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

Suite 200
1801 Hollis Street
Halifax NS B3J 3N4

Bureau 200
1801, rue Hollis
Halifax, NÉ B3J 3N4

June 15, 2021

Craig Hudson
Atlantic Mining NS Corp.
409 Billybell Way, Mooseland
Middle Musquodoboit, NS B0N 1X0

SUBJECT: Fifteen Mile Stream Gold Project – Information Requirements (Round 1, Part 1)

Dear Craig Hudson:

The Impact Assessment Agency of Canada (the Agency) has completed its technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Fifteen Mile Stream Gold Project (the Project).

The Agency has determined that additional information is required, as per the information requirements (IRs) attached. The Agency is finalizing IRs related to Mi'kmaq of Nova Scotia and cumulative effects, which will be provided shortly.

With the issuance of these IRs, the federal timeline within which the Minister of Environment and Climate Change must make a decision is paused as of June 15, 2021. Once Atlantic Mining NS Corp. submits responses to all the IRs, the Agency will determine if the information provided is complete and the timeline for the environmental assessment will resume. For further information, please consult the Agency document on Information Requests and Timelines: https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/information-requests-timelines.html

The responses to IRs may be in a format of your choice; however, the format must be such that the responses to individual IRs can be easily identified. You may wish to discuss certain IRs with the Agency or other government experts, as necessary, to obtain clarification or additional information, prior to submission of the responses. Working directly with government experts in this manner will help to ensure that IRs are responded to satisfactorily. The Agency can assist in arranging meetings with government experts, at your request.

The IRs and your responses will be made public on the Canadian Environmental Assessment Registry (CEAR) Internet site: https://iaac-aeic.gc.ca/050/evaluations/proj/80152.

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

Suite 200
1801 Hollis Street
Halifax NS B3J 3N4

Bureau 200
1801, rue Hollis
Halifax, NÉ B3J 3N4

Please confirm receipt of this message and contact me if you require further information.

Sincerely,

<Original signed by>

Kathryn MacCarthy

Project Manager, Impact Assessment Agency

Atlantic Region

Cc: Suzanne Wade & Stephen Zwicker - Environment and Climate Change Canada

Matthew Baker & Janice Ray - Fisheries and Oceans Canada

Shelley Ball & Peter Unger - Natural Resources Canada

Jason Flanagan - Transport Canada

Joel Kaushansky, Jeff Reader & Beverly Ramos-Casey - Health Canada

Jason Flanagan – Transport Canada

Bridget Tutty – NS Environment and Climate Change

Attachment:

Attachment 1 - Information Requirements for the Fifteen Mile Stream Gold Project

Fifteen Mile Stream Gold Project
Information Requirements (Round 1, Part 1) from Environmental Impact Statement Review:
June 15, 2021

INTRODUCTION

The Impact Assessment Agency of Canada (the Agency) is completing its technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Fifteen Mile Stream Gold Project. The Agency's review is supported by submissions from government experts, the Mi'kmaq of Nova Scotia, and the public. The Agency determined that information is required, as per the information requirements (IRs) below.

ACRONYMS AND SHORT FORMS

ACCDC	Atlantic Canada Conservation Data Centre
Agency	Impact Assessment Agency of Canada
ARD	acid rock drainage
ASF	Atlantic Salmon Federation
CAAQS	Canadian Ambient Air Quality Standards
CaNP	carbonate neutralization potential
CCME	Canadian Council of Ministers of the Environment
COPC	chemical of potential concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EAC	Ecology Action Centre
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EQS	environmental quality standards
ESFW	Eastern Shore Forest Watch Association
FMS	Fifteen Mile Stream Gold Project
HC	Health Canada
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
LAA	Local Assessment Area
LIDAR	light detection and ranging

ML/ARD	metal leaching and acid rock drainage
NAG	non-potentially acid generating
NCNS	Native Council of Nova Scotia
NPR	net potential ratio
NRCan	Natural Resources Canada
PAG	potentially acid generating
RAA	Regional Assessment Area
ROM	run of mine
SAR	Species at Risk
SARA	*Species at Risk Act*
SC	Save Caribou
SCC	Sierra Club Canada
SOCI	Species of Conservation Interest
SuNNS	Sustainable Northern Nova Scotia
TIC	total inorganic carbon
UW	University of Waterloo's Environmental Assessment Review Society
VC	valued component
WC	watercourse
WRSA	waste rock storage area

ATTACHMENT 1: INFORMATION REQUIREMENTS FOR THE FIFTEEN MILE STREAM GOLD PROJECT – ROUND 1, PART 1

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Atmospheric Environment					
IR-01	HC	Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.2.1 Changes to the atmospheric environment Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia Part 2, Section 7.1.10 Mi'kmaq of Nova Scotia	Section 6.1.5.2 FMS Study Area Methodology (pg. 214 pdf) Appendix J.1 – Noise Baseline and Predictive Modeling Report - Section 5.1.2 Operation (pg. 14 pdf) Appendix J.1 – Noise Baseline and Predictive Modeling Report - Table B-1: Acoustic Specification and Location of Noise Sources (pg. 36 pdf)	The EIS Guidelines require a description and analysis for how changes to the environment caused by the Project will affect the health conditions of the Mi'kmaq of Nova Scotia – specifically referencing noise exposure. Additionally, the EIS Guidelines require that the Proponent predict changes in ambient noise levels. The EIS provided insufficient information on noise sources quantified in noise modelling, including the type of noise sources, location and timing of their use. According to Section 5.1.2 of Appendix J.1., "*The operation noise modelling is based on the following assumptions:* • *only significant noise sources are used in this study including the primary crusher, excavators, dozers, compactors, hydraulic drill, haul trucks;…*" Additionally, there is no information provided for time of day when trucks will be traveling along interior haul roads and public roadways. All Project-related noise sources, including mobile noise sources (e.g., concentrate haulage traffic), must be included in the assessment unless there is adequate justification to exclude them. It is unclear if other Project-related noise sources were excluded in the noise assessment. This information is required to determine potential noise-related health impacts.	a) Provide a description of all of the noise sources that were evaluated in the noise assessment model (i.e., the numbers of each type of equipment that will be used, their locations and proximity to receptors, the time-period [i.e., daytime /evening /nighttime]) when equipment will be generating noise, etc. b) Provide a rationale, consistent with *Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise*[1] for the exclusion of any noise sources not included in the model.
IR-02	HC KMKNO IAAC EAC	Part 1, Section 3 Scope of the Environmental Assessment Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.2.1 Changes to the atmospheric environment Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia Part 2, Section 7.1.10 Mi'kmaq of Nova Scotia	Section 6.1.6.1 FMS Study Area (pg. 217 pdf) Map Book - Figure 2.1-2 Closest Residences (pg. 9 pdf) Section 6.17.5.1.3 Mobile Equipment Accident (pg. 891 pdf) Section 6.1.9 Proposed Compliance and Effects Monitoring Program (pg. 221 pdf) Appendix J.1 – Noise Baseline and Predictive Modeling Report (pg. 1-37)	The EIS Guidelines require that any Project-related increases in traffic volume between the Fifteen Mile Stream (FMS) and Touquoy mine sites be included in the assessment. The EIS is missing the predicted ambient noise levels at key receptor points that could potentially be affected by the concentrate haulage traffic between the FMS and Touquoy sites. Although the Proponent indicated that noise levels from the FMS Mine Site will "*…attenuate to background levels (25.9 dBA) over an approximate distance of 4 to 5 km [kilometres] at or before the nearest seasonal or permanent residence*", it is unclear if the noise emissions from the concentrate haulage traffic were considered for these locations. The EIS notes that the mining activities will be occurring 365 days per year continuously on a 24-hour basis, and that concentrate haulage traffic will consist of 8-11 return trips on average per day. Given that specific activities are expected to occur during both daytime and nighttime hours, the percentage of highly annoyed (%HA) and sleep disturbances for key receptors located near the Project site and along the concentrate haulage routes should be determined. It is unclear from the EIS and Appendix J.1 if seasonal cabins and/or recreational land use areas (e.g. hunting, gathering activities) in closer proximity to the Project site than permanent residences (the nearest being identified as 4.9 kilometres from the Project site) were evaluated in the noise assessment. Not all receptor locations are presented on noise contour plot figures. This information is required to determine potential noise-related health impacts.	a) Provide the location of the following key receptors on a map that also shows the results of predicted noise assessment in consideration of mobile noise sources such as concentrate haulage traffic between the FMS and Touquoy mine sites: • the four identified receptors (Figure 2.1-2) adjacent to Highway 374 south of the FMS Mine Site; • residences, seasonal camps, cabins, cottages, and Mi'kmaq traditional land use sites; • the Mi'kmaq communities of Beaver Lake and Sheet Harbour (refer to Figure 2.1-4); and • along the Mooseland Road. b) If Project-related truck traffic is likely to occur during night-time hours, weekends, and/or holidays, identify and evaluate it in the noise modelling and determine the percentage of highly annoyed (%HA) and sleep disturbances for key receptors located near the Project site and along the concentrate haulage routes. c) Update the environmental effects assessment on noise to consider the effects of concentrate haulage traffic and update the proposed mitigation, follow-up monitoring and conclusions, as appropriate.

[1] *Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise.* https://www.ceaa.gc.ca/050/documents/p80054/119378E.pdf

