge to an engineered wetland to treat for nitrates and nitrites. The wetland will discharge to Gold Brook.”
- “To further mitigate and reduce the risk of adverse impacts to fish and fish habitat downstream of the settling ponds, all pond outlet structures will be equipped with emergency shut-off valves that can be closed if any water quality parameter exceedances are triggered.” (pg 37)
- “The ponds will be designed with enough freeboard to accommodate the inflow while the shut-off valves are closed. To this end, each pond will be designed with enough capacity to hold the runoff volume generated by the 5-year 24-hour storm event plus 5% climate change factor, with the emergency shut-off valves closed (emergency operating conditions).”
    - “During an emergency shut-off at either of the south ponds or at the northwest settling pond, the weather forecast will be monitored, and the ponds will be drained (into the central or northeast ponds) ahead of any storm event expected to be greater than a 5-year storm (98.4 mm). This will minimize the risk of unauthorized discharge to the environment.” (F.4, pg 3)
- “The ponds will be lined with an HDPE liner, underlain by geotextile. A layer of sand will be placed on top of the HDPE liner to protect against punctures and a layer of riprap on top of the sand layer. The riprap is to act as ballast to prevent the liner from being impacted by buoyancy forces of the nearby groundwater as well as provide erosion protection.” (pg 38)
- “Runoff from the reclaimed TMF and WRSAs will continue to be collected in the settling ponds indefinitely.” (pg. 40)
    - This appears to be contradicted on page 44, where it is stated “The north and southeast settling ponds will remain functional until the water quality is stable and meets applicable guidelines.”? Which is the correct statement?
- “During the closure phase the central settling pond will discharge to the West Pit.” (pg 41)

- "The southwest settling pond will begin discharging to Gold Brook Lake in the construction phase and will continue be decommissioned/reclaimed following removal of the till and organic material stockpiles in the closure phase." (pg 41)
    - It is unclear from this statement where the southwest settling pond will discharge after decommissioning/reclamation
- "The East and West Pits will discharge water to Gold Brook Lake once they have finished filling with water. The East Pit is expected to be filled by Year 19, and the West Pit is expected to be filled by Year 35." (pg 41)
- "The general concept for reclaiming the PA will be to remove all buildings, infrastructure, and facilities that can be dismantled. Till and organic material stockpiles will be used in reclaiming the PA. All other infrastructure including the East and West Pits, WRSAs, and TMF (including ditching and settling ponds) will be contoured to blend with the natural landscape and re-vegetated. The TMF will be capped with a dry cover." (pg 43)
    - What does this mean from perspective of water balance in reclamation phase?
    - What does this mean from the perspective of on-going management of the TMF embankments and their stability?

Water Resources:

- "Gold Brook Lake is the primary surface water feature in the area and is likely an area of groundwater discharge. Gold Brook Lake is approximately 1,700 m long with a maximum width of approximately 790 m at its northern end and 110 m at its southern end. Gold Brook Lake has a maximum depth of approximately 3.0 m and a mean depth of 1.7 m. Gold Brook Lake is drained from its southern end by Gold Brook which flows in a southerly to southeasterly direction ultimately discharging into Seal Harbour Lake and the Atlantic Ocean." (pg 170)
    - "Gold Brook Lake is relatively large is size at 79 hectares, when compared to the area of the secondary, shore direct watershed (~4000 ha) (Figure 6a to d, Appendix H.1). Depth within Gold Brook Lake ranges between 0.61 m to 3.05 m, with the deepest basin running north to south through the central-eastern extent of the lake based on bathymetry data collected by Signal Gold (Figure 6, Appendix H.1). This littoral zone, which typically extends up to 2 m in depth, accounts for approximately 40% (32 ha) of the lake's overall area. Field measurements of depth matched the bathymetry data closely, with 3.35 m representing the maximum recorded depth throughout Gold Brook Lake." (pg 320)
    - "Fish collection was completed in four main areas within Gold Brook Lake (north, east, south and west) three times throughout the summer of 2021 and a total of 473 individuals were collected and released. Yellow perch represented 62% of all fish captured from Gold Brook Lake (n = 294). Smaller components of banded killifish, American eel, golden shiner, brook trout, and blacknose shiner were observed throughout the fish collection program." (pg 353)
- "Gold Brook is a perennial, third order watercourse. This watercourse is a braided system that has one main channel (WC64A) and approximately 10 branches (WC64, branches B through K). The braided channels are described in the Fish and Fish Habitat Baseline Report (Appendix H.1). These portions of Gold Brook provide suitable habitat for YOY, juvenile and adult brook trout,

adult American eel, all life history stages of golden shiner, and all life history stages of yellow perch and banded killifish, primarily in slower and deeper reaches." (pg 352)

- "The aquatic environment, including Gold Brook Lake, Gold Brook, and contributing watercourses, have been affected by the deposition of tailings from historic mining operations." (pg ii)
- "The total area directly and indirectly (flow reductions) impacted by the Project is 26,353 m2." (pg v)
- "As described in Section 5.6, the East Pit will be filled in Year 19, which is 11 years after it begins to fill with water, and the West Pit will be filled in Year 35, which is 24 years after it begins to fill with water. The East and West Pits will discharge water to Gold Brook Lake once they are filled." (pg. 43)
- "The numerical groundwater flow model simulated the potential changes in baseflow that may occur within and surrounding the PA under East Pit EOM, West Pit EOM, and PC conditions. The simulated change in baseflow is assessed at select assessment points down-gradient of Gold Brook Lake." (pg 202)
- "As shown in Table 5.5-13, the simulated baseflow reduction ranges from 53 to 320% at East Pit EOM, from 50 to 254% at West Pit EOM, and from 34 to 86% at PC." (pg 202)
- "Surface water quantity monitoring has been completed in the PA since 2018 by Signal Gold and GHD…Velocities were measured at 60% of the depth below the water surface, which was assumed to be equal to the average of the vertical velocity profile." (pg 217)
    - "GHD and Anaconda field staff completed surface water monitoring concurrently from March to July 2021 in order to cross-train Anaconda on preferred field methods. Anaconda completed the surface water monitoring program from August 2021 to present." (App F.3, pg 2)
    - "Manual water level and flow measurements were used to generate rating curves for stations SW-12-21, SW-14-21, SW-16-21, and SW-17-21. Continuous flow graphs produced from these rating curves are presented in Appendix B. Rating curves and continuous flow graphs will be continuously updated during on-going monitoring as more data is collected and the stage-discharge relationships are further defined." (App F.3, pg 3)
    - What QA/QC has been completed on the continuous streamflow measurements produced through the application of the rating curves? The continuous flows for SW14 outline an event in Sept/Oct where flows reach 4.5 m^3/s, but no similar peak is shown on the SW14 "2021 Hydrograph" figure – is this an error? The values from this event has the potential to significantly impact monthly average flows that may be further reported within the submission and used to support conclusions. In addition, as a watercourse with significant braiding, it is important to understand the exact location of the monitoring completed at SW-12-21, and more information surrounding the considerations in choosing the site at this location. Rating curves used to support discharge calculations must also be provided for review. In the SW15 "2021 Hydrograph" figure, water levels are shown to be negative? Against what reference? It should be noted that the baseline information collected here is critical to the effective assessment of future impacts, and as such it is equally as critical that these measurements be completed to a high quality, trustable standard.

- "The 2021 calculated flow measurements at the outlet of Gold Brook Lake (SW-12-21) ranged from 3 L/s on July 20, 2021 to 1,035 L/s on April 1, 2021." (pg 225)
    - To confirm, these reflect values calculated using developed rating curves?
- "Surface water levels were monitored at 14 locations…Staff gauges were installed at these monitoring locations and used for discrete surface water level measurements. In addition, continuous water level data from stations…were collected at 15-minute intervals…Continuous surface water levels were corrected using the discrete water levels collected during the monitoring events." (pg 217)
- "During the construction phase and onward, monitoring location SW-12-21 will need to be decommissioned due to ease of access, and monitoring location SW-22-21 located just downstream will be commissioned and monitored in its place…streamflow data collection at this location was not feasible and therefore SW-11-21 will be decommissioned during the construction phase and SW-24-21 (upstream, to a more confined portion of Gold Brook) should be implemented and streamflow monitoring will be incorporated." (pg 266)
    - Based on the information in the submission, it is unclear how much these stations are proposed to be moved. It is critical to have a reliable, consistent locations for surface water level and flow monitoring that is monitored prior, during, and after project activities. Moving these stations represents a significant challenge in having this necessary data to support assessment of impacts from the activity moving forward.
- "Approximately 17 ha of the northwestern edge of the PA and 0.8 ha of Project infrastructure (a portion of the northwest WRSA and an organic material stockpile) falls within the Isaacs Harbour River secondary watershed (1EP-1)." (pg 218)
- "Approximately 83 ha of the northeastern portion of the PA and 10.6 ha of Project infrastructure (a portion of the TMF and an organic material stockpile) falls within the New Harbour River secondary watershed (1EQ-4)." (pg 219)
- "Approximately 49 ha in the eastern portion of the PA and 0.8 ha of Project infrastructure (a portion of the TMF) falls within the 1EQ-SD29 shore direct watershed." (pg 219)
- Table 5.6-2
    - Average depth provided in this table – what does this value represent? Average water depth at a representative cross section within the watercourse as measured at a particular time (if so, when)? Average depth at bankfull width?
    - It is very difficult to obtain an adequate understanding of watercourses in the area based on the information provided here
- "The projected climate change impacts were also assessed by applying climate change factors to the yield values. The historical and projected average annual precipitation totals were obtained for Guysborough, NS from the NSECC Climate Data (NSECC, 2022). The projected average annual precipitation totals are provided for the 2020s, 2050s, and 2080s and were considered representative of the year 2020, 2050, and 2080, respectively. A linear interpolation was performed to estimate the climate change projected precipitation totals for all years in between. Finally, the percent increase from the historical value was calculated for each year to represent the climate change factors that are applied to the yield in the water balance analysis."
- The information provided in Section 5.6.3.3.2 does not provide much in terms of presenting an understanding of baseline water resources in the area for the purposes of assessing impacts

- "Signal Gold has undertaken an engagement and consultation program with the Mi'kmaq of Nova Scotia, stakeholders, regulators, and the public…Throughout this process, various issues, concerns, and opportunities have been identified in relation to the Project…For the Surface Water Resource VC, identified concerns include:
  - Changes to water levels in shallow surface features (wetlands, streams)
  - Potential water contamination due to proposed Project activity
  - Effects due to siltation, blasting, acid mine drainage
  - Mobilization of arsenic, mercury, cadmium from TMF
  - Effects of cyanide from ore processing
  - Effects of water withdrawals for process source water
  - Effects of discharges into waterbodies
  - Effects on fish and other aquatic species
  - Changes to surface water drainage and regime
  - Long-term effects of open pits and effects on Gold Brook Lake" (pg. 231)
- "As the Project has the potential to cause direct and indirect effects on surface water quantity and quality outside of the PA, the LAA is considered the most appropriate spatial boundary for this assessment. Where portions of watersheds have been included, it is not expected that impacts to the aquatic environment, including wetlands, will extend beyond the PA." (pg 232)
- "The water balance analysis was developed to utilize climate inputs at a daily time-step, allowing the results to be summarized at monthly or annual intervals. The water balance analysis was used to estimate the flow volumes at the proposed mine water management features and at 29 assessment points over the duration of the Project. The locations of assessment points used in the water balance analysis are presented in Figure 5.6-5." (pg 236)
    - How do these points relate to the SW quantity stations to support effective calibration and validation?
- "A soil-water balance working model was used to simulate baseline hydrological processes. The model used the 50-year daily records of rainfall, snowfall, average temperature, and calculated potential evapotranspiration (PET) as inputs, and included models of the snowpack and soil-water storage. A snowpack model was used to calculate yield (i.e., the sum of rainfall and snowmelt) and a soil-water storage model was used to calculate actual evapotranspiration (AET), baseflow, surface runoff, and total runoff depths for application in the water balance." (pg 238)
    - "The 50-year timeseries of daily yield, baseflow, and surface runoff depths simulated from the soil-water balance working model were used to generate average monthly runoff coefficients for each flow component. The simulated results were summarized into monthly totals, then averaged over the 50-year period, to produce average monthly values of yield, baseflow, and surface runoff depths. Ratios of average monthly baseflow depth and yield were used to generate average monthly baseflow runoff coefficients. Ratios of average monthly surface runoff depth and yield were used to generate average monthly surface runoff coefficients for application in the WBM." (Appendix F.5, pg 9)
    - "Figure 4.4 plots the percent change in cumulative simulated flow compared to cumulative observed flow as the blue line. The percent change at the end of the simulation is approximately 23%." (F.5, pg 7)

    - "The results presented on Figure 4.3 indicate that there are differences between the precipitation recorded at the Collegeville Auto station and the precipitation patterns experienced at the site." (Appendix F.5, pg 7)
        - What has been done to confirm that these differences are not associated with model performance?
    - "There are several simulated flow events with corresponding high yields that are not reflected in the observed flow record. Conversely, there are several observed flow events that are not reflected in the simulated record due to the correspondingly low yields, calculated from the precipitation observed at the Collegeville Auto climate station." (Appendix F.5, pg 9)
    - Through review of this and the information found in Appendix F.5, it is unclear to me what was done from the perspective of calibration/validation of the model, the limitations related to using the partial year baseline information available, and the resulting level of confidence in the results
- "One limitation of the water balance analysis is that it does not account for attenuation of water within Gold Brook Lake; as a result, flow data at both baseline and at each project phase is shown as relatively low based on precipitation data. In reality, precipitation is naturally attenuated in the lake and flow spikes in Gold Brook have not been observed and are not expected. To account for the lack of lake attenuation in the model, streamflow at the Gold Brook assessment points are presented as moving 7-day averages; presented on a daily time step. Even with the 7-day averaging to simulate lake attenuation, artificial spikes in baseline and Project phase stream flows still occur, especially when baseline flow is very low." (pg. 238)
- "After the pits have been mined to their full potential, they will begin to fill with water to form pit lakes. During this time, pit inflows include direct precipitation, groundwater inflow, and overflow from adjacent settling ponds to reduce the time required to form the pit lakes and stabilize the groundwater flow patterns." (pg 239)
    - Is the further reduction of flows to Gold Brook Lake as a result of diverting the settling pond discharges considered in the potential impacts on the lake during the filling stages?
- "The water demands result in a maximum reduction in the average monthly flow volume of 9.0% in the month of August during the East EOM development phase at the Gold Brook Lake outlet." (F.5, pg 17)
- "The impact of the Project on the water levels in Gold Brook Lake were assessed by routing the baseline and West Pit EOM daily flow records through the lake storage using the HEC-RAS software and comparing the corresponding lake level results. Lake inflow is equal to the sum of the total runoff from the natural drainage areas of the lake and discharge from a combination of the North Settling Pond, Central Settling Pond, East Pit, West Pit, and TMF WTS, depending on the scenario. Lake outflow is equal to lake inflow minus lake evaporation, water demand withdraws during operations and lake flow routing effects. The lake outflow is calculated at the Lake Outlet assessment point. The assessment was performed using 50 realizations of the daily flow timeseries for each of the baseline and West Pit EOM conditions based on 50 years of the historical climate record. The West Pit EOM scenario was selected for this analysis because the largest reductions in flow volume on Gold Brook are predicted to occur during this year on an average annual basis. The active storage volume of the lake was equated to a water surface

elevation using a stage-storage relationship, calculated from the light detection and ranging (LiDAR) data for the region. It is assumed that the water surface elevation in the LiDAR represents permanent lake level, which would correspond to the invert elevation of the three 1,800 mm diameter corrugated steel pipe (CSP) culverts that control the outflow from the lake to Gold Brook." (pg 244)

- From a review of Table 1 within Appendix B of Appendix F.5, it is unclear what has been explicitly considered in the water balance at the Gold Brook Lake Outlet location. The format of this Appendix differs from Appendix A, which provides more in terms of a summary of the components of the water balance. Additional information is necessary to support the water balance results and the conclusions in the submission that follow, including:
  - What daily flow records are being referred to here?
  - Can you quantify and further explain the lake routing effects that are referred to in the above?
  - What about losses from the lake from the groundwater perspective for the various project phases, including West EOM where both pits are filling?
  - In saying that the assessment was performed using 50 realizations of the daily flow timeseries – what exactly is meant here? My understanding is that the water balance for the Lake Outlet was run 50 times using different meteorological inputs, and the results averaged to provide what is shown in Table 1 – is this correct?
- From what has been presented in the submission, it is unclear if Gold Brook Lake had multi-year assessment completed like is shown in Appendix A for the various surface water features developed for the site, or what the results of such an assessment would be. This information is critical to understand the potential for impacts on Gold Brook Lake and downstream as a result of the various phases of the project.
- Where observed flows in Gold Brook near the outlet of Gold Brook Lake are already low (e.g., 5 L/s) and many tributaries of Gold Brook within the project area are reported to be directly or indirectly impacted, underestimated impacts to Gold Brook Lake water levels could result in challenging conditions for Gold Brook, and could increase the overall extent of impacts on surface water resources related to project activities

- "It is assumed that the water surface elevation in the LiDAR represents permanent lake level, which would correspond to the invert elevation of the three 1,800 mm diameter corrugated steel pipe (CSP) culverts that control the outflow from the lake to Gold Brook." (pg 244)
  - Under what conditions is this level reached in the water balance? How often can it be expected that outflows to Gold Brook will not occur?
- "Hydraulic modelling was completed to estimate the effects of the Project on the hydraulic regime of Gold Brook between Gold Brook Lake (upstream) and Seal Harbour Lake (downstream). A 2-dimensional hydraulic model of Gold Brook was developed using HEC-RAS software, a computer program that models the hydraulics of water flow through natural rivers and is widely used to determine hydraulic parameters such as water surface profiles and flow velocities. Low flow (10th percentile) and average flow conditions were simulated for the baseline and West Pit EOM scenarios." (pg 244)

    - "Manning coefficients were estimated based on analysis of aerial imagery and consultation of available literature. Manning's coefficients of 0.04 was chosen for the main river channel." (pg 325)
    - How was the model calibrated/validated, and where can this information be found?
- "A significant adverse effect to surface water quantity from the Project is defined as:
  - Residual effects have high magnitude, are of potential regional geographic extent and of medium to long term duration, occur at any frequency and are only partially reversible to irreversible." (pg 249)
    - High Magnitude is defined as "Change in predicted average monthly discharge is greater than 25% below baseline conditions"
    - Regional geographic extent is defined as "direct and indirect effects from Project activities are restricted to the RAA", which according to Figure 5.6-4, begins at the inlet to Seal Harbour Lake
    - Medium to long term duration is defined as "effects occur in the construction phase and operations phase" to "effects occur in the construction phase and operations phase and persist in closure", and is understood to also include Permanent durations, defined as "valued component unlikely to recover to baseline conditions"
    - Partially reversible to irreversible is defined as "mitigation cannot guarantee a return to baseline conditions" to "effects to VCs are permanent and will not recover to baseline conditions"
    - No justification is provided in the submission to support the definition and criteria used in determining a significant adverse effect on surface water quantity.
- Table 5.6-9 Outlines Project Activities and Surface Water Interactions (pg 251)
    - Closure is missing a critical 'Relevant Project Activity' related to surface water management – it is understood through review of the submission that drainage on site will be managed during this time to support in more rapidly filling the East and West pits.
- "33 watercourses are anticipated to be directly impacted by Project activities, as detailed in Table 5.6-10. NS watercourse alteration approvals for these watercourses will be required to support Project development." (pg. 250)
- "It is expected that the maximum average annual flow reduction on Gold Brook during the West Pit EOM development phase will be approximately 10% at the outlet of Seal Harbour Lake. This is due to the increased natural drainage of approximately 1830 ha; therefore, it is expected that the impacts of the Project on flow reduction during West Pit EOM are limited to areas upstream of Seal Harbour Lake." (pg 252)
    - How were the approximation of 10% reduction at the outlet of Seal Harbour Lake and the conclusion that a potential 10% reduction at outlet of Seal Harbour Lake does not represent an impact from the Project determined? What about different timescales than annual, and different conditions than average? What is the range of expected impacts to areas downstream of Seal Harbour Lake during summer conditions for years that are more dry than typical?
- Table 5.6-11

    - Information is provided in terms of average annual flow impacts. How is this information used to support in determination of significance, when the definition of significance includes assessment of changes in predicted average monthly discharges?
- "The predicted impacts to each assessed watercourse are summarized below. Further detail on the water balance analysis conducted for this assessment is provided in Appendix F.5."
- "The groundwater and water balance models predict that WC-14 and Gold Brook will experience a reduction in baseflow as a percentage of the total flow in the East Pit EOM, West Pit EOM, and closure scenarios. Baseflow will be reduced to 10% of the total flow during the East Pit EOM and West Pit EOM scenarios and 18% of total flow during closure at the WC-14-DS4 assessment point." (pg 255)
    - Information to support what timestep is being used here is required - my understanding is that the 'total flow' term being used above is using an annual timestep, like the information provided in Table 5.6-11. If my stated understanding of the values being used here is correct, this assessment is at risk of significantly underestimating impacts related to baseflow changes on flows within these watercourses. There should be a focus on low flow periods where baseflows are most significant – please clarify
- "There will be no baseflow contributions to Gold Brook at the GB-DS1 assessment point due to the proximity of the East and West Pits. However, baseflow only represents 1% of the total flow at this location in baseline conditions." (pg 255)
    - Where did this 1% come from?
- Section 5.6.6.1.1 is very difficult to review, and this information should have been provided in a different format (e.g., a table).
- "As described in Section 5.6.5.2.4, the impact of the Project on the water levels in Gold Brook Lake were assessed by routing the baseline and West Pit EOM daily flow records through the lake storage using the HEC-HMS software and comparing the corresponding lake level results."
    - Section 5.6.5.2.4 highlights HEC-RAS was used, not HEC-HMS. These are very different software packages. Section 5.8.5.2.2 mentions HEC-HMS as well?
- Figures 5.6-12 and 5.6-13 – at current, these figures are nearly impossible to review and understand. The colours are very close to each other, and are impossible to differentiate in many cases.
- "The Project's total wetland direct impact area is expected to be 90.599 ha (partial and complete), which represents 27.5% of total wetland area within the PA (329.033 ha, see Appendix G.1 (Wetland Baseline Report))." (pg 295)
- "Changes to wetland hydrology are a common driver for further change to wetland function and habitat integrity. Potential indirect impacts to wetland hydrology through changes in contributing LCAs, surface water flow reductions, and groundwater drawdown can be assessed through modeled impacts to surface water and groundwater. These hydrological effects are discussed and estimated in the following sections. As a result of the models used, the indirect wetland impact estimates provided herein represent a "worse-case", conservative impact extent and are primarily used to inform recommendations for monitoring. Actual indirect impacts of the Project will be determined at the permitting stage and through monitoring programs (presented in Section 5.7.8)." (pg 298)
    - From a review of Figures 5.7-3, I would highlight the following wetlands as requiring additional assessment/monitoring as wetlands that, based on high-level hydrologic

evaluation including review of values provided in Tables 5.8-9 and 5.8-10, appear to have underestimations of indirect impacts within the submission:

- WL1 (partially direct impacts, reduction in contributing area through various site components, reduction in groundwater contributions due to mine activities) – significant risk in hydrologic impacts of this wetland complex due to site activities. There is currently significant uncertainty in the success of the proposed mitigation of pumping and discharging treated groundwater to East and West Pits to Gold Brook from the perspective of WL1, particularly those parts of the wetland that are located upgradient of the Gold Brook channel itself;
- WL7 & WL8 (partially direct impacts, reduction in contributing area due to SE Waste Rock Area;
- WL12 (significant reduction in contributing area due to NE WRSA and NE Till Stockpile) – strongly recommend this at minimum be heavily monitored as likely to be much more impacted than predicted here;
- WL17 (significant direct impacts, reduction in contributing area through various site components) – likely to be completely altered;
- WL27 (significant reduction in contributing area due to TMF) – Table 5.8-9 highlights a range of reductions in flow of 25-61% predicted in the watercourse at this location under normal year conditions, as example;
- WL74 (significant direct impacts, reduction in contributing area through various site components)
- WL229 (partially direct impact, reduction in contributing area due to TMF);

- "Table 5.8-9 provides a summary of hydrologic modelling results from a normal year model output. Selected sites were evaluated under a dry year scenario; a summary of these results is provided in Table 5.8-9." (pg 343)
    - Why do some results appear to improve during dry year conditions? As an example, results from WC14-DS2 outline a range of predicted flow change of -61 to -25 for the East Pit EOM Phase under a normal year, while results from the same WC14-DS2 location and the same East Pit EOM Phase under a dry year outline a range of predicted flow change of -58 to -25.
- "During all Project phases, it is important to note that an increase in flow is predicted at the various assessment points along Gold Brook during low flow periods (mainly the summer months). This is due to continual release of treated effluent into Gold Brook Lake, which essentially supplements flow during low flow periods. This is a passive, natural release of water from the lake, with no modification to the lake outlet: high percentage increases in flow are reflective of very low flow at baseline, supplemented by more continuous flow from the lake, and are not expected to affect the geomorphology of the lake outlet or watercourse." (pg 352)
    - The values outlined for Gold Brook in Table 5.8-9 include positive flow changes from 3426% to 2220841%. For the baseline flow of 3 L/s within Gold Brook earlier in the submission, this would increase the flow to 66,625 L/s – this represents a significant change. What assessment was done from the perspective of validating the statement that these flows will not affect the geomorphology of the lake outlet or watercourse?

- "During East Pit EOM, daily flow reductions are predicted to occur between 24-46% along the length of Gold Brook. The reductions in flow are predicted to occur during seasonal high flow periods. Due to a continual release of water from Gold Brook Lake, it is predicted that daily flows will generally increase during the low flow period, and the time of the low flow period will be lengthened by 78 days at the Lake Outlet but shortened by between 265-288 days per year at all subsequent points." (pg 352)
    - Why the difference between Lake Outlet and subsequent points? The Lake Outlet would be receiving the same continual release of water from Gold Brook Lake, correct?
    - How could the low flow period be shortened by 265-288 days? The natural low flow period would be much less than this value?
- "During West Pit EOM when neither pit is full nor releasing to the environment, daily flow reductions of 26 to 47% are predicted to occur. The low flow period is predicted to be lengthened at the Lake Outlet by 78 days but shortened at all subsequent downstream points by between 266-288 days. Overall, Gold Brook is expected to experience an increase in flow relative to baseline in the low flow scenario." (pg 352)
    - How is this possible, where no supplemental flow is being provided to Gold Brook, and the majority of site water collected is being diverted to filling to the East and West Pits? Where can more information to support this assessment be found and reviewed? At current, it is very difficult to have confidence in these results.