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-03	HC	Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.2.1. Changes to the atmospheric environment Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia Part 2, Section 7.1.10 Mi'kmaq of Nova Scotia	Section 6.1.3.1 Regional Baseline Conditions (pg. 211 pdf) Appendix J.1 – Noise Baseline and Predictive Modeling Report – Section 3.1 Methodology (pg. 10 pdf) Section 6.1.3.2 FMS Study Area Baseline Conditions (pg. 211-212 pdf) Appendix J.1 – Noise Baseline and Predictive Modeling Report - Section 3.4 Baseline Conditions (pg. 12-13)	The EIS Guidelines require the provision of current ambient noise levels at key receptor points (e.g. Mi'kmaq of Nova Scotia communities; closest residences, and seasonal camps, cabins and cottages), including the results of a baseline ambient noise survey. The EIS is missing the current ambient noise levels at key receptor points that could potentially be affected by the concentrate haulage traffic between the FMS and Touquoy sites. The Proponent indicated in Section 6.1.3.1 of the EIS that "*The acoustic monitoring completed in the vicinity of the FMS Study Area is considered representative of the local baseline conditions*." However, a scientific rationale was not provided in Section 3.1 of Appendix J.1 explaining why the background noise levels measured continuously over a 24-hour period between November 20-22, 2017 at two monitoring locations within the proposed FMS Mine Site are representative of local baseline conditions. The current ambient noise levels of the four identified receptors (Figure 2.1-2) adjacent to Highway 374 south of the FMS Mine Site, the Mi'kmaq communities of Beaver Lake and Sheet Harbour (Figure 2.1-4) and Mooseland Road are missing in the baseline ambient noise survey. In Section 6.1.3.2 of the EIS, the determination of noise sources to be included in L90 did not adhere to Health Canada guidelines which introduces uncertainty regarding the representativeness of reported baseline noise conditions. This information is needed to determine the validity and representativeness of the baseline noise levels.	a) Provide a rationale, consistent with Section 6.2.1 of *Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise*[1], for why measured baseline-sound-level data conditions are considered representative of the Project Area and key receptor locations. b) Provide additional information regarding what sounds were included or excluded from the baseline measurements, including information on non-anthropogenic sounds. Specifically, report all noise sources that contribute to the L90 noise index. c) Update baseline noise measurements and estimates at locations that are representative of key receptors, the environmental effects assessment and mitigation measures, as appropriate.
IR-04	HC KMKNO	Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.2.1 Changes to the atmospheric environment Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia Part 2, Section 7.1.10 Mi'kmaq of Nova Scotia Part 2, Section 7.6.3 Cumulative effects assessment	Section 6.1 Noise (pg. 210-221 pdf) Map Book - Figure 6.1-3 Fifteen Mile Stream Spatial Boundaries: Noise Section 8.0 Cumulative Effects Assessment – Table 8.4-1: Initial Screening of the Valued Components based on the Outcome of the Environmental Effects (pg. 935 pdf)	The EIS Guidelines require an assessment of the Project's cumulative effects – particularly to specify other projects or activities that have been or that are likely to be carried out that could cause effects on each selected Valued Component (VC) within the boundaries defined, and whose effects would act in combination with the residual effects of the Project. The EIS is missing the cumulative effects of noise from all current and reasonably foreseeable projects within the vicinity of the Project site. The EIS indicated that the adverse residual effects of noise are not significant based on an initial screening of the environmental effects outcome for noise (Table 8.4-1). However, the Local Assessment Area (LAA) and Regional Assessment Area (RAA) for noise (Figure 6.1-3) does not include haulage routes along Highway 374 and Highway 224 from the FMS Mine Site to the Touquoy Mine Site. Furthermore, the Beaver Dam Gold Project, the Touquoy Mine Site, the Cochrane Hill Gold Project, and other non-mining projects (e.g., local forestry activities) were not included. Consequently, it is not clear whether all sources of potential cumulative effects for noise were considered in a worst-case scenario. This information is needed to assess potential noise-related cumulative health impacts.	a) Update the effects assessment for noise to include the increased traffic between the FMS and the Touquoy sites. b) Provide a cumulative effects assessment for traffic noise, including the reasonably foreseeable projects: Beaver Dam Gold Project, Cochrane Hill Gold Project and forestry activity. c) Update the direct and cumulative effects assessment of related VCs and include additional mitigation to reflect the worst-case scenario, as appropriate.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-05	KMKNO EAC	Part 2, Section 7.2.1 Changes to the atmospheric environment Part 2, Section 7.3.4 Species at risk Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia	Section 6.10.6.4 Sensory Disturbance	The EIS Guidelines require a description of all direct and indirect effects of noise from Project activities. The EIS is missing a discussion of the potential impacts of increased noise emissions (including nighttime emissions) on wildlife, particularly harvested species and species at risk (SAR), due to increased truck traffic between the FMS and Touquoy sites. A map illustrating the zone of potential impacts to wildlife due to nighttime noise emissions would be helpful. This information is required to adequately assess the potential effects of noise on SAR and those traditionally harvested by the Mi'kmaq.	a) Update the noise effects assessment to include effects on wildlife species, particularly SAR and those traditionally harvested by the Mi'kmaq communities in the region. b) Provide a map showing the predicted nighttime noise levels around both the FMS and Touquoy sites to illustrate the zone of potential impacts to wildlife due to nighttime noise emissions.
IR-06	HC	Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.2.1 Changes to the atmospheric environment Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia Part 2, Section 7.1.10 Mi'kmaq of Nova Scotia	Section 6.1.6.1 FMS Study Area (pg. 217 pdf) Appendix J.1 – Noise Baseline and Predictive Modeling Report	The EIS Guidelines require the assessment of the changes to the environment on the Mi'kmaq of Nova Scotia's human health, including noise exposure and vibrations from blasting. Information describing the anticipated effects from low-frequency noise and related mitigation measures is not included in the EIS. As per Health Canada's *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise*[1], the preference is for United States Environmental Protection Agency's (1974) sonic boom criterion to be used as a blasting mitigation noise level for blasting that lasts less than one year. For blasting of duration more than one year, it is suggested to follow the recommendations in ISO 1996-1:2003. This information is required to assess the effects of low-frequency noise.	a) Assess impacts of low-frequency noise events such as blasting using the preferred criteria and measurements for assessing noise, as per *Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise*.[1] b) If impacts of low-frequency noise events are anticipated, revise the environmental effects assessment on noise to consider the effects of low-frequency noises and update the proposed mitigation, follow-up and conclusions as appropriate.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-07	HC IAAC	7.1.1 Atmospheric environment 7.2.1 Changes to the atmospheric environment	Section 6.2.3. - Baseline Conditions (pg. 223-226 pdf) Appendix C.1 – Human Health Risk Assessment (HHRA) – Section 3.1 Air (pg. 19 pdf) Appendix J.2 – Ambient Air Quality Assessment	The EIS Guidelines require a baseline survey of ambient air quality in the Project Area and in the airshed likely to be affected by the Project, including identifying and quantifying emissions sources for, but not limited to, contaminants including volatile organic compounds. In the EIS, Table 6.2-4, which describes the baseline air pollutant concentrations at the FMS Mine Site, and Table 6.2-5, which describes the ambient air concentrations levels at the Touquoy Mine Site, are both incomplete and do not provide data regarding all the required air pollutants indicated in the EIS Guidelines, such as carbon monoxide and volatile organic compounds. A complete baseline survey of ambient air quality conditions in the Project Areas is necessary to accurately assess potential effects. Data collected in 2004 from sites further away, and perhaps not representative of the Project Area, were also used for the baseline description. Some of the data that is referenced is insufficient since it is not site-specific and not recently relevant. For example, the EIS states that two sites were sampled for a 24-hour period in 2017 near the FMS Study Area. Figure 1-1 in Appendix J.2 indicates that one is in the proposed Tailings Management Facility area and the other to the northwest of the Project Area. Additional data was collected from Cochrane Hill (40 kilometres to the east) for total suspended particles, PM10, arsenic and mercury. No maps were provided to show the relative position of the sampling stations for the 2004 data set. The uncertainty about the baseline data introduces uncertainty in other sections of the EIS, including the estimated exposures to ambient metals on fine particulate matter (PM2.5) identified in Table 6-3 and 6-4 of Section 6.2 of Appendix C.1. This baseline information is necessary to accurately evaluate potential Project-related air quality impacts to human health.	a) Provide a complete baseline survey of temporally and spatially representative ambient air quality as required by the EIS Guidelines for the FMS Mine Site and Touquoy Mine Site. b) Provide a justification for why the data collected at each selected air monitoring station is representative of the site specific conditions for the Project. c) Use the data from the updated baseline survey of ambient air quality conditions in the Project Area to update the estimated exposures to ambient metals for PM2.5 (Table 6-3 and 6-4 in Appendix C.1) and the effects assessment, as appropriate. d) Provide a map of the ambient air survey locations relative to the FMS and Touqouy Mine Sites and any receptors.
IR-08	IAAC	Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.1.3 Topography and soil	Appendix J.2 – Section 4.3 Emissions Source Data	The EIS Guidelines require a baseline survey of ambient air quality and a description of soils in the Project Areas. The EIS used trace metal data from the Beaver Dam Mine EIS for dust modelling (see page 28 of Appendix J.2). Similarly, the EIS relied on baseline soil data from Beaver Dam. No rationale was provided as to why this data is considered comparable to the Project. Information on the atmospheric environment and soils from the Project is required to assess their potential effects on various VCs.	a) Provide a rationale for why the trace metal data used for dust modelling, as well as the soil samples, from the Beaver Dam Mine are comparable to conditions at the FMS Site.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-09	HC	Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.1.10 Mi'kmaq of Nova Scotia Part 2, Section 7.2.1 Changes to the atmospheric environment Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia Part 2, Section 7.4 Mitigation measures	Section 6.2.7 Mitigation Section 6.2.5 Effects Assessment Methodology Map Book - Figure 2.1-2 Closest Residences (pg. 9 pdf) Map Book - Figure 2.1-4 Protected Areas (pg. 11 pdf)	The EIS Guidelines require a prediction of air quality changes. Some of the standards referred to in Table 6.2-6 of the EIS are outdated. More recent and stringent health protective ambient standards such as the *Canadian Ambient Air Quality Standards* (CAAQS) for nitrogen dioxide (NO_2) and sulphur dioxide (SO_2) should be used. The spatial and temporal boundaries of chemicals of potential concern (COPCs) at the following locations, which are in close proximity to the proposed concentrate haulage routes along Highway 374, Highway 224, and Mooseland Road from the FMS Mine Site to the Touquoy Mine Site, are not delineated: • the four receptors (refer to Figure 2.1-2) adjacent to Highway 374 south of the FMS Mine Site; • the Mi'kmaq communities of Beaver Lake and Sheet Harbour (refer to Figure 2.1-4); and • any additional key receptors (e.g., residences, seasonal camps, cabins, cottages Mi'kmaq traditional land use sites) along the haulage route. This information is needed to identify effects of changes to air quality on health and socio-economic conditions of the Mi'kmaq of Nova Scotia.	a) Provide the predicted pollutant concentrations for COPCs in consideration of concentrate haulage traffic, through isopleths or other means, overlaid with receptor locations, including: • the four identified receptors (Figure 2.1-2) adjacent to Highway 374 south of the FMS Mine Site; • the Mi'kmaq communities of Beaver Lake and Sheet Harbour (Figure 2.1-4); and • residences, seasonal camps, cabins, cottages, and Mi'kmaq traditional land use sites along the haulage route. b) Compare the predicted pollutant concentrations for $PM_{2.5}$, O_3, SO_2, and NO_2 to the CAAQS. c) Update the effects assessment and any associated mitigation or follow-up, as appropriate. d) Delineate spatial and temporal boundaries of COPCs for the four identified receptors (Figure 2.1-2) adjacent to Highway 374 south of the FMS Mine Site and on the Mi'kmaq communities of Beaver Lake and Sheet Harbour (Figure 2.1-4), which could potentially be impacted by the air pollutant emissions from the proposed concentrate haulage.
IR-10	HC	Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.2.1 Changes to the atmospheric environment Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia Part 2, Section 7.1.10 Mi'kmaq of Nova Scotia Part 2, Section 7.4 Mitigation measures	Section 6.2.7 Mitigation (pg. 236 pdf) Appendix L.1 – Section 3.5 Fugitive Dust Management Plan (EMP 5) (pg. 14 pdf) Section 6.2.9 Proposed Compliance and Effects Monitoring Program (pg. 239 pdf)	The EIS Guidelines require a description of mitigation measures that are specific to each environmental effect identified. Mitigation measures, follow-up, and monitoring activities for air quality during the construction, operation, decommission, and reclamation phases are not described in sufficient detail to determine their effectiveness. For example (Section 6.2.7, Table 6.2-14; Appendix L1-Section 3.5): • there are no criteria thresholds for the implementation of mitigation measures; • the functionality and processes of the public and/or Mi'kmaq complaint mechanism is not described; and • the Fugitive Dust Plan contains insufficient information to assess its effectiveness. Additional information of the Project monitoring activities and follow-up programs needs to be provided, including the list of COPCs that will be monitored and the sampling protocol. This information is required to help determine the significance of residual effects of the Project on the VCs once mitigation measures are implemented and how the effectiveness of the mitigation measures would be verified through the follow-up program.	a) Provide a more detailed description of the proposed air quality mitigation measures, including criteria thresholds and functionality and processes of the public and/or Mi'kmaq complaint mechanism. b) Describe in detail how the Fugitive Dust Management Plan will identify potential sources and reduce fugitive dust emissions associated with mining and related activity during all phases of the Project. c) Provide the list of the COPCs that will be monitored for which Project phases and the sampling protocol.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-11	HC	Part 2, Section 7.1.1 Atmospheric environment Part 2, Section 7.2.1 Changes to the atmospheric environment	Appendix C.1 – Human Health Risk Assessment – Section 6.1 Methods (pg. 39 pdf)	The EIS Guidelines require a description of changes to the atmospheric environment. The EIS underestimates the potential risks to human health related to air quality impacts. For example, in Section 6.1 of Appendix C.1, only the assessment scenarios and associated assumptions for baseline, Project alone, and baseline plus Project are described. The future development and decommissioning or abandonment assessment scenarios were not included. An explanation for the exclusion of these scenarios is not provided. This information is needed to complete the cumulative effects assessment.	a) Complete a cumulative effects assessment for air quality, including a fulsome description of the associated assumptions for the following air quality assessment scenarios: • cumulative or future development; and • decommissioning or abandonment. b) Alternatively, provide a detailed rationale for why a cumulative effects assessment for air quality is not required.
IR-12	KMKNO	Part 2, Section 3.1 Project components	Section 2.4.2.1.4.1 Crushing	The EIS Guidelines require a description of the Project and its components, including the crusher and processing facilities. Section 2.4.2.1.4.1 of the EIS states that the ore-bearing rock will be trucked from the pit to the run of mine (ROM) hopper for crushing or stockpiled on the ROM storage pad for later crushing. It is unclear if this is an indoor or outdoor facility. This information is required to adequately assess the potential effects to air quality.	a) Clarify whether the ROM storage pad is an indoor facility. If crushing and stockpiling activities are not contained indoors, update the air dispersion modelling to account for the air quality effects from the crushing and stockpiling activities.
Geology and Geochemistry					
IR-13	NRCan Public	Part 2, Section 2.2 Alternative means of carrying out the project	Section 2.6.8.2 Backfill	The EIS Guidelines require that where final decisions have not been made concerning the placement of Project infrastructure, the technologies to be used, or that several options may exist for various Project components, the Proponent shall conduct an environmental effects analysis at the same level of detail for each of the various options available (alternative means) within the EIS. Section 2.6.8.2 of the EIS identifies the preferred option for mine waste/materials storage as stockpiles and identifies that potentially acid generating (PAG) material would be covered with a clay cover to reduce infiltration and acid rock drainage (ARD). The rationale provided for not assessing the alternative of backfilling PAG rock and/or leachable arsenic (See IR-21) materials into the open pit is that "*environmental effects are generally similar in both alternatives; additional atmospheric emissions would be associated with the backfill alternatives; and costs would be prohibitive*." Contaminated arsenic material has had significant costs at other legacy gold mine sites in Canada. Considering the concerns with arsenic mentioned in IR-21, the alternative assessment for waste rock should be revisited. This information is needed to fully evaluate effects on surface water and subsequently fish and fish habitat.	a) Provide long-term predictions of pH, arsenic, and other elements such as nickel and cobalt in surface water and sediment associated with covering PAG rock and arsenic waste rock with a clay cover. b) Update the model for the clay cover to include erosion rates over time. c) Conduct additional assessment for the alternative of backfilling metal leaching and acid rock drainage (ML/ARD) and/or leachable arsenic waste rock into the open pit for technical and economic feasibility. This could involve modelling the long-term pH, arsenic, and other elements such as nickel and cobalt predictions in water and sediment and comparing the results with the preferred option.
IR-14	NRCan EAC ESFWA	Part 2, Section 2.2. Alternative means of carrying out the project Part 2, Section 7.2.2 Changes to	Section 2.6.8 Mine Waste/Material Storage (Soil, Overburden, Waste Rock, Ore, Low Grade Ore)	The EIS Guidelines require changes to water quality attributed to ML/ARD associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction materials to be assessed. Seepage generated from the waste rock storage facility and tailings management facility can affect fish habitat if it is not controlled, even after long-term post closure. There is potential for both ML/ARD from waste materials. It is not clear if there is a proposed liner system under the capped potentially acid generating waste rock storage facility for leachate collection, long-term	a) Clarify if a liner system is planned for underneath the PAG rock or arsenic containing waste rock storage facility. b) Discuss the technical and economic feasibility of lining beneath the PAG waste rock stockpile. c) Use hydrogeological and surface water modeling to support either using a liner or not using a liner.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
		groundwater and surface water	Appendix J.4 – Section 2 Design Consideration (pg. 2)	monitoring, and treatment systems in case the cap liner is damaged or leaking. Lining beneath PAG waste rock storage facilities is generally considered best-practice to mitigate potential effects on groundwater and surface water. Therefore, the technical and economic feasibility of lining the PAG stock pile should be discussed. This is required to ensure that impacts to groundwater and surface water are limited to protect fish habitat.	
IR-15	NRCan EAC SuNNS ESFW	Part 2, Section 2.2 Alternative means of carrying out the project Part 2, Section 3.1 Project components	Section 2.6.15 Tailings Storage Final Discharge Point Section 2.6.8 Mine Waste/Material Storage (Soil, Overburden, Waste Rock, Ore, Low Grade Ore) Appendix D.2 – Section 4.3.2 Embankment Construction (pg. 23)	The EIS Guidelines require the Project to be described, by presenting the Project components, associated and ancillary works, and other characteristics that will assist in understanding the environmental effects – including the tailings management facility (footprint, location and preliminary designs). The EIS Guidelines also require changes to water quality attributed to ML/ARD associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction material to be assessed. Geotechnical investigation and testing of material properties must be conducted for the construction of dam foundation and earth structures for a safe and stable dam construction. It is unclear what material will be used for dam foundation construction. Identifying the material to be used for dam foundation construction is necessary to ensure safe and stable dam construction, which will reduce the likelihood of accidents and malfunctions.	a) Describe the material to be used for dam foundation construction. b) Provide test results that identify suitable materials (e.g., in consideration of ML/ARD potential) to be used for dam construction or a plan to ML/ARD ensure that suitable construction materials are identified as the Project advances.
IR-16	NRCan IAAC Public ESFWA	Part 2, Section 3.1 Project components Part 2, Section 7.2.2 Changes to groundwater and surface water	Section 2.6.13 Mine Waste Storage (Tailings) Appendix F.1 – Section 2.1.3 Conversion of Loads into Concentrations Appendix F.3 – Section 1.1 Project Background (pg. 1-2)	The EIS Guidelines require the Proponent to assess changes to water quality attributed to ML/ARD associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction material. For post-closure performance of the dry cover on the tailings management facility, hydrogeological modelling should use tailings content and release rates of acidity and contaminant to predict seepage quality. If results show any potential contaminants of concern, a proper leachate collection system with a liner and treatment systems could be necessary for long-term post-closure. Predicted metals and other solutes in the seepage along with baseline concentrations of the same elements measured in the affected streams should be provided in a table to evaluate mass loadings. In addition, the cover system design should include climate change factors, including extreme weather conditions as well as earthquake prediction (as per Canadian Dam Association mining dam guidelines). An adequate thickness of capping materials on should be placed tailings with adequate compaction, runoff collection, and erosion control systems with climate change factors. Section 2.1.3 of Appendix F.1 of the EIS states "*During Post-Closure, a soil cover will be placed on the [waste rock storage area] WRSA in order to limit infiltration and oxygen flow. A cover efficiency of around 60% was estimated, thereby reducing the contact water volume to less than half of the [operations phase] EOM infiltration rates. No detail regarding cover placement or material was provided to Lorax and it was assumed that the reduction in flow will result in a proportional reduction in contact water.*"	a) Provide preliminary information on cover design of the tailings management facility and evidence that the current cover design will withstand high precipitation events and prolonged droughts in the long-term. b) Provide information on the proposed cover for the waste rock storage area and its proposed design. Indicate the expected efficiency of the cover and if the efficiency is expected to change over time. Update Appendix F.1 as required. c) Provide a table with predicted metals concentrations and other solutes in the seepage along with baseline concentrations of the same elements measured in the affected streams to evaluate mass loadings. d) To address the potential that the tailings produce ML/ARD during operations, describe seepage control measures that will be implemented to minimize long-term post-closure effects on the surrounding environment.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				To assess the long term impacts to water quality of the waste rock storage area, further details on the cover are required. This information is required to determine the potential environmental effects on surface water and subsequently fish and fish habitat associated with the proposed cover design.	
IR-17	NRCan ECCC EAC	Part 2, 7.1.5 Groundwater and surface water Part 2, 7.2.2 Changes to groundwater and surface water	Section 6.4.8 Residual Effects and Significance Section 6.6. Surface Water Quality and Quantity Appendix B.6 – Final – Surface Water Quality Modelling Assessment Report Appendix B.7 – Final – Hydrological and Surface Water Quality Modelling Assessments for Watercourse 12	The EIS Guidelines require that the Proponent will present baseline information in sufficient detail to enable the identification of how the Project could affect the valued components and an analysis of those effects – with Section 7.1.5 specifically relating to groundwater and surface water. The baseline section of the EIS provides baseline sediment contamination. However, no predictions of sediment contamination are presented in the effects, residual effects and cumulative effects to water and fish habitat sections. The section on Geology, Soil and Sediment showed sediment contamination predictions were not considered there either. Omitting sediment predictions in the receiving environment of both FMS and Touquoy and downstream means the metal mass balance is incomplete and therefore, the predictions to water quality cannot be verified. Predicting future sediment quality through modelling would remove some uncertainty associated the predictions of effects associated with possible sediment contamination. The predictions of sediment contamination and its potential effects are necessary to determine potential changes to water quality.	a) Provide information on suspended solids, partitioning coefficient of COPCs and settling rates for particles used to predict sediment accumulation of COPC. b) Provide associated predictions of sediment contamination in the receiving environment of both FMS and Touquoy and downstream during construction, operation, closure, and post-closure. c) Provide sediment quality modelling to help quantify impacts to sediment based on the baseline sediment quality dataset. d) Use these predictions to determine if mitigation measures associated with the effluent (stand-by modular treatment), tailings and potentially acid generating waste rock management are the best available technology and techniques economically feasible.
IR-18	NRCan	Part 2, Section 7.1.2 Geology and geochemistry	Appendix F.2 – Section 3 Samples and Analytical Methods Appendix F.2 – Section 4 Results Appendix F.1 – Section 2.2.2 WRSAs	The EIS Guidelines require the Proponent to complete a geochemical characterization to predict ML/ARD following the MEND (2009) guidance document[2], which recommends samples capture the compositional variability as well as sufficient spatial coverage throughout the pit to capture all potential ML/ARD risk. The Proponent has not meet recommendations stipulated in MEND (2009) for the following: • Appendix F.1 page 2-16 references use of the LeapfrogTM geological block model to differentiate PAG and non-potentially acid (NAG) generating zones and calculate PAG rock tonnage, but Appendix F.2 does not provide mine rock tonnage estimates. NRCan therefore cannot confirm that sufficient samples were collected per lithology. • Appendix F.2 Figure 3-1 (page 3-2) presents sampled drill collar locations in plan view. NRCan cannot confirm the spatial distribution of mine rock samples in relation to the pit outline, deposit geology, or mineralized zones. • The sample length for mine rock ranged from 1.0-5.0 m (Section 3.1.1 page 3-1). Short intervals can be skewed by mineral clusters or veins and can miss-represent the bulk composition of the geological unit. • Appendix F.2 Section 4.1.1.1 states that HC2 (AR) and HC4 (GW) have the highest relative proportions of argillite and greywacke clasts, respectively, which contradicts Table 4-2 HC2. • Appendix F.2 Section 3.1.2 states that the 2018 conventional tailings stream is considered representative of material that will be managed in the tailings management facility; at the	a) Provide tonnage estimates for each waste rock and low-grade ore lithology and a comparison to the number of samples collected. Include a plan to address any data gaps in terms of underrepresented lithologies based on tonnage or insufficient spatial distribution. b) Provide cross sections or images from the LeapfrogTM block model that show the location of all low-grade ore and waste rock samples collected to date. c) Justify the short sample interval used in the study, in terms of carbonate and sulphide mineralogy and sample observations in the field and, if possible, include an evaluation of exploration assay data to support this discussion. d) Confirm the clast composition of HC2 and HC4 in Table 4-2. e) Confirm that KM5644 continues to be representative of the anticipated head ore composition and metallurgical process design. If either the bulk head ore composition or metallurgical process has changed since 2018, provide a comparison of the bulk ore chemistry of KM5644 with the updated anticipated chemistry.