Fish and Fish Habitat

- "Where fish habitat is present in a wetland, but outside of an entrenched channel, it is described as a wetland mosaic (accessible to fish). In addition, watercourses were assumed to provide fish habitat, regardless of whether they are directly connected to fish bearing streams or proven to be occupied by fish. In an effort to make conservatively inclusive decisions in this effects assessment, even those watercourses lacking connectivity to known fish bearing streams (i.e., WC99, WC57, WC69, etc.,) are included as fish habitat, and proposed for offsetting if a project interaction is proposed." (pg. 314
- "A total of 473 individual fish were collected throughout all seasonal fish collection programs in Gold Brook Lake. Seventy-three percent of the individuals observed were yellow perch (n=346). The remaining fish collected in Gold Brook Lake comprised of 14% banded killifish (n=66), 5% blacknose shiner (n=25), 4% American eel (n=19), 3% golden shiner (n=15), and less than 1% brook trout (n=2). Within Gold Brook Lake, the benthic community had a low to low/moderate diversity of organisms (3 – 11 taxa per sample); and low to high abundances (301 – 7,568 individuals per metre squared)." (pg 320)
- For Rocky Lake: "A total of 186 individuals were collected and released throughout all seasonal fish collection programs. Ninety-one percent of the individuals observed were golden shiner (n=170), while the remaining 9% (16 individuals) were American eel." (pg 320)
- During the 2020-2021 field program, three rounds of electrofishing and additional trapping were completed to confirm fish presence in two sections of Gold Brook. These efforts resulted in the capture of five species of fish throughout the system, including banded killifish, brook trout, American eel, golden shiner, and yellow perch." (pg 321)
- "A key limitation of the Ecological Flow Requirement guidance identified by DFO (2013) is that the determination of effects to fish and fish habitat are not well understood in intermittent,

seasonal, or ephemeral watercourses. The instream flow needs for watercourses that naturally lack flow at certain times of the year are not well understood, and guidance is lacking to determine effects to fish habitat in these systems. As a result, if these systems are encountered in the effects assessment, a determination will be made based on known physical parameters of the watercourse, known or expected fish usage, and predicted alterations in the natural flow regime. Of the watercourses with expected indirect impact, the majority are small perennial streams, though WC9 is classified as having intermittent portions, WC11 is described as ephemeral, and WC19-20 are discontinuous and partially subterranean in the upper reach." (pg 326)

- "A significant effect on the Fish and Fish Habitat VC was defined in Section 5.8.6 as:
  - A Project-related HADD of fish habitat or the death of fish, as defined by the Fisheries Act, that cannot be mitigated, or offset; and an unauthorized Project-related alteration of fish habitat." (pg 366)

Conclusions

A high-level summary of key reported impacts on surface water resources has been provided below.

- A total of 10,742 m (10.7 km) across 32 watercourses and one open water feature, covering a cumulative area of 16,292 m2, are reported to be irreversibly directly impacted as a result of the proposed activity. A Fish Habitat Offset Plan has been proposed to mitigate.
  - There is currently no NSECC policy associated with this type of direct impacts.
  - Typical NSECC approaches outline that for this type of alteration (e.g., infilling), approvals should be rejected unless the alteration is in the interest of the public good and there are no other reasonable alternatives.
- An additional 10,056 m2 of indirectly impacted watercourse area is reported in the submission, with the proposed mitigations of a Fish Habitat Offset Plan.
- 90.6 ha of direct impacts to wetlands, or 27.5% of the total delineated wetland area with the Project Area, are anticipated as a result of the proposed activity. This includes 43.4 ha of direct impacts to Wetlands of Special Significance. An additional 18.4 ha of indirect wetland impacts have been reported in the submission.

Recommendations:

Planning/Design Issues:

- There is significant complexity in predicting the impacts that will occur to Gold Brook Lake and Gold Brook as a result of the proposed activity. Extensive alterations to natural drainage patterns, timing of flows, and overall flow regimes are outlined throughout the submission. As a result and in consideration of the questions/comments outlined throughout this review document that require clarification, there is a high degree of uncertainty in the proponents quantification of potential impacts and their extents, and also of the potential effectiveness of the mitigations proposed (e.g., the pumping, treatment, and discharge of collected inflows from the East and West Pits to supplement flows in Gold Brook Lake and thus Gold Brook), including its impacts related to altering the natural flow regime and stream temperature conditions.

Considering these questions that exist, the potential impacts and overall alterations to these surface water resources are currently at risk of being underestimated.

- If the project is approved and watercourse alteration approvals are sought, it is recommended that Gold Brook be identified as requiring watercourse alteration permitting as a result of anticipated indirect impacts as part of the proposed project activities. As part of this, ECC (and likely DFO) will be seeking more certainty in the assessment of the potential impacts to Gold Brook Lake and Gold Brook as outlined in feedback provided in my detailed comments above (e.g., considerations for the impacts to environmental flow needs, watercourse stability, how changes in flow regimes will be effectively managed to minimize environmental impact). Final mitigation plans will require adjustment from those proposed in this submission to reflect updated assessments, to be supported by a monitoring plan that will function to validate the effectiveness of mitigation and the extent of alterations reflected in the approval application. The extent of this monitoring must reflect the degree of uncertainty in the predicted effects.
- If responses to the questions/comments outlined in this document are completed as part of the EA process, it would allow for these questions to be addressed in a way that is part of the public process, so that the public (including groups outlined in the engagement and consultation program outlined in the submission) would have an opportunity to review and comment on any updated information.

Operational Issues/Other Permitting Processes:

- Less than one year of surface water quantity monitoring data has used to support definition of baseline conditions and in developing/supporting the various models developed to assess potential impacts on surface water resources. As a result, the baseline data's limitations include lacking an understanding of interannual variability in local surface water conditions and of site baseline conditions for the December – March timeframe. In addition, several key surface water quantity monitoring locations are planned to be decommissioned/altered as part of project construction activities. This is a source of a high degree of uncertainty in the proponent's assessment of project effects on surface water and as a data set that can be used in effectively assessing impacts of the proposed activity in the future.
    - Prior to commencement of the project, the proponent is to submit a plan to NSECC for review and acceptance outlining a proposed approach to modify the existing baseline surface water quantity stations on Gold Brook, and describing how baseline surface water quantity data needs will be sufficiently met, with specific consideration for how the data will effectively support both the future evaluation of potential impacts and the data needs of assessments into these impacts (e.g., modeling). As part of developing this plan and in consideration of the complexity of measuring low flows (such as those in the 3-5 L/s range that have been measured in Gold Brook), it is recommended that the proponent, through collaboration with DFO and NSECC, engage the Water Survey of Canada (WSC) within Environment and Climate Change Canada as experts in the area of surface water quantity monitoring to install and operate hydrometric network station(s) to support monitoring at a level of quality sufficient to support assessments and evaluation within the system moving forward.

- ECC questions the validity of the values used in determining if a mixing zone approach can be used for effluent discharge to Gold Brook.
    - The approach will require justification or adjustment for ECC to consider SSWQG that are based on this work.
- Through high-level hydrologic evaluation, there are several wetlands whose indirect impacts have been identified as being potentially underestimated by the submission. If this project is approved, Wetland Alteration Approvals applications for the Project will need to include accurate assessments of indirect effects. It is recommended that these be further evaluated and explicitly consider predictions for watercourse reductions, and any updated values of indirect impacts be communicated, monitored, and mitigated. Please refer to comments from the wetland specialist for any additional comments from this perspective.
- Site water management plans to be submitted to the department for review and acceptance prior to project activities taking place. This plan is to include discussion and assessment of the changes to flow timing to Gold Brook and Gold Brook Lake as a result of treatment of water collected throughout site, with a focus on assessing impacts to surface water resources and how any impacts are proposed to be mitigated.
- A detailed sediment and erosion control plan for the overall project is to be developed by a qualified professional and is required to be submitted as part of any industrial approval application for NSE review and approval prior to construction activities, including clearing, grubbing, and stripping, take place.
- A detailed sediment and erosion control plan focused on the proposed roadworks is to be developed by a qualified professional and is required to be submitted for NSE review and approval prior to construction activities, including clearing, grubbing, and stripping, take place. In addition to this plan and prior to commencement of the project, it is recommended that the applicant provides details for review and acceptance by NSECC surrounding the approach to mitigate potential impacts to local drainage patterns resulting from the roadworks proposed by the project.
- The water needs proposed in the submission require a surface water withdrawal approval prior to taking place. To effectively evaluate the sustainability of the proposed withdrawal, the application for a surface water withdrawal for the expected withdrawals from Gold Lake is required to be completed with consideration for the cumulative impacts of the project on water levels within Gold Brook Lake and the associated impacts of the cumulative activity on flows within Gold Brook.

NOVA SCOTIA
Environment and Climate Change

Barrington Place
1903 Barrington Street
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Halifax, Nova Scotia
Canada B3J 2P8

Date: 11th July 2022

To: Candace Quinn, Environmental Assessment Officer

From: Climate Change Division

Subject: **Goldboro Gold Project**

Climate Change Adaptation

- Section 2.4.2.15.2 Settling Ponds: "The ponds will be designed with enough freeboard to accommodate the inflow while the shut-off valves are closed. To this end, each pond will be designed with enough capacity to hold the **runoff volume generated by the 5-year 24-hour storm event plus 5% climate change factor**, with the emergency shut-off valves closed (emergency operating conditions)."
    - Current guidance from Environment and Climate Change Canada on a scaling factor for IDF curves to account for climate change is to include a 7% compounding scaling factor per degree of warming. The project scope anticipates that initiation of closure will begin in 2036. Climate projections for the Gold Brook Lake region from the Canadian Centre for Climate Services (through ClimateData.ca) show a median mean annual temperature of approximately 8.0°C for this timeframe (range consistent across emission scenarios), compared to a historical (1981-2010) annual average temperature of approximately 6.3°C, an increase of nearly 2°C. To properly account for the runoff volume generated by the 5-year 24-hour storm under climate change by the mid-late 2030s, a scaling factor of closer to 14% would be suggested to align with ECCC guidance.
- Section 5.14.1.3 Settling Pond Failure: "The concrete outlet structures have been designed to control **storm events up to and including the 1 in 100-year 24-hour climate change adjusted storm event** through a series of orifices to achieve a minimum detention time of 24-hours for TSS settling. The concrete outlet structure will be surrounded by a layer of riprap to reduce exit velocities and further assist with TSS settling. The emergency overflow channels will convey flows resulting from storm events greater than the 1 in 100 year, 24-hour climate change adjusted design storm event, **up to and including Hurricane Beth**."
    - The climate change adjusted storm event is not defined here,but might presumably refer to the 5% scaling factor mentioned earlier in Section 2.4.2.15.2. Similar to the suggestion provided there, a scaling factor closer to 14% would better align with ECCC guidance for this timeframe. In addition, while the rainfall associated with Hurricane Beth was a very rare event (250+ mm of rain), there should potentially be a determination of whether the emergency overflow channels should be designed with a

scaling factor to account for climate change with a precipitation event of this magnitude.

- Section 5.14.3.1 Water Treatment System Failure: “The ponds will be designed with enough freeboard to accommodate the inflow while the shut off valves are closed. To this end, each pond will be designed with enough capacity to hold the runoff volume generated by the **5 year 24 hour storm event plus 5% climate change factor**, with the emergency shut off valves closed (emergency operating conditions).”
    - Same as above, a 5% scaling factor may be insufficient for proper consideration of climate change given the intended operational timeframe of the Project.
- Section 6.1 Climate Change: “**NSECC has published projections for future climate variables based on 30-year time periods for 13 regions within NS**. The historical baseline was set as 1961-1990, and future projections are available for the 2020s (2011-2040), 2050s (2041-2070) and 2080s (2071-2100) (NSECC, 2014).”
    - Best practice at the current time would be to use downscaled climate projections for an ensemble of climate models from the IPCC’s Fifth Assessment Report (AR5) [until AR6 data becomes available in the near future]. The dataset referenced here is based on an older model run for a single climate model, and as such may not adequately represent the current state of knowledge for climate projections in this region. Updated projections can be accessed through the Canadian Centre for Climate Services using the online portal ClimateData.ca, for a variety of indices that may be relevant to the Project. Use of updated projections may better support any conclusions about the potential impact of climate change on Project activities.

Climate Change Mitigation

- In **Section 5.1.6.2**. the proponent has estimated and provided annual peak emissions estimates to be 33.08 kt of CO2e, approximately 0.26% of the reported 2020 GHG total for NS. The average annual emissions over the life of the Project are estimated to be 18.98 kt of CO2e approximately 0.15% of the reported 2020 GHG total for NS. Based on the referenced definitions for adverse effects, the project would have an insignificant adverse effect on the GHG emissions profile of Nova Scotia. This assertion based on annual emissions is acceptable.

- The potential GHG emission sources over the life of the project have not been clearly stated. For example, are they related to heat and electricity generation, transportation or process related? Clarity into the expected GHG emissions sources and activities should be provided where available.

From:	Quinn, Candace M
To:	McInnis, Mark
Subject:	FW: CanmetMINING comments on Signal Gold Inc. - Goldboro Gold Project - EA Registration
Date:	July 12, 2022 8:39:47 AM

From: Goulet, Richard <richard.goulet@NRCan-RNCan.gc.ca>
Sent: July 11, 2022 4:10 PM
To: Quinn, Candace M <Candace.Quinn@novascotia.ca>
Cc: Cole, Jennifer <jennifer.cole@NRCan-RNCan.gc.ca>; Goulet, Richard <richard.goulet@NRCan-RNCan.gc.ca>
Subject: CanmetMINING comments on Signal Gold Inc. - Goldboro Gold Project - EA Registration

Dear Mme Quinn,

As per your request of June 16th 2022, CanmetMINING is providing expert comments on acid rock drainage (ARD) and metal leaching (ML).

These reports were considered: Appendix E.3 and Appendix E.4 (excluding historical tailings)

The following is a high level summary of issues and recommendations related to ARD/ML and mine waste management. The proposed approach to mine rock segregation and management is reasonable, however the following additional measures are recommended:

- Consider identification of ARD potential using the NPR value rather than the proposed "operational NPR", which is a less conservative approach to identification of PAG1, PAG2, and NPAG
- Additional kinetic testing of PAG1 waste to evaluate worst-case metal loading rates and timing to onset of ARD (targeting upper quartile S and lower quartile NP). Update water quality prediction model accordingly
- For operational testing for mine rock segregation, increased sampling and testing frequency in rock near the greywacke marker unit (similar to the proposed approach near the ore zone), as testing to date shows that this unit contains elevated sulphur and arsenic content
- Arsenic leaching from NPAG rock requires further evaluation to support the use of NPAG rock for construction. CanmetMINING recommends additional kinetic testing of NPAG rock with varying geochemistry (total arsenic; ratios of total sulphur to SFE arsenic) to evaluate the suitability of the proposed 100 mg/kg cut-off for identifying arsenic leaching material, with continual refinements of this cut-off as new information is obtained. In addition, the sequencing of NPAG and low arsenic reaching mine rock should be evaluated to confirm sufficient volumes of material are available when required

We thank you for the opportunity to participate in this review and hope these comments will be useful.

Sincerely,

The CanmetMINING Impact Assessment Review Team

NOVA SCOTIA
Natural Resources and Renewables
Wildlife Division

136 Exhibition St.
Kentville, Nova Scotia
B4N 4E5

Date: 10 July 2022

To: Candice Quinn, ECC

From: Wildlife Division, Department of Natural Resources and Renewables (NRR)

Subject: Goldboro Gold Project (Signal Gold Inc). Environmental Assessment

The NS Department of Natural Resources and Renewables (NRR) has reviewed the Goldboro Gold Project Environmental Assessment Registration Document and offers the following comments and recommendations:

1) **Loss of 178 to 268 individual Vulnerable Blue Felt Lichen (up to 23% of NS population)**

- The area impacted by this project is extensive, encompassing 1055 ha of largely forested habitat of which 410.8 ha will be completely removed for the placement of infrastructure, mining pits, waste rock storage, and the tailings management facility.

- Habitat removal proposed by the project will result in the **direct loss of 21 Blue Felt Lichen occurrences/locations and a total of 178 thalli** (individuals) (EA page 433 and Appendix I.4 Lichen Management Plan).

- 900 lichen thalli from 172 sites in Nova Scotia were recorded between 1999 and 2018 (Species at Risk Act *Blue Felt Lichen Management Plan [proposed] 2020; supported for finalization by Nova Scotia*). Accounting for the number of new Blue Felt Lichen occurrences (50) and thalli (268) recorded for this project, the placement of infrastructure for this project would result in **a direct loss of 9.5% of all known sites (21/(172+50)) and 15.2% of all known thalli (178/(900+268)) of Blue Felt Lichen in Nova Scotia.**

- The **potential total loss of Blue Felt Lichen** from direct removal, edge effects, dust deposition, and changes to hydrology for this project **could be as high as 22.5% of all known sites (50/(172+50)) and 22.9% of all known thalli in NS (268/(900+268)) if all occurrences with the project area were impacted.**

- Edge effects from habitat removal "can result in the desiccation and death of lichen species and is one of the biggest threats to SAR and SOCC lichens" (EA page 434). Decreased air quality via sulfur dioxide and nitrous oxide emissions, metal mobilization and dust deposition can also negatively impact lichens (Appendix I.4). These edge effects have been documented to extend to 500 m for some species of lichen (Cameron et al 2013), and 500 m was selected as the maximum extent for potential negative impacts to lichens via edge effects for this EA. All 268 thalli of Blue Felt Lichen are within this 500 m edge effect limit, and most are within 100-200 m of proposed infrastructure. Blue Felt Lichen may also be impacted from changes to hydrology in the 18 wetlands where they are found within the project area.

- **Blue Felt Lichen are listed as Vulnerable under the Nova Scotia Endangered Species Act (ESA)** and as Special Concern under the federal Species at Risk Act (SARA). This status is intended to offer protection to prevent species that are sensitive to human activities or natural events from becoming threatened, endangered or extirpated as a consequence of human activity. At the time of last assessment, Blue Felt Lichen was near to qualifying for Threatened status based on population size, but did not quite meet the threshold. Additional decline in population size, distribution, habitat loss or decline, number of mature individuals and/or via population viability analyses can elevate at-risk status based on

the preestablished IUCN assessment criteria used in association with the ESA and SARA. If status increases to "Threatened" or "Endangered" through additional loss, the purpose of the ESA will have been breached and legal prohibitions against disturbance, harm or destruction of the remaining occurrences will be triggered, adding additional constraints to other future activities on the landscape. The risk of elevated status is dependent on the state of knowledge at the time of next assessment.

- The management goal for Canada and Nova Scotia is to maintain a stable population of Blue Felt Lichen by preventing further losses in number and sizes of populations, and range. This is the lens through which individual projects should be assessed. To assist with this, Nova Scotia has an *At Risk Lichen Special Management Practice* SMP_BFL_At-Risk-Lichens.pdf (novascotia.ca) which describes management approaches to working around this species, including but not limited to buffers. This SMP was developed to manage forestry operations and is suited for forest clearing and forest road activities but is likely inadequate to address all forms of habitat loss and degradation in a mining context.

- The Goldboro Gold project has made efforts to micro-site infrastructure to avoid the destruction of Blue Felt Lichen and allow a 100 m buffer as required by the *Nova Scotia At-Risk Lichen – Special Management Practices*. Apart from transplantation and monitoring, no other mitigation is proposed and further avoidance of Blue Felt Lichen does not appear practical (Section 5.7.7.1 Wetland Avoidance EA pg. 306) for the open pit mining with processing on site project option selected (Section 2.8).

- The proposed "Goldboro Gold Mine Lichen Management Plan" (Appendix I.4) suggests translocation of individual lichen thalli as a possible mitigation measure. This plan references a lichen translocation and monitoring plan implemented in 2021 for the Wellington Connector Road Project. This translocation was for a single Blue Felt Lichen thalli and the monitoring is ongoing. This example cannot be used to illustrate the success of translocation and whether this is viable option for Blue Felt Lichen moving forward. Transplanting this species is not identified as a management practice for the conservation of the species and in this case, would act contrary to the purpose of the Endangered Species Act and the management goal for this species – to prevent loss of numbers, populations sizes and range. NRR does not support the transplanting of listed species for developments, but only as a conservation practice where we might be trying to re-establish the species from where it had been lost or to bolster population numbers or genetic diversity so the population may be able to sustain itself. Transplantation of lichens remains experimental, and the long-term outcomes and success rate are unknown. It is likely a proportion, if not all, of individuals would be lost from transplanting, and it would be difficult to ensure similar habitat conditions that not only allow survival, but also future propagation.

- An abnormally high number of Blue Felt Lichen occurrences fall within the project area. It is expected that this is a result of the specific habitat conditions at the site; however, it is plausible that general area hosts higher densities of this species. Additional surveys outside the study area but within the county may provide more flexibility with respect to mitigation options should the species be demonstrated to be locally common. Information on suitable habitat outside the project area will also be necessary to support the transplantation mitigation proposed by the proponent.

- Blue Felt Lichen have been recorded in 18 wetlands within the Project Area. The Nova Scotia Wetland Conservation Policy (2011) states that the Government will consider "wetlands known to support at-risk species as designated under the federal *Species at Risk Act* or the NS Endangered Species Act to be Wetlands of Special Significance (WSS)". There is no distinction for the level of "at-risk" for a species under the NS ESA for a WSS designation to be assigned.

- One occurrence of Frosted Glass Whiskers (SARA Special Concern) was recorded in Wetland 194. A 100 m buffer shall be applied to this occurrence as per the NS *At Risk Lichen Special Management Practice.*

2) Long-term loss of 410.8 ha of wildlife habitat and intensive impacts to 1055 ha of total habitat

- The Goldboro Gold Project area is 1055 ha, and it is expected there will be a total direct loss of 410.8 ha of wildlife habitat (mostly softwood (167.8 ha), mixed wood forests (77.6 ha) and softwood forest swamps (84.5 ha)) and the remaining area impacted. This represents a major conversion of wildlife habitat, including habitat for at-risk species, to infrastructure for the long-term (24 project years (EA page 387), 50-70 years

for a mature forested landscape to develop). It is unlikely reclamation will result in the complete reversal of the Project effects. Much of this forested area will be permanently converted post remediation to non-forest features.

- This project falls within identified moose core habitat and signs of moose (tracks and browsing) have been recorded in the Project Area in 2017 and 2021, suggesting that the area is habitually occupied by one or more individuals of the endangered Mainland moose (NS ESA 13(1)(c)). Habitat loss will include 17.2 ha of winter and summer cover and 35.7 ha of summer forage and 35.7 ha of winter habitat for the Endangered Mainland Moose, all of which have limited availability in this area and will need to be enhanced to support Mainland Moose recovery (NRR 2021).

- Habitat for four at risk (SAR) forest birds and 24 bird Species of Conservation Interest (SOCI) were identified during avian surveys. The project is expected to directly impact (remove) 104.3 ha of endangered Canada Warbler habitat (DLF 2021a) and 344 ha of habitat that could be used by the threatened Olive-sided Flycatcher (DLF 2021b).

- The draft Wildlife Management Plan (Appendix I.5) indicates that an unvegetated buffer of 10 m will be maintained along roadsides to reduce the potential for collisions with wildlife. This wide corridor (20 m plus road width) will augment the amount of wildlife habitat removed for the project and result in substantial habitat fragmentation.

- Direct habitat loss is calculated and presented in the EA as the number of hectares lost per species group and as percentages of the Local Assessment Area (LAA), which encompasses a 5 km buffer surrounding the PA. “The LAA boundaries were defined based on the expected maximum extent of direct and impacts to the terrestrial environment. A 5 km buffer was selected to encompass the extent in which light levels emitted from the Project reach approximate background levels (0.1 lux) and in consideration of the maximum extent of noise levels from the Project.” (EA page 385).

- Whilst presentation of the direct loss of habitat within the LAA is informative, it does not appear to fully take account of the overall project impacts. First, the analysis assumes that adjacent habitat is void of wildlife and does not consider competitive effects as animals are forced to leave the project area. Presumably, suitable habitats for SAR and other wildlife outside of the project area are already occupied and are unavailable for use. Secondly, the LAA itself will experience fragmentation and indirect effects from the project (light, noise, increased traffic) and these impacts have not been fully accounted for in the analysis of the magnitude of impacts. When considering habitat loss, the total percentage impacted by the project, **including direct and indirect effects,** should be calculated compared to the intact equivalent land cover within the broader ecological area outside of the LAA. For example, habitat loss and impacts to wildlife should be calculated as percentage of land cover within the Ecosection or in a subsection of the Eastern Interior Ecodistrict and Eastern Shore Ecodistrict as per the *Ecological Land Classification for NS.*

NRR Recommendations:

- Direct habitat loss and indirect impacts to wildlife and wildlife habitat should be recalculated and analysed as separate values compared to the intact equivalent land cover at an appropriate spatial scale within the broader ecological area outside of the area of project influence, and for SAR, calculate loss relative to the total of available habitat for the species in NS.

- **Compensation for loss of wildlife and at-risk species habitat should be required in the form of a biodiversity offset through land purchase(s) and conveyance to protected area designation(s) to add to the NS government commitment of protecting 20% of NS land and water by 2030. Compensation should account for the type of habitat lost with a like or better requirement and increased compensation required for loss of habitat for species-at-risk.**

- In the event of vulnerable SAR destruction or vulnerable SAR habitat degradation or loss (Note: destruction of threatened or endangered SAR and certain types of habitat are prohibited under the ESA), the proponent must work with NRR to identify a mitigation plan that provides compensation habitat

and/or addresses recovery actions to support species at risk recovery in Nova Scotia as identified in related SAR management plans or recovery plans

- Road width and any associated unvegetated verges shall be as narrow as possible, while still ensuring road safety, to reduce the amount of habitat loss and fragmentation and retain habitat connectivity.

3) Wildlife Management Plan

- The proponent has provided a draft Wildlife Management Plan in Appendix I.5.

NRR Recommendations:

- **Prior to commencement of the Project, the Approval Holder must obtain approval of the Wildlife Management Plan from the NS Department of Natural Resources and Renewables. The Wildlife Management Plan must be implemented as approved. Approval of the Wildlife management Plan may be granted upon provision of the following:**

- Information to be added to the Wildlife Management Plan (WMP) shall include:

a) A Lighting Mitigation Plan for Wildlife that identifies measures to minimize the impacts of lighting on birds and bats and discusses options for adaptive management.

b) Avian Monitoring Plan

There is the potential for artificial lighting from the project to attract migratory birds and seabirds. Attraction to lights may result in collision with lit structures, their support structures, or with other birds. Disoriented birds are prone to circling a light source and may deplete their energy reserves and either die of exhaustion or drop to the ground where they are at risk of depredation.

The Country Island Complex Important Bird Area (IBA) is located 6.4 km southwest of the Project. Country Island has supported many breeding NS ESA and SARA-listed Endangered Roseate Terns in recent years. Roseate Terns have also been recorded nesting in nearby Goose Island, an unnamed island off Charlos Cove, Inner West Bird Island, Cooks Island, Dorts Island and Hog Island.

The Wildlife Management Plan shall include a plan to monitor the site for stranded birds and bird fatalities during spring and fall migration periods, and during the colonial seabird breeding season, throughout the construction phase and for the first 3 years of operation. The Proponent should conduct systematic checks for stranded birds and carcasses, whereby designated staff record search effort. Depending on the outcomes of these surveys, site lighting may require adjustment and additional mitigation implemented.

c) A process for managing wildlife and wildlife habitat exposed to spills or hazardous chemicals should be included the WMP. This would include the removal of any ongoing threats, clean-up and rehabilitation of wildlife and wildlife habitat. Alternatively, reference in the WMP can be made to a suitable Emergency Response Plan where these hazards are clearly addressed for wildlife.

d) The WMP notes that the sensitive period for avifauna is from 15 April to 31 August (Table 3). However, most species of raptors (eagles, osprey, falcons, hawks and owls) breed and establish nests much earlier, and nests may be active from 1 February to 15 August. The WMP shall include details to educate Project personnel on the breeding periods for these species, nest identification, and the appropriate communication process with NS NRR should raptor nests be identified on site.

e) Appropriate mitigation must be installed to prevent wildlife species from entering the tailings management facility and open pits during construction, operations, and closure.

4) Additional NRR Recommendations

NRR offers the following additional recommendations for consideration as conditions for project approval:

- Prior to project commencement, the proponent shall provide NS NRR with digital way points and GIS shapefiles showing precise locations of all species listed under the NS ESA and SARA and all S1, S2, S3 listed species under the Atlantic Canada Conservation Data Centre identified during field surveys within the project area. Data should adhere to the format prescribed in the "*NRR Template for Species Submissions for EAs*."

- The Approval Holder shall clear vegetation outside of the breeding season for most bird species (April 15 to August 30). Vegetation clearing shall be recorded in a daily log that shall be available for review by the Department indicating the date and time of the clearing operation and the contractor. Exceptions to allow clearing during the breeding season would only be considered for small areas following justification of why the clearing could not be completed outside of the breeding season. Authorization for clearing during the breeding season must be provided in writing by the Department.

- Raptors, including eagles, osprey, falcons, hawks and owls, breed and establish nests much earlier than most bird species, from 1 February to 15 August. These species and their nests are protected under the *NS Wildlife Act*. Searches for these large stick nests shall be conducted prior to clearing during this nesting period. Should a raptor nest be observed on-site, NS NRR shall be contacted to determine a suitable buffer distance until the nest becomes inactive.

- Five species of rare SOCI vascular plants were recorded within the Project Area (Nova Scotia Agalinis, Northern Comandra, Wiegand's Sedge, Variegated Scouring Rush, Southern-twayblade). Efforts shall be made, and documented, to avoid all occurrences of these species and their surrounding habitat to the extent possible during site construction and operation.

- Revegetation must be undertaken using native species following consultation with NRR.

- ECC should consider establishing a SAR reclamation bond, or a surety bond as a financial guarantee that the land being disturbed for the mine's operation or related activities, will be returned to its former (original) condition or an acceptable condition that supports SAR and is agreed on by the regulator and the proponent.

References

Cameron, R.P., Neily, T., and H. Clapp. 2013. Forest harvesting impacts on mortality of an endangered lichen at the landscape and stand scales. Canadian Journal of Forest Research 43: 507-511.

COSEWIC. 2010. COSEWIC assessment and status report on the Blue Felt Lichen *Degelia plumbea* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 42 pp.

Environment and Climate Change Canada. 2020. Management Plan for the Blue Felt Lichen (*Degelia plumbea*) in Canada [Proposed]. Species at Risk Act Management Plan Series. Environment and Climate Change Canada, Ottawa. iv + 23 pp.

Nova Scotia Department of Lands and Forestry (DLF). 2021a. Recovery Plan for the Canada Warbler (*Cardellina canadensis*) in Nova Scotia [Final]. Nova Scotia Endangered Species Act Recovery Plan Series.

Nova Scotia Department of Lands and Forestry (DLF). 2021b. Recovery Plan for the Olive-sided Flycatcher (*Contopus cooperi*) in Nova Scotia [Final]. Nova Scotia Endangered Species Act Recovery Plan Series.

Nova Scotia Department of Natural Resources and Renewables (NRR). 2021. Recovery Plan for the Moose (*Alces alces americana*) in Mainland Nova Scotia. Nova Scotia Endangered Species Act Recovery Plan Series. 96pp.

From: Quinn, Candace M
To: McInnis, Mark
Subject: FW: Signal Gold Inc. - Goldboro Gold Project - EA Registration (18-NS-002D)
Date: July 12, 2022 1:06:57 PM
Attachments: image001.png
image002.png

From: Wade,Suzanne (ECCC) <suzanne.wade@ec.gc.ca>
Sent: July 11, 2022 9:00 AM
To: Quinn, Candace M <Candace.Quinn@novascotia.ca>
Cc: Hingston,Michael (ECCC) <Michael.Hingston@ec.gc.ca>; Mawhinney,Kim (ECCC) <Kim.Mawhinney@ec.gc.ca>; Worthman,Sydney (ECCC) <Sydney.Worthman@ec.gc.ca>; Mailhiot,Joshua (ECCC) <Joshua.Mailhiot@ec.gc.ca>; Breau,Monique (ECCC) <Monique.Breau@ec.gc.ca>; Drover,Brian (ECCC) <Brian.Drover@ec.gc.ca>; Mroz,Rita (ECCC) <Rita.Mroz@ec.gc.ca>
Subject: RE: Signal Gold Inc. - Goldboro Gold Project - EA Registration (18-NS-002D)

Hello again Candace,

I just received one additional comment….could you please add this to our comments below:

30. In section 2.2.3 (Regulatory Compliance) of Appendix F.7, the report states that "The list of potential COCs has been refined to 24 parameters". Please provide further information on the process used to refine this list. This would assist readers in verifying that all potential risks have been addressed.

Thanks,

Suzanne Wade.

From: Wade,Suzanne (ECCC) <suzanne.wade@ec.gc.ca>
Sent: July 11, 2022 8:55 AM
To: Quinn, Candace M <Candace.Quinn@novascotia.ca>
Cc: Hingston,Michael (ECCC) <Michael.Hingston@ec.gc.ca>; Mawhinney,Kim (ECCC) <Kim.Mawhinney@ec.gc.ca>; Worthman,Sydney (ECCC) <Sydney.Worthman@ec.gc.ca>; Mailhiot,Joshua (ECCC) <Joshua.Mailhiot@ec.gc.ca>; Wade,Suzanne (ECCC) <suzanne.wade@ec.gc.ca>; Breau,Monique (ECCC) <Monique.Breau@ec.gc.ca>; Drover,Brian (ECCC) <Brian.Drover@ec.gc.ca>; Mroz,Rita (ECCC) <Rita.Mroz@ec.gc.ca>
Subject: FW: Signal Gold Inc. - Goldboro Gold Project - EA Registration (18-NS-002D)

Hi Candace,

Environment & Climate Change Canada's Canadian Wildlife Service (ECCC-CWS) have reviewed the Environmental Impact Assessment registration documents for the proposed Goldboro Gold Mine by Signal Gold Inc. (formally Anaconda Mining Inc.) to operate a new gold mine (4,000 tonnes/day extraction capacity) and associated infrastructure and storage areas which will surround Gold Brook Lake, Goldboro, Guysborough County, Nova Scotia.

Attachments:

- Atlantic Canada Shorebird Survey Protocol (2014)
- Guidelines for Wildlife Emergency Response Plans (2021) and template (Appendix A)
- ECCC's Procedures for handling and documenting stranded birds (2016)
- The Canadian Nightjar Survey Protocols (2022), summary and data sheets (Note: These protocols are updated every year).

Wildlife Comments

ECCC-CWS is responsible for the administration of the *Migratory Birds Convention Act* (MBCA) and the *Species at Risk Act* (SARA), which includes the management and conservation of migratory birds and protection of SARA listed species at risk and their habitats. ECCC-CWS has the following comments for consideration in EIA review:

- The project is expected to result in habitat loss, additional habitat fragmentation, decreased habitat quality and the interior forest condition. Several types of migratory bird habitat are in decline in Nova Scotia, including mature coniferous forest, mature deciduous forest and mature mixed forest. This is of concern because certain bird species prefer mature forest habitat. Furthermore, some bird species, generally known as interior species, only prosper when the tracts of mature forest are relatively large and un-fragmented (i.e. interior forest).

  ECCC-CWS recommends that the proponent undertake project activities that avoid causing further loss and fragmentation of these habitat types and further fragmentation of the landscape.

- The proponent anticipates 95.974 ha of wetland alteration (direct loss), including several wetlands of special significance, and predicts indirect impacts to wetlands (e.g. hydrological impacts); however, the proponent considers project effects to be "low", "negligible" or "not significant" with the completion of a NS wetland compensation plan and monitoring as per the province's wetland policy.

ECCC-CWS advocates for the goal of no net loss of wetland functions where wetland loss has reached critical levels. In instances where wetland losses are deemed unavoidable, and where residual impacts remain, ECCC-CWS recommends the consideration of conservation allowances for the loss of wetland functions required by species at risk, including wetland dependent migratory birds species at risk listed on Schedule 1 of the *Species at Risk Act* (e.g. Canada Warbler and Olive-sided Flycatcher) and species of conservation concern (e.g. Greater Yellowlegs).

In their effort to avoid/minimize habitat loss from the placement of infrastructure, stockpiles and storage areas (organic and waste rock) in un-disturbed habitats, including wetlands, the proponent should clarify in the Alternative Assessment Section whether potential alternative locations were investigated to consider relocating these on and off site in areas already disturbed.

- Section 5.9.6.2.1 - Direct Loss to Avifauna Habitat due to Project Footprint, indicates that the following SARA listed migratory bird species at risk habitats are anticipated to be directly impacted by the proposed project: Canada warbler, Olive-sided Flycatcher, Evening Grosbeak and Wood Thrush and the project is estimated to result in the direct loss of:
    - 104.3 ha of Canada warbler habitat (wetland dependent species at risk);
    - 344.0 ha of Olive-sided flycatcher habitat (wetland dependent species at risk);
    - 287.9 ha of Evening Grosbeak habitat;
    - 80.0ha of Wood Thrush habitat;

  While there is no federal assessment of this project, ECCC-CWS recommends as a best practice that the EIA consider SARA ss79(2). ECCC-CWS recommends updating this section to include a discussion outlining avoidance/minimization and mitigation measures (e.g. conservation allowances) consistent with best available information including any Recovery Strategies, Action Plans or Management Plans.

  The Recovery Strategy for Canada Warbler (*Cardellina Canadensis*) (2016)[Final] is available at: https://species-registry.canada.ca/index-en.html#/consultations/2730.

  The Recovery Strategy for Olive-sided Flycatcher (*Contopus cooperi*) (2016)[Final] is available at: https://species-registry.canada.ca/index-en.html#/species/999-683#recovery_strategies

  The Management Plan for the Evening Grosbeak (*Coccothraustes vespertinus*)[Proposed] (2022) is available at: https://species-registry.canada.ca/index-en.html#/species/999-

683#recovery_strategies

- Greater Yellowlegs were observed in the project area during the breeding season. These are a migratory bird Species of Conservation Interest (SOCI) in the Maritimes. The Greater Yellowlegs was recently assessed as a species of High Concern in Canada by some of North America's leading shorebird experts, including members of ECCC CWS's Shorebird Technical Committee (Hope et al. 2019). Greater Yellowlegs breed specifically in muskeg bogs and scrub spruce barrens which are found almost exclusively in boreal-like coniferous forests in the Cape Breton highlands, Eastern Nova Scotia, and along the Atlantic Coast, therefore the species' breeding habitat is limited. Pairs establishing territories, nesting birds and chick-rearing birds should not be disturbed.

  As noted in the bullet above, ECCC-CWS recommends considering the loss of wetland habitat for species of conservation concern/interest (e.g. 11.4 ha of suitable habitat for Greater yellowlegs) in the cumulative effects assessment and discussion of wetland compensation plans (e.g., conservation allowances).

  If the project is approved and activities are planned during the breeding season, ECCC-CWS recommends a 300 meters setback from Greater Yellowlegs nests from mid-April until chicks have naturally left the area, and monitoring plan to verify the efficacy of the setback. If birds show signs of disturbance despite the 300m setback, activities should be immediately halted, and a proposed adaptive management plan submitted to ECCC-CWS and the Province of Nova Scotia (Department of Environment and Department of Natural Resources and Renewables).

- Section 5.9.8 Mitigation, Table 5.0-20 Mitigation Measures of the Terrestrial Environment, quote: "*Clearing of vegetation will occur outside the breeding bird window (April 15th-August 31st)* ***where possible****. If this is not possible, then nest sweeps will be completed by a qualified biologist prior to clearing. The proponent will work with NSDNRR and NSECC to develop nest sweep protocols*". The Wildlife Management Plan (Appendix I.5) indicates, quote: "*Clearing and grubbing activities will be completed outside the accepted breeding bird window (April 15th to August 31st),* ***where practica*****ble**".

  ECCC-CWS recommends that the Proponent avoid clearing during the migratory birds breeding season, as a measure to avoid and reduce potential impacts to migratory birds and species at risk, and to ensure compliance with the *Migratory Birds Convention Act* and associated regulations, and the *Species at Risk Act*.

  ECCC-CWS does not recommend nest searches or sweeps in vegetation and complex habitats prior to clearing or land disturbance activities during the breeding season, except when nests are known to be easy to locate without disturbance (e.g. previously cleared

area, simple habitats, low vegetation) and carried out by experienced observers using appropriate scientific methodology.

- Appendix I.1, Avifauna Baseline Report, the spring migration surveys window may have missed early spring migrants (e.g. waterfowl) and early nesters (e.g. Killdeer) which arrive as early as March 15. The fall migration surveys may have the bulk of the fall waterfowl/seaduck fall migration which occurs in October and can extend into November.

  The area is also known to be important for many species of conservation concern/interest shorebirds (e.g., Whimbrel, Spotted Sandpiper, Solitary Sandpiper, Greater Yellowlegs, and Willet) which use coastal salt marsh and wetland/bog/heathlands for staging and foraging during migration and nesting. The fall migration surveys may have missed early shorebird migration movements (commencing as early as July 15). Note: Migrant shorebird species such as whimbrel are more likely to be in the bogs and heathlands while the tide is high and the intertidal is inaccessible. They also tend to move in and out of inland foraging areas at dusk and dawn. For subsequent surveys, ECCC also recommends referencing the Atlantic Canada Shorebird Surveys (ACSS)(2014; attached) to monitor potential impacts on migrant shorebirds and their habitats.

  It is noted that the Government of Saskatchewan Common Nighthawk Survey Protocols (2017) were used. For subsequent surveys, ECCC-CWS also recommends referencing the "Canadian Nightjar Survey Protocols" (2022; attached) and adapting these to the project area for monitoring nightjars with at minimum the following modifications: two survey nights, and pre-determined stops at between 1 and 1.5 kilometers. Nightjar surveys should start no earlier than June 10, within 7 days on either side of a full moon, and started 1 hour before sunset to 2 hours *after* sunset. Please note that ECCC-CWS does not recommend the use of playbacks when monitoring for species at risk.

- It is noted that the Loon Lake Nature Reserve is located to the north of the project and loons may be nesting in the area of the project. ECCC-CWS recommends a minimum 200 m (low disturbance activities) buffer around Common Loon nests during the months of May, June, and July. ECCC-CWS recommends no high disturbance activities (e.g. blasting) occur within 1 km of active Common Loon nests during the nesting season (May, June and July).

- Due to the potential for migratory birds (e.g. Leach's Storm Petrel) to be attracted to project lighting, ECCC-CWS recommends the development of additional contingency measures should stranded birds be found on-site during construction and operations, particularly during months of September-October. Staff should immediately report stranded birds to ECCC-CWS. After one or more stranded bird is found, it is recommended that daily searches of the site be conducted, ideally at dawn or early morning, to locate any birds that may have been stranded overnight and enable safe release. ECCC's "Procedures for

handling and documenting stranded birds" (see attached) should be considered in the Wildlife Management Plan.

- Appendix I.1 Goldboro Gold Project Biophysical Baseline Report: Avifauna Section 1.2 Regulatory Context, should be updated to include the *Migratory Birds Convention Act* to the list of legislation that may direct resource development and conservation of avifauna species and their habitat.

- There are 189 priority lichen thalli of four lichen species at risk (one species at risk and three species of conservation interest) that will be directly impacted by the proposed project, including Blue Felt lichen a species listed as Special Concern on Schedule 1 of SARA, and, potential indirect effects to Frosted Glass Whiskers lichen. The translocation of lichen is proposed as mitigation. According to Appendix I.4 Lichen Monitoring Plan, lichen translocation is still considered experimental and requires long-term study. Given the uncertainty of levels of impacts and success of proposed mitigations, the current conclusion of low impact magnitude may be inaccurate. ECCC-CWS recommends the proponent consult provincial lichen biologists with the NS Department of Natural Resources for technical advice on the impacts of lichen species at risk under their jurisdiction.

  The Management Plan for the Blue Felt Lichen (*Degelia plumbea*)[Proposed](2020) is available at: https://species-registry.canada.ca/index-en.html#/species/1123-766#management_plans

  The Management Plan for Frosted Glass-whiskers (*Sclerophora peronella*)[Final](2011) is available at: https://species-registry.canada.ca/index-en.html#/species/739-578#management_plans

- A cumulative effects assessment section or discussion does not appear to be included as part of the EIA. Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions. ECCC-CWS recommends the EIA include a discussion of cumulative effects of past and existing infrastructure found on or near the proposed site (e.g., other mining and quarry operations, forestry operations, wind farms, roads, terminals, etc.), as well as, impacts from any new/proposed infrastructure (e.g., roads, transmission lines, wind farms, pipelines, other mining operations, Canso Spaceport, noise disturbance, wildlife attraction to lighting, etc.).

Applicable Legislation and Standard Advice

The *Migratory Birds Convention Act*

The *Migratory Birds Convention* Act (MBCA) protects migratory birds, their eggs, nests, and young. Migratory birds protected by the MBCA generally include all seabirds (except

cormorants and pelicans), all waterfowl, all shorebirds, and most landbirds (birds with principally terrestrial life cycles). The list of species protected by the MBCA is at https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/convention-act.html. Bird species not listed may be protected under other legislation. The MBCA protects these migratory birds, their nests and eggs anywhere they are found in Canada, including ocean waters, and prohibits the dumping of substances harmful to birds in waters or areas frequented by them. Bird species not listed may be protected under other legislation.

Under Section 6 of the *Migratory Birds Regulations* (MBR), it is prohibited to disturb, destroy, or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under the authority of a permit. It is important to note that under the MBR, no permits can be issued for the harm of migratory birds caused by development projects or other economic activities.

Deposition of Harmful Substances

Section 5.1 of the MBCA indicates that it is unlawful to deposit a substance that is harmful to migratory birds or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such an area. ECCC-CWS provides the following recommendations, including the preparation and implementation of Wildlife/Migratory Birds Management Plan, which includes:

- Monitoring the use of open ponds by migratory birds, as well as monitoring the presence of substance in the open ponds or associated water bodies that are harmful to migratory birds;
- Measures to deter migratory birds from coming into contact with the harmful substances; and
- Measures to haze migratory birds off of ponds containing harmful substances, if necessary.

Vegetation Clearing and Dewatering

It is the responsibility of the proponent to ensure that activities comply with the MBCA and regulations. In fulfilling its responsibility for MBCA compliance, the proponent should take the following points into consideration:

- Information regarding regional nesting periods can be found at http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1 . Some species protected under the MBCA may nest outside these timeframes;

- Most migratory bird species construct nests in trees (sometimes in tree cavities) and shrubs, but several species nest at ground level (e.g., Common Nighthawk, Killdeer, sandpipers), in hay fields, pastures or in burrows. Some bird species may nest on cliffs or in stockpiles of overburden material from mines or the banks of quarries. Some migratory birds (including certain waterfowl species) may nest in head ponds created by beaver dams.

Some migratory birds (e.g., Barn Swallow, Cliff Swallow, Eastern Phoebe) may build their nests on structures such as bridges, ledges or gutters.

- One method frequently used to minimize the risk of destroying bird nests consists of avoiding certain activities, such as clearing, during the regional nesting period for migratory birds.

- The risk of impacting active nests or birds caring for pre-fledged chicks, discovered outside the regional nesting period, can be minimized by measures such as the establishment of vegetated buffer zones around nests, and minimization of activities in the immediate area until nesting is complete and chicks have naturally migrated from the area.

- Dewatering of storage, settling and/or natural ponds should be scheduled to avoid the migratory bird breeding season in order to avoid flooding or drying out of nests of ground-nesting migratory birds and species at risk (e.g. Common Nighthawk, Killdeer, sandpipers) potentially nesting in fringing wetland habitat surrounding storage ponds, adjacent grassland habitats and sparsely vegetated stockpiles;

It is incumbent on the proponent to identify the best approach, based on the circumstances, to complying with the MBCA. Further information can be found at: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html

Nest Searches or "Sweeps"

Active nest searches are generally not recommended since they have a low probability of locating all nests and likely to cause disturbance to nesting birds, except when the nests searched are known to be easy to locate without disturbing them. Nests in complex habitat are difficult to locate, and adult birds avoid approaching their nests in a manner that would attract predators to their eggs or young. In many circumstances, incidental take is still likely to occur even when active nest searches are conducted prior to development activities.

Ground nesting migratory birds (e.g. Common Nighthawk) may also be attracted to previously cleared areas during the breeding season. Common Nighthawk are very cryptic in coloration and finding a bird on the nest or a nest site can be challenging. Using active nest searching techniques must be carefully evaluated because the risk of disturbing active nests is high.

Breeding bird surveys conducted by a qualified biologist may be considered in monitoring non-complex habitats to identify the presence of potentially nesting birds in an area. Nest searches may be considered prior to the removal and disposal of any abandoned installations, structures, and buildings during the breeding season, and if found, the proponent should identify mitigation measures to avoid disturbing nesting birds (e.g. Barn Swallow), as well as, bat species at risk (e.g. Little Brown Myotis) maternity roosts ('residence' under SARA).

Buildings should be surveyed for evidence of birds and bats (e.g. nests in rafters, attics, gutters, and feces/guano) followed by surveys during the breeding season to confirm presence, and mitigation measures identified. A Barn Swallow (*Hirundo rustica*) Residence description (GoC 2019) is available at: https://species-registry.canada.ca/index-en.html#/species/1147-790#residence_description

Noise

Anthropogenic noise produced by construction and human activity can have multiple impacts on birds, including causing stress responses, avoidance of important habitats, changes in foraging behaviour and reproductive success, and interference with songs, calls, and communication. Activities that introduce loud or random noise into habitats with previously low levels of anthropogenic noise are particularly disruptive.

ECCC recommends including mitigation measures in the environmental management plan for operational activities that could introduce very loud and random noise disturbance (e.g. blasting) near migratory bird habitats during the bird breeding season (e.g. prioritize construction works in areas away from natural vegetation; high disturbance activities should be scheduled outside the migratory bird breeding season; equipment and vehicles should be kept in good working order and well muffled).

Light Attraction

Attraction to lights at night or in poor visibility conditions (i.e. fog) during the day may result in a collisions with lit structures and strandings. Disoriented migratory birds are prone to circling light sources and may deplete their energy reserve and either die of exhaustion or be forced to land where they are at risk of depredation. At coastal and inland sites in NS, there is potential for migratory birds (e.g. Leach's Storm-Petrels) to be attracted to lights and be found stranded (grounded on land or a structure). This is a concern particularly during the fall migration period. High onshore winds can blow birds inland from the coast or ocean (sometimes high numbers of birds) and birds can be attracted to brightly lit inland sites, such as industrial areas, which can disorient birds leading to stranding.

Once stranded, some species such as storm-petrels cannot fly back to the ocean without assistance and are vulnerable to predators and other hazards. If found quickly, storm-petrels can safely released back to the ocean. ECCC's "Procedures for handling and documenting stranded birds" should be considered Wildlife Management Plan(s).

Banks and Stockpiles

Migratory bird species such as the Bank Swallow (listed as Threatened on Schedule 1 of SARA and Endangered under the NS *Endangered Species Act* (ESA)) may nest in banks or large piles of soil left unattended/unvegetated. The guidance document "*Bank Swallow (Riparia riparia) in Sandspit and Quarries*" (ECCC, 2020) offers advice in preparing mitigation measures in the

management of stockpiles during construction activities: https://species-registry.canada.ca/index-en.html#/documents/1602. Note: A Bank Swallow residence (i.e. burrow) is protected under the MBCA and SARA. A Bank Swallow Residence Description (GoC 2019) is available at: https://species-registry.canada.ca/index-en.html#/documents/3521 The *Recovery Strategy for the Bank Swallow (Riparia riparia) in Canada* [Proposed](2021) is also available at: https://species-registry.canada.ca/index-en.html#/consultations/1586

The *Species at Risk Act*

The *Species at Risk Act* (SARA) "General prohibitions" apply to this project. In applying the general prohibitions, the proponent, staff and contractors, should be aware that no person shall:

- kill, harm, harass, capture or take an individual;
- possess, collect, buy, sell or trade an individual, or any part or derivative;
- damage or destroy the *residence* of one or more individuals.

General prohibitions only apply automatically:

- on all federal lands in a province,
- to aquatic species anywhere they occur,
- to migratory birds protected under the MBCA (1994) anywhere they occur.

Section 33 of SARA prohibits damaging or destroying the residence of a listed threatened, endangered, or extirpated species. For migratory birds species at risk, this prohibition immediately applies on all lands or waters (federal, provincial, territorial and private) in which the species occurs.

Under SARA ss. 79(1)(2), the person responsible for the assessment of environmental effects of project is responsible for identifying the adverse effects (direct and indirect) on all listed species and its critical habitat and, if the project is carried out, must ensure that measures are taken to avoid or lessen those effects and to monitor them. These measures must:

- be consistent with best available information including any Recovery Strategy, Action Plan or Management Plan in a final or proposed version; and,
- respect the terms and conditions of the SARA regarding protection of individuals, residences, and critical habitat of Extirpated, Endangered, or Threatened species.

While there is no federal assessment requirements for this project or activity, ECCC-CWS advocates a similar approach to provincial and territorial assessment related to the management and protection of species at risk. ECCC-CWS recommends that the proponent present technically feasible mitigation measures consistent with best available information including any Recovery Strategy, Action Plan or Management Plan (final or proposed version). In instances where habitat for SAR cannot be avoided, the proponent should provide an explanation why avoidance is not possible, as well as, provide a discussion of

conservation allowances if appropriate (see ECCC's *Operational Framework for Use of Conservation Allowances* (2012) available at: https://www.canada.ca/en/environment-climate-change/services/sustainable-development/publications/operational-framework-use-conservation-allowances.html).

For species which are not listed under SARA, but are listed under provincial legislation only or that have been assessed and designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), it is best practice to consider these species in EA as though they were listed under SARA.

SAR observations should also be submitted to the Atlantic Canada Conservation Data Centre, directions on how to contribute data can be found at: http://accdc.com/en/contribute.html.

The Federal Policy on Wetland Conservation in Canada

While the Federal Policy on Wetland Conservation does not apply to this project, ECCC advocates for the conservation of wetlands in areas where wetland losses have already reached critical levels (e.g. NB, NS, PEI, southern Ontario, Prairies) and regionally important wetlands. ECCC-CWS recommends that project effects on wetlands be avoided. Where they cannot be avoided, they should be minimized, and for residual impacts there should be compensation to mitigate the effects. ECCC recommends the development of a Wetland Compensation Plan that fully describes the mitigation hierarchy, including:

- Identification of wetlands potentially affected by the project,
- A detailed description of potential effects, and the reasons why avoidance and minimization of impacts were determined to be not possible, and
- Identification and justification of proposed offset ratios.

As a mitigation measure to compensate for the lost habitat function for wetland associated landbird species at risk and species of conservation concern, in instances where such habitat cannot be avoided, ECCC-CWS recommends the use of conservation allowances as a third step in the mitigation hierarchy of avoidance, mitigation and compensation.

SAR - Bats

The Little Brown Myotis (*Myotis lucifugus*) is listed as Endangered (SARA Schedule 1 and NS *Endangered Species Act*). The *Recovery Strategy for the Little Brown Myotis (Myotis lucifugus), the Northern Myotis (Myotis septentrionalis), and the Tri-colored Bat (Perimyotis subflavus) in Canada* (2018) is available at: https://species-registry.canada.ca/index-en.html#/consultations/2475. Table 8 of the RS provides examples of "*Activities Likely to Result in the Destruction of Critical Habitat*" which includes activities that cause excessive disturbance (e.g., lights, noise, vibrations), such as quarrying, excavating, blasting and forest clearing activities.