[2] Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. MEND Report 1.20.1. Mining Environment Neutral Drainage Program, Natural Resources Canada. December 2009.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				time of testing, ore composite samples (KM5644) came from an expanded mining area. If resource definition and metallurgical process designs have changed since 2018, the tailing samples tested may no longer be representative of the anticipated tailings chemistry. This information is required to meet the recommendations of the MEND Program to accurately predict ML/ARD.	
IR-19	IAAC Public	Part 2, Section 7.1.2 Geology and geochemistry	Section 6.4.3.6 Metal Leaching and Acid Rock Drainage Appendix F.2 – Fifteen Mile Stream Project - ML/ARD Assessment Report	The EIS Guidelines require a geochemical characterization of expected mine material such as waste rock, ore, low grade ore, tailings, overburden and potential construction material to predict ML/ARD including oxidation of primary sulphides and secondary soluble sulphate minerals. Section 6.4.3.6 and Appendix F.2 of the EIS provide an assessment of ML/ARD of four lithologies (argillite, argillite-greywacke, greywacke-argillite, and greywacke) and ore. However, the proportion of each lithology is not discussed when assessing the neutralization potential of greywacke on the other rock types. Section 6.4.3.6.2 of the EIS states modelling results suggest that the neutralization potential will be depleted from the FMS mine rock between approximately 6 and 15 years. A conservative estimate for time to neutralization potential depletion for the static test samples indicates that approximately 50% of the PAG samples will become acidic within 10 years. Section 4.1.2.1.2 of Appendix F.2 states "*…up to 40% of all PAG samples are expected to produce acidic contact water within 6 years. The 6-year mark corresponds with the detection limit for CaNP (4.5 kg $CaCO_3$/t) which implies that acidic conditions may develop earlier in these samples.*" It is unclear that if the PAG argillite is separated from the neutralization potential of the greywacke in separate stockpiles, how the acid-generation of the argillite will be delayed by 10 years. Nor is it clear if mitigations will be employed during the post-closure phase to treat and monitor for potential long-term effects. Section 2.1.1.1 of Appendix F.1 states "*Conceptually, it was assumed that potentially acid-generating (PAG) materials would remain neutral during operations up until the end of mining.*" However, as up to 40% of the PAG rock could be acid producing within 6 years, this assumption may not be valid and acid-generation could begin while the mine is still operational prior to the cover being placed. The EIS needs to include what mitigation measures are planned for the PAG stockpile during operations. Details should be provided if there is follow-up monitoring proposed to confirm the predictions of the potential for acid generation. This information is needed to fully evaluate effects on surface water and subsequently fish and fish habitat.	a) Provide the proportions expected of each of the four lithologies that will make up the waste rock and tailings. b) Describe how the PAG material will have a delayed onset of acid generation for 10 years, given that the PAG material is planned to be stockpiled separately from the NAG material. c) Provide mitigation measures that would mitigate acid generation and for the collection and treatment of acid drainage and metals leachate during the operations phase of the mine. Provide details of any follow-up monitoring that would be conducted to confirm the predictions related to the potential for acid generation.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-20	NRCan	Part 2, Section 7.1.2 Geology and geochemistry	Appendix F.2 – Section 3 Samples and Analytical Methods Appendix F.2 – Section 4 Results	The EIS Guidelines require an evaluation of the ARD potential of mine rock and construction materials following MEND (2009) guidance, to inform effective waste management plans and segregation of NAG and PAG waste. Elevated ARD risk associated with the Meguma Group is well documented in Nova Scotia[3] [4] [5] [6]. In Appendix F.2, the following results for carbonate neutralization potential (CaNP) and net potential ratio (NPR) cannot be replicated: • Field bin sample LX-18-FB3: the reported CaNP values are inconsistent (19 kg $CaCO_3$/t in Table 4.4 and 21 kg $CaCO_3$/t in Appendix 4-2) and cannot be replicated using the total inorganic carbon (TIC) of 0.25% reported in Appendix 4-2. • HC1 to HC5: the NPR values reported in Table 4.4 cannot be replicated using the method described in Section 3.2.1.2 and the modified neutralization potential and acid potential calculated from sulphide sulphur, as presented in Table 4.4. Appendix F.2 Section 3.2.1.2 states that CaNP is calculated from TIC content but Table 4.4 reports "Total C". Total carbon measurements include graphite, which is observed in the Meguma Supergroup; the presence of graphite can cause CaNP to be overestimated if it is calculated from total carbon. Section 4.1.1.2 of Appendix F.2 states that the full set of acid base accounting analyses for all mine rock samples is presented in Appendix 4-2 of Appendix F.2 including fizz rating; however, the fizz rating is not provided in Appendix 4-2 of Appendix F.2. In Section 4.1.1.2.3, the Proponent proposes to use neutralization potential to evaluate ARD, which includes less reactive silicate minerals such as chlorite and biotite compared to carbonate minerals. CaNP decreases in content with increasing argillite clast content, from greywacke (median 25 kg CaCO3/t) to argillite samples (median 6.8 kg CaCO3/t). After 40 weeks of testing, the argillite humidity cell sample was showing decreasing pH trends; and the timing to onset of ARD is estimated to be 6 years or less based on CaNP content (Section 4.1.2.1.2). CaNP should be used to more conservatively evaluate ARD potential, rather than the modified neutralization potential. In Appendix F.2 Section 4.1.1.1, various sulphide minerals are identified through XRD and QEMSCAN, including pyrrhotite, chalcopyrite, pyrite, sphalerite, and other (unidentified) sulphides. Sulphate minerals were not noted to have been observed and are not anticipated in the deposit geology. Acid potential should be based on the total sulphur content rather than sulphide sulphur, as detectable sulphate could be related to pyrrhotite oxidation in the core, as suggested by the observed weathering rims on the pyrrhotite (Section 4.1.1.1 page 4-3). This information is required to assess the effects of effluent on groundwater and surface water which could affect fish and fish habitat.	a) Provide the CaNP content of LX-18-FB3 and the NPR for all humidity cell samples and describe calculation methods. Discuss how updated results change the ARD classification of these samples. b) Provide the method used to measure the carbon content of mine rock and discuss the potential presence graphite based on regional geology, core logging and mineralogical observations. c) Update Appendix 4-2 of Appendix F.2 of the EIS to include fizz ratings for all samples. d) Re-evaluate the ARD potential of all mine rock samples using total sulphur to calculate acid potential and carbonate neutralization potential. Provide updated results for each lithology and a discussion of how this more conservative approach effects the interpretation of ARD potential. Updated results should be used in the block model evaluation requested in IR-25.