Outside of the listed critical habitat (i.e. hibernacula), other habitat features such as bat maternity roosts are important to the maintenance and recovery of the species. ECCC-CWS recommends the development of additional mitigation measures to avoid effects on bat maternity roosting habitat during the bat breeding season. Potential impacts (e.g. blasting) should also be considered as part of the environmental assessment. ECCC-CWS recommends consulting provincial species at risk biologists at the NS Department of Lands & Forestry for technical expertise related to monitoring bat SAR and regional windows (contact NS Lands & Forestry: Donna Hurlburt at Donna.Hurlburt@novascotia.ca and/or Pamela.Mills@novascotia.ca)

Invasive Species

A variety of species of plants native to the general project area should be used in revegetation efforts. Should seed mixes for herbaceous native species for the area not be available, it should be ensured that plants used in re-vegetation efforts are not known to be invasive.

Measures to diminish the risk of introducing invasive species should be developed and implemented during all project phases. These measures could include:

- Cleaning and inspecting construction equipment prior to transport from elsewhere to ensure that no vegetative matter is attached to the machinery (e.g., use of pressure water hose to clean vehicles prior to transport).
- Regularly inspecting equipment prior to, during, and immediately following construction in areas found to support Purple Loosestrife to ensure that vegetative matter is not transported from one construction area to another.

Fuel Leaks/Spills and Wildlife Emergency Response Plan

The proponent must ensure that all precautions are taken by the contractors to prevent fuel leaks from equipment, and that a contingency plan(s) is prepared in the case of spills. Furthermore, the proponent should ensure that contractors are aware of s5.1 MBCA prohibitions. Provisions for wildlife response activities should be identified in contingency plans to ensure that pollution (e.g. oil spill) and non-pollution incidents (e.g. collisions, stranded birds) affecting wildlife are effectively and consistently mitigated. ECCC guidance is available for consideration (see attached *Guidelines for Wildlife Emergency Response Plans* (2021) and template (Appendix A)).

In the event of mortality of an individual migratory bird species at risk or 10 or more migratory birds, ECCC-CWS expects to be contacted within 24 hours via the SCFATLEvaluationImpact-CWSATLImpactAssessment@ec.gc.ca.

Events involving a polluting substance (e.g. oil spill) should be reported to the 24-hour environmental emergencies reporting system: **1-800-565-1633**.

Specific requests for ECCC environmental assessment advice should be directed to ECCC's environmental assessment window for coordination at: FCR_Tracker@ec.gc.ca.

Water Quality Comments

General

Pollution prevention and control provisions of the *Fisheries Act* are administered and enforced by ECCC. Subsection 36(3) of the *Fisheries Act* prohibits "anyone from depositing or permitting the deposit of a deleterious substance of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter such water".

It is the responsibility of the proponent to ensure that activities are managed so as to prevent the release of substances deleterious to fish. In general, compliance is determined at the last point of control of the substance before it enters waters frequented by fish, or, in any place under any conditions where a substance may enter such waters.

Specific Comments

1. In the executive summary, in the *Effects of the Environment on the Project* section, the report states that "Due to the relatively short duration of the Project, and the contingencies added to mine water infrastructure design, climate change is not anticipated to affect the Project. Elsewhere in the report, there is discussion of aspects of the project requiring. In section 5.6.5.3.2, the report states that "Runoff from the reclaimed TMF and WRSAs will continue to be collected in the settling ponds indefinitely." While the operational phase of the project may be short, other changes as a result of the project are longer in duration. Please revisit this statement and conclusions related to climate change as appropriate.

2. Table 1.5-1 (Applicable Regulatory Framework) notes that DFO is responsible for "Fisheries Act Authorization required for any direct or indirect disturbance of fish or fish habitat". It should also be noted that ECCC is responsible for section 36.3 of the *Fisheries Act* and, while the *Metal and Diamond Mining Effluent Regulation* (MDMER) is correctly identified as applying to mine effluent limits during the operational phase of the mine, the general provisions of the *Fisheries Act* apply before and after the mine is operational and to all non-mining discharges at all times.

3. In Chapter 2, the report states that "Goldboro Gold Mining Inc. has received an

indemnification letter from the Province releasing the company from any liabilities related to the past mining and milling activities if those areas are not disturbed with new or proposed activities. NSLI is currently undertaking a Phase I and Phase II ESA and remedial action plan for all historic tailings located on Crown land within the Upper Seal Harbour Gold District and Lower Seal Harbour Gold District, including the PA. Signal Gold is part of a historic tailings working group with NSLI and has findings of the limited Phase I and Phase II ESA completed for the Project". What is the relationship between Goldboro Gold Mining Inc. and Signal Gold? The Phase I/II ESA conducted by GHD (Appendix E1) is assumed to be separate from the NSLI work described. Is this correct?

4. In section 2.4.2.11.1 the report states that a "A seepage collection system consisting of drains and pumps will be used to collect seepage from the TMF. Drains will be installed in the foundation along the upstream toe of the TMF embankment to collect potential seepage below the embankment and safely direct it to the nearest downstream seepage collection sump, located adjacent to the downstream toe of the embankment. Water collected in the seepage collection sumps will be transferred back into the TMF using a pump-back system. If the collected water is suitable for release to the environment (i.e., meets the discharge criteria), then it may be discharged to the downstream receiving environment." Does this mean that collected seepage water may be directly discharged instead of being pumped back to the TMF? What are the "discharge criteria"? Seepage may be considered effluent under the MDMER with the expectation of discharge through a final discharge point.

5. In section 2.4.2.11.3, the report states that "The polishing pond embankment will be constructed in one stage as a zoned rockfill dam. The bulk fill within the embankment will consist of NPAG material, sourced from the open pits. The zoned embankment will be constructed with filter graded materials consisting of a liner bedding layer and one filter/transition zone (processed mine rock)." Is the processed mine rock NPAG material?

6. In section 2.4.2.15.3 (Water Treatment System), the report states that "Mine contact water will be managed to meet the following regulatory discharge requirements prior to discharge to the natural environment:
    - Metal and Diamond Mining Environmental Regulations (MDMER) Objectives
    - Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines (WQG) for the Protection of Freshwater Aquatic Life (FWAL)
    - NS Tier I Environmental Quality Standards (EQS) for Surface Water
    - Site-specific criteria (based on background data)"

    Throughout the document, there are references to "Regulatory Limits" (e.g. Table 5.6-12) when referring to CCME or other criteria. Please note that, while MDMER discharge limits are regulatory limits applicable during the operational phase of the mine, it may not be appropriate to label other guidelines as regulatory discharge requirements.

7. In section 2.4.2.15.3, with reference to proposed water treatment, the report states that "Based on the predictive water quality analysis completed for the Project, described in Section 5.6, active water treatment is anticipated to be required throughout the operations phase and in the first two years of the closure phase (Years 12 and 13) to remove metals, nitrogen series, and cyanide from effluent. Passive water treatment methods are proposed for Years 14 through 18 for removal of metals. At what point in the closure phase does the proponent estimate that the mine will become a Recognized Closed Mine under the MDMER?

8. In section 2.4.2.15.12 (Sewage System), the report states that "Two separate wastewater treatment plants will service the employee accommodations and mill area. Sewage flow rates as well as treatment requirements were adopted from the *Atlantic Canada Wastewater Guidelines Manual for Collection, Treatment and Disposal (Environment Canada, 2006*). Two containerized sewage wastewater treatment units will be installed. Treated wastewater from the employee accommodations wastewater treatment plant will be directed to the southwest settling pond. The mill area wastewater treatment plant will discharge to the central settling pond." Note that sewage wastewater is normally not considered effluent under the MDMER. Are these settling ponds meant to treat mine contact water? Note also that the 2006 *Wastewater Guidelines* have been replaced *(Atlantic Canada Wastewater Systems Guidelines (2022) https://www.acwwa.ca/resources/water-wastewater-guidelines/kmp/design-guidelines/268-atlantic-canada-wastewater-systems-guidelines-may-2022/file.html*).

9. In section 2.4.3 (Closure), the report states that "Reclamation and Closure Plan requirements are governed by the NS Mineral Resources Act." It may be useful for the report to also reference the Recognized Closed Mine requirements under the MDMER.

10. In section 2.4.3.5 the report states that "The East and West Pits will be allowed to flood during this phase, creating two open waterbodies. The East Pit is expected to be filled in Year 19 and the West Pit is expected to be filled in Year 35." It also states that "Passive water treatment methods are proposed for Years 14 through 18 and no water treatment is anticipated following Year 18". Does this mean that no water treatment is expected for the pit lakes? This is important as overflow from the East Pit and West Pit will discharge to Gold Brook Lake after they are filled. The report goes on to state that "Surface and groundwater monitoring is planned to continue at select locations within the PA throughout the pit filling period and will be terminated once water quality and quantity stabilize and following consultation with applicable regulators." What criteria will be used to determine water quality stability in the pit filling period?

11. In section 3.1 (Water Management), the report states that "during the construction phase of the Project, surface water runoff and groundwater inflows will be directed to specified receiving storage areas and locations prior to discharge into the receiving environment." Note that applicable discharges from the site will only be subject to the MDMER effluent limits once the mine becomes operational.

12. In section 4.1 (Predicted Treatment Requirements), the report states that "certain constituents are predicted to exceed regulatory limits either in effluent discharge or within the receiving watercourse due to impacts of the Project on the water quality of

the runoff. During times where there are predicted exceedances of regulatory limits occurring, treatment of the effluent will be required to ensure water quality entering as well as the fully-mixed constituent of concern concentrations in the receiving water body are below regulatory limits." Guidelines identified for use in the receiving environment should not be labelled "regulatory limits".

13. In section 4.4 (Monitoring and Follow-up), the report states that "Monitoring programs will be implemented to ensure regulatory compliance." Although monitoring may be done for this purpose, regulatory compliance is usually considered separately outside of the EA process.

14. In section 5.1.4.2 Aquatic Habitat, there appears to a reference error; "…Three wetlands have been evaluated to provide and support potential fish habitat (see Figure 14Error! Reference source not found.)"

15. In section 5.6.6.1.5 (Historic Tailings), the report states that "Considering the predicted increase in water levels at West Pit EOM under low flow conditions, it is unlikely that any new areas of historic tailings within the sediments of Gold Brook will be exposed as a result of the Project." Can you comment on the possibility of these historic tailings within the sediments being remobilized under changing flow conditions?

16. In section 5.6.6.2.2 (Predicted Treatment Requirements) the report states that "treatment requirements have been broken into three different categories: metals, nitrogen species and cyanide treatment requirements". In Table 5.6-15 (Predicted Treatment Requirements), it appears that no treatment of surface waters is required beyond year 18. Is this correct? During this phase, the project would likely be subject to the general provisions of the *Fisheries Act* rather (rather than the MDMER effluent limits).

17. In section 5.8.2, the report states that "A Fish and Fish Habitat Baseline Report was prepared (Appendix H.1) to support the description of the existing conditions related to fish and fish habitat within the Fish Habitat Study Area (FHSA). The FHSA is defined as the entirety of the PA, with a southern extension to incorporate a downstream portion of Gold Brook." How did you determine the size of this southern extension? How does this compare to the size of the LAA?

18. In section 5.8.2.6 (Detailed Fish Habitat Assessments), the report states that "The Goldboro area was an active and productive mining area from 1893 to 1910. There are historic workings as well as known environmental hazards throughout the area due to this history of mining…Tailings migrated from the streams and wetlands where they were deposited into the downstream receiving environment (Gold Brook) and may present a continuing threat to fisheries resources." Has this pre-project risk to fisheries resources been quantified?

19. In section 5.8.5.3 (Thresholds for Determination of Significance), a significant effect to

fish and fish habitat is defined as: a Project-related HADD of fish habitat or the death of fish, as defined by the *Fisheries Act*, that cannot be mitigated, or offset; and an unauthorized Project-related alteration of fish habitat.

By comparison, in section 5.6.5.4.2 (Surface Water Quality), "a significant adverse effect to surface water quality from the Project is defined as: Residual effects have high magnitude, are of potential regional geographic extent and of medium to long term duration, occur at any frequency and are only partially reversible to irreversible". Similar definitions of significant adverse effect are presented for other VCs. Why does the definition of significant adverse effect for fish and fish habitat differ and use more regulatory wording related to HADD?

20. In Appendix E.4, section 4.1.3 (Construction Material), the reports states that "All construction sites outside of the WRSAs will exclusively utilize NPAG waste rock to prevent the formation of ARD. Further, low-As waste rock will be targeted for these facilities. The geochemical assessment demonstrated a weak but non-negligible positive relationship of solid phase As content and As leachate data (SFE testing) (Figure 4-2). Based on this relationship, a solid phase As concentration of 100 ppm is proposed as a preliminary cut-off to use for waste rock for construction." The ARD Management plan includes careful monitoring for seeps and contingency plans should monitoring reveal unexpected results. Presumably this preliminary cut-off can be revisited if necessary.

21. In the table of contents, should Appendix F.3 be labelled *2021 Surface Water and Sediment Monitoring Report* as per the title page?

22. In Appendix F.3, section 2.4 (Industrial Approval Monitoring), the report states that "As part of the Industrial Approval (Approval No. 2018-101368-02) effective August 5, 2020, groundwater and surface water monitoring has been completed since August 2018." It is assumed that this set of surface water monitoring results is for a different purpose and separate from those results discussed as part of the 2021 baseline sampling program in Appendix F.3.

23. In Appendix F.8 (Initial Dilution Zone Study), the report states that *The Canadian Council of Ministers of the Environment (CCME) and The Atlantic Canada Wastewater Guidelines (ACWG) (Environment Canada, 2006)* set out limits on the size of the mixing zone. Please note that the wastewater guidelines have been replaced *(Atlantic Canada Wastewater Systems Guidelines (2022) https://www.acwwa.ca/resources/water-wastewater-guidelines/kmp/design-guidelines/268-atlantic-canada-wastewater-systems-guidelines-may-2022/file.html*. It would also be useful to include the CCME reference. CCME guidance states that the use of IDZs imply that no dilution is allowed for persistent, toxic and bioaccumulative substances. Are there any substances in this category in the list of potential contaminants in surface water?

24. Figure 4 (WEST PIT DISCHARGING (Y37) GOLD BROOK LAKE NEAR FIELD MIXING ZONES) of attachment 4 of Appendix F8 shows overlapping “100 m regulatory zones” for the East and West pit discharges. Has this been considered in the evaluation of mixing zones?

25. In section 6 (Post-Closure Water Treatment Systems) of Appendix F9, the report states that “Passive anoxic limestone drains (ALDs) are assumed to provide sufficient treatment for each settling pond overflow present during post-closure conditions. The ALDs involve the burial of limestone in oxygen-depleted trenches. An ALD consists of a trench containing limestone encapsulated in an impermeable liner that is covered with clay or compacted soil. Surrounding the limestone with an impervious liner also helps maintain anoxic conditions in the drain. The cap also prevents water infiltration and helps prevent carbon dioxide from escaping. Prior to the development and installation of an ALD, influent water must be characterized to ensure effective system design.” What sort of ALD monitoring is planned (e.g. flow, dissolved metals concentration, pH at the bottom) to ensure that the reactive surface area within the drain is effective? Any contingencies plans for reagitation or replacing of the limestone if required?

26. In Appendix F.11 (Water Monitoring Plan), SW-24, on the edge of the PA, is identified as the southernmost surface water sampling location. As the LAA was considered the appropriate area for the assessment of effects and baseline sampling in different media was completed downstream (south) of SW-24, would it be useful to include additional downstream surface water sampling locations in the planned monitoring network?

27. In Appendix J.3, it is noted “that metals in historic tailings located near Gold Brook that will not be managed in the TMF may have the potential to oxidize and leach contaminants into surface water bodies because of the predicted water quantities in the PA. This contamination source has not been considered quantitatively in this HHERA and is an uncertainty in the conclusions”. Should this also be documented in section 5.5 (Uncertainties)?

28. In Appendix J.3, the report states that “The sediment dataset characterizes two distinct exposure areas, Gold Brook and Gold Brook Lake, and as shown in Table A.4 of Appendix A, the sediments in Gold Brook generally have higher metal concentrations than those in Gold Brook Lake because of the presence of historic tailings associated with Gold Brook. For this reason, risks to human health and ecological receptors will be estimated separately for Gold Brook and Gold Brook Lake. Since the number of samples collected was limited to characterize baseline sediment concentrations, maximum values were calculated for the two distinct exposure areas, Gold Brook Lake (5 samples) and Gold Brook (6 samples, including RA-SED-9 located at the location WC64), separately. These baseline samples are considered sufficient for the completion of a HHERA.”

    There is some question whether the single sediment sampling event over 2 days (11 discrete samples in total) is enough to adequately characterize the sediments in the entire LAA over the entire lifespan of the project. Additional sediment sampling in

these two waterbodies (Gold Brook and Gold Brook Lake) may reduce the uncertainty associated with estimates of risk. The use of maximum sediment concentrations as representative of all sediments in each of these 2 waterbodies is also questionable. Using a different approach to generate a more representative sediment concentration may lead to additional parameters being screened into the assessment of ecological risk in the HHERA which is important in the overall assessment of effects. What sort of sediment monitoring is planned throughout of the project?

Surface Water Quality results are shown for Gold Brook and Gold Brook. There is some question whether the water quality samples collected over the nine month period in 2021 is enough to adequately characterize the water quality in the entire LAA over the entire lifespan of the project. Additional surface water sampling in these two waterbodies (Gold Brook and Gold Brook Lake) may reduce the uncertainty associated with estimates of risk.

In section 5.1.3.2 (Surface water), the report states that "To select the chemicals of potential concern in surface water, the maximum predicted surface water (95th percentile baseline surface water concentration)" was used. What data was used to generate the 95th percentile baseline surface water concentration in Tables F.3 and F.4? This is important in the COPEC screening step in the ecological risk assessment which is important in the overall assessment of effects.

29. In Appendix J.3, the report states that "No incremental ERs exceed their target of 1, which indicates that the risks related to the Project are negligible for the COPECs. As such, potential risks to ecological health for the two exposure areas (Gold Brook Lake and its watershed, and Gold Brook and its watershed) due to the presence of the Project can be ruled out and no further assessment is required." The conclusion also refers to "no potential ecological risks". The proponent should be careful in how potential risk is being communicated. Risks associated with ERs less than one are generally considered acceptable but not necessarily negligible. Rarely would there be no or zero ecological risk. Readers should be assured that the proponent continues to be mindful of ecological risk as the project proceeds and that the HHERA can be revisited if conditions change. Additional questions on the COPEC screening process in the ERA are found in other comments.

Accidents and Malfunctions

Hazardous materials (e.g. fuels, lubricants, hydraulic oil) and wastes (e.g. waste oil) should be managed so as to minimize the risk of chronic and/or accidental releases. For example, the proponent should encourage contractors and staff to undertake refueling and maintenance activities on level terrain, at a suitable distance from environmentally sensitive areas including watercourses, and on a prepared impermeable surface with a collection system.

The proponent is encouraged to prepare contingency plans that reflect a consideration of potential accidents and malfunctions and that take into account site-specific conditions and sensitivities. The Canadian Standards Association publication, *Emergency Preparedness and Response,* CAN/CSA-Z731-03, reaffirmed 2014), is a useful reference.

All spills or leaks, such as those from machinery or storage tanks, should be promptly contained and cleaned up (sorbents and booms should be available for quick containment and recovery), and reported to the 24-hour environmental emergencies reporting system (Maritime Provinces 1-800-565-1633).

If you have any questions, please let me know.

Suzanne Wade

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NOVA SCOTIA

Natural Resources and Renewables

M E M O R A N D U M

TO: Candace Quinn, NS Department of Environment and Climate Change

FROM: NS Department of Natural Resources and Renewables

DATE: July 10, 2022

RE: Goldboro Gold Project – Signal Gold Inc. – Guysborough County, Nova Scotia

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The Department of Natural Resources and Renewables (herein the Department or NRR) provides the following comments on the above project:

Crown Lands:

Lands Services branch review of this project has determined the following:

• The proponent will require a Crown land lease for the use of Crown land;

• Any watercourse alteration and/or water withdrawal approvals on Crown lands associated with the project would require landowner permission from the Department Natural Resources and Renewables; and

• Approximately 5,500 metres of new public access roads will be constructed. If a new public road is being built on Crown lands it could require a transfer of administration and control from the Department of Natural Resources and Renewables to the Department of Public Works. Public Works would need to be consulted to ensure any new roads meets their standards.

No further approvals/authorities would be required for this project from Land Services.

Wildlife, Wildlife Habitat and Species-at-Risk:

Comments regarding wildlife, wildlife habitat and species-at-risk were provided directly to the reviewer per previous agreement.

Geoscience and Mines:

The review of the Environmental Assessment Registration Document was conducted based on the department's experience with similar undertakings, and with the intention of identifying potential concerns which may be proactively addressed prior to the initiation of the project, or

throughout the completion of this project.

Socioeconomic Considerations

1. An increase of $2.1 Billion in provincial Gross Domestic Product (GDP) is estimated over the life of the project.
2. $528 Million, related to the project, is estimated to be generated through direct and indirect Federal, Provincial, and Municipal taxation.
3. An estimated 583 direct jobs are expected to be generated during the 2-year construction period of the project, and 215 direct jobs are expected to be generated annually for the life of the project.

Conceptual Mining Plan Overview

4. The project uses a conventional open pit mining method, with the open pits designed in such a way to avoid direct disturbances to Gold Brook Lake and Gold Brook.
5. The tailings management facility uses an acceptable downstream construction method, with tailings being thickened prior to deposition to reduce the overall footprint of the tailings management facility. The conceptual design, and site selection and placement of site infrastructure, such as the open pits, waste rock storage areas, other site infrastructure, and tailings management facility appears to have reduced and/or minimized impacts to the surrounding environment while meeting operational requirements. Additionally, the use of thickened tailings reduces the required sizing of the tailings management facility and has geotechnical properties which are more favourable for long term disposal. This tailings method is preferable to conventional tailings deposition.
6. The present approach to mining as outlined by the proponent is appropriate and consistent with standard safe operating practices and industry best practices. This approach has been reviewed as presented in the Environmental Assessment Registration Document and is acceptable to the Department of Natural Resources and Renewables at this time.
7. As required by the *Mineral Resources Act* and associated regulations, a detailed mine plan, complete with detailed designs, is expected during the submission of the mineral lease application. The entirety of the mine plan will be reviewed again at the time of the application submission.
8. The Department requests that the proponent provides a geotechnical evaluation of the tailings management facility detailed design by an Independent Tailings Review Board (ITRB) as part of the mineral lease application.

Note: The proponent has completed a feasibility study that is not included as part of the Environmental Assessment Registration Document submission. The feasibility study and overall mine design including open pits, waste rock storage areas, site infrastructure, and tailings management facility will be further reviewed in detail as part of the mineral lease application and the proponent’s submission of the detailed mine plan.

Historical Mining Activities

9. The completion of this project will also address historical tailings and tailings impacted material related to historical mining activities, and disposal of these materials in a proper engineered tailings management facility.
10. The completion of this project will lead to the elimination of historical abandoned mine openings which currently present a potential environmental and physical hazard to humans and wildlife. The proponent is advised to consult with the Department of Natural

Resources and Renewables to ensure that the proponent has access to all readily available records related to historic mine plans, abandoned mine openings, and historical workings on, and in the vicinity of the site. Prior to initiation of work in these areas, all records are to be reviewed by the proponent for health and safety, and environmental considerations.

Conceptual Reclamation & Closure Plan

11. It is noted that the Conceptual Reclamation & Closure Plan is reasonable and preliminary in nature however, there are a couple of items for which we request refinement and additional details including:
    a. Provide detail under the monitoring section to include the type of monitoring to occur (i.e., geotechnical, groundwater, surface water, atmospheric monitoring, etc.).
    b. Although the details are noted within the text of the document, please expand the schedule to include each general activity type, and major individual activity noted within the reclamation plan (timeframes for active and passive water treatment, backfilling of the pits, construction of spillways, etc.) and provide details regarding activity/event sequencing and any critical pathway to complete reclamation and closure of the site as per the schedule.
12. As the development of this plan continues, the Department of Natural Resources and Renewables will likely have additional requests for details, clarifications, and comments.

The details requested above are not necessarily required prior to approval of the Environmental Assessment as Items 11 & 12 may be addressed appropriately through the submission of the Reclamation & Closure Plan during the mineral lease application and subsequent submissions as required through the *Mineral Resources Act*.

Regional Services:

The Regional Services Branch of the Department is responsible to liaise with other Government Departments and Agencies regarding the assessment and reclamation of known and potential contaminated sites. The Goldboro (Gold Brook Lake) property is on the list of potentially contaminated mine sites on Crown lands in Nova Scotia. The province is assessing these properties and treatment of any historic tailings on Crown lands would be a net benefit to the province. Development of the Goldboro mine project will address tailings that are located in areas that will be disturbed during construction and operation of the mine site.

Conditions:

1) All required approvals must be in place prior to any work commencing.

2) For public roads to be built on Crown lands the proponent must work with the Department of Public Works to ensure roads are built to acceptable standards.

Recommendations:

1) The proponent consults with the Department of Natural Resources and Renewables to obtain

all readily available records related to historic mine plans, abandoned mine openings, and historical workings on, and in the vicinity of the site. In addition, prior to initiation of work in these areas, all records are to be reviewed by the proponent for health and safety, and environmental considerations.

2) While not a requirement for approval of the Environmental Assessment the Department of Natural Resources and Renewables requests additional information and clarification on the monitoring section of the Conceptual Reclamation and Closure Plan to include the type of monitoring to occur (i.e., geotechnical, groundwater, surface water, atmospheric monitoring, etc.).

3) The Conceptual Reclamation and Closure Plan should also expand the schedule to include each general activity type, and major individual activity noted timeframes for active and passive water treatment, backfilling of the pits, construction of spillways, etc.) and provide details regarding activity/event sequencing and any critical pathway to complete reclamation and closure of the site as per the schedule.

Native Council of Nova Scotia

The Self-Governing Authority for Mi'kmaq/Aboriginal Peoples Residing Off-Reserve in Nova Scotia throughout traditional Mi'kmaq Territory

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Rural & Native Housing Group

Aboriginal Peoples Training & Employment Commission (APTEC)

Netukulimkewe'l Commission

Wejikwom Housing Commission

Social Assistance Recipient Support for Employment & Training (SARSET)

Micmac Language Program

Native Social Counselling Agency

Child Help Initiative Program (CHIP)

E'pit Nuji Ilmuet Program (Prenatal)

Reaching Home Indigenous Program

Parenting Journey Program

Youth Outreach Program

Mi'Kma'ki Environments Resource Developments Secretariat (MERDS)

Aboriginal Connections in Trades & Apprenticeship (ACITA)

July 8, 2022

Environmental Assessment Branch
P.O. Box 442
Halifax, Nova Scotia
B3J 2P8

RE: Goldboro Gold Project

To Whom It May Concern,

The Native Council of Nova Scotia was organized in 1974 and represents the interests, needs, and Rights of Off-Reserve Status and Non-Status Section 91(24) Indians/Mi'kmaq/Aboriginal Peoples continuing on our Traditional Ancestral Homelands throughout Nova Scotia as Heirs to Treaty Rights, Beneficiaries of Aboriginal Rights, with Interests to Other Rights, including Land Claim Rights.

The Native Council of Nova Scotia (NCNS) Community of Off-Reserve Status and Non-Status Indians/Mi'kmaq/Aboriginal Peoples supports projects, works, activities and undertakings which do not significantly alter, destroy, or impact the sustainable natural life ecosystems or natural eco-scapes.