[3] Fox, D., C. Robinson, and M. Zentilli. 1997. Pyrrhotite and associated sulphides and their relationship to acid rock drainage in the Halifax Formation, Meguma Group, Nova Scotia. Atlantic Geology, 33: 87-103.
[4] Nova Scotia, 2017. Acid Rock Drainage. https://novascotia.ca/natr/meb/hazard-assessment/acid-rock-drainage.asp. Last updated 2017-12-10.
[5] Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. MEND Report 1.20.1. Mining Environment Neutral Drainage Program, Natural Resources Canada. December 2009.
[6] White, C.E. and T.A. Goodwin. 2011. Lithogeochemistry, petrology, and the acid-generating potential of the Goldenville and Halifax groups and associated granitoid rocks in the metropolitan Halifax regional Municipality, Nova Scotia, Canada. Atlantic Geology, 47:158-184.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-21	NRCan	Part 2, Section 7.1.2 Geology and geochemistry	Appendix F.2 – Section 4.1 Mine Rock	The EIS Guidelines require a geochemical characterization of the expected mine materials to predict metal leaching. In Section 4.1.1.1 of Appendix F.2 of the EIS, arsenic is identified at elevated solid phase concentrations in all lithologies. Mineralogy testing of the composite field bin sample reports arsenopyrite hosting up to 99.4% of the arsenic, with the remaining 0.6% in gersdorffite, although the Proponent notes that QEMSCAN cannot identify the adsorbed fraction of arsenic, which *"…may contribute a significant portion to the leachable As inventory."* Haysom et al (1997)[7] tested various samples from the Goldenville and Halifax Groups (Beaverbank Formation) and identified that arsenic mineral phases extend throughout the solid solution series between arsenopyrite, cobaltite, and gersdorffite, with glaucodot also observed in a sample from the Goldenville Formation. Cobalt and gersdorffite have been further identified in other parts of the province (Welt et al, 2020)[8]. The presence of these minerals poses a significant risk for metal leaching due to their high reactivity relative to pyrrhotite, arsenopyrite, and pyrite (Chopard et al, 2015[9]; MEND 2004[10]). Further, as documented by Kennedy and Drage (2017)[11], elevated arsenic concentrations are observed in the metamorphic bedrock aquifers of the Meguma Group, demonstrating elevated arsenic mobility under natural conditions. Section 4.1.2.1.3 of Appendix F.2 of the EIS states "*…as already seen for the SFE [shake flask extraction] tests, As mobility does not directly correlate with As content in the solid phase.*" and in Section 4.1.1.4 of Appendix F.2 of the EIS "*…As mobility is more strongly tied to factors other than the solid-phase content, such as time of exposure, mineralogical association, and grain liberation.*" Shake flask extraction tests were conducted on the kinetic test samples only, and as such correlations between total arsenic and leachable arsenic are based on a very limited data set for mine rock. Higher arsenic loading rates are observed in the greywacke-argillite and greywacke humidity cell tests, which have lower ARD potential and would likely be identified as NAG material for construction of the tailings impoundment. Further, the tailings saturated column reported increases in arsenic and cobalt concentrations under reducing conditions. Mineralogy testing was not completed on the tailings to confirm the mineral phases hosting arsenic. The conceptual model for metal leaching needs to be refined, with support from more detailed mineralogy studies on samples of varying arsenic content from all lithologies. This is required to minimize the risk associated with metal leaching from the long-term exposure of waste rock in the tailings impoundment, and support refinement of the approach to material segregation and waste rock management planning, and better identify water treatment requirements	a) Provide a comprehensive discussion of the mineral phases hosting arsenic and the conceptual model for arsenic leaching. Include a summary of data gaps that need to be addressed for a more fulsome understanding of the controls on arsenic leaching and a plan to address these gaps as the Project advances. b) Provide a discussion on potential practical methods for identifying arsenic-leaching waste during operations. This discussion should be used to support the approach to segregation and block model evaluation requested in IR-25.

[7] Haysom, S.J., R.J. Horne, and G. Pe-Piper. 1997. The opaque mineralogy of metasedimentary rocks of the Meguma Group, Beaverbank-Rawdon area, Nova Scotia. Atlantic Geology 33: 105-120.
[8] Welt, N., E. Adlakha, J. Hanley, M. Kerr, G. Baldwin, N. McNeil, and R. Parsons. 2020. Characterization of Co-Ni-bearing polymetallic vein occurrences, Meguma Terrane, Nova Scotia. Prospectors and Developers Association of Canada, March 2020.
[9] Chopard, A., M. Benzaazoua, B. Plante, H. Bouzahzah, and P. Marion. 2015. Kinetic tests to evaluate the relative oxidation rates of various sulfides and sulfosalts. 10th International Conference on Acid Rock Drainage & IMWA Annual Conference. Santiago, Chile.
[10] MEND 2004. Review of Water Quality Issues in Neutral pH Drainage: Examples and Emerging Priorities for the Mining Industry in Canada. MEND Report 10.1. Mine Environment Neutral Drainage Program, Natural Resources Canada. November 2004.
[11] Kennedy, G.W. and J.M. Drage. 2017. An arsenic in well water risk map for Nova Scotia based on observed patterns of well water concentrations of arsenic in bedrock aquifers. Nova Scotia Natural Resources, Geoscience and Mines Branch. Open File Report ME 2017-003.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-22	NRCan	Part 2, Section 7.1.2 Geology and geochemistry Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix F.2 – Section 4.1.2 Kinetic Test Results Appendix F.1 – Section 2 Source Term Derivation Approach Appendix B.6 – Section 3.4 Sensitivity Analysis	The EIS Guidelines require changes to water quality attributed to ML/ARD associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction material to be assessed. They specifically reference longer term rates of acid generation (if any) and metal leaching; estimates of potential time to the onset of ML/ARD; and quantity and quality of leachate from samples of tailings, waste rock, and ore. These leachate compositions are used to develop source terms for the water quality model to evaluate the quality of effluent to be released from the site to receiving waters. In Section 4.1.2.1 of Appendix F.2 of the EIS, humidity cell test samples HC1 and HC2 were ongoing at 50 weeks as these samples were expected to generate acidic test leachate. If HC1 and HC2 were indeed continued until generation of acidic leachate, then the timing to onset of acidic conditions (Section 4.1.2.1.2 of Appendix F.2) and acidic loading rates (Section 2.1.1.2 of Appendix F.1) should be updated to use site specific data in the water quality model (Appendix B.6). This update should consider the observations of Sexsmith et al (2015)[12]. However, if neither HC1 nor HC2 have produced acidic leachate to date, the acidic loading rate assumptions developed based on Cochrane Hill samples (Appendix F.1 Section 2.1.1.2) are likely the most reasonable proxy. However, a detailed comparison of the geology, mineralogy, and ML/ARD potential of the Cochrane Hill and FMS lithologies is required to confirm this is appropriate. Table 2-1 of Appendix F.1 provides neutral loading rates derived from humidity cell test weeks 5-15 for the operational/end of mine phase. Arsenic results for HC3 and HC4 show a pronounced decrease from week 0-9 while nickel presents a similar pronounced decrease in all five samples. The use of cycles 5-15 excludes these peak results and underestimates the potential short-term loading rates associated with the rinsing of sulphide mineral oxidation products. This approach is not considered conservative given the fast oxidation rate of pyrrhotite demonstrated by observed oxidation rims (Section 4.1.1.1 of Appendix F.2), as well as the potential presence of sulpharsenides (IR-21). A sensitivity analysis was completed to evaluate the effects of misclassified PAG waste rock (1-2%) in both the non-potentially acid generating waste rock storage facility and the tailings impoundment (Appendix B.6 Section 3.4). However, a similar approach was not undertaken to assess risk of arsenic leaching materials in either of these facilities. Considering the long-term exposure of waste in the tailings impoundment, and potential challenges to waste segregation (IR-25), a sensitivity analysis is required to fully bracket the potential risk of neutral mine drainage from the mine rock used to construct tailings impoundment. The sensitivity analysis should consider the updated conceptual model for arsenic release (IR-21). If the acidic loading rates and other assumptions in the water quality model have changed substantially based on updated kinetic test data, consideration should be given to re-running the water quality model as the Project advances. These predicted changes are required to evaluate the quality of effluent to be released from the site to receiving waters which will affect fish and fish habitat.	a) Confirm the status of HC1 and HC2 testing and provide updated kinetic test results (Section 4.1.2 graphs and Appendix 4-6 tables), an updated estimate for the timing to onset of acidic conditions, and updated metal loading rates. b) If HC1 and/or HC2 generated acidic leachate, compare the updated timing to onset of ARD and metal loading rates to those used as source terms for the water quality model (Appendix B.6) and discuss implications for changes in effluent predictions c) If HC1 and HC2 have not produced acidic leachate, provide a detailed comparison of the geology, ML/ARD potential, and kinetic test results of the Cochrane Hill and FMS lithologies to demonstrate that the Cochrane Hill humidity cell results are a reasonable proxy for FMS. Present this comparison using box and whisker plots of static test data including the humidity cell results, as well as updated time series graphs for the kinetic test results for both sites. Also include a comparison of the Cochrane Hill and FMS field bin results, if applicable, using updated field bin results. d) Calculate the operational/end of mine life neutral loading rates including results from the first flush peak and discuss the implications for this higher short-term loading rate in the water quality model. e) In consideration of comments in IR-21, comment on the conservatism in the arsenic loading rates and the need for a sensitivity analysis on the inclusion of arsenic leaching materials in the NAG waste rock storage facility and the tailings impoundment. f) Update the model if acidic loading rates and other assumptions in the water quality model have changed substantially based on updated kinetic test data.