Our NCNS Community has continued to access and use natural life within those ecosystems and eco-scapes. The equitable sharing of benefits arising from projects and undertakings serve a beneficial purpose towards progress in general and demonstrate the sustainable use of the natural wealth of Mother Earth. These projects are accomplished with respect for the Constitutional Treaty Rights, Aboriginal Rights, and Other Rights of the Native Council of Nova Scotia Community continuing throughout our Traditional Ancestral Homeland in the part of the Mi'kma'ki now known as Nova Scotia.

The Alteration & Destruction of Wetlands

The NCNS is concerned with the extensive alteration of wetlands & wetlands of special significance (WSS) proposed by the project. It is our community's conclusion that the 90.599 ha of proposed direct wetland impact alone is an unfeasible amount of wetland to reasonably achieve a "no net loss" scenario that would satisfy the *2019 Nova Scotia Wetlands Conservation Policy*[1].

[1]Environment Office of the Minister, "Nova Scotia Wetland Conservation Policy", (October 2019)

Aside from the historically inordinate amount of wetland alterations proposed by the project, the proponent's assessment of the project footprint has identified 23 wetlands of "special significance". This classification is granted through the *Wetland Conservation Policy* due the presence of Species at Risk (SAR) within each wetland. While the Environmental Assessment Registration Document (EARD) notes that the Wetland Ecosystem Services Protocol – Atlantic Canada (WESP-AC) assessment has determined that no WSS within the project area is considered "functional", this in no way diminishes the classification under the *Wetlands Conservation Policy* as the EARD seems to suggest. Given the classification of WSS, Under Objective 1 of the *Wetlands Conservation Policy*, *Section A* states that "Government will not support or approve alterations proposed for a WS or any alterations that pose a substantial risk to WSS". The NCNS holds the government to this policy, and cannot in good conscious support the approval of this project because of it.

Wetlands play significant functions within the ecosystem, including: maintaining watershed health, buffering storm water, and removing organic waste and excess nutrients. The mass removal of these wetlands only serves to weaken Nova Scotia's ecosystem, and disrupt the natural restoration that will occur if the ecosystem is left undisturbed. This is how habitat loss is allowed to happen, it is chipped away at a few hectares at a time, until one day there is no longer similar habitat in the region. It is a tale of the Tragedy of the Commons, similar to the passenger pigeon's extinction in North America, it is picked away by everyone until it is gone.

Introductory Vectors for Invasive Alien Species

The NCNS is concerned with introductory vectors, and the presence of invasive alien species that may already inhabit the project and surround areas. The proponent has neglected to establish any mitigative measurements, or publish an invasive alien species survey within the EARD.

Invasive alien species are predisposed to establish themselves in recently disturbed environments due to the localized eradication of natural predators and removal of resource competition resulting from anthropogenic activity. Activities such as grubbing, construction of waste rock storage, and mass excavation, that will take place during the construction of the mine are heavy stressors on the environment that will provide an opportunity for invasive alien species to establish themselves. As the environment is stressed, there is then an increased potential for invasive alien species to be successfully introduced via vehicles, on the boots of workers, and other vectors if no preventative measures are taken.

The NCNS requests the proponent develop procedures to mitigate introductory vectors for invasive alien species. This could include mandated practices to clean vehicles and employee boots prior to entry of the project site to ensure they do not act as introductory vectors. Additionally, we request clarification if an invasive alien species survey has been performed, and if not, that one be conducted.

Consultation with the Mi'kmaq of Nova Scotia

We would like to take this opportunity to reiterate that it is important for all proponents of projects to understand that the Off-Reserve Aboriginal Community represented by the NCNS is included within the definition of the word "Indian" of Section 91(24) of the *Constitution Act*, 1982. The Supreme Court of Canada in a landmark decision in *Daniels v. Canada (Indian Affairs and Northern Development)*, 2016 SCC 12. declared that "the exclusive Legislative Authority of the Parliament of Canada extends to all Indians, and Lands reserved for the Indians", and that the "word 'Indians' in s. 91(24) includes the Métis

and non-Status Indians".[2] Since 2004, in multiple decisions passed by the Supreme Court of Canada: *Haida Nation*[3]*, Taku River Tlingit First Nation*[4]*, and Mikisew Cree First Nation*[5], has established that,

> Where accommodation is required in making decisions that may adversely affect as yet unproven Aboriginal Rights and title claims, the Crown must balance Aboriginal concerns reasonably with the potential impact of the decision on the asserted right or title and with other societal interests.

Further, both the Government of Nova Scotia and the Government of Canada are aware that the "Made in Nova Scotia Process", and the *Mi'kmaq-Nova Scotia-Canada Consultation Terms of Reference* does not circumvent the Provincial Government's responsibility to hold consultations with other organizations in Nova Scotia that represent Indigenous Peoples of Nova Scotia. While the proponent may have to engage with the thirteen Mi'kmaq First Nations through the Assembly of Nova Scotia Mi'kmaq Chiefs, represented by the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), the KMKNO does not represent the Off-Reserve Aboriginal Community who has elected to be represented by the NCNS, since 1974.

We assert the Off-Reserve Aboriginal Communities, as 91(24) Indians, are undeniably heirs to Treaty Rights and beneficiaries of Aboriginal Rights as substantiated by Canada's own Supreme Court jurisprudence. As such, there is absolutely an obligation to consult with the Off-Reserve community through their elected representative body of the NCNS. The Crown's duty to consult with all Indians extends beyond that only with Indian Act Bands, or as through the truncated Terms of Reference for a Mi'kmaq Nova Scotia Canada Consultation Process.

Going Forward To
A Better Future

Habitat and Impact Assessment Manager
Maritime Aboriginal Aquatic Resources Secretariate

Cc: Chief and President, NCNS
Commissioner, Netukulimkewe'l Commission
Executive Director, MAARS & MAPC Projects
Director of Intergovernmental Affairs, MAPC

[2] "Daniels v. Canada" (Indian Affairs and Northern Development), (2016), SCC 12, 1 S.C.R. 99
[3] "Haida Nation v. British Columbia" (Minister of Forests), (2004), 3 S.C.R. 511.
[4] "Taku River Tlingit First Nation v. British Columbia" (Project Assessment Director), (2004), 3 S.C.R. 550.
[5] "Mikisew Cree First Nations v. Canada" (Minister of Canadian Heritage), (2005), 3 S.C.R. 388.

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July 14th, 2022

Candace Quinn
Environmental Assessment Officer
Environmental Assessment Branch
Nova Scotia Environment and Climate Change
Email: candace.quinn@novascotia.ca

RE: Continuing Consultation with the Assembly of Nova Scotia Mi'kmaw Chiefs on the Goldboro Gold Project – Signal Gold Inc.

Mrs. Quinn,

I write to acknowledge receipt of your letter dated June 10th, 2022, with respect to continued consultation under the *Terms of Reference for a Mi'kmaq- Nova Scotia – Canada Consultation Process* (TOR) as ratified on August 31, 20210, on the above noted project.

The Mi'kmaq Nation in Nova Scotia has a general interest in all lands and resources in Nova Scotia as the Mi'kmaq Nation has never surrendered, ceded, or sold the Aboriginal title to any of its lands in Nova Scotia. The Mi'kmaq have a title claim to all of Nova Scotia and as co-owners of the land and its resources it is expected that any potential impacts to rights and title shall be addressed. Clearly, this project will impact Mi'kmaq Rights and Title.

This project will impact several communities and their section 35 rights which are affirmed and protected in the 1982 *Constitution Act.* Section 35 affirms the Mi'kmaq of Nova Scotia right to hunt and fish throughout Mi'kma'ki (Unceded land of the Mi'kmaq people). This project will clearly impede that ability in the surrounding area (including but not limited to the ability to hunt, fish, and gather in the project area). As referenced in the Mi'kmaq Ecological Knowledge Study (MEKS), but not limited to, Moose, Atlantic Salmon, American Eel, Brook Trout, Bear, are all found in the project area. There is little consideration in the Environmental Assessment Registration Document (EARD) with respect to impacts this mine will have on the mainland moose population. It is expected that Nova Scotia Environment and Climate Change (NS-ECC) will ensure these species will not be impacted by this proposed project.

Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO)'s Technical Team has reviewed the EARD by Signal Gold and wishes to raise the following concerns/technical questions:

5.1 Air

- Where are the proposed monitoring locations for dust/particulate? Has a particulate monitoring plan been developed? A map and monitoring plan should be sent to our office for review and comment.

- How is the proponent going to minimize dust and particulate from entering the lake? Gold Brook Lake will be surrounded by infrastructure. Will there be monitoring conducted within the lake to determine how much particulate is entering the lake? How will this adversely impact fish and fish habitat? What studies are proposed? There is no mention anywhere of this in the document.

- How will dust affect wildlife food source? What studies and mitigation efforts are planned to prevent harm to wildlife?

5.2 Light

- This section of the EARD does not adequately address the impact to mainland moose habitat, species near the mine in particular nocturnal species, migratory birds.

- How will light monitoring occur? Is there a Light monitoring plan? Please provide the proposed monitoring plan.

5.3 Noise

- Where are the proposed monitoring locations for noise? Has a noise monitoring plan been developed? A map and monitoring plan should be sent to our office for review and comment.

- There is no mention of impacts to fish and fish habitat for noise and blasting. There is special concern with the concussive impacts of blasting. Please describe how this will be mitigated in detail.

- There is concern of nitrates entering Goldbrook Lake. What guarantees can NS-ECC make that there will be no impact from these nitrates entering the nearby bodies of water.

5.4 Geology, Soil and Sediment

- What is the plan for the contaminated sites? Is there a requirement for the proponent to remediate these sites? Are these sites part of the crown's remediation plan? There is significant concern with the remobilization of historic tailings and the potential for them to enter Gold Brook Lake and the surrounding watershed, especially with the increase of activity proposed in the area.

- What is the frequency of testing for Acid Rock Drainage? Where will testing occur? Please provide a monitoring/mitigation plan for Acid Rock Drainage.

- Has a groundwater model been developed? If not, one is requested. Faulting and an interconnection between surface water, groundwater, potential pit, tailings management facility and the Gold Brook Lake and its watershed is a significant concern.

5.5 Groundwater Resources

- Signal Gold Inc. has identified groundwater as a valued component to be monitored for baseline quality and quantity throughout the development, operations, and closure of the Goldboro Gold Project. KMKNO agrees that groundwater is a valued consideration but while Signal Gold Inc. proposes that impacts will not extend beyond the LAA, our office finds the extent of impacts less straightforward. Recognizing the effort Signal Gold Inc. has put forth to determine baseline data and the development of a Hydrologic Conceptual Site Model the changes to groundwater quantity pose a significant threat to hunting and fishing areas utilized by the Mi'kmaw of Nova Scotia.

- Groundwater samples collected from available monitoring wells show a significant number of samples with elevated levels of ammonia nitrogen and metals in exceedance of safe guidelines many of these also exceeding the criteria for groundwater discharge into surface water. Modelling shows that groundwater flow mimics local topography and discharges into low laying surface waters. In this case Gold Brook Lake, then flowing into Gold Brook and the Atlantic Ocean.

- Blasting is expected to increase bedrock fracturing and therefore increase permeability and flow. Not only will be groundwater be moving into significant hunting and fishing grounds in unprecedented ways but natural recharge of groundwater from rainfall is expected to be diminished due to compression of topsoil and surface grounds of the Project. Operations threaten to release poor quality groundwater in unpredictable discharge locations within significant areas for the Mi'kmaw.

5.6 Surface Water Resources

- The Project Area is adjacent to Anakew'katik (Isaacs Harbour) which is a significant site for the potential of pre-contact archaeological artefacts and habitat for endangered species listed under SARA. The watershed area within the project boundaries is an important site the Mi'kmaw of Nova Scotia for deer and salmon.

- Baseline conditions of surface waters currently exceed guidelines for both Gold Brook and Gold Brook Lake, with high concentrations of metals and low pH values. Planned mitigation measures offered by the proponent include treatment of the effluent flowing directly into Gold brook Lake from TMF, North Settling Pond and Central Settling Pond. While full mixing was found to occur within 100m of discharge only one assessment point was used to capture constituent loading in Gold Brook Lake. Both the southeast and southwest Settling Ponds discharge directly into Gold Brook and the KMKNO wishes to know how moving water will be treated and contained should there be levels found to exceed guidelines in the brook?

- Waters flows from Gold Brook Lake into Gold Brook and onto wetlands, significant areas and towards to Seal Harbour Lake, where there is also an anticipated reduction in flow and known fishing grounds.

- Signal Gold Inc. has determined that there will be irreversible changes in water quality and quantity throughout the Project Area and the LAA yet, determined these changes to not be significant. Cultural importance is not listed as a factor when determining significance of a residual effect. Having determined that ground and surface waters move unpredictably towards areas of significance for the Mi'kmaw of Nova Scotia, the cultural importance of traditionally used lands and waters should be included in the assessment.

5.7 Wetlands

- Section 5.7.7.1 speaks to wetland avoidance and suggests that 72.5% of the wetlands will not directly be impacted however, we are concerned over the long term and indirect impacts of work done within this area. There is no mention within the EARD of the protection effort considered for the surrounding lakes and wetlands, or studies that may occur within to ensure that water quality and habitat is not diminished because of this work. There are approximately 452 ha of wetlands within the proposed project area. These wetlands are part of a much larger water system, water shed.

- Water itself is sacred. Water is life, supporting aquatic life, mammals, micro-organisms, and so much more. The removal of vegetation from these watercourses will lead to the degradation to those and surrounding water courses, and therefore the degradation of the habitat that those watercourses support. This is expected to have devastating impacts to both the aquatic and terrestrial species that rely on the water courses/bodies within the Project area and the LAA.

- Further, wetlands support a wide variety of niche habitats, including habitat for many sacred, ceremonial medicines and plants. Without a comprehensive study of the wetland vegetation, we are unable to determine the full extent of impacts to habitat and culture.

5.8 Fish and Fish Habitat

- American Eel and Brook trout are found in Gold Brook Lake and the surrounding watercourses. Every effort should be made to conserve as much habitat as possible. If habitat needs to be destroyed, the offsetting should include improvements to brook trout and American eel habitat.

- Western Tributary to Gold Brook Lake proposed at 1:1 offsetting, this seems insufficient and should at least be a 2:1 ratio.

- Indirect impacts of 10056 m^2 and direct impacts of 16296 m^2 are huge areas and are only being proposed at 2:1 offset ratio. A 3:1 offsetting ratio is recommended.
- Should this project be approved, the offsetting efforts should include improvements to Atlantic Salmon and American Eel habitat in the area.

- There are several plans (Fish rescue, Sediment and Erosion control plan, blasting plan, etc.) that have been outlined and not completed. Our office requests copies of these for review and comment.

- If there is an unforeseen adverse change to habitat quality during operations, what provisions are in place for the company to rehabilitate the habitat?

- Regulators should consider flow rates on watercourses and implementing conditions to keep minimum flow for fish passage of all species.

5.9 Terrestrial Environment

- Table 5.9-2 Vegetation Types Observed within the PA speaks to the forest ecosystem classification of vegetative types. While the Forest Ecosystem Classification is a great tool for classifying a forest type, it is not sufficient reporting of the actual vegetation on site. Within the project area, there are 452 ha of wetlands. Wetlands support a multitude of niche habitats for both culturally significant species and species at risks (SAR's). It would be our expectation that a comprehensive vegetative inventory be conducted throughout the project areas.

- Additionally, Gold Brook Lake is at the center of the proposed infrastructure. This lake and its watershed have been used for recreation in the near past and present dates. The riparian areas of this lake also host a variety of ecosites ideal for wildlife and rare/ at-risk vegetation.

- Further, it is unclear what, if any, the impacts of mining on a molecular scale would be. It is of concern that remaining vegetation within the LAA would absorb toxins or other aliments non-natural to the habitat thus creating a poor/toxic food source for grazing wildlife. We are requesting a that a molecular characterization study/ molecular and biochemical study be conducted on the surround the surrounding vegetation prior to any mining activities.

5.9.3.1.3 Species at Risk (SAR) and Species of Conservation Interest (SOCI)

- This section speaks to lichens. Within the project area both Boreal Felt lichen and Blue lichen were observed.

- The importance of lichens to our environment can not be limited to just one value. Lichens in general can provide us with very valuable information about our surrounding environment. Some lichens can only be present in areas of low pollution, others can inhabit areas of moderate to high pollution converting that atmosphere into a healthier, more sustainable one. Lichens also hold a strong value within the Mi'kmaw nation in Nova Scotia. Through research, multiple words have been identified in the Mi'kmaw language to reference lichens proving their importance to Nova Scotia Mi'kmaq. Further, traditional use of various lichens has been documented and noted to medicinal and ceremonial.

- The mitigation efforts as outlined by this EARD for lichens can not guarantee appropriate protection and preservation of these sensitive species.

5.9.2.4 Avifauna

- Several Avian Species at Risk were noted within the proposed project area (PA), including species that would inhabit the area year-round.

Priority Birds Within 5 km Radius:

- Bank swallow (Riparia, SARA Threatened, NSESA Endangered) - Bank swallow (Hirundo rustica, SARA Threatened, NSESA Endangered) – The three main habitat types occupied by Bank Swallows include coastal cliffs, riverbanks, and active sand and gravel pits and most breeding colonies occur at in vertical banks. Work inclusive of mining would be destructive to the habitat of bank swallows; and if this species is present, work should not be permitted to occur.

- Canada warbler (Cardellina canadensis, SARA Threatened, NSESA Endangered) – Canada warbler require forested swamps, forested swamps, shrub thicket swamps, riparian woodlands, moist forests, brushy ravines, northern hardwood forests, mature forests with gaps in the canopy, open and treed muskeg. Mining activities would disrupt the habitat of this species.

- Short-eared owl (Asio falmmeus, SARA Special Concern) – Habitats include but are not limited to marshes, meadows, prairies, and open woodlands. Further, short eared owl is known to inhabit the study year-round and known to winter in the area, thus habitat degradation is not supported.

- Common nighthawk (Chordeiles minor, SARA Threatened, NSESA Threatened) – is expected to inhabit this area during breeding season. Work during breeding season would not be supported.

- Olive-sided flycatcher (Contopus cooperi, SARA Threatened, NSESA Threatened) – Habitat includes edges of coniferous or mixed forests with tall trees or snags for perching, alongside open areas, or in forests with standing dead trees and snags. The project area is within breeding habitat, therefore if work were to proceed, we would recommend leaving large snags for perching. We do not recommend disturbing core habitats, however.

- Evening grosbeak (Circus hudsonius, SARA Special Concern, NSESA Vulnerable) – Because this is suitable habitat for Evening grosbeak and this species is known to inhabit this area year-round, we do not recommend proceeding with habitat alteration.

- Finally, the EARD suggests that clearing of vegetation will occur outside the breeding bird window (April 15th – August 31st) where possible. It is not clear under what conditions site alteration would occur during breeding season. We are requesting more information.

Section 5.9.3.2.1 Mainland Moose

- The project area falls in Mainland Moose core habitat. Core habitat is designated when habitat meets the niche needs of the specific species. The EARD states that moose were

documented within the project area, indicating the use of the area for mainland moose. Activities that result in the degradation of Species at Risk habitat is not supported. Gold mining results in permanent cumulative impacts including but not limited to water degradation and the immediate and future loss of habitat and safe food sources. It has been implied that moose will alter movement due to the sensory disturbance; and have documented that they may not inhabit an area within 3-4 km of a mine due to destructive aliments of mining activity. With fewer than an estimation of 700 mainland moose, further degradation to Mainland Moose habitat is unacceptable. It is our continued request that no mining activities occur within this range of a moose habitat or moose corridor.

5.10 Socioeconomic Conditions

- This section of the EARD states that "Overlap between Project activities and Mi'kmaq land and resource is minimal in comparison to the surrounding areas". As stated throughout this letter, this project area is rich in traditional use.

5.11 Indigenous People

- This section of the EARD does not adequately address the impacts this project will have on Rights and Title, Traditional Harvesting or The Mi'kmaw's ability to fish for a moderate livelihood. The proponent is focusing on the economic opportunities and less on the infringement of Mi'kmaw Treaty Rights. This section needs to be reworked with a Two-Eyed Seeing Approach and incorporate traditional knowledge in a more holistic approach.

The KMKNO Archaeological Research Department (ARD) has reviewed the EARD Submission from Signal Gold located in Goldboro, Nova Scotia. Specifically, Section 5.12 (Pages 517 – 528), the most recent Archaeological Resources Impact Assessment (HRP #: A2021NS063) located in Appendix L.1. of the EARD Submission, and three previous ARIAs that were undertaken for lands associated with this project (#A2017NS043, #A2019NS102, and #A2020NS126). The most recent ARIA assessed approximately 925ha and the most current recommendations have been offered based on background studies, field reconnaissance, and includes previous recommendations from the above earlier studies. There has been, to date, no sub-surface testing.

KMKNO's ARD supports the recommendation by Davis MacIntyre & Associates that "prior to ground disturbance of any kind, any areas of elevated potential identified above should be subjected to a programme of limited shovel testing prior to clearing, grubbing, or development, to determine the presence or absence of archaeological resources" (HRP: A2021NS063, 2021: 32). We would like to emphasize that elevated potential is based on interpretation which can be impacted by experience, objectives and can therefore include subjectivity. Also, multitemporality can be overlooked when referenced against current landscape conditions and/or within previously disturbed areas where there has been historic industrial activity, or when "elevated potential" has been conflated from a category between low, moderate, or high. Although there are areas of the landscape which may be considered as having elevated potential using predictive modelling, it remains a model ONLY until there is subsurface testing. "Moderate" potential has been interpreted as an area "where there is a chance the locations were utilized by Mi'kmaq or

their ancestors for encampment or other activities. Determination of potential use is based on factors such as quality of the land (e.g., dry, and elevated) and proximity to watercourses (e.g., accessible by canoe)" (Signal Gold Inc. 11222385 (3) Goldboro Gold Project, 2022: 521). It is unclear if, amongst "other activities" for which potential is considered in the model include quarrying, logistical encampment, fishing, portage, tool cashing, hunting blinds, petroglyphs, wayfinding (i.e. trail trees) and other such non-large-scale-encampment, since these varied activities each have different requirements of the landscape and different archaeological signature characters.

This is an extensive project with a footprint that exhibits complex contemporary impacts to cultural heritage associated with the development of waste storage areas, access roads, and infrastructure (and the logistical footprints of each of these) in a landscape that has a documented record of use by Mi'kmaq for hunting, fishing, harvesting (including aquatic harvesting), and travelling. It is an area that has been, and continues to be, used into the present with many areas considered sacred. Areas of elevated potential have been linked to quality of land for larger groups of families to set up their homes ("encampment sites") and proximity to watercourses but have not made a connection to how it was used repeatedly for, among other things, hunting which is an important part of Mi'kmaw cultural heritage. To illustrate how cultural evidence defines the use of an area we need look no further than the number of modern hunting blinds identified in the above reconnaissance projects and recorded during surveys. They are often described as abandoned, range in structural integrity, and are constructed from a variety of materials, including a polyurethane tent enclosure that appears to be intact. It is important to note that vacant hunting blinds are not necessarily abandoned. Those that are intact and structurally sound signify very clearly the length of time that this area has been used traditionally for hunting purposes. When cross-referenced with the types of resources identified in this area, in fact, they speak to the region's continued and ongoing use into the present as an ever-evolving cultural landscape.

Although the recommendations offered in the most recent ARIA suggests that there is low potential of encountering Mi'kmaw heritage within its study area, there is a cumulative inventory of areas where Mi'kmaw belongings could be present, specifically around/near Gold Brook Lake that hold elevated archaeological potential (HRP #A2017NS03: 36-37; HRP #A2019NS102: 16). The presence of hunting blinds clearly illustrates the region's continued traditional use. This area is in Eskikewa'ki (frequently translated as "skin dressers' territory"). The main message that has been communicated in most of the studies is that a "lack of archaeological data for the area likely reflects a lack of extensive archaeological survey rather than an absence of archaeological sites" (HRP# A2021NS063: 8; HRP# A2020NS126: 9). Survey MUST not remain limited to surface observations and must include regular and consistent subsurface testing to, a) understanding the subsurface character of landscape formation evidence and b) test for subsurface presence of Mi'kmaw archaeological heritage.

The Assembly of Nova Scotia Mi'kmaw Chiefs expects a high level of archaeological diligence with evidence-based decisions grounded in an understanding of the subsurface environmental data. The Maw-lukutijik Saqmaq (Assembly of Nova Scotia Mi'kmaw Chiefs) expects subsurface data, adequate to eliminate concern for presence, protection, and management of Mi'kmaw archaeological and cultural heritage as part of assessment of potential in advance of

any development. It has been acknowledged in Section 5.12.7 of the EARD in a table outlining construction activities that "Areas of elevated archaeological potential likely to be impacted by mine site development will be investigated through archaeological shovel testing (with Mi'kmaq participation). Archaeological work/testing work will be completed before final engineering/infrastructure design and before any ground is disturbed, as recommended in the archaeological studies" (Signal Gold 11222385 (3) Goldboro Gold Project, 2022: 525). Signal Gold has committed to eliminating or reducing effects of the Project on cultural and heritage resources and we strongly recommend all proposed disturbances or impact areas within the Signal Gold development area be subjected to adequate subsurface testing by a qualified professional archaeologist before any development occurs.

Disturbance is defined, for archaeological purposes, as the dislocation of soils and/or sediments, such as that by heavily treaded or tracked vehicles, as well as purposeful excavation by heavy equipment. Disturbance can also mean building or altering a site for a different use. Mi'kmaq archaeological sites have developed since time immemorial and may not be identified from the surface character of the current landscape, one cannot conclusively eliminate potential for Mi'kmaw archaeological heritage, without subsurface testing, regardless of current landscape conditions.

KMKNO would also like to make the following additional comments:

The Department of Natural Resources and Renewables have begun to identify a list of critical minerals in Nova Scotia. Gold has not been identified as one of these critical minerals. Nova Scotia Environment and Climate Change must give special consideration to any resources that will be permanently extracted from the Mi'kmaw's unceded territory without proper consultation and compensation.

The Environmental Management Plan (EMP) located on Appendix B.2 has little to no mention of the Mi'kmaw, Two Eyed-Seeing or Traditional Use and Harvesting. This EMP should be reworked with a more holistic approach.

There is little mention in this EARD of cumulative impacts for having multiple mines in operation in the province. KMKNO remain concerned with the potential for environmental cumulative effects from this project, as well as other project anticipated for development in and surrounding the area.

An updated MEKS is required in accordance with the Mi'kmaq Ecological Knowledge Protocol. An updated MEKS is needed to fully access how this project will impact local Mi'kmaw communities and their harvesting ability.

It is our expectation that consultation will continue on any future permits and approvals, including the Fisheries Act Authorization.

The 30-day comment period for this EARD has not been sufficient time for review to fully access the impacts this project will have on Mi'kmaw Rights and Title. In future a comment

period of 60-days is recommended and would be more appropriate for more meaningful review and comment.

KMKNO does not represent Membertou, Millbrook or Sipekne'katik. We do encourage consultation with these communities to fully access the impacts to Mi'kmaw Rights and Title.

Please contact Patrick Butler, Senior Mi'kmaw Energy and Mines Advisor at KMKNO for any further questions.