[12] Sexsmith, K., D. MacGregor, and A. Barnes. 2015. Comparison of Actual and Calculated Lag Times in Humidity Cell Tests. 10th International Conference on Acid Rock Drainage & IMWA Annual Conference. Santiago, Chile.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-23	IAAC NRCan	Part 2, Section 7.2.2 Changes to groundwater and surface water	Section 2.4.1.1.1 Site Preparation and Pre-Production Section 6.4.3.4 Historic Tailings, Waste Rock and Current Sediment Quality Appendix I.3 – Limited Phase II Environmental Site Assessment Appendix F.1 – Section 2.4.1 Till and Topsoil Stockpiles Appendix F.1 – Section 5 Recommended Future Work	The EIS Guidelines require an assessment of changes to water quality attributed to ML/ARD associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction material. Section 2.4.1 of Appendix F.1 of the EIS states that the calculation of source terms for till and overburden were based on five till samples from the FMS Site and five topsoil samples from the proposed Beaver Dam Gold Mine. Appendix F.1 states that it was assumed that the soil characteristics between FMS and Beaver Dam are sufficiently similar and so topsoil at Beaver Dam can be used as a proxy. This assumption is not supported by data. Section 2.4.1.1.1 of the EIS notes that during the site preparation phase topsoil and glacial till overburden will be stockpiled for later use in reclamation. However, there is no mention of plans to characterize the chemistry of these soils and tills to determine their suitability for use in later reclamation work. This is important for minimizing exposure to contaminated materials and for setting appropriate targets for eventual mine site reclamation. Figure 2 in Appendix I.3 showed that arsenic concentrations exceeded the NSE Tier 1 environmental quality standards (EQS) by up to three orders of magnitude. It was concluded that elevated arsenic concentrations are expected to be present across the site due to the presence of arsenopyrite in the mineralized bedrock. High arsenic concentrations (>1000 mg/kg) were documented at several sites outside of known historic tailings deposits, suggesting that contamination by historical mining activity may be more widespread than previously recognized. Sampling methods should be designed to evaluate metal concentrations in both the topsoil and underlying till at each sample site if these materials are to be managed in separate stockpiles. These data would provide a comparison for future environmental monitoring activities and help guide reclamation efforts. Advice on suitable sampling protocols is provided in Parsons and Little (2015)[13]. This information is needed to evaluate effects on surface water and subsequently fish and fish habitat.	a) Provide supporting evidence that topsoil in the area of the proposed Beaver Dam Mine is similar to that at the FMS Site. b) Discuss the technical and economic feasibility of conducting a comprehensive survey of soil and till geochemistry at the FMS Site prior to clearing and grubbing of overburden to delineate the extent of soil contamination exceeding the NSE Tier 1 EQS and prevent potential adverse effects to surface water quality, wetlands, fish and fish habitat resulting from accidental disturbance of mine wastes.

[13] Parsons, M.B., Little E, M.E. (2015) Establishing geochemical baselines in forest soils for environmental risk assessment at the Montague and Goldenville gold districts, Nova Scotia, Canada. Atlantic Geology 51: 364–386. https://doi.org/10.4138/atlgeol.2015.017