Yours in Recognition of Mi'kmaw Rights and Title,

Director of Consultation
Kwilmu'kw Maw-Klusuaqn Negotiation Office

c.c.:

Kwilmu'kw Maw-Klusuaqn Negotiation Office
Nova Scotia Natural Resources and Renewables
Nova Scotia Department of Natural Resources and Renewables
Office of L'nu Affairs
Department of Fisheries and Oceans
Department of Fisheries and Oceans

Skeir, Tina

From: @hotmail.com
Sent: June 10, 2022 7:36 PM
To: Environment Assessment Web Account
Subject: Proposed Project Comments

Project: signal-gold-goldboro-project Comments: A good project for Goldboro and the entire province of Nova Scotia. Mineral extraction will happen somewhere, if not here, in the world, to meet the demand for gold and other minerals. It is better to have that demand met by mines in Canada where the environmental laws and regulations are enforced. The revenues from this mine will support a range of skilled people that are home grown and want to work in mining and will do a great job. Royalties will help maintain the services and infrastructure. Upon completion of operations the mine will be reclaimed and rehabilitation efforts will be completed. Name: Email: @hotmail.com Address: Municipality: Dartmouth email_message: Privacy-Statement: agree x: 51 y: 26

Skeir, Tina

From: @dal.ca
Sent: June 10, 2022 10:18 PM
To: Environment Assessment Web Account
Subject: Proposed Project Comments

Project: signal-gold-goldboro-project Comments: As an employee of the only other operating gold mine, I strongly encourage the minister to approve the necessary permits to get this mine operating. I have been following this project and company for quite some time and have full confidence in the management of this project. Name:
Email: @dal.ca Address: Municipality: Elmsdale email_message: Privacy-Statement: agree x: 34 y: 32

Skeir, Tina

From: @gmail.com
Sent: June 10, 2022 10:34 PM
To: Environment Assessment Web Account
Subject: Proposed Project Comments

Project: signal-gold-goldboro-project Comments: There is simply no need for these projects anymore.the ends dont justify the means. We need to be cleaning up old sites and protecting our water.Our childrens lives and future absolutely depend on it. I used to fish in the Moose River area.I have a lot of good memories. I would leave it like i found it.I respected the land and nature.My father and I would take our garbage back to the city for proper disposal.Only to have it torn to pieces for shiny rocks.Look at the huge hole.There is enough gold on earth already What do I get from this gold.What do we get from this gold. Its just not worth it. We need a liveable clean healthy environment.We dont need more shiney rocks. We need to protect nature and stop poisoning it.Have we not done enough damage to this planet. And i wont even say te them to dig somewhere else.Just stop. Name: Email: @gmail.com Address: Municipality: Halifax email_message: Privacy-Statement: agree x: 63 y: 26

Skeir, Tina

From: @gmail.com
Sent: June 11, 2022 7:52 AM
To: Environment Assessment Web Account
Subject: [PROBABLE-SPAM] Proposed Project Comments

Project: signal-gold-goldboro-project Comments: Already a company name change even before the project was approved. The government must ensure that these pop-up companies do not change ownership, with the mine eventually being owned by a company that will declare bankruptcy and vacate the province as the project winds down and remediation is supposed to take place, leaving behind an eventual environmental disaster. A multi-million dollar trust, to be held by the government PRIOR to the beginning of mining would help alleviate this trick of the mining industry. Name: Email: @gmail.com Address: Municipality: UPPER MUSQUODOBOIT email_message: Privacy-Statement: agree x: 62 y: 20

Skeir, Tina

From: @gmail.com
Sent: June 11, 2022 10:49 AM
To: Environment Assessment Web Account
Subject: [PROBABLE-SPAM] Proposed Project Comments

Project: signal-gold-goldboro-project Comments: No one wants a mine because of the environment but with no mines there is no money in this province to keep the province going. Environmentalists canâ?Tt keep saying not in my backyard and still continue to use electronic devices and electric cars. So I guess we keep destroying other peoples backyard so we are not inconvenienced. So how do we keep this province going? So tired of this crap in Nova Scotia. Name: Email: @gmail.com Address: : Meaghers Grant email_message: Privacy-Statement: agree x: 67 y: 20

Skeir, Tina

From: @ns.sympatico.ca
Sent: June 11, 2022 11:09 AM
To: Environment Assessment Web Account
Subject: Proposed Project Comments

Project: signal-gold-goldboro-project Comments: Our cottage is very near there and we are concerned about blasting and the impact to the environment, the trucks going and coming and the general change to our beautiful retreat spot. Please, please be careful to study all potential impact when you do this study. Thank you Name:
Email: @ns.sympatico.ca Address: Municipality: Dartmouth email_message: Privacy-Statement: agree x: 80 y: 23

Skeir, Tina

From: @gmail.com
Sent: June 11, 2022 12:35 PM
To: Environment Assessment Web Account
Subject: Proposed Project Comments

Project: signal-gold-goldboro-project Comments: This is a well design project that captures environmental sustainability plus community engagement. Overall, this project should proceed while providing a great opportunity for Nova Scotians. Name: Email: @gmail.com Address: Municipality: Waverley email_message: Privacy-Statement: agree x: 65 y: 11

Skeir, Tina

From: @gmail.com
Sent: June 11, 2022 8:40 PM
To: Environment Assessment Web Account
Subject: Proposed Project Comments

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: signal-gold-goldboro-project Comments: Please dont let this go ahead. Moose river is a disaster waiting to happen and now this. These companies try to dazzle politicians with promises of jobs and of how safe their projects will be but history repeats itself time and again. Its always the wildlife that pays the price and then its the tax payers who foot the bill if the government decides the area is worth cleaning up. These current regulations and guidelines dont reflex the 100mm rains that are becoming common and these things are always on rivers. The salmon are just making a weak comeback, and the eastern shore is one of the last places that native brook trout continue to thrive, cant we try to help them out a bit rather than contaminate more. Name: Email: @gmail.com Address: Municipality: Mount uniacke email_message: Privacy-Statement: agree x: 75 y: 13

Skeir, Tina

From: @eastlink.ca
Sent: June 13, 2022 5:56 AM
To: Environment Assessment Web Account
Subject: Proposed Project Comments

Project: signal-gold-goldboro-project Comments: Any development in Nova Scotia is good to see - we need to attract well paying jobs that employ folks for many years. Mining is dirty and ugly. PERIOD. However, Goldboro has submitted a thorough plan to contain their operation, minimize impact, and even clean up the mess left behind from historical operations. I really hope that their proposal is approved, for the economic growth of our small, overtaxed, tired, province. Name: Email: @eastlink.ca Address: Municipality: Southampton email_message: Privacy-Statement: agree x: 80 y: 33

Skeir, Tina

From: @novascotia.ca
Sent: June 13, 2022 11:03 AM
To: Environment Assessment Web Account
Subject: Proposed Project Comments

Project: signal-gold-goldboro-project Comments: Please do not allow another greedy company destroy our lands. One only has to take a drive through the awful mess that is currently being created by Atlantic Gold in Moose River, Halifax County and realize that this is what will happen in Goldboro as well if permits get approved. When these companies have taken what they want, we the taxpayers will forever have to come to terms with what is left. Destroyed and contaminated waterways, continual threats/endangerment to the wildlife and all other species at risk. Dont let the smoke and mirrors talk from these companies fool you. Take a drive through what used to be the community of Moose River and keep in mind that this company is not done yet in there goal to create more destruction - dont let it happen anywhere else in this province. Name: Email: @novascotia.ca Address: Municipality: Mooseland email_message: Privacy-Statement: agree x: 59 y: 18

Skeir, Tina

From: @gmail.com
Sent: June 14, 2022 10:05 AM
To: Environment Assessment Web Account
Subject: [PROBABLE-SPAM] Proposed Project Comments

Project: signal-gold-goldboro-project Comments: As a young professional in the mining industry, I would love to stay home in Nova Scotia having the Goldboro project approved would allow me and other young professionals continue living here. Mining is necessary for us Nova Scotians to continue enjoying our modern standard of living and its conveniences. Having mining occur here, with Nova Scotias and Canadas high environmental standards, will ensure that environmental impacts are minimized. Name: Email: @gmail.com Address: Municipality: Bedford email_message: Privacy-Statement: agree x: 44 y: 33

Skeir, Tina

From: @ns.sympatico.ca
Sent: June 14, 2022 2:22 PM
To: Environment Assessment Web Account
Subject: Environmental Assess Goldoboro Mine Project
Attachments: EIS Goldboro .doc

Attached is my submission responding to the request for input on Signal Gold Inc's. Goldboro Gold Project. I want to thank you for providing an opportunity to comment and staff for taking the time to consider my input.

@ns.sympatico.ca

Sent from Mail for Windows

June 14, 2022

Environmental Assessment Branch
Nova Scotia Environment and Climate Change

To Whom it May Concern;

I am writing this submission regarding Signal Gold's proposed Goldboro Mine. While I am not aware of all the environmental features of the Goldboro area, I am concerned with the number of potential Gold mines along Nova Scotia's Eastern Shore.

Gold mining affects the environment in many negative ways, including the release of large amounts of exhaust from heavy equipment and transport, toxic drainage into nearby waterways and the removal of large amount of vegetation and overburden soils. The proposed Goldboro Mine is to be mined with an open pit dug specifically for that purpose. Even the richest of mines only produce a few grams of gold per ton of displaced rock and soil.

Gold mining creates large amounts of waste rock, more than almost any other type of mining. This is because of the relative rarity of gold, with almost all large deposits easily obtained near the surface having already been extracted. According to a Washington Post article, the rocks in which gold is found tend to be high in sulfur and/or acidic compounds, and when exposed to air and water via the digging of large pits, these rocks easily leach toxic compounds into the environment. The quantities of waste rock produced by these mines must be removed, requiring a great deal of fossil fuel consumption and emissions. The leftovers of this waste, once processed, are full of toxic metals that never biodegrade, creating permanent toxic hazards at disposal sites.

<u>Mining and Its Comprehensive Impact on the Eastern Shore</u>

Information from the province of Nova Scotia shows there are forty to fifty gold districts on Nova Scotia's Southern Uplands between Halifax and Goldboro. Most of these have had some level of historic exploration with varying levels of remaining mine waste and pollution.

As of 2012 eleven districts were actively being explored for possible open pit or underground mine development. The estimated reserves in each of these areas are estimated to range from 150,000 to 1,000,000 troy ounces and at $2,000 (US) per ounce the possible value would be from $300m to $2B dollars per site. Over the past twenty years the price of an ounce of gold has increased five times. If the value has a similar increase over the next twenty years, it is not hard to imagine that there would be investment interest to develop each of the forty to fifty know gold districts over the next several decades.

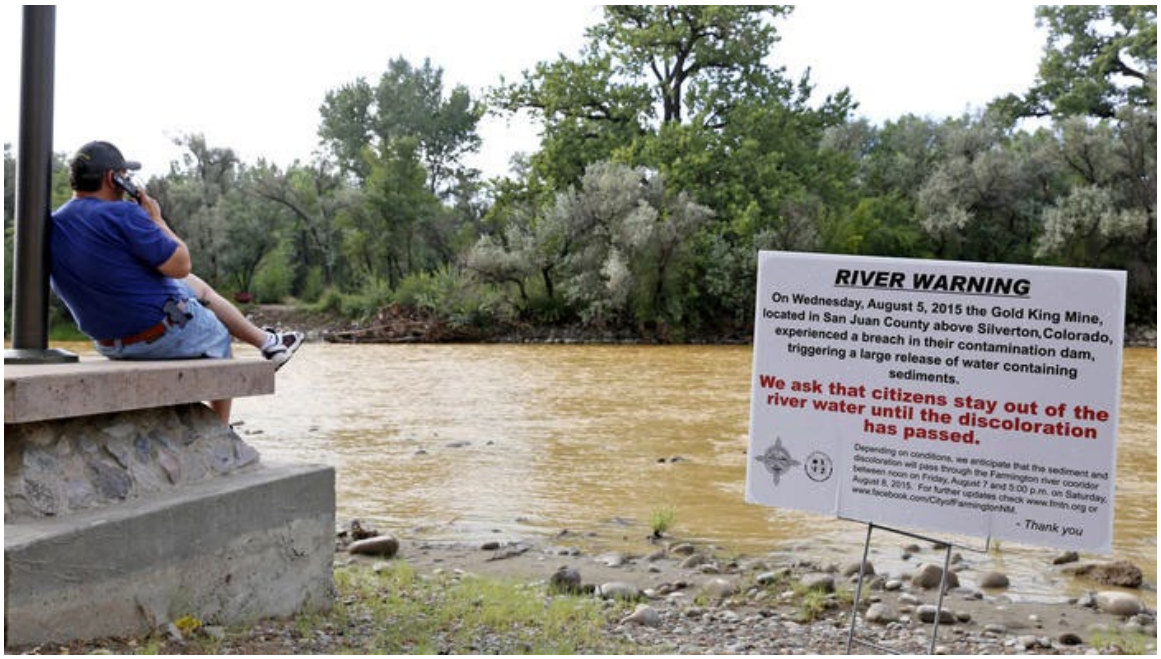
This raises two points that need to be addressed before any new mine is approved, (1) what is the combined impact of developing all these potential sites on the environment and character of the Eastern Shore and (2) are some sites less environmentally sensitive than others and can sites be identified that would have the least impact on the environment, particularly critical wildlife habitat.

Over the last few years there has been a change in the Economic Development model with many more employees working remotely. Many of these people are attracted to more rural areas so they can access and enjoy nature and the natural beauty of the area. Areas with hundreds of hectares of land cleared of all vegetation, large pits, and piles of waste rock are not consistent with this vision and would discourage some of

this next generation of workers from relocating to the area rural areas needing new environmentally friendly employment opportunities.
.
We need initiatives that enhance the environment rather than an open pit, or for that matter any mine, that exploits it. There needs to be a comprehensive broad vision for the entire Eastern Shore before another mine is developed in a piece meal basis without broader consideration of how all of the potential mines might impact the character and attractiveness of the Eastern Shore.

Potential Environmental Issues and Concerns

There are numerous examples of similar resource extraction and processing project that have had disastrous impact on the surrounding environment. Some of these may have been because of insufficient regulations and oversight, but there are too many examples where accidents happened and the environment suffered. The following picture is from one such site in Colorado.



Even in Nova Scotia there are examples where contamination has impacted the environment. The Sydney Tar Ponds contamination resulted from the treatment method of the waste and by-products of a resource refinement operation. Tailings at numerous mine sites in Nova Scotia have left waste tailings with sufficient pollution to restrict human contact.

While it is proposed to remove some of the toxicity of the material and run-off entering the Tailings Pond, the proponent needs to clearly articulated the treatment for:

- the over burden relocated to facilitate the development of the site,
- non-ore bearing rock removed to reach the gold bearing ore,
- ore being stock piled waiting to be processed, or
- dust and other airborne materials that settle on adjacent lands and watercourses

While it is not certain what level of environmental damage a mine (Mainly Open Pit) may cause, there are examples where catastrophic failures have required hundreds of millions of dollars to clean up. There needs to be a policy that applies to all resource extraction throughout the Province of Nova Scotia by requiring any Operator to provide a bond that would cover the cost of a “Worst Case” mine failure scenario. To date the amount a mine operator is required to be put up before any mining begins is only a fraction of what could be

needed if a complete mine failure occurred. I am asking that any future approvals, including the proposed Goldboro Mine, contain a requirement to provide a bond of at least $500m. Such a bond should be sufficient to cover the cost to restore the "worst case" environmental damage a mine failure might cause. Whatever, portion of the Bond that is not required to address environment damage caused throughout the life of the mine, would be returned to the Operator when the mine is closed and the area fully restored.

Conclusion

As a society we need to change our approach and value the health of the ecosystems on which humans and all other species depend on over the short term economic benefit its exploitation can provide a few (often foreign) investors.

Not only do these ecosystems support our physical wellbeing, they are critical for our emotional and mental health. We can never say which project is one too many, but we must to change how we view the environment – NOW so it remains healthy and can support future generations.

There needs to be recognition that although many mining projects do take place without catastrophic consequences, they do happen and there needs to be sufficient bonding, reserves, etc. to fully and completely address any failures. This does not mean all the funds would have to be spent, but rather they would be available to cover the "worst case" scenario.

I would ask that any decision to approve the Goldboro Mine be deferred until:

- there is a plan in place that considers the entire Eastern Shore (or for that matter all of Nova Scotia) and sets out where mines can be developed with the least risk, and areas that are either too environmentally sensitive or environmentally important to permit them to proceed, and
- A comprehensive policy that requires any mine Operator or Developer in Nova Scotia to provide sufficient bonding to cover the cost to completely and fully address any mine failure.

Thank you for considering my concerns.

Yours Truly

From:
To: Environment Assessment Web Account
Subject: Signal Gold - Goldsboro Project
Date: June 21, 2022 12:52:13 PM

Please accept his email as my support for the Goldborough signal gold project. I believe this project will bring much-needed economic development to the area and will be compliant with Nova Scotia laws regarding the environment.

Sent from my iPhone

From:
To: Environment Assessment Web Account
Cc: Lloyd Hines
Subject: Signal Gold
Date: June 21, 2022 10:21:14 PM

Dear Sirs,
I write in support of the company Signal Gold's
application for a permit to build and operate a surface and/or subsurface gold mine near Golboro, off the Goldbrook Road in the Municipality of the District of Guysborough, Nova Scotia.
This area of Nova Scotia has been a gold producing area for over a century. Of course, our modern mining methods and stewardship has become hugely enhanced, particularly with regard to environmental impacts during the ensuing decades. Our Province has adopted new and forward looking legislation in the Mineral Resources Act which places significant economic and environmental goals, which ensure close continuous stewardship on behalf of the public good by the company.
The immediate area has been the site of other industrial activities such as the Sable Offshore Energy Project and more recently as a site for LNG fabrication and trans - shipment.
Such developments as that proposed by Signal Gold provides significant economic stimulus with little negative impact when operated as per the well defined parameters of the legislative guidelines.

Sincerely,

From:
To: Environment Assessment Web Account
Subject: Signal Gold (Anaconda) Goldboro Project
Date: June 24, 2022 10:41:39 AM

Good morning,

I am writing to you in support of the Signal Gold Goldboro Project. I graduated with a Mining Engineering degree from Dalhousie University in 2019, and have settled into a position with Nova Construction in Antigonish, Nova Scotia. I am also a resident of Guysborough County, in the process of building a house in the town of Guysborough, with full intentions to retire here, years down the road.

I've been following the progress of this project ever since it was initiated, while I was still in school. I am very excited to see the progress and the recent submission of the EARD. This project will create so many, much needed job positions, and will have such a positive impact on local businesses and Guysborough County in general.

Given the extent of the EARD submission, I hope their extreme efforts to mitigate and eliminate any adverse affects during the project, is recognized and considered in depth.

Once again, please consider this Guysborough resident in full support of this project.

Thank you,
--

From: @ns.sympatico.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: June 28, 2022 10:52:16 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: signal-gold-goldboro-project Comments: No! You already more than know the reasons why not... Name: Email: @ns.sympatico.ca Address: Municipality: Halifax email_message: Privacy-Statement: agree x: 39 y: 22

MacKEEN LEGAL SERVICES INCORPORATED
Barristers, Solicitors & Notaries Public

P.O. Box 200
146 Main Street
Guysborough, Nova Scotia
B0H 1N0
Telephone (902) 533-2644
Facsimile (902) 533-3526

June 21, 2022

Environmental Assessment Branch
Nova Scotia Environment and Climate Change
PO Box 442
Halifax, NS
B3J 2P8

Dear Sir / Madam:

Re: Signal Gold Inc.

Please accept this letter as my letter of support for the Signal Gold Project to take place in the Goldboro, Guysborough County Area.

I strongly support this proposed project. I believe it will deliver significant economic benefits to Guysborough County. The employment benefits, both during the construction and the operation phases should be substantial. These are important jobs in an area of high unemployment and insufficient economic diversity.

As well, I believe the environmental requirements imposed upon the project will ensure both an environmentally sustainable and economically beneficial project.

It is my hope that the Department of Environment will approve this project, with suitable and appropriate environmental safeguards in place.

I trust you will find the above in order.

Yours very truly,

From: _gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: June 30, 2022 5:26:59 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: signal-gold-goldboro-project Comments: I would urge the group not to approve this project, and instead to prioritize human and environmental health. The economy will benefit far more from investments in a clean, green future. Name: Email: @gmail.com Address: Municipality: Tantallon email_message: Privacy-Statement: agree x: 61 y: 24

From: @hotmail.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: June 30, 2022 6:05:18 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: signal-gold-goldboro-project Comments: We need this project to get the green light as soon as possible as we need Industry in Guysborough County and this project will create Employment with good paying jobs for a large number of workers Name:
Email: @hotmail.ca Address:
Municipality: New Harbour email_message: Privacy-Statement: agree x: 55 y: 18

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: June 30, 2022 8:12:14 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: signal-gold-goldboro-project Comments: This project is an insult to Nova Scotia , which doesnt need this kind of environmental degradation, and Nova Scotia be ashamed to approve it. Where is your self-respect Nova Scotians!! Be proud of our future! Name: Email: @eastlink.ca Address: Municipality: Halifax email_message: Privacy-Statement: agree x: 46 y: 25

From:
To: Environment Assessment Web Account
Subject: Signal Gold Development Proposal
Date: July 4, 2022 2:44:02 PM
Attachments: image001.jpg
image002.jpg

To whom it May Concern.

Please accept this email as a confirmation for our support for the above referenced project.

Regards

President
Mulgrave Machine Works Ltd.
Box 280, 34 England Ave.
Mulgrave N.S. B0E 2G0
Ph: 902 747 2157
Fax: 902 747 2227

mmw@mulgravemachineworks.ca
mulgravemachineworks.ca/feedback

CWBW471 (167x220) (114x150)

From: @hotmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: July 4, 2022 5:53:32 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: signal-gold-goldboro-project Comments: There is no such thing as environmentally safe gold mining. Please do not approve this project. Name: Email: @hotmail.com Address: Municipality: email_message: Privacy-Statement: agree x: 76 y: 26

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: July 5, 2022 11:47:52 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: signal-gold-goldboro-project Comments: This company has been in constant contact with us as the area they intend to mine iscrossed by several of our Atv trails.they have fully cooperated and have addressed all of our concerns.we are hopeful that this mine will succeed and create job opportunities which have been sadly lacking in this area for several years. Name: Email: @gmail.com Address: Larrys River. Municipality: email_message: Privacy-Statement: agree x: 56 y: 20

From: _____ outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: July 5, 2022 12:41:59 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: signal-gold-goldboro-project Comments: I am looking forward to seeing new industry come to Guys Co NS as we are in need of a place that will provide employment for this area. We can already start to see the affect that there environmental and safety policies are falling in place with the signage around the site and the communication with our bike club on what they are doing in the area and what the next steps will bring Name: Email: outlook.com Address:
Municipality: email_message: Privacy-Statement: agree x: 1223 y: 227

Ecology Action Centre
P. 902-429-2202
F. 902-405-3716
2705 Fern Lane
Halifax, NS | B3K 4L3

The following submission in response to Signal Gold Inc's Goldboro Gold Project EARD is on behalf of the Ecology Action Centre.

The Ecology Action Centre is a member-based environmental charity in Nova Scotia; we are the province's oldest and largest environmental NGO. Since 1971, the Ecology Action Centre has been working at the local, regional, national and international level to build a healthier and more sustainable world. This submission was completed by EAC's Wilderness Team staff and includes contributions from EAC members with subject matter expertise.

The Ecology Action Centre does not support the proposed project. Gold mining creates negative social, health, environmental and economic impacts on local communities and the natural environment. The inevitable harms and destruction from tailings, depletion of aquifers, infilling, and other pollution simply put too much pressure on the life support systems of our province.

Globally and locally, the gold mining industry contributes to the climate crisis and biodiversity collapse. In the face of these worsening crises, we desperately need intact ecosystems to be doing what they do best: sequestering carbon thereby mitigating the harm of greenhouse gases in the atmosphere, providing clean water and air for us and other living creatures, and supporting local biodiversity. Nature based climate solutions play a critical role; the most effective way to benefit from them is by protecting these ecosystems from the mass destruction and harm of these economically driven project.

We do not need open pit gold mining as it is an unnecessary industry. Gold can be recycled infinitely, and there is already more than enough mined gold to meet the needs of humans. In fact, Natural Resources Canada's list

of minerals critical for the green energy transition does not include gold. Therefore, the degradation of communities and the natural environment from open pit gold mining is indefensible.

This proposed project infringes upon Treaty Rights and threatens traditional hunting grounds and gathering areas of the Mi'kmaq. Local Mi'kmaq community members rely on these important lands for food security and more; gold mining activities would severely damage these areas.

Based on existing jurisprudence and past litigation, the Province is fully aware that the Mi'kmaq have a credible, strong claim of Aboriginal title to their traditional territories, including the lands, water, and resources upon which the Mi'kmaq relied on since time immemorial. The Province is obligated to consult on the risks and impacts on Aboriginal & Treaty Rights, including the Aboriginal title. Historically, the provincial EA process has failed to appropriately address these inherent and constitutionally protected rights. Further, we understand the Province is currently refusing to engage under Sipekne'katik's self-governed, community-based consultation protocol. We are concerned that Sipekne'katik will not be meaningfully and adequately consulted under Mi'kmaq law and the United Nations Declaration on the Rights of Indigenous Peoples, a failure that could jeopardize the regulatory process and undermine Goldboro's attempt to gain a social license to operate.

In addition, jobs and economic activity associated with the open pit gold mining industry only concern the short term. However, we must also consider the long-term negative environmental and economic consequences from the legacy of the toxic waste and destruction from open pit gold mines. Those working at the mine are needed in jobs that move us all into a livable future. We need these skilled Nova Scotians to lend their efforts to adapting to climate change and reducing its impacts.

30 Day Comment Period

The Ecology Action Centre believes that the 30-day comment period is not enough time to provide a full response. Together, Signal Gold Inc's EARD, including all the appendixes, total thousands of pages. For most organizations, community groups, and individuals, 30 days is not an adequate amount of time to review these documents and submit a thorough response. In addition, many of those who are interested in reviewing the documents and submitting comments do so on a volunteer basis and must dedicate a significant amount of time outside of their work and home life to write their comments. Please extend future public comment periods to at least 60 days so that organizations, groups and members of the public have a sufficient opportunity to review the relevant documents and form comments in response. This would also bring the EA public consultation period in line with another Nova Scotia Environment and Climate Changes comment period. NSECC seeks public input on proposed Wilderness Area designation through a public consultation process that is open for 60 days.

Comments on specific sections of the EARD and Appendices

4.3.2.2 Spatial Boundaries

The EARD states that: "The PA encompasses the immediate area in which Project activities occur and are likely to cause direct and indirect effects to VCs. The PA includes the mine site and all associated infrastructure associated."

In section 5.1.5.1.1 Spatial Boundaries, the EARD states that: "The PA encompasses the immediate area in which Project activities may occur and includes infrastructure associated with the mine site plus a buffer of 100 – 200 m." The proponent should justify why a buffer of 100 – 200 m was selected for assessing the impacts on air.

The EARD states that "The LAA encompasses adjacent areas outside of the PA where Project related effects to VCs are reasonably expected to occur. Generally, the LAA is limited to the area in which Project activities are likely to have indirect effects on VCs; however, the size of the LAA can vary depending on the VC being considered, and the biological and physical variables present."

In section 5.1.5.1.1 Spatial Boundaries, the EARD states that "The LAA encompasses an area 15 km from the PA in all directions. The proponent should justify why an area of 15 km was selected for assessing impacts on air.

Environmental Effects Assessment

5.1 Air

The impacts of air quality on wildlife are not discussed by the proponent but should be.

5.2 Light

The fact that light can have effects on wildlife is only briefly mentioned. The proponent should discuss this further, including drawing on the literature about this issue.

5.3 Noise

The proponent briefly mentioned that fauna and birds can be affected by noise, but then does not discuss this further. The proponent should draw upon the literature on this subject and examine it in relation to the proposed project. Here are just two papers about the subject, although there is also research on the effects of noise in the freshwater environment on fish (at least):

1) Weilgart, L. 2018. The Impact of Ocean Noise Pollution on Fish and Invertebrates. (Available through Dalhousie University).

2) Wright, D.G., Hopky, G.E. 1998. Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters. Canadian Technical Report of Fisheries and Aquatic Sciences 2107.

All noise monitoring locations were at the base of the slope next the mine site, on the western side (near Highway 316). There should also be noise monitoring sites placed at the same level as the mine site, including to the north, east, and south of the site. Also, one noise receptor in the nearby Nature Reserve and one in the (pending) Wilderness Area should be modeled. Both of these sites, owned and managed by NSECC, seek to be havens for wildlife, and people, away from the impacts of large-scale human impacts. Baseline noise levels should be established at these sites, and then monitoring should be completed at these sites. This would provide the Province with information about whether mining activities are impacting the sites.

Wetlands

There is concern with regards to the 112 wetlands that will be impacted by this project. Globally, over 64% of wetlands have been lost due to human activity since 1900, and as we lose wetlands, we also lose their incredible benefits and services that they provide to both humans and the natural environment. A GPI Atlantic study (2000), on NS's water resource values wetlands provide an estimated $7.9 billion worth of benefits in ecosystem services to Nova Scotians annually. In addition, a recent study on Nova Scotia wetlands found that, "the value of wetlands is roughly $124-$373 ha-1 yr-1, and ranges from $5,105 to $39,795 ha-1" and that "carbon sequestration may provide benefits to Nova Scotia on the order of C$10 billion" (Gallant, Withey, Risk, Cornelis van Kooten, & Spafford, 2020).

In particular, we have concerns about the direct and indirect impacts of the mining activities and how they will contribute to the continued loss and destruction of natural wetlands. The loss or destruction of wetlands can result in: degradation, fragmentation and loss of wetland habitat and local biodiversity, deterioration of water quality from lack of natural water purification, increased sedimentation and soil erosion, changes in natural hydraulic systems and disruption to the local watershed, reduction in water supply and water storage, higher threat of flooding, and reduction in groundwater recharge and higher vulnerability to droughts. Taking into account the aforementioned estimates of wetland loss, in addition to the indirect impacts that will be caused by this project, we do not believe these proposed plans are appropriate or justified.

Furthermore, the proponent does not include carbon sequestration in their discussion on wetland function. This is not only a concern as carbon sequestration is an important wetland function as highlighted by the Nova Scotia Wetland Conservation Policy and The Federal Policy on Wetland Conservation, but also because the sequestered carbon in the wetlands can be released into the atmosphere upon alteration and destruction of these wetlands, thus contributing further to climate change. The proponent should provide a detailed discussion on the ability of the wetlands at the project site to sequester carbon, including predictions of how much carbon will be released upon wetland alteration.

5.7.5 Effects Assessment Methodology

The proponent indicates, including in Figure 5.7-1, that a significant amount of forested swamps and treed swamps are located within the Project Area. In light of this, there is concern that the discussions by the proponent do not fully consider the important value of treed swamps. The results from a recent study "strongly suggest that forested wetlands are avian diversity hotspots and, as such, key habitats for bird conservation in Nova Scotia. Forested wetlands in general had more bird species, more individuals, and higher abundance of several species and guilds of conservation concern than

mature and regenerating upland sites" (Brazner & MacKinnon, 2020). In another study on bird communities in forested wetlands in Nova Scotia, it was found that "of the 208 documented breeding bird species in Nova Scotia, [the researchers] found evidence (mainly singing males) that 95 (46%) were breeding in the 229 FWs [they] surveyed. Given that [their] surveys were restricted to a single visit at only two points within each wetland, this is no doubt a conservative estimate of the diversity of breeding birds that are using these habitats…..These results and other studies suggest that a large number of bird species depend on or at least utilize [forested wetlands] in Nova Scotia during the breeding season and that they may play important roles in the conservation of several at-risk species" (Brazner & Achenbach, 2019). However, despite their high value, these types of wetlands "are being converted to other uses at a higher rate in Nova Scotia than other 17 wetland types" (Brazner & Achenbach, 2019). These studies highlight the high value of these wetlands and the importance of conserving them.

5.7.6.1.1 Direct Impacts to Wetlands of Special Significance

There are 22 wetlands within the PA in which sessile or non-mobile SAR have been observed. This means that these 22 wetlands have been assessed to be potential Wetlands of Special Significance (WSS). Of the 22 potential WSS, 18 are proposed to be directly impacted by Project activities and infrastructure. The Nova Scotia Wetlands Conservation Policy states "Government will not support or approve alterations proposed for a WSS or any alterations that pose a substantial risk to a WSS, except 1) alterations that are required to maintain, restore, or enhance a WSS; 2) alterations deemed to provide necessary public function, based on an Environmental Assessment (if required) with public review or other approvals (e.g., Wetland Alteration Approval) as appropriate." Because this project does not appear to align with the exceptions outlined in the Nova Scotia Wetlands Conservation Policy, should any of these wetlands be confirmed to be a WSS, they cannot be altered either completely or partially by the proponent.

The proponent writes that "One additional wetland contained a confirmed observation of a mobile SAR (i.e., Canada warbler (Cardellina canadensis) in Wetland 25), but at this time, is not presented as potential WSS." The proponent should explain why this wetland is not being presented as a potential WSS.

5.7.7.1 Wetland Avoidance

The proponent writes that "while blue felt lichen has been found in relative abundance in the local area (i.e., beyond the PA, Section 5.9), the Project team has, nonetheless, worked to avoid the blue felt lichen wherever practical. However, due to the location in which some proposed Project activities can be performed (the locations of the East and West Pits are fixed by geology) the extent to which the Project can be manipulated to avoid impacts to wetland habitat is constrained." The proponent should clarify what is meant by the term "wherever practical" in this context. As we discuss elsewhere in our comments, blue felt lichen is a SAR and therefore should be avoided completely. If it is not feasible to avoid all blue felt lichen, this is then not an appropriate location for this type of project.

The proponent states that "the TMF is the largest single infrastructure impact to wetlands. Many factors were considered when determining its placement including: watershed position, direct impacts to fish and fish habitat, water quantity and quality implications resulting in indirect impacts to fish and fish habitat, noise, dust and light considerations, proximity to residences and cottages, baseline land and resource use (ATV trails, local traffic and land use), Indigenous use of the land, archaeological resources, geotechnical and other engineering considerations, dam integrity and safety, cost, and other technical considerations. As a result, siting of the TMF to further avoid wetlands was not feasible (see Section 2.8.1.8)." While we agree that it is important to take into consideration the factors above including watershed position, impacts to fish, water quality and quantity, Indigenous use of the land, and safety, we believe that if it not feasible to

also prioritize the avoidance of wetlands, this project should not be allowed to take place.

"Infrastructure with greater ability to be micro-sited (i.e., till and organic material stockpiles and WRSAs) were adjusted to reduce impacts to wetlands, specifically potential WSS (e.g., avoidance of SAR lichen occurrences) where practical." The proponent should clarify what is and is not practical in this context. Furthermore, regardless of practicality, the proponent must avoid any alterations to WSSs.

Climate Change

Effects of the Environment on the Project

On page vii, the proponent writes that "due to the relatively short duration of the Project, and the contingencies added to mine water infrastructure design, climate change is not anticipated to affect the Project." The proponent should provide detailed information about the anticipated or possible impacts and risks of climate change on the project area during the decades following the closure of the mine.

The proponent also writes that "the emergency overflow spillways connected to the settling ponds were designed to convey flows resulting from storm events up to and including Hurricane Beth as a design storm." While the proponent indicates that Hurricane Beth was chosen due to the amount of rainfall experienced, the proponent should not be using this Hurricane as its only baseline. Hurricane Beth took place over half a century ago in 1971; the impacts of climate change, including severe weather events, have worsened since this time and will continue to intensify in both frequency and severity. Furthermore, the proponent should also take into consideration both precipitation and wind when planning for the impacts of hurricanes at the project area. In the summer of 2021, the IPCC released a report with information concerning hurricanes. According to this report, in 2020, there were 30 named storms; this is the most on record and almost

three times the typical numbers. Similarly, the 2021 Atlantic hurricane season was the third-most active Atlantic hurricane season on record. The report also finds that these storms are shifting north, and becoming slower which in turn can result in more rain and cause more wind damage.

6.1 Climate Change

The proponent writes that "the Project will be designed to withstand more extreme precipitation events, including the effects of these events (e.g., flooding and erosion)." The proponent should describe in detail how they are preparing for such events, and what data they are using as a baseline for these weather events. In addition, the proponent should describe emergency plans should an extreme weather event have major impacts in the project area.

5.9 Terrestrial Environment

The EARD states that: "A significant adverse effect on the Terrestrial Environment from the Project is defined as:

A Project-related effect that is likely to cause a permanent, unmitigated, alteration to habitat that supports flora and fauna species."

Assessments of impacts, in this and other EARD, always assume that species can just go "elsewhere." There is also the assumption that habitat that is temporarily destroyed or degraded at the project site will be restored upon reclamation, and then wildlife, plants and lichen can and will return.

Elsewhere, there are other individuals of the displaced species, so migrant individuals may not be able to occupy that habitat if its already occupied. Elsewhere, habitat may be unsuitable or degraded for migrant individuals. Wildlife, plants, and lichens may not return to the site once the site is reclaimed – they may no longer be present in the larger area, or may not move back into the (now degraded) habitat at the site. The proponent has

not provided sufficient evidence that destroying habitat, displacing wildlife, or destroying individual plants or lichens does not cause permanent, unmitigated habitat loss for select species.

On page 369 the VC "Terrestrial Environment" should have also potentially been selected because effects on this VC could impact Indigenous people's activities, such as hunting and gathering.

On page 370 the EARD states: "Following completion of mainland moose surveys and during preparation of the environmental effects assessment, an updated mainland moose recovery plan: "Recovery Plan for the Moose (Alces Americana) in Mainland Nova Scotia" (NSDNRR, 2021) was released. This Recovery Plan (as described in Section 5.9.2.3.1), identifies core habitat throughout the province including the PA. Due to potential implications for the Project, and Project risk, additional surveys (e.g., winter tracks and PGI) were undertaken to increase survey effort and coverage across the LAA. The data have not been analyzed at this time and results are not carried forward in the result sections. A technical report will be provided to Signal Gold in July 2022 and the report will then be provided to NSDNRR."

This work is very relevant to the project. NSECC staff should review the technical report, and discuss it with NSDNRR, and advise the Minister on this subject, before the Minister makes a decision on the next step in this Environmental Assessment.

On page 371 the proponent describes areas survey for nesting Snapping Turtles. Snapping Turtle surveys should have also included historic mine tailings, which can be a suitable nesting substrate for turtles in Nova Scotia.

In 2017 and 2021 signs of Mainland Moose were observed in the PA. ACCDC provided data that confirms one moose observation (from their records). On page 376 the proponent identifies that the Project Area contains Mainland Moose Core Habitat as identified in the recent Mainland Moose recovery plan. The proponent argues that based on looking at

another map in the recovery plan (Figure 10) regarding Habitat Suitability, the PA does not intersect with high Habitat Suitability Index values, and therefore is not a priority area for conservation. The area is still a high priority for conservation due to the fact that it is within Core Habitat, and additionally signs of moose have been found in the Project Area.

On page 378 please update the references to the Nova Scotia's Mainland Moose Recovery Plan. The 2007 version is now outdated by the 2021 version.

On page 390 the "grouping" of major habitat and land use types doesn't seem to take into account age of a forest, which matter. For example, forests across the Mixedwood Forest Group can have very different ages, leading to different structures and typical species composition. The proponent should not group such diverse forest types. This then influences the evaluation of how much habitat is lost at the site. For example:

"The P-ELC has identified suitable habitats for all observed SOCI vascular plant species and these habitats are found widespread throughout the LAA. Given the size of the LAA and the distributions of these species within the province, it is likely other occurrences of these observed species exist elsewhere in the LAA."

This is assumption is incorrect. SOCI use specific habitat within the P-ELC, so they may not be found at the same P-ELC somewhere else in the LAA.

On page 433 the EARD states that: "79% of Blue Felt Lichen individuals (thalli) observed are predicted to be impacted by the project. The magnitude of direct impact to lichen habitat is predicted to be low."

This predict impact is not low, for either the Blue Felt Lichen at the site, or Blue Felt Lichen in the province. 50 Blue Felt Lichen locations are found within the Project Area, with 225 individuals! This is exceptional for a SAR! The proponent should revise the magnitude of this direct impact.

On page 434 the EARD states that lichens suffer from mines due to "sulfur dioxide and nitrous oxide emissions, metal mobilization, and dust generation. The haul roads and pits will lead to dust deposition around them."

"Species decline was noted at dust deposition levels of 1.0-2.5 g/m2/day. Effects to lichens were still observed at levels 0.07 g/m2/day. Modelled particulate deposition rate is expected to have a maximum dust deposition of 3.41 g/m2/day concentrated immediately adjacent to the East and West Pit and associated haul roads. Dust levels generally fall below 0.07 g/m2/day ranging from 300 m to 1,800 m from the haul roads and the East and West Pits. In general, edge effects are expected to be the primary driver to negative impacts to lichens and encompass modelled dust deposition extents."

The EARD proposed to translocate lichens directly impacted by site infrastructure construction, but leave behind lichens not directly touched. It is proposed to leave a 100 m buffer ("where practicable") around these remaining lichen, but the above-referenced research suggested that lichens within 100 m of dust-producing haul roads and pits would experience negative impacts. This supports a larger buffer (500 m) to be left around lichens.

On page 447 the EARD states: "Barred owls are associated with seven P-ELC habitats (mixedwood forests, mixedwood forested swamps, softwood forests, softwood forested swamps, hardwood forests, hardwood forested swamps, waterbodies), which accounts for 63.8% (9,864.0 ha) of the LAA. The Project is estimated to result in a loss of 331.4 ha of suitable habitat for this species, resulting in 3.4% loss within the LAA. Habitat loss for nocturnal owls within the LAA is to have predicted low magnitude of impact."

This assumes that LAA is a relevant size and shape to Barred Owls, which maintain large territories. It could be that loss of habitat results in birds trying to move into territories already established by others of their species, and so

can't move in. Evaluation of the impacts of loss of habitat for individual bird species should related to the scale and biology relevant to the species.

The following three sections (i.e., Historic Mine Tailings, Tailings Management Facility, and The Southwest Till Pile) were written by Ken Summers.

Historic Mine Tailings

The proponent's assessment of plans for the treatment of historic tailings, and for the construction and operation of the Tailings Management Facility, both raise significant concerns; and these concerns EAC has are closely related

Alternatives to the chosen method for treating the extensive historical gold mining wastes are merely mentioned, no comparisons are offered. The method chosen by the proponent is to remove identified historic tailings that are located where the open pit mines will be excavated, and to place these historic tailings in the constructed Tailings Management Facility. No details are given for the handling and disposal process or the risks involved, and there are no reasons given for choosing that method. There is no evaluation of the performance when this same method was used at the Atlantic Gold Touquoy Mine and its Tailings Management Facility (TMF). EAC further notes that the fate of those historic tailings from the Moose River Mine in turn rests on the integrity of that Atlantic Gold TMF and its problematic history.

Both the East and West Pits encompass watercourses and wetlands with identified historic tailings deposits. The wetland in the East Pit area is larger, has heavy concentrations of tailing deposits, and drains directly into Gold Creek. Yet there is no assessment or consideration of excavating those deposits out of a wetland with minimal mobilization of the materials. Gold Creek and surrounding wetlands cover the entire 150m width between the West and East Pits. The watercourses, wetlands, and minimal dry land are heavily laden with identified historical tailings. The very highest

concentrations of As and Hg found by Parsons et al are in a wetland approximately 40m from the West Pit.

As noted by the proponent Nova Scotia Lands is currently undertaking a Phase I and Phase II ESA and remedial action plan for these historic tailings. But there is no discussion of the interaction of open pit mining right up to the border of this projected remedial work. We note that the East Pit comes within 20m of Gold Brook, with its many identified tailings locations. As well as this area of highest concern between the two open pits, the south side of the West Pit comes within 20m of a wetland that is also a NSDEM identified Historic Tailing area.

Nowhere in the assessment is there a consideration of the possibility of construction through areas not identified as having significant concentrations of historic tailings, nor of remedies.

Tailings Management Facility

The location of Monitoring wells around the Tailings Management Facility suffers from a number of inadequacies. We refer to the map, Figure 5.5-1, page 153. There are no monitoring wells on the TMF eastward down slope draining to Ocean Lake. The monitoring well shown at location 53 is a critical placement, near the Polishing Pond and the TMF in the short interval to Gold Brook Lake. It does not appear to have been drilled and installed yet. It is not clear that Location 51 is outside the TMF. Nor is it clear that Location 1 is outside both the TMF and the Organic Material Pile. There must be at least one year of baseline data for each monitoring well before there is any activity on the TMF.

The *2007 Focus Report Touquoy Gold Project* devotes 21 pages to the design, operation, monitoring, contingencies, and emergency preparedness for the Tailings Management Facility there. By comparison, and not counting location and method selection in either case, Signal Gold

devotes just 3 pages to these crucial topics (which begin on pages 30 and 531 of the Registration Document).

At a minimum, the proponent should have included with their proposal for the TMF a comparison to the very similar Touquoy TMF now nearing the end of its working life. EAC notes that both Atlantic Gold in 2007, and Signal Gold now, referred to and relied on the Canadian Dam Association Dam Safety Guidelines- a publication understandably focusing on construction and operation with a view to preventing catastrophic dam failure.

The Touquoy TMF has for years been the subject of chronic infractions for seepage from the facility, culminating in numerous fines. Nowhere does the CDA Dam Safety Guidelines take up the issue of dam seepage (Appendix) https://cda.ca/sites/default/uploads/files/CDA_Dam_Safety_Guidelines_TOC-Preface.pdf

An instructive excerpt from the 2007 Touquoy Focus Report, page 203:

6.4.3 TMF Seepage Management

1. Why doesn't the tailings dam leak?
The clay core of the dam is 6 m wide and designed to inhibit seepage. The core is keyed into bedrock or low permeability soil to a depth of 1.5 m. The bottom of the key trench is slush grouted (cemented) to seal cracks and provide a continuous barrier to seepage. Tailings are deposited against the dams to reduce seepage.

Since the chronic seepage issue of that TMF is well known, at a bare minimum the proponent should have addressed this history. And since the CDA Guidelines to do not cover seepage, the proponent should have engaged a civil engineer for designing criteria of the dam.

In addition to the concerns about seepage of currently produced tailings laden water, EAC refers to our earlier point that the safety of historic tailings

containment and storage also depends on the integrity of the Tailings Management Facility.

The Southwest Till Pile

The proposed Southwest Till Pile as shown seems to encroach on the 30 meter right of way for the Maritimes and Northeast Pipeline. It appears it may be planned to be to either side of the ROW. Either way, it has a listed weight of 2.88 Mt and 95m height (p.30). If not planned to cover the M&NP, at a minimum heavy equipment has to traverse the ROW with the burdens. None of this is mentioned by the proponent, let alone are risks assessed.

A large number of mine buildings and facilities will be constructed along 2000 meters of the ROW, yet there is no assessment of risks during construction or mine operation. Nor any notation of consultations with the pipeline owner or regulator. Of particular note is that the West Pit comes within around 25m of the ROW.

Appendix I.4 – Lichen Monitoring Plan

This plan, prepared by McCallum Environmental Limited, refers to the company as Anaconda, not Signal. Was this the plan that was prepared for the previous proposed version of the gold project? If so, it should have been updated to reflect the current proposed project.

The plan commits to consulting with DNRR, but should also consult with Sean Haughian at the Nova Scotia Museum of Natural History, who has extensive expertise in lichens. The company (Signal) should also commit to engaging with the provincial Lichen Recovery Team.

The plan states: "At this time, the number of monitoring stations and the level of effort at each station has not been determined." Before the final version of the plan is approved by DNRR (which should be done before construction of the project begins), the proponent should commit to the

number of monitoring stations, their location, and the level of monitoring effort that will be carried out.

"Fifty occurrences of blue felt lichen consisting of 268 thalli, and one observation of frosted glass whiskers (+100 podetia) were observed within the PA." This statement has a different number of occurrences and thalli than other parts of the EARD. Section 5.9 states there are 225 thalli.

The Lichen Monitoring Plan proposes lichen translocation for situations where lichens would be killed by the construction of site infrastructure. This is not the first time this has been proposed in Nova Scotia, yet there is still no public results or peer-reviewed papers regarding whether translocation of Blue Felt Lichen has been successful yet in Nova Scotia. This approach should not be offered to Signal as a mitigation option until such time. A flaw within the current approach is that lichens can be translocated to Protected Areas (that's good), *or* Crown land. Translocation to Crown land with no protected status could be committing the lichens to their demise, since the Crown land they are translocated to could be altered in the future in the way that kills the lichen, such as for another mine (or a wind farm, or another Crown land use).

The setback from Blue Felt Lichen should be 500 m, which is supported by the literature, not 100 m ("where practicable"), which is the current At-risk Lichen SMP (DNRR).

Appendix J.2 - Viewshed Analysis

This analysis should have included an Observer Location within Isaacs Harbour River Wilderness Area (Pending). Part of the goal of Wilderness Areas is to provide opportunities for wilderness-based recreation (i.e., away from large-scale and usual human impacts). Creating a view from the Wilderness Area of an industrial-scale project damages the wilderness setting for those visiting the Wilderness Area.

Appendix D.5 – Noise Impact Study

Baseline noise results are from just 3 days in July in 2018. This study would be more rigorous and representative if baselines noise results were collected from other times of the year (and other noise receptor locations, as previously mentioned in these comments).

Modeling predicts noise impacts at proposed property boundary, however, the proposed project boundary will not necessarily be where sound ends. Modeling should predict noise impacts at receptor sites beyond the proposed property boundary. At least one POR (Point of Reception) should have been included and model for a location within Isaacs Harbour River Wilderness Area (Pending).

This study does not examine impacts of noise on wildlife. This is a body of research on impacts of noise on wildlife, and that should be discussed (at minimum) by the proponent in this EARD.

From: @gmail.com
To: Environment Assessment Web Account
Subject: [PROBABLE-SPAM] Proposed Project Comments
Date: July 9, 2022 1:45:22 PM

Project: signal-gold-goldboro-project Comments: Dear Sir/Madame, I do not support the proposed project. Please do the right thing and cancel this project. Gold mining creates negative social, health, environmental and economic impacts on local communities and the natural environment. I am a concerned Nova Scotia resident who lives in Tatamagouche. Globally and locally, the gold mining industry contributes to the climate crisis and biodiversity collapse.harms and destruction from tailings, depletion of aquifers, infilling, and other pollution simply put too much pressure on the life support systems of our province. We do not need open pit gold mining as it is an unnecessary industry. Gold can be recycled infinitely, and there is already more than enough mined gold to meet the needs of humans. In fact, Natural Resources Canadaâ?Ts list of minerals critical for the green energy transition does not include gold. Therefore, the degradation of communities and the natural environment from open pit gold mining is indefensible. This proposed project infringes upon Treaty Rights and threatens traditional hunting grounds and gathering areas of the Miâ?Tkmaq. Local Miâ?Tkmaq community members rely on these important lands for food security and more gold mining activities would severely damage these areas. The Province is obligated to consult on the risks and impacts on Aboriginal Treaty Rights, including the Aboriginal title. Historically, the provincial EA process has failed to appropriately address these inherent and constitutionally protected rights. Further, we understand the Province is currently refusing to engage under Sipeknekatiks self-governed, community-based consultation protocol. We are concerned that Sipeknekatik will not be meaningfully and adequately consulted under Mikmaq law and the United Nations Declaration on the Rights of Indigenous Peoples, a failure that could jeopardize the regulatory process and undermine Goldboros attempt to gain a social license to operate. In closing, please do the right thing and stop this project right now. I am not an expert and rely on others to provide more detailed scientific background as to why this project should be cancelled. I fully support the comments submitted by the NS Ecology Action Centre. Yours truly , concerend Nova Scotia Resident. I do not support the proposed project. Gold mining creates negative social, health, environmental and economic impacts on local communities and the natural environment. I am a concerned Nova Scotia resident who lives in Tatamagouche. Globally and locally, the gold mining industry contributes to the climate crisis and biodiversity collapse.harms and destruction from tailings, depletion of aquifers, infilling, and other pollution simply put too much pressure on the life support systems of our province. We do not need open pit gold mining as it is an unnecessary industry. Gold can be recycled infinitely, and there is already more than enough mined gold to meet the needs of humans. In fact, Natural Resources Canadaâ?Ts list of minerals critical for the green energy transition does not include gold. Therefore, the degradation of communities and the natural environment from open pit gold mining is indefensible. This proposed project infringes upon Treaty Rights and threatens traditional hunting grounds and gathering areas of the Miâ?Tkmaq. Local Miâ?Tkmaq community members rely on these important lands for food security and more gold mining activities would severely damage these areas. The Province is obligated to consult on the risks and impacts on Aboriginal Treaty Rights, including the Aboriginal title. Historically, the provincial EA process has failed to appropriately address

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@gmail.com :

Municipality: Tatamagouche email_message: Privacy-Statement: agree x: 61 y: 24

From:
To: Environment Assessment Web Account
Subject: Goldboro gold mine project
Date: July 9, 2022 3:22:16 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

I note with grave concern that the proposed open -pit gold mine on the N.S. Eastern Shore will be built on an area comprising 223 wetlands!

Years ago, I thought of wetlands as a yucky swampy nuisance and I'm told that many Canadians thought so too.

But now I look upon any loss of wetlands as a tragedy and it becomes part of my climate change anguish. So I am shifting the weight of wetland destruction from inevitable to "not on my watch".

Besides being carbon sinks, and filterers of human waste, chemicals, and other pollutants, wetlands sustain regional water resources, buffering the excesses of droughts and floods. They help stabilize the climate.

And it is in and around WETLANDS that the greatest blossoming of BIODIVERSITY continues to occur. Bio-diversity means all the nature that goes together to sustain WILDLIFE.

Our wholesale destruction of wetlands for the sake of a few decades of some activity - once again I am shocked into the recognition that most of us live only for the moment.

Obviously I am not a professional scientist or environmentalist. Yet I hope that you share my concern for Nova Scotia, her land and her people.

I just read that the UN Convention on Biological Diversity or COP 15 has been relocated from Kunming, China to Montreal, Canada. It will be held in December 2022.

Respectfully,

@gmail.com
Halifax, N.S.

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: July 10, 2022 9:58:49 AM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: signal-gold-goldboro-project Comments: They have been open and willing to discuss any concerns that we may have had Certainly hope this project is approved and provides jobs to our area Name: Email: @outlook.com Address: Guysborough co. Municipality: New harbour email_message: Privacy-Statement: agree x: 48 y: 18

East Coast Environmental Law
6061 University Ave, PO Box 15000
Halifax, NS B3H 4R2

Environmental Assessment Branch
Nova Scotia Environment and Climate Change
PO Box 442 Halifax, NS B3J 2P8

SENT BY EMAIL
EA@novascotia.ca

July 10, 2022

To Whom It May Concern,

Re: Comments on the Environmental Assessment Registration Document for the Proposed Goldboro Gold Project

East Coast Environmental Law appreciates the opportunity to comment on the Environmental Assessment Registration Document ("EARD") for the Goldboro Gold Project proposed by Signal Gold Inc.