IR-24	NRCan IAAC	Part 2, Section 7.1.2 Geology and geochemistry Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix F.1 – Section 2 Source Term Derivation Approach	The EIS Guidelines require an assessment of changes to water quality attributed to ML/ARD associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction material – specifically referencing quantity and quality of effluent to be released from the site into the receiving waters. Section 2.1.2.2 of Appendix F.1 of the EIS states that "*…the Touquoy site presents an excellent site analogue with respect to geology…*", however the two sites are not compared in terms of hydrothermal events and mineralization associated with the emplacement of sulphide minerals that are responsible for ARD-mine leaching. Further, an in-depth comparison of geochemical test results was not provided to demonstrate that waste rock reactivity at both sites is comparable with respect to ARD-mine leaching risk. Touquoy site monitoring data are used to develop scaling factors and calibrate the source term loading rates for the FMS. Section 2.1.4 of Appendix F.1 of the EIS states "*As a final step, the model output was compared to water quality results from other data sources, namely field-scale kinetic testing and site analogues (Touquoy). These data sources are highly valuable in re-assessing solubility limits and provide an opportunity to validate scaling factors used for the geochemical source term model.*" Although some parameters are provided in Table 2-6, Section 2.1.2.3 of Appendix F.1 of the EIS, the referenced water quality monitoring data utilized to develop parameter-specific contact water scaling factors were not presented for verification. Further, no information was provided on how the field bin data was used in source term development and water quality modelling. As discussed in Section 2.3.4 of Appendix F.1 of the EIS, the source term for the tailings management facility embankment was developed using monitoring data from four Touquoy tailings management facility embankment monitoring stations, assuming that the NAG greywacke material used for the embankment construction will behave similarly to the greywacke at Touquoy. A comparison of the geochemical test results for the greywacke at both sites was not provided to justify this assumption. Per IR-25, challenges may be anticipated in segregation of NAG and non-arsenic leaching material for construction of the tailings management facility, such that direct comparison with the Touquoy greywacke may not be reasonable. Similarly, Section 3.2 states that the prediction of nitrogen source term for the tailings embankment and pit walls were based on Touquoy water quality monitoring stations; however, the water quality data from Touquoy was not provided. This Section also states that "*The monitoring time frame used for these predictions are from August 2017 - October 2018 and November 2017 - October 2018, for the pit walls and the TMF embankments, respectively.*" Given that the Touquoy mine only became operational in October 2017, this data may not be reflective of an active mine site. More recent data should be considered to confirm the findings for source term calculations. Section 6.4.9 of the EIS states that geochemical source term predictions heavily rely on theoretical constraints, representative geochemical test work, and the availability of site analogue data. To close data gaps that would increase the confidence in the geochemical source term predictions for future model iterations, the following recommendations are made: • *"Continued operation of Fifteen Mile Stream potentially acid generating (PAG) humidity cells to assess the long-term effect of metal leaching behavior…;* • *Additional sampling and static testing of waste rock material to increase the confidence in the sulphur and neutralization potential (NP) contents as well as PAG proportions within this population…;*	a) Provide a comprehensive evaluation to support the use of Touquoy as an analogue site. The review should be supported by regional geology, field observations, and site-specific mineralogy and geochemical test results from both sites. b) Provide a comparison of the source term model output with site monitoring data (i.e., seepage and/or runoff from waste storage facilities) and field bin data to support the verification of scaling factors. c) Provide a comparison of the geochemical test results for the greywacke at both sites that is anticipated to be used for construction of the tailings storage facility embankment. d) Provide up-to-date water quality data from monitoring stations at Touquoy to support the predictions of the source terms for the FMS. Including up-to-date geochemical data from the toe of the Touquoy tailings management facility to support the predictions of the drainage chemistry from the FMS tailings management facility. e) Update source term calculations if water quality data has changed from 2017 and 2018 (when the mine first opened) to current day. f) Clarify which of the recommendations listed in Section 6.4.9 of the EIS have been implemented and provide the results of implementing those recommendations.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				• *Collection of site-specific topsoil samples…;* • *Continued tracking and reporting of Touquoy WRSA tonnage, footprint, and lithological proportions along with continued waste rock drainage monitoring to allow for better calibration of model and scaling factors which can be applied to the Fifteen Mile Stream WRSA in future model iterations...*" To understand the geochemical impact of the tailings disposal plan, it is recommended that the material be tested via acid-base accounting and potentially other characterization methods. Appendix F.1 has not been updated since September 2019 and therefore it is unknown if these recommendations have been implemented. This information is needed to fully evaluate effects on surface water and subsequently fish and fish habitat.	
IR-25	NRCan	Part 2, Section 7.2.2 Changes to groundwater and surface water Part2, Section 9.2 Monitoring	Appendix F.2 – Section 4 Results Appendix F.3 – Section 2 Classification of Metal Leaching and Acid Rock Drainage Potential Appendix F.3 – Section 4 Monitoring and Management	The EIS Guidelines require an assessment of changes to water quality attributed to ML/ARD associated with the storage of waste rock, ore, low grade ore, tailings, overburden and potential construction material – specifically referencing surface and seepage water quality from the waste rock dumps, tailings/waste rock impoundment facility, stockpiles and other infrastructure during operation and post-closure; and a sensitivity analysis to assess the effects of imperfect segregation of waste rock. Section 4.1.1 of Appendix F.3 states the Proponent will monitor waste rock quality through operations by analysis of either grade control samples or blast hole cuttings. PAG waste rock will be segregated and stored separately from NAG waste rock, which will also be used for construction of the tailings impoundment. Geochemical test results presented Table 4.1 of Appendix F.2 of the EIS indicate that ARD risk is associated with increasing argillite clast content, while the greywacke end-member contains higher carbonate content and most samples tested are NAG. This is consistent with observations of ARD risk in rocks of the Meguma Group (IR-20). Conversely, humidity cell tests report higher arsenic loading rates from the greywacke-argillite (HC3) and greywacke (HC4; short-term only) samples. Appendix F.3 does not present an approach to evaluate the arsenic leaching potential of waste rock, which should be considered for the NAG material targeted for construction of the tailings impoundment (IR-21). In consideration of the complex folding and faulting of the tightly interbedded argillite and greywacke units, the feasibility of physical segregation of PAG and arsenic leaching material will be challenging through either a chemical or lithological approach. Therefore, a comprehensive evaluation through modeling of ML/ARD material in the LeapfrogTM block model is required, which is referenced in Section 2.3 of Appendix F.2 of the EIS and may be underway. Sufficient sampling and testing should be completed to refine the model to evaluate the feasibility of segregation at the operational scale. Based on this evaluation, the recommended minimum sampling frequency of one sample for every 100,000 tonnes of waste rock mined in-pit provided in Section 4.1.1 of Appendix F.2 of the EIS should be re-evaluated to ensure that it provides sufficient resolution of data to support effective segregation of mine rock during operations. A higher sampling frequency may be required in zones of the pit where the argillite and greywacke are tightly interbedded and/or folded. For the ARD determination of operational monitoring samples, Section 2.1 of Appendix F.3 of the EIS recommends the analysis of sulphide sulphur and	a) Using the Leapfrog™ block model, complete a comprehensive evaluation of the spatial distribution of all mine rock samples reporting a carbonate NPR<2 (IR-20) and elevated arsenic leaching potential (IR-21). Provide images from the block model and updated quantities of both PAG and NAG-arsenic leaching material in relation to mine sequencing to support a detailed approach to locate and segregate waste rock for construction use, specifically material that is both NAG and not anticipated to leach arsenic. b) Provide an estimated volume of waste rock required for the tailings impoundment construction and compare this with the quantity of available NAG and non-arsenic leaching waste rock that can be feasibility segregated. c) Provide rationale for the proposed approach to test waste rock throughout operations for ARD, including specific test methods and justification for the operational sampling frequency. Provide details as to what would trigger the model to be revised as the Project advances.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				modified neutralization potential, while Section 4.1.1 of Appendix F.2 of the EIS identifies total sulphur and total carbon. As presented in IR-20, using total sulphur and carbonate neutralization potential is recommended and considered more conservative; however, graphite must be considered in the selection of the best approach for carbonate analysis. Both buffering capacity and total sulphur need to be considered, as the modified Sobek method is not practical to support rapid decision-making regarding waste rock segregation during operations. This information is needed to fully evaluate effects on surface water and subsequently fish and fish habitat.	
IR-26	NRCan	Part 2, Section 9.2 Monitoring	Appendix F3 – Section 4 Monitoring and Management	The EIS Guidelines requires the consideration of changes to water quality attributed to ML/ARD associated with the storage of tailings. Section 4.2.1 of Appendix F.3 of the EIS proposes using the minimum requirement for the monitoring frequency of tailings samples of one sample for every 100,000 tonnes of ore processed. Tailings sampling frequency should ideally be more frequent at first and then reduced based on adequate characterization of variability in contaminant levels; it should also be guided by the mine exploitation plan and ore zones that may present potential risks related to acid generation, arsenic, nickel and cobalt. As a result, groundwater, surface water and sediment quality need to be monitored to verify the accuracy of the predictions. Section 4.2.1 states that "*…kinetic testing in the form of saturated columns is currently being operated at the Lorax laboratory to quantify metal leaching rates under suboxic conditions.*" However, no information is provided. This information is required to verify the predicted tailings inventory, release rates and associated predicted contamination of groundwater and surface water and sediment quality and assess associated impacts to fish and fish habitat.	a) Justify the operational monitoring sampling frequency and whether it will be sufficient to capture variability in tailings contaminant inventory and release rates over life of the mine and adequately capture the changes in mineralogy as deposited tailings age. b) Provide data from column experiments. c) Confirm and explain how the predictions of contaminant inventory in the tailings and associated release rates and predictions of contamination to groundwater and surface water will be used to inform the tailing characterization program during the operation of the mine.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-27	ECCC Public	Part 2, 7.1.5 Groundwater and surface water	Section 6.4 Geology, Soils and Sediment Section 6.4.2.2 Touquoy Baseline Program Methodology	The EIS Guidelines require sediment quality analysis for key sites likely to received mine effluents. Section 6.4.1 of the EIS presents the rationale for selection of sediment as a VC because of the "*…potential for construction and mining activities, including the relocation of historic mine waste rock and tailings, to discharge sediment to nearby watercourses. Increased sediment loads can degrade water quality, smother benthic habitats and transport heavy metals and other pollutants. These contaminants in turn may negatively affect biota.*" Sediment quality is an important aspect of a healthy ecosystem especially in supporting fish health in the receiving environment. The Proponent conducted baseline sediment studies but has not modelled or predicted impacts to sediments nor is any monitoring program planned to evaluate sediment quality. While water quality modelling and monitoring programs give good information related to the health of the aquatic environment, continuous loadings of elevated COPC may be deposited to sediments over time which may then act as an ongoing source of contamination in the benthic environment which can affect fish health. Section 6.4.2.2 of the EIS states "*Sediment quality at the Touquoy Mine Site will not be affected by activities associated with the Project and so no assessment of the potential effects on sediment quality at the Touquoy Mine Site was conducted.*" However, supporting evidence for this statement was not provided. COPC in sediments in streams and rivers can be remobilized over time or during high flow events to create risks to downstream aquatic receptors. Without these predictions, it is difficult to evaluate the significance of risks to sediment quality.	a) Complete an assessment of potential effects to sediment quality or provide rationale as to why this is not required. b) Provide details on any monitoring or follow-up that is proposed to confirm predictions related to the Project's effects sediment quality. c) Provide supporting evidence for the assertion that the processing and storing of the FMS tailings concentrate at Touquoy will not affect sediment quality at Touquoy.
IR-28	ECCC NRCan IAAC EAC SuNNS	Part 2, 7.1.5 Groundwater and surface water Part 2, 7.2.2 Changes to groundwater and surface water Part 2, Section 9 Follow-up and Monitoring Programs	Section 2.4.1.1.2 Management of historic waste rock and tailings Section 6.4.3.4 Historic Tailings, Waste Rock and Current Sediment Quality Section 6.4.6.1 FMS Study Area Section 6.4.9 Proposed Compliance and Effects Monitoring Program, historical mine waste Appendix I.1 – Section 3.2 Remedial Option Selection Appendix I.2 – Revised Phase 1 Environmental Site Assessment	The EIS Guidelines require information on waste management and recycling (other than mine waste such as tailings and waste rock). Section 3.2 of Appendix I.1 states that previous reports indicate that historic water rock piles have the potential for acid generation and possible contaminant pathways related to improperly abandoned diamond drill holes. Section 3.3.1 of Appendix I.3 and Section 6.4.3.4 of the EIS reports that arsenic concentrations of up to four orders of magnitude greater than the Nova Scotia Environment Tier 1 Environmental Quality Standards. In addition lead and mercury exceeded the NSE Tier 1 EQS. Surface water samples had concentrations of aluminum, arsenic, cadmium, chromium and iron above the NSE Tier 1 EQS. This indicates that the waste rock in the area leaches the above metals into the environment. Figure 2 in Appendix A of Appendix I.3 indicates that the soil samples collected that have high concentrations of arsenic are attributed to historic waste rock and are located in the area of the proposed pit. Section 6.4.9 of the EIS states "*Delineation and subsequent management of historical tailings and waste rock (soil and sediment) will be completed, in advance of commencement of construction that is located within the footprint of Project infrastructure.*" Section 3.1 of Appendix I.1 of the EIS and Section 6.4.6.1 of the EIS present four remedial options and Section 3.2 of Appendix I.1 of the EIS presents a methodology for selecting a remedial option. However, no preferred remedial option has been selected. It is difficult to assess the effects and applicable mitigations of remediating historical tailings and waste rock without knowing which option is going to be selected.	a) Describe how historical mine waste would be managed before mine construction commences. b) Select a preferred remedial option for historical tailings and waste rock, with supporting evidence. c) Describe water management procedures and mitigations for the preferred remedial option. d) Conduct acid base accounting and shake flask extraction tests on historical tailings and waste rock at the Fifteen Mile Stream. Incorporate these results in an updated version of EMP 4 and clarify the criteria that will be used to decide whether historical tailings and waste rock are appropriate for direct disposal in the tailings management facility, or if cell encapsulation within the tailing management facility will be required (as discussed in Section 3.1.3 of Appendices I.1 and L.1 (EMP 4)). Alternatively, provide a rational for why base accounting and shake flask extraction tests are not required.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
			Appendix I.3 – Limited Phase II Environmental Site Assessment Appendix L.1 – EMP 4: Historical Tailings and Waste Rock Management Plan	Section 2.2 of Appendices I.1 and L.1 (EMP 4) outlines methods for delineation and characterization of historical tailings and waste rock prior to excavation. In addition to the total metals analyses reported in Appendix I.3, the use of acid base accounting and shake flask extraction tests is also recommended to assess the potential for ML/ARD from historical tailings. No acid base accounting or shake flask data are included for historical tailings in the EIS or supporting documents. Assessing the for ML/ARD potential of the historical tailings prior to excavation is important, especially for saturated tailings from wetland areas that have remained under low-oxygen, reducing conditions since deposition. Research has shown that tailings stored in wetland areas often contain reactive sulphides and other arsenic-bearing phases that can quickly oxidize upon exposure to atmospheric conditions (DeSisto et al. 2016)[14], releasing acidic waters and high concentrations of sulphate, arsenic, iron, and other elements (DeSisto et al. 2017)[15]. This information is needed to determine significance of effects on fish and fish habitat and human health receptors.	
Groundwater and Surface Water					
IR-29	IAAC ESFWA	Part 2, Section 7.1.5 Groundwater and surface water	Appendix B.1 Fifteen Mile Stream Gold Project Hydrogeological Investigation Section 6.5.3 Baseline Conditions	The EIS Guidelines require information on hydrogeology including temporal changes in groundwater flow (e.g. seasonal and long term changes in water levels). Table 6 of Appendix B.1 and Table 6.5-2 of Section 6.5.3.1.2 of the EIS provide groundwater levels for FMS 2018 hydrogeological boreholes. However, data is only provided from mid-August 2018 until June 2019. This does not allow for a single year of seasonal variability to be assessed. Section 6.5.3.1.2 states that groundwater level monitoring will continue at a quarterly basis; however, none of the results after June 2019 were reported. Similarly, Section 5.4.2 and Appendix G of Appendix B.1 of the EIS provides groundwater geochemical results and does not include data more recent than June 2019. Appendix G of Appendix B.1 of the EIS provides laboratory certificates of groundwater analysis. However, these results are not tabulated and compared against the relevant provincial and federal guidelines. In addition, Section 6.5.3 of the EIS which provides baseline conditions of groundwater only contains data from 2018 and 2019. This information is needed to assess the seasonal and temporal changes to groundwater which affect baseflow to surface water (fish habitat).	a) Provide groundwater levels measured at the site since June 2019. b) Update Appendix G of Appendix B.1 with groundwater geochemical results from data collected after June 2019. c) Tabulate the data from the laboratory certificates provided in Appendix G of Appendix B.1 and compare against relevant provincial and federal guidelines. Explain any seasonal variations or temporal changes in the data and highlight any values that exceed relevant provincial or federal guidelines/standards. d) Update Section 6.5.3 to include any more recently collected data after 2019. e) Update the effects assessment for groundwater using the complete data set, or validate that more recent data would not change any of the analyses that include groundwater data as an input or calibration parameter
IR-30	NRCan KMKNO Public	Part 2, Section 9 Follow-up and Monitoring	Section 6.5.10 Proposed Compliance and Effects Monitoring Program (p.252)	The EIS Guidelines require a follow-up program to verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the Project. In Table 10.1-1 of Section 10.1 of the EIS, the Proponent proposes a monthly water levels monitoring program in 27 existing wells and several new wells to be installed around the tailings	a) Discuss the technical and economic feasibility of monitoring groundwater levels daily for background and the most sensitive observation wells as part of the follow-up program.

[14] Desisto, S.L., Jamieson, H.E., Parsons, M.B. (2016) Subsurface variations in arsenic mineralogy and geochemistry following long-term weathering of gold mine tailings. Applied Geochemistry 73: 81–97; https://doi.org/10.1016/j.apgeochem.2016.07.013

[15] Desisto, S.L., Jamieson, H.E., Parsons, M.B. (2017) Arsenic mobility in weathered gold mine tailings under a low-organic soil cover. Environmental Earth Sciences 76: 773; https://doi.org/10.1007/s12665-017-7041-7 (includes acid-base accounting results for historical tailings)

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
			Section 10.0 Follow-up and Monitoring Programs Proposed (p.986; Table 10.1-1)	management facility. It is recommended that monitoring wells be placed south of the tailings management facility to verify groundwater flow direction and quality prior to groundwater impacting the Anti-Dam Flowage. Important fluctuations of the groundwater levels may occur over few days due to climatic inputs and may be misinterpreted with respect to the influence of the dewatering process when monthly monitoring is in place. The amount that is pumped from the open pit and pumping schedule also impact the variation in groundwater levels and this information is not provided. Background and most sensitive observation wells should be monitored daily for groundwater levels to adequately validate and update the groundwater predictive models. In addition, the monitoring plan for groundwater should provide: mapping of the final effluent discharge points; threshold concentrations for each parameter; timing or persistence of threshold concentration that would initiate treatment; supporting environmental effects monitoring of ecological features including criteria, metrics, and schedule; a description of the specific treatment technology that will be implemented if the threshold concentration or ecological criteria are exceeded; a schedule of implementation from the time of detection to the time of deployment of the treatment system; describe the limitations of the treatment system to manage storm water flow. This information is required verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the Project.	b) Provide an estimate of the total amount of water pumped resulting from the dewatering activities (at least on a monthly basis) as part of the follow-up program. c) Provide additional information on the monitoring plan for groundwater including: mapping of the final effluent discharge points; threshold concentrations for each parameter; timing or persistence of threshold concentration that would initiate treatment; supporting environmental effects monitoring of ecological features including criteria, metrics, and schedule; a description of the specific treatment technology that will be implemented if the threshold concentration or ecological criteria are exceeded; a schedule of implementation from the time of detection to the time of deployment of the treatment system; describe the limitations of the treatment system to manage storm water flow.
IR-31	IAAC EAC NCNS ESFWA	Part 2, Section 7.1.5 Groundwater and surface water	Appendix B.1 - Fifteen Mile Stream Gold Project Hydrogeological Investigation Section 6.5.3.1 FMS Study Area Baseline Conditions Section 6.5.2.1.1.1 Groundwater Data Collection Appendix B.8 - 2017 Geotechnical Hydraulic Conductivity Data Summary	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area, which discusses the hydrostratigraphy and groundwater flow systems; a sensitivity analysis that will be performed to test model sensitivity to climatic variations (e.g. recharge) and hydrogeologic parameters (e.g. hydraulic conductivity). Table 7 in Section 5.3.1 of Appendix B.1 and Table 6.5-3 of Section 6.5.3.1.4 of the EIS provide packer testing results for the FMS 2018 hydrogeological boreholes. However, the test interval is not linked to a hydrostratigarphic units identified in Section 3.3.3 of Appendix B.2 as necessary for the FMS groundwater modelling input. Table 8 in Section 5.3.2 of Appendix B.1 of the EIS provides single well response test summary but does not relate the testing interval to hydrostratigraphic units identified in Section 3.3.3 of Appendix B.2. Table 9 in Section 5.3.3 of Appendix B.1 of the EIS provides hydraulic conductivity estimates based on soil grain size but does not relate the soil type to hydrostratigraphic units identified in Section 3.3.3 of Appendix B.2 for use in the FMS groundwater model. Appendix E of Appendix B.1 provides the single well response test analysis sheets. The single well response tests were analysed using the Hvorslev analysis. This method is for confined aquifers and may produce erroneous results when used for unconfined aquifers as is the case at Fifteen Mile Stream Project Area. Several other methods such as Bouwer-Rice (1976) are methods specifically designed to be used with unconfined aquifers.	a) Provide hydraulic conductivity testing that correlates to the hydrostratigraphic units identified in Section 3.3.3 of Appendix B.2. b) Revise the single well response test analysis to use a method that reflects the ground conditions observed (e.g. unconfined aquifer). c) Provide the data and analysis used to estimate the hydraulic conductivities from the 2017 packer testing of the Egerton-MacLean. d) Provide a figure illustrating the drawdown extent for the four sensitivity analysis simulations. e) Provide an explanation as to why all surface water features are not represented in the model with a boundary condition. Explain the effect that this would have on the modelled result. Discuss the impacts that the drawdown in groundwater levels would have on surface waterbodies. Provide an explanation, supported by observed or published data, as to why areas were modelled with a reduced recharge.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				Section 6.5.2.1.1.1 states that in 2017, angled geotechnical boreholes were drilled in the Fifteen Mile Stream Study Area with select boreholes targeting the Egerton-MacLean (Golder 2018) and that packer testing was conducted to understand the hydraulic conductivity. Appendix B.8 provides the hydraulic conductivity cross-sections from this investigation. However, no data or analysis is provided. Section 4.4 of Appendix B.2 of the EIS describes four sensitivity analysis simulations of the model. Section 5.0 of Appendix B.2 states that the steady-state extent of drawdown due to dewatering of the open pit based on a 1 m drawdown contour extends to 830 m from the open pit. However, the extent of drawdown is not provided for the four sensitivity analysis simulations. Figure 6 of Appendix B.2 of the EIS illustrates the model boundaries and recharge on the upper surface. There does not appear to be a good correlation between surface water features (ponds, streams, rivers, etc.) and seepage nodes or constant head boundaries. The impacts on surface waterbodies caused by the drawdown of groundwater during operations and closure should be discussed. Figure 6 of Appendix B.2 of the EIS also illustrates that recharge is reduced to 75 millimetres per year in the area of the pit while in other areas the recharge is set to 150 millimetres per year. The rationale provided for recharge is based on higher infiltration values being assigned to areas with an elevation above 136 metres above sea level. This seems to have been arbitrarily assigned and does not account for other things that can change recharge amounts such as ground cover (forested verses cleared areas) and impermeable surfaces (buildings/pavement) verses permeable surfaces(forest/cleared areas). Section 5.1 of Appendix B.3 presents monthly regional climate data for the FMS to calculate potential evapotranspiration. This data does not seem to have been used in the FMS groundwater model to determine recharge. This information is needed to ensure that the FMS groundwater model of sufficient quality to be relied upon for decision making purposes which is required to fully evaluate changes in groundwater and their effect on surface water and subsequently fish and fish habitat.	
IR-32	NRCan IAAC KMKNO EAC	Part 2, Section 7.1.5 Groundwater and surface water	Appendix B.1 - Fifteen Mile Stream Gold Project Hydrogeological Investigation Appendix B.2 - Fifteen Mile Stream Gold Project Hydrogeological Modelling Assessment Appendix B.8 - 2017 Geotechnical Hydraulic Conductivity Data Summary	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area, which discusses the hydrostratigraphy and groundwater flow systems; a sensitivity analysis that will be performed to test model sensitivity to climatic variations (e.g. recharge) and hydrogeologic parameters (e.g. hydraulic conductivity). The Proponent indicates that the hydrogeological model was not calibrated with reported baseflow values because those values were not available at the time of model construction. It is well known that several combinations of hydraulic conductivity and recharge values can provide the same exact calibration performances, but each of them produce different flux (or baseflow) estimates. Thus, hydraulic head alone as a calibration target does not guarantee the accuracy of the simulated baseflow. Section 1.3 of Appendix B.2 of the EIS indicates that data used to calibrate and inform the FMS groundwater model was limited to data collected prior to June 2019. Section 5.1 of Appendix B.10 of the EIS provides groundwater levels recorded up to January 2020. The model should be updated to ensure that it accurately reflects seasonal changes in groundwater levels so that there can be confidence in the predictions under a range of natural conditions. Section 6.5.5.2.1 of the	a) Calibrate the FMS hydrogeological model with observed baseflow values. b) Document the approach to model rivers (e.g., streambed conductance values) to clearly understand the numerical assumptions made with respect to the nature of the link between the rivers and the aquifers. c) Update the model to include 2019 and 2020 groundwater data for calibration purposes and to ensure that the model remains calibrated under wetter and dryer conditions. Explain how the model will be updated and verified against new data in the future. d) Revise the model to more accurately reflect areas of groundwater discharge and recharge or provide an analysis of how this inaccuracy in the FMS groundwater model may affect predicted results.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				EIS states that as additional baseline information is obtained, the model calibration will be verified against the new data; however, this was not presented in Appendix B.2. Section 5.2 of Appendix B.1 of the EIS states that slight upward gradients between A/B well pairs were observed at locations FMS-HG18-04, -07, -10, -15 and -16. Table 2 in Section 3.4 of Appendix B.2 indicates that these upward gradients are not reflected in the FMS groundwater model at FMS-HG18-04, -10, -15, -16. Upward gradients reflect areas where groundwater is discharging to the surface which can be important sources of baseflow for surface water bodies. It is important that the FMS groundwater model reflects areas of discharge and recharge of groundwater. It is essential to use baseflow estimate to calibrate a numerical model to ensure that indirect effects of dewatering activities on surface water bodies and wetlands can be assessed accurately. This information is needed to ensure that the FMS groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	
IR-33	IAAC KMKNO ESFWA NCNS	Part 2, Section 7.1.5 Groundwater and surface water	Section 6.4.3.1 Topography and Soils Appendix B.2 - Fifteen Mile Stream Gold Project Hydrogeological Modelling Assessment, Section 2.2.2.2	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area. For a groundwater model to be appropriate, the data used in its creation must be supported by literature reviews, observed or analysed data. The FMS groundwater model in Appendix B.2 has many assumptions that are not supported by literature reviews, observed data, or analyzed data. For example, Table 1 of Section 3.2 in Appendix B.2 of the EIS states that "groundwater flow is dominated by the overburden and upper bedrock units"; therefore accurately assessing overburden and upper bedrock thickness is critical to ensure the model reflects site conditions. However, the thickness in overburden (glacial till) is inconsistent throughout the EIS with several sections providing different values (Section 6.4.3.1 of the EIS, Section 6.4.3.2 of the EIS, Section 3.4.1 of Appendix I.2, and Section 1.2.4 of Appendix I.3). However, none of the values provided support the value used in Appendix B.2, Section 2.2.2.2. Furthermore, the value used is not supported by literature references cited, borehole logs or other observed data. The groundwater contours illustrated in Figure 5 of Appendix B.2 appear to be generated based on a combination of groundwater levels measured in monitoring wells and selected (but not all) surface water bodies. No rationale is provided in Section 2.3.1 as to why certain surface water bodies were selected while others were omitted in determining groundwater elevations. In addition, Appendix B.1 states that there are both upward and downward gradients of groundwater flow from shallow to deep bedrock. This should be illustrated by providing separate groundwater elevation contours for the deep and shallow groundwater systems. Likewise, Section 6.4.3.3 of the EIS states that the FMS study area sediments were metamorphosed and deformed into a series of tight, northeast-trending regional folds. However, Table 1, in Section 3.2 of Appendix B.2 states that a 10:1 horizontal to vertical anisotropy in the geologic strata was assumed. This assumption is typically valid in horizontally bedded sedimentary rocks where groundwater preferentially flows along bedding planes. However, in the case of metamorphosed folded sedimentary rocks the bedding planes are not horizontal and preferential flow paths can be dominated by fractures rather than bedding planes. There is no supporting evidence (literature review, data from borehole logs, structural analysis of the site) to substantiate this assumption.	a) Revise the FMS groundwater model to be consistent with the observed conditions presented in the EIS and its appendices or provide additional observed data that supports the following input parameters in the model: • overburden thickness; • vertical hydraulic gradients and shallow verses deep groundwater flow regimes; • vertical anisotropy; • bedrock geology including the faults in the area; and • increased hydraulic conductivity around the pit due to blasting. b) Provide a rationale as to why certain surface water bodies were selected or omitted in determining groundwater elevations. c) Assess the potential effects on flows and travel time to the Killag River and other surface waterbodies including wetlands, if pit water with higher concentrations of contaminants flow through the most permeable units (overburden and fractured bedrock) or if the bedrock fractures open up in the pit due to blasting.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				Similarly, Section 6.4.3.5 of the EIS provides the bedrock geology. However, this geology is not reflected in Section 2 or 3 of Appendix B.2. Figure 6.4-6 illustrates both the Seigel Fault Zone and the Serpent Fault zone extending beyond the extent of the open pit. However, in the modelled simulation illustrated in Figure 13 of Appendix B.2, the zone of enhanced hydraulic conductivity representing the fault is truncated within the pit and does not extend to the modelled boundary. This may result in an under estimation of potential impacts to surface water bodies. Section 2.2.4 of Appendix F.1 states "Generally, blasting practices will lead to the development of a blast-influenced (fracture) zone within the pit walls, a portion of which can be expected to fail and collapse onto underlying pit benches over time." However, a zone of increased hydraulic conductivity around the pit was not considered in the groundwater model. This could result in an underestimation of pit inflows, which would lead to an underestimation of contact water. In addition, if pit water flows through the more permeable overburden, fractured bedrock layer travel times to the Killag River and other surface waterbodies could be underestimated, likewise if there is a discrete fracture between the open pit and the Killag River in bedrock, the flows and travel time from the open pit to the Killag could be underestimated. This information is needed to ensure that the groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	