Our comments are based on a review of the main body contents of the EARD, as we did not have the capacity to examine the appendices. As we discuss in more detail below, we are concerned by several apparent gaps in the information provided by the proponent, and we urge the Minister of Environment and Climate Change to require more complete information from the proponent before deciding whether or not to approve the proposed project.

Additionally, we renew calls that we have made in recent submissions on other proposed projects undergoing environmental assessments in Nova Scotia, in which we have highlighted deficiencies in the Department of Environment and Climate Change's current manner of assessing how proposed projects may affect climate change mitigation in Nova Scotia. Although Nova Scotia's *Guide to Considering Climate Change in Environmental Assessments in Nova Scotia* states clearly that the "carbon footprints" of proposed projects not only include projects' greenhouse gas ("GHG") emissions but also projects' impacts on "carbon sinks" (i.e., carbon-sequestering ecosystems such as forests and wetlands), we continue to see a pattern in which proponents fail to meaningfully address the climate impacts of extensive ecosystem destruction and disturbance. As with other prospective open-pit gold mines that have been proposed for development in eastern Nova Scotia, the proposed Goldboro Gold Project would involve extensive destruction and disturbance of carbon-sequestering ecosystems, and we urge the Minister to require additional information from the proponent addressing: (i) how the proposed destruction and disturbance of carbon-sequestering ecosystems affects the GHG and climate change analyses presented in the EARD, including the assessment of how the proposed project would affect the achievement of the climate targets set out in Nova Scotia's *Environmental Goals and Climate Change Reduction Act*; and, (ii) how the costs associated with the loss of

carbon-sequestering ecosystems and the crucial ecosystem services they provide affects the socio-economic analyses presented in the EARD.

In the sections that follow, we briefly address the key concerns we noted when reviewing the EARD.

1.0 Apparent Gaps in the Information Provided

Our review of the EARD indicated that there are several significant gaps in the information provided by the proponent. In particular, we noted the following:

- the groundwater modelling discussed in section 5.5.5 appears to simply assume that the Tailings Management Facility ("TMF") will not leak;
- the discussion in section 5.14.1.4 indicates that a dam breach analysis and other analyses related to the potential failure of the TMF have not yet been completed and that the proponent proposes to defer those analyses to the "detailed design stage" if an environmental assessment approval is received;
- the discussion in section 2.4.2.11.2 indicates that the TMF water treatment method has not yet been determined and will likewise be chosen during the "detailed design stage" if an environmental assessment approval is received;
- it appears that proposed groundwater monitoring plans do not include plans for long-term, post-closure monitoring of the TMF and surrounding area; and,
- surface water modelling for the TMF and surrounding area appears to assume stabilization after Year 18, and it is not clear how this timeline corresponds with the 500-year timeline used for assessments elsewhere in the EARD.

This is not an exhaustive list. We are particularly concerned by the apparent failure to conduct a dam breach analysis as part of this environmental assessment and account fully for the potential adverse effects and environmental effects that any failure of the TMF could cause. We urge the Minister to require further information from the proponent in this regard before deciding whether or not to approve the proposed project.

2.0 Failure to Address Nova Scotia's Current Climate Targets and Environmental Goals

Section 5.1.5.4.2 of the EARD refers to the repealed *Environmental Goals and Sustainable Prosperity Act* and the repealed *Sustainable Development Goals Act*, and it fails to take into consideration the proclaimed *Environmental Goals and Climate Change Reduction Act* ("*EGCCRA*"). We urge the Minister to require additional information that contextualizes the proponent's GHG emissions assessment within the context of *EGCCRA* and the GHG emissions reduction goals that Act contains.

As we noted above, our opinion is that this environmental assessment should also assess how the proposed destruction and disturbance of carbon-sequestering ecosystems affects the GHG and climate change analyses presented in the EARD, including the assessment of how the proposed project would affect the achievement of the climate targets set out in *EGCCRA*.

3.0 Proposed Destruction and Disturbance of Wetlands

The EARD demonstrates that the proposed project will have a significant impact on wetlands, including numerous Wetlands of Special Significance. The proponent ultimately concludes that the proposed project's effects on wetlands will not amount to significant environmental effects because compensation requirements will lead to wetland restoration and support elsewhere in the province.

East Coast Environmental Law has studied the application of Nova Scotia's laws and policies that exist to protect wetlands in the province, and, to date, we have concluded that those laws and policies are deficient. The province's wetlands inventory is out of date, and it is not clear to us that the Government of Nova Scotia has systems in place to calculate, on a cumulative basis, how the loss of wetlands in a proposed project area will affect the province's wetlands inventory on the whole. Given that Nova Scotia has long had clear policies in place to prevent net loss of wetlands and to provide special protections for Wetlands of Special Significance, the absence of information required to implement those policies is deeply concerning. Moreover, it is not clear to us that compensation requirements imposed within the terms and conditions of environmental assessment approvals are actually being enforced, and we are among the many individuals, community groups, and organizations in Nova Scotia who fear that many proposed projects have been authorized under terms and conditions requiring ecosystem protection or restoration elsewhere, but that the required protections and restoration requirements are often ignored or forgotten. Finally, even if ecosystem protection and restoration requirements are imposed as terms and conditions of an environmental assessment approval and those requirements are fulfilled, protecting or restoring one ecosystem to compensate for the loss of another does not account for the loss experienced by the other-than-human species inhabiting/comprising the lost ecosystem and does not guarantee that the ecosystem services preserved for Nova Scotians will be equivalent to those lost (particularly if the Government of Nova Scotia lacks the inventory data necessary to ensure that the ecosystems protected and restored as compensation for lost ecosystems are ecosystems of the same type and capable of providing the same services).

For all of these reasons, we are deeply concerned that approval of the proposed Goldboro Gold Project will exacerbate wetland loss in Nova Scotia, including the loss of Wetlands of Special Significance. Our analysis of the Nova Scotian laws and policies that exist to protect wetlands in the province indicates that the regime requires significant updates. In our view, every new approval that allows additional loss of wetlands under the existing regime risks causing irreparable harm.

We also note that although wetlands are significant carbon-sequestering ecosystems, the EARD does not appear to take this ecosystem function into account in a meaningful way (although it is mentioned briefly in section 5.7.6.1.2). As we noted above, Nova Scotia's *Guide to Considering Climate Change in Environmental Assessments in Nova Scotia* states clearly that the carbon footprints of proposed projects not only include projects' GHG emissions but also projects' impacts on "carbon sinks", and the EARD does not appear to take such impacts into account. We therefore urge the Minister to require further information in this regard before deciding whether or not to approve the proposed project.

4.0 Accounting for the Social Costs of Carbon when Assessing Socio-economic Effects

The EARD's assessment of the proposed project's effects on socio-economic conditions describes the project's socio-economic effects as being primarily positive. Notably, the assessment does not appear to include any analysis conducted through the lens of Nova Scotia's goals, targets, and needs with respect to climate change mitigation and adaptation. In past submissions to NSECC, East Coast Environmental Law has advocated for the incorporation of a "social cost of carbon" analysis that would take into account the costs of losing carbon-sequestering ecosystems in Nova Scotia. Although we recognize that such costs may be difficult to quantify, we would argue that it is unreasonable to ignore such costs altogether when assessing the effects that a proposed project could have on socio-economic conditions within the province. A social costs of carbon analysis can also be applied to assess the impacts of emitting additional GHGs into the atmosphere. We urge the Minister to require additional analysis of the costs to Nova Scotians of losing carbon-sequestering wetlands and emitting additional GHGs into the atmosphere as part of this environmental assessment.

5.0 Failure to Consider Other Open-pit Gold Mines Proposed in Nova Scotia within the Analysis of "Other Undertakings in the Area"

The proponent's analysis of potential interactions between the proposed project and "other undertakings in the area" limits the "area" assessed to a radius of 30 kilometres around the proposed Project Area. This radius excludes the sites of the three additional open-pit gold mines that the proponent Atlantic Mining NS Corp has proposed to construct and operate in eastern Nova Scotia.

Although Nova Scotia's *Environmental Assessment Regulations* do not explicitly require cumulative effects assessments to be carried out as part of environmental assessment processes, the requirement to address the potential interactions of a proposed project with "other undertakings in the area" supports cumulative effects assessment, and the Department of Environment and Climate Change has explicitly required cumulative effects assessments in other recent environmental assessment processes.

In our view, this environmental assessment cannot be completed meaningfully and reasonably without a cumulative effects assessment that addresses the potential implications, adverse effects, and significant environmental effects of multiple open-pit gold mines being constructed and operated in eastern Nova Scotia. Cumulative effects concerns include not only the proliferation of contaminated sites that will exist and require monitoring and management by Nova Scotians in perpetuity; they also include the cumulative effects of multiple mine sites disturbing extensive carbon-sequestering ecosystem areas and emitting hundreds of thousands of tonnes of GHGs over the course of their operating lives.

Additionally, we note that Canada's common law defining the Crown's duty to consult Indigenous peoples before making decisions that could adversely affect Indigenous rights states clearly that cumulative effects assessments may be required as part of consultation processes.

6.0 Prospective Impacts on Species at Risk

Impacts on several species at risk and species of conservation concern are addressed throughout the EARD. East Coast Environmental Law is concerned by any government authorization of activities that destroy or adversely affect ecosystems that support species at risk; however, given the limits on our capacity to respond to this EARD in more detail, our comments focus on prospective impacts on two species in particular: Mainland Moose (designated as "endangered" under Nova Scotia's *Endangered Species Act*) and Blue Felt Lichen (designated as "vulnerable" under Nova Scotia's *Endangered Species Act*).

Regarding Mainland Moose, we recognize that the EARD takes into account, to some extent, the *Recovery Plan for the Moose (Alces Alces Americana) in Mainland Nova Scotia* which Nova Scotia's Department of Natural Resources and Renewables published in 2021 ("the Recovery Plan"). In particular, we note that the proponent's analysis in section 5.9.3.2 of the EARD recognizes that the location of the proposed project is within the core habitat area identified by the Recovery Plan. The proponent appears to conclude that because the proposed project will not be located in an area that the Recovery Plan identified as having high Habitat Suitability Index ("HSI") and road density ranking scores, and because the proposed project site does not currently appear to have dense usage by Mainland Moose, that losing this core habitat will not have significant consequences overall. This conclusion ignores emphatic statements in the Recovery Plan emphasizing that there is currently insufficient suitable habitat available to achieve the recovery of Mainland Moose in Nova Scotia and that recovery efforts must therefore focus not only on maintaining "existing high-quality habitat" but also on "enhancing habitat suitability in the remainder of the Core Habitat with the goal of improving future habitat suitability".[1] The Recovery Plan makes it clear that Mainland Moose in Nova Scotia cannot afford to lose any more of the habitat that supports their survival and could support their recovery.

Although the core habitat areas identified in the Recovery Plan have not yet been designated by regulation and protected in law, we urge the Minister to give careful consideration to the Recovery Plan when assessing the proposed Goldboro Gold Project and work closely with departmental staff to ensure that the proposed project's effects on Mainland Moose are fully understood.

Regarding Blue Felt Lichen, we note that the proponent is proposing significant disturbance and potential destruction of individuals of this species and that translocation has been proposed as a possible means of avoiding loss of the species. As noted in section 5.7.3 of the EARD, the presence of Blue Felt Lichen in wetlands within the proposed project area is among the reasons why several of those wetlands have been assessed as being presumed Wetlands of Special Significance. The EARD makes it clear that the project cannot proceed as proposed without some Wetlands of Special Significance and their resident species at risk being impacted—possibly destroyed or irreversibly altered. East Coast Environmental Law remains deeply concerned that such impacts continue to be approved in the absence of management regimes that

[1] Nova Scotia Department of Natural Resources and Renewables, *Recovery Plan for the Moose (Alces Alces Americana) in Mainland Nova Scotia* (2021) at page 3. Similar statements to this effect are repeated throughout the Recovery Plan.

enable the Government of Nova Scotia to assess how "localized" impacts in one proposed project area will affect provincial ecosystems and biodiversity cumulatively.

7.0 Government Obligations to Recognize and Honour Mi'kmaw Rights

Finally, the EARD makes it clear that Mi'kmaq in Nova Scotia have expressed several concerns about the proposed project, including potential impacts on Mi'kmaw use of lands and resources, potential translocation of contaminated fish, and potential impacts on community safety and wellbeing—and on the safety and wellbeing of Mi'kmaw woman and girls in particular—due to the proposed establishment of employee accommodations onsite.

East Coast Environmental Law does not speak for Mi'kmaq in Nova Scotia, but we support Mi'kmaw rights initiatives and advocate in solidarity for environmental decision-making processes that recognize and honour Mi'kmaw rights. We therefore urge the Government of Nova Scotia to ensure that consultation and engagement with Mi'kmaq meets the expectations set out in the *United Nations Declaration on the Rights of Indigenous Peoples*, which, in our view, requires the Crown to go further than meeting the minimum standards set out in the constitutional common law that has shaped the Crown's duty to consult.

From: @gmail.com
To: Environment Assessment Web Account
Subject: [PROBABLE-SPAM] Proposed Project Comments
Date: July 10, 2022 2:30:19 PM

Project: signal-gold-goldboro-project Comments: Like many others opposed to the Goldboro gold project, Iâ?Tm a concerned citizen and volunteer. The 30-day comment period simply wasnâ?Tt an adequate amount of time to review thousands of pages and submit a thorough response. Therefore, my submission about the proposed project is limited by this time constraint. The Goldboro gold project would negatively affect flora such as endangered blue felt lichen and fauna such as barred owls, nesting snapping turtles, and endangered mainland moose. In light of the twin crises of biodiversity loss and climate change, it would be unduly reckless to permit the Goldboro open-pit gold mine to proceed. Like the other gold mines proposed for the Eastern Shore, the potential benefits would be negligible and short-lived, whereas the adverse environmental and community impacts would be significant and long-lasting. The sixth mass extinction is an ongoing extinction event, the likes of which has never before been seen in human history. The Center for Biological Diversity reports, â?oThe current rate of extinction of species is estimated at 100 to 1,000 times higher than natural background rates.â? The UN warns, â?oAround 1 million animal and plant species are now threatened with extinction, many within decades, more than ever before in human history.â? We have lost 60 of the planetâ?Ts wildlife in less than 50 years, according to the World Wildlife Fundâ?Ts 2020 Living Planet Report. Populations of Canadian species that are of global conservation concern have declined in Canada by an average of 42 between 1970 and 2016. Populations of Canadian species that are of national conservation concern have declined by an average of 59 between 1970 and 2016. A holistic view of land-use planning and conservation science is vital to accurately predict and prevent adverse impacts to wildlife, such as reduced habitat integrity and connectivity, direct mortality, and sensory disturbances. Environmental harms will not cooperatively stay within a neat little block the â?oproject footprintâ?. As a resultâ?"or by designâ?"the company has underestimated the cumulative effects on nearby watersheds, wetlands, and wildlife. The observations of mainland moose within these ecosystems are highly significant given the state of the species in Nova Scotia. Scientist Thomas Millette, commissioned by the Department of Lands and Forestry, undertook aerial surveys using special thermal-imaging equipment to search for the endangered mainland moose in 2017 and 2018. His estimates showed that there could be fewer than 100 mainland moose in Nova Scotia. The 2021 Recovery Plan for the mainland moose a report prepared for the Nova Scotia Department of Natural Resources and Renewables states: Threats to the Mainland Moose are well known but complex, and may be interrelated and/or cumulative, which makes addressing them challenging. Generally, threats can be categorized as habitat loss, fragmentation, poaching, and disease. Residential and commercial developments, and industrial activities such as mining and quarrying, result in a permanent conversion of habitat to that which is unsuitable for the use of Mainland Moose. For the mainland moose, habitat loss and habitat fragmentation lead to an increase in disease, parasites, and poaching. Therefore, habitat changes as a result of development affect all of the factors of highest concern for mainland moose abundance and distribution. Furthermore, the Project Area contains 50 Blue Felt Lichen locations with 225 individuals. This is highly unusualâ?"and highly significantâ?"for an endangered species. This is a clear indication that the area should

be protected, not destroyed. I would like to echo the concerns that the Ecology Action Centre raised about Blue Felt Lichen in its submission: The EARD proposed to translocate lichens directly impacted by site infrastructure construction, but leave behind lichens not directly touched. It is proposed to leave a 100 m buffer â?owhere practicableâ? around these remaining lichen, but the above-referenced research suggested that lichens within 100 m of dust-producing haul roads and pits would experience negative impacts. This supports a larger buffer 500 m to be left around lichens. We are still living with the toxic legacy of historic gold mining here in Nova Scotia, where citizens are paying millions and millions of dollars to remediate historic gold mines. But we can at least choose not to compound the problem by approving more gold mines. Habitat destruction and fragmentation, the destruction of wetlands, biodiversity loss, and increased greenhouse gas emissions as a result of the proposed gold project are unacceptable. But we donâ?Tt have to choose extinction, inequity, or an unlivable planet. In this time of unprecedented climate change and biodiversity loss, we are at a historic moment to choose differently. Please, choose to reject the Goldboro gold project and the years of harm it would cause. Sincerely, Name: Email: @gmail.com Address: Municipality: Hammonds Plains email_message: Privacy-Statement: agree x: 26 y: 32

June 21, 2023

Re: Signal Gold EA

To whom it may concern,

Please accept this correspondence as my affirmation of support for the Signal Gold mining development recently submitted to your Department for review.

Gold mining has a long history in our region and the broad public have a good understanding of the operational impacts. We are home to the largest open pit mine in Nova Scotia (Martin Marietta) and have had significant exploration for new gold mining for the past number of years. Local residents have participated in frequent public consultations and demonstrated their interest and support.

It is obvious that Signal Gold have taken the time to undertake a thorough submission for the review of your Department and we encourage you to minimize any unnecessary delays in the completion of the review.

Regards,

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Please accept this correspondence as my affirmation of support for the Signal Gold mining development recently submitted to your Department for review.

Gold mining has a long history in our region and the broad public have a good understanding of the operational impacts. We are home to the largest open pit mine in Nova Scotia (Martin Marietta) and have had significant exploration for new gold mining for the past number of years. Local residents have participated in frequent public consultations and demonstrated their interest and support.

It is obvious that Signal Gold have taken the time to undertake a thorough submission for the review of your Department and we encourage you to minimize any unnecessary delays in the completion of the review.

Regards,

Country Hbr. N.S

From: @outlook.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: July 10, 2022 5:51:40 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: signal-gold-goldboro-project Comments: We support the Goldboro Gold Project for the Three Hundred and Fifty Construction Jobs the Project will create in the Local Area . We also support the the badly needed Boost to the overall Economy that this Project will Provide . Companys in Northeastern NS have a Dismal rate of success in dealing with the Environmental Assessment Board . The Industrial Construction Economy in this part of the Province effectively Killed . The situation is so bad the Apprentice Department has Cancelled all the Steamfitter Classes in the Province . Name: Email: @outlook.com Address: , Antigonish ,NS , Municipality: Antigonish email_message: Privacy-Statement: agree x: 69 y: 17

From: @gmail.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: July 10, 2022 8:40:06 PM

Project: signal-gold-goldboro-project Comments: Herein are my comments and concerns: 1. Considering the proposed depths of the open pits 190 and 250m and relatively close proximity Gold Brook Lake, will the water in Gold Brook Lake be depleted? 2. I donâ?Tt see a discussion on distances from the open pits that bedrock fractures will occur as a result of blasting ie blast halo. This will result in water table lowering extending farther distances and could result in the lowering of water levels in Gold Brook Lake, situated not far away. The blasting would likely open mineralized fractures, thereby providing an additional source of ARD into the open pits. 3. There is no discussion of ARD generation under anaerobic conditions, which would occur due to ferric hydroxide chemical reactions when pH is below 4. Keeping the pH elevated in the area as much as possible would alleviate this situation. Application of limestone and gypsum on the ground surface would help keep the pH of infiltrating precipitation higher. 4. It appears that approximately 100 hectares of wetlands will be adversely affected. Wetlands are now deemed vital to maintain carbon capture and physical disturbance of wetlands will release substantial amounts of gaseous emissions. There needs to be discussions on this. Name: Email: @gmail.com Address: Municipality: Dartmouth email_message:

Privacy-Statement: agree x: 42 y: 21

From: @eastlink.ca
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: July 10, 2022 8:46:00 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
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Project: signal-gold-goldboro-project Comments: On May 28th, we went in by foot to the site at Goldboro that Signal Gold Inc wants to exploit for gold extraction. We found a large number of possible burial mounds and ancient Lâ?TNuâ?Tk monumental stone structures. We found evidence that possible Miâ?Tkmaq burial mounds and additional significant historical and spiritual features are being deliberately disturbed and/or damaged on this land. Before we went in, we plotted out possible burial mounds on LiDAR and can provide you with these images. We dropped a pin and visited all pinned sites. Besides finding the damaged, destroyed and possible looted mounds, we found lots of mounds that have not been disturbed, but will be destroyed should this site be allowed to be gutted out by Signal Gold Inc. It is really important at this time in Nova Scotiaâ?Ts history to not destroy any more of the Miâ?Tkmaq history. It needs to be preserved. Although the approval process for Signal Gold Inc is still on-going, the company does have approval for sampling. The degree of destruction is far greater than sampling should warrent. We physically walked the land in question and the place is a mess. We noted that many of the possible burial mounds have been plowed down and destroyed by Anaconda and this is illegal. There was continuous evidence of machinery being in there destroying everything in its path. We wonder why there has to be so much destruction to do sampling. It seems a bit much. We wonder why they need to tear in there and tear up the whole landscape to do sampling. We wonder why are they not walking the land. This destruction that has already happened by Signal Gold is irreversible and we wonder why they have no respect for our land and our history. Could it be that they are seeing what we are seeing ON LiDAR and are deliberately destroying it? This, we think to be the truth. Along with having the coordinates for the mounds, we also have coordinates of many Culturally Modified Trees we found on this land in Goldboro. These trees are of significant cultural value and to destroy them would also be illegal. Name: Email: @eastlink.ca Address: Municipality: Gaetz Brook email_message: Privacy-Statement: agree x: 80 y: 17

From: @live.com
To: Environment Assessment Web Account
Subject: Proposed Project Comments
Date: July 10, 2022 8:55:10 PM

** EXTERNAL EMAIL / COURRIEL EXTERNE **
Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

Project: signal-gold-goldboro-project Comments: If this project can take place without detrimental effect on the land or environment and future generations maybe it should be discussed, but over 150 years of mining activity has yet to make such an outcome probable. Therefore NO. Name: Email: @live.com Address: Municipality: Tangier email_message: Privacy-Statement: agree x: 86 y: 20

July 12, 2022

Environmental Assessment Branch
Department of Environment and Climate Change
P.O. Box 442
Halifax, NS, B3J 2P8
Fax: (902) 424-6925

To Whom it May Concern:

On behalf of the Atlantic Salmon Federation (ASF) I am writing in response to the request for feedback on the provincial environmental assessment of the Goldboro Gold Project proposed by Signal Gold Inc. Upon reviewing the proposal and information provided by the proponent, ASF did not see any areas of immediate threat to wild Atlantic Salmon with the current proposed project, however we do have some reservations about the broader implications of the project.

Gold Brook, where the proposed project is to be located, is not a known salmon river watershed. However, the proposed site footprint is very near to the Isaacs Harbour River and New Harbour River watersheds, both of which are known salmon rivers that have or are suspected to have significant remanent populations. These fish are part of the Southern Uplands (SU) population of salmon, which is recommended by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for listing as an endangered species under the federal Species at Risk Act (SARA). Fisheries and Ocean's Canada (DFO) is currently deciding on that recommendation. Regardless of their listing decision, DFO, according to modelling and recovery potential assessments published by DFO in 2013, consider salmon in the SU rivers to be at high risk for extinction. DFO, through their planning and protection areas divisions, also recognizes that the coastal and marine environment downstream from the proposed site to be ecologically and biologically significant for SU salmon and other migratory species, and to contain important habitat.

Salmon from rivers in the Eastern Shore parts of the SU are doing relatively better. Conservation of these remanent sub-populations and their freshwater and marine habitats are thought to represent the best chance at saving and recovering the SU population. Significant recovery efforts are underway on the Eastern Shore by our regional council, the Nova Scotia Salmon Association (NSSA), and our affiliates, such as the St. Mary's River Association (SMRA). While we don't see a direct threat from this proposal to these recovery efforts, the proximity of the proposed mine site to an important sub-population and its habitat does give us pause. We are especially apprehensive if the site is modified in the future as we have seen at other gold mine sites within NS and elsewhere in Canada. These sorts of changes can often have larger impacts on ecological integrity.

Regional Director, Atlantic Salmon Federation
Nova Scotia Office
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PO Box 5200 S Andrews, NB, E5B 3S8
800 565 5666; savesalmon@asf.ca
Error! Hyperlink reference not valid.www.asf.ca

We also have some solicitude about chronic sub-lethal alterations in water quality downstream from the proposed site. Water quality is a major determining factor for SU salmon and other aquatic life. Gold mining operations in Canada and globally, especially where there are gold processing facilities, have been shown to alter ground and surface water chemistry and hydrodynamics. While these alterations are managed and are usually considered to be sub-lethal, they can be chronic and long-lasting changes that can persist a significant distance from the mine site. Scientific evidence has shown that chronic sub-lethal changes to water quality can alter the behavior and survival of salmon and trout. Work by the NSSA has shown that mitigation of these types of impacts, when it can be done, is difficult and extremely costly. While not an immediate threat, the addition of another gold processing facility and tailings facility in the province coupled with the requirement of perpetual maintenance of a tailing's facility does cause unease due to the proposed proximity to critical habitat.

While there isn't a known salmon population in Gold Brook, it does have American Eel and brook trout populations. It is therefore likely that this system could support salmon and might be a candidate river for reintroduction if water quality and habitat in the system was improved. While there are no current proposals for a salmon conservation program on Gold Brook, efforts by the proponent to recover historic tailings could help improve conditions in the area making a salmon conservation program in this key part of the SU possible. We would encourage both the province and the proponent to remain open to this possibility and manage the site, if approved, in a corresponding manner.

While we do not see an immediate threat, we do still have concerns with this proposal. Its proximity to important sub-populations of salmon and their habitat, and the ability to potentially alter the environment in a persistent way generate unease and do not permit us to express support for the project. The lack of salmon in the immediate area coupled with proposed efforts to remediate historic tailings are positives from our perspective. However, this does not negate our largest concern: that the opening of a new processing facility and introduction of a new active gold mine in NS will lead to justification or implications for the approval of future sites. Too often we have seen investment in one area used as a justification for approval of other proposals where the environmental impact may be significantly greater. Our lack of opposition for this project does not mean we will support the approval of future projects. We request that, if approved, the decision letter indicates that the approval of this site will have no impact on future environmental assessments.

I apologize for the tardiness of our submission and ask that you kindly consider our input. Thank you.

Sincerely,

Regional Director
Atlantic Salmon Federation

About ASF:

The Atlantic Salmon Federation (ASF) is an international conservation organization established in 1948. The Federation is dedicated to the conservation, protection and restoration of wild Atlantic salmon and the ecosystems on which their wellbeing and survival depend.

ASF's headquarters are in St. Andrews, New Brunswick, Canada, with regional offices in each of the Atlantic provinces, Quebec, and Maine. ASF maintains a network of six regional councils (New Brunswick, Nova Scotia, Newfoundland and Labrador, Prince Edward Island, Quebec, and Maine) and over one hundred affiliates that cover the freshwater range of wild Atlantic salmon in Canada and the United States. Through this network ASF represents more than 25,000 volunteers and members.