IR-34	IAAC	Part 2, Section 7.1.5 Groundwater and surface water	Section 6.5.6.1 FMS Study Area Groundwater Interactions Appendix B.2 - FMS Gold Project Hydrogeological Modelling Assessment	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area, which discusses the hydrostratigraphy and groundwater flow systems; a sensitivity analysis will be performed to test model sensitivity to climatic variations (e.g., recharge) and hydrogeologic parameters (e.g., hydraulic conductivity). Section 6.5.6.1 of the EIS defines the project activities that could cause changes to groundwater quality and quantity as 1) hardening of surfaces therefore reducing recharge; 2) increased recharge thereby potentially increasing groundwater table level; 3) open pit dewatering; and 4) blasting. In the FMS groundwater model (Appendix B.2) a reduction in recharge based on areas of reduced infiltration due to an increase in impermeable surfaces is not considered. This information is needed to ensure that the groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	a) Revise the FMS groundwater model (Appendix B.2) to consider the potential changes to groundwater quantity and quality based on hardening of surfaces, increased recharge, open pit dewatering, and blasting. b) Describe the effects that these changes would have on groundwater recharge and elevation of the groundwater table by updating the groundwater model, including the potential reduction in baseflow to nearby wetlands and surface water bodies.
IR-35	IAAC KMKNO EAC ESFWA SC	Part 2, Section 7.1.5 Groundwater and surface water	Appendix I.4 – Groundwater Flow and Solute Transport Modelling	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area, which discusses the hydrostratigraphy and groundwater flow systems. Appendix I.4 provides an updated model of the Touquoy Mine where concentrate tailings from the FMS are to be deposited. The modelled output differs significantly from the values provided in the 2019 EIS. However, insufficient information was provided to determine exactly what values were changed to obtain a different result. For example, Section 3.2 of Appendix I.4 of the EIS provides conceptual model boundaries and indicates that natural hydrologic and hydrogeologic boundaries such as watershed boundaries and surface water bodies were used to define the lateral extent of the conceptual model. However, the values assigned to these model boundaries were not provided. In particular, the changes made to the groundwater model with respect to Moose River and other surface water bodies to	a) Provide the values of all model boundary conditions including the type of condition applied (e.g. constant head, constant flux, river, drain, etc.). b) Provide the values assigned to the constant head and river boundary conditions for the surface water bodies and the methodology used to select the values. Provide the changes, if any, to the values assigned to Moose River and other surface waterbodies to obtain a better calibration with observed drawdown in groundwater and reduction in baseflow observed at Moose River and other surface waterbodies that could be affected. c) Provide the evidence to support the thickness of the four overburden units.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				obtain a better calibration with observed drawdown and reduction in baseflow observed at Moose River and other surface waterbodies should be explained. Figure 4.3 in Appendix I.4 illustrates the locations where surface water boundary conditions were assigned. However, the values assigned to these surface water boundaries were not provided. Section 3.3.1 of Appendix I.4 of the EIS provides the conceptual model for overburden hydrostratigraphic units including identifying four overburden units (stony till, silt till, organics and silty drumlin). This section states that the stony till unit is assumed to be 4 metres thick but does not provide evidence to substantiate this assumption. No thickness is provided for the other three overburden units. Figure 4.2 in Appendix I.4 of the EIS states that weathered fractured bedrock is 10 metres thick; however, this is not related to rock quality designations for boreholes and there is no discussion as to whether or not this varies between the five identified bedrock units. This information is needed to ensure that the Touquoy groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	d) Provide rock quality designations for the five identified bedrock units to support the assumption that fractured bedrock extends 10 metres.
IR-36	IAAC KMKNO	Part 2, Section 7.1.5 Groundwater and surface water	Appendix I.4 – Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Fifteen Mile Stream Tailings in Touquoy Open Pit Section 6.5.3.2 Touquoy Mine Site Baseline Conditions	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area, which discusses the hydrostratigraphy and groundwater flow systems. Section 3.3.1 of Appendix I.4 states that the hydraulic conductivities of till is estimated to range from $3x10^{-7}$ to $1x10^{-5}$ metres per second; however, no information is provided as to how these values were estimated, which of the four identified till units were tested, and what screen intervals were tested (e.g., was fractured bedrock screened in addition to overburden). Similarly, in Section 3.3.2 of Appendix I.4 of the EIS, ten hydrostratigraphic units are described for bedrock and a range of hydraulic conductivities were provided. However, it is unclear if all bedrock units were tested for hydraulic conductivity and no information is provided regarding the type of testing. Figure 3.1 in Appendix I.4 of the EIS illustrates the range in hydraulic conductivity estimates based on packer tests and slug tests, but there is no indication of where these tests were located at the site and what unit was tested. Section 6.5.3.2 of the EIS provides hydraulic conductivity estimates of various hydrostratigraphic units. However, the calibrated modelled values are not within the same order of magnitude of the field estimated values provided in Section 6.5.3.2 of the EIS. This information is needed to ensure that the Touquoy groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	a) Provide details on how the hydraulic conductivity was estimated including which overburden and bedrock units were tested, and the screen interval tested. If not all overburden and bedrock units were tested for hydraulic conductivity or if all tests were conducted with screened sections in both overburden and bedrock, provide a rationale for not testing all identified units. Discuss the uncertainty that this would have on the modelled results. b) Provide the locations that were tested for hydraulic conductivity in overburden and bedrock. c) Revise the Touquoy groundwater model to reflect hydraulic conductivities estimated from field data or provide a rationale for using values that are different by orders of magnitude.
IR-37	IAAC KMKNO ESFWA	Part 2, Section 7.1.5 Groundwater and surface water	Appendix I.4 – Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Fifteen Mile	The EIS Guidelines require an appropriate hydrogeologic model for the Project Area, which discusses the hydrostratigraphy and groundwater flow systems; a sensitivity analysis will be performed to test model sensitivity to climatic variations (e.g., recharge) and hydrogeologic parameters (e.g., hydraulic conductivity). Section 4.3.5 of Appendix I.4 of the EIS states that the extent of the Touquoy pit was modelled as of August 2019. However, Appendix I.4 (the Touquoy groundwater model) was updated in	a) Provide the modelled results simulating the pit extent for 2020 and the calibration to observed groundwater levels and baseflow. b) Provide the rationale for not having calibration targets (monitoring wells, river gauges) more distributed throughout the model domain. Discuss how this lack of data will affect the accuracy of modelled predictions.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
			Stream Tailings in Touquoy Open Pit	2020/2021. It is unclear if the pit is modelled at the extent that was mined in 2019 or if it was updated to reflect the extent that was mined in 2020/2021. If the model does accurately reflect groundwater levels and baseflow in 2020 it provides more confidence in the predictive ability of the model. Figure 4.4 of Appendix I.4 illustrates the locations of the calibration targets. This shows that all the calibration targets are immediately adjacent to the mine site features with no wells located in the study area. This lack of distributed data can result in a poor correlation with regional groundwater levels resulting in poor predictive capabilities of the model. Table 4.6 of Appendix I.4 provides calibrated model parameters. Although there are fourteen different hydrostratigraphic units identified, the expected range is the same for all overburden units and the same for all bedrock units. The upper and lower expected ranges do not seem to be based on site specific data relating to the actual hydrostratigraphic units. Vertical anisotropy seems to have been assigned via PEST rather than due to any geological properties identified. Site-specific observations and data must be provided to support the reasonableness of the vertical anisotropy. Figure 4.6 of Appendix I.4 illustrates the calibration sensitivity to parameter estimates. However, it does not indicate the number of calibration targets (monitoring wells or surface water monitoring locations) in each identified hydrostratigraphic unit. Figure 5.4 of Appendix I.4 illustrates the drawdown at the end of FMS Operations at the Touquoy Mine. The drawdown contours are very tight and parallel to Moose River. This may indicate that the river and constant head boundary conditions assigned are influencing the drawdown more in the model than they may in nature. This can result in an over prediction in the amount of baseflow that will flow into Moose River at the end of operations. Table 5.3 and 5.4 in Appendix I.4 provides the source term concentrations used to predict mass loadings to Moose River from Groundwater. Section 5.4.1.1 of Appendix I.4 states that the solute transport model assumes that FMS tailings would have the same characteristics as Touquoy based on the similarity in the source rock and that the tailings would be produced in the same mill. However, Appendix F.1 provides source terms for tailings at the Fifteen Mile Stream site which would provide a more accurate result. The source term concentrations provided in Table 5.3 and 5.4 of Appendix I.4 are not consistent with those calculated for Fifteen Mile Stream tailings in Appendix F.1 of the EIS. The contaminant transport model should be updated to use the source terms for the Fifteen Mile Stream tailings. Section 5.4.2.1 of Appendix I.4 of the EIS states that Figures 5.11 and 5.12 illustrate that predicted concentrations are below detection limits; however, the solute transport model does not predict concentrations of individual metals instead provides a relative concentration. This relative concentration should be applied to the contaminants of concern which have concentrations above the detection limit. This information is needed to ensure that the Touquoy groundwater model can reliably evaluate changes in groundwater and subsequent effects on surface water and fish and fish habitat.	c) Provide site-specific data to support the expected ranges for the calibration targets including groundwater recharge, evapotranspiration, hydraulic conductivity, and vertical anisotropy. d) Provide the number of calibration targets in each of the hydrostratigraphic units in Figure 4.6 of Appendix I.4. e) Describe how Moose River was modelled and if the boundary condition set is influencing the drawdown contours. Discuss the potential for over-predicting the groundwater contribution to at the end of operations. f) Update the contaminant transport model to use the source terms calculated in Appendix F.1. g) Apply the predicted relative concentration to demonstrate the concentrations anticipated into Moose River for individual COPC.
IR-38	ECCC	Part 2, Section 7.4 Mitigation measures	Section 6.5.5.4.2 Groundwater Quality	The EIS Guidelines require measures be considered that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project.	a) Clarify how receiving environment waters can be used to moderate effects thresholds. Revise the effects assessment considering that the magnitude of effects should not change depending on receiving environment.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				Section 6.5.5.4.2 of the EIS states "*If the magnitude of the effect is negligible, low or moderate, the residual effect is considered to be not significant as this groundwater will likely be reporting to a surface water body that will likely moderate the potential effect on overall water quality*." Relying on dilution of contaminants in the receiving surface water environment to mitigate all but the most significant effects is not a conservative approach. Rather, this approach increases the uncertainty associated with estimates of the severity of effects associated with the Project. It is unclear how receiving environment waters can be used to moderate effects thresholds. The magnitude of low, moderate and significant effects should not change depending on receiving environment. This information is required to ensure that the effects to surface water are not being underestimated by ignoring the potential contaminants that could be transmitted through groundwater.	
IR-39	KMKNO ESFWA NCNS	Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix B.2 Fifteen Mile Stream Gold Project Hydrogeological Modelling Assessment Appendix B.6 Fifteen Mile Stream Gold Project Surface Water Quality Modelling Assessment	The EIS Guidelines require a description of changes to groundwater recharge/discharge areas and any changes to groundwater infiltration areas. Section 2.5.2 of Appendix B.6 states that net change to groundwater inflows to and outflows from surface water systems were provided by the concurrently developed FMS hydrogeological model. However, it is unclear as to what outputs from groundwater model were used in the hydrological model. Section 4.2 of Appendix B.2 of the EIS provides the seepage from the tailings management facility and the waste rock storage area. However, the seepage from the open pit during the post-closure phase when it is flooded is not considered. This could result in an underestimation of the potential contaminants that could impact surface waterbodies. The FMS groundwater model provided in Appendix B.2 was for steady-state flow and did not consider contaminant transport. Therefore, no estimates of contaminant concentrations, plume size, or mass loading was considered using the FMS groundwater model. As contaminant transport modelling was not conducted, the model was unable to predict the mass of contaminants that will pass from groundwater to surface water. Therefore, it is unclear how loading of contaminants to surface water from groundwater was included in the surface water assessment. This information is needed to fully evaluate changes in groundwater and the subsequent effects on surface water and fish and fish habitat.	a) Provide the output values and scenarios (e.g. current conditions, operations, post-closure) from the hydrogeological model used in the hydrological model. Provide the rationale for using the groundwater values chosen in the hydrological model. b) Provide particle tracking analysis for seepage from the pit during the post-closure phase. Provide the predicted flow rate on the expected seepage from the pit to the surface waterbodies. Provide an assessment on how this might affect surface water quality. c) Provide the rationale for not conducting contaminant transport modelling or provide an estimate of the predicted contaminant concentrations, plume size and mass loading that will result from the Project. d) Describe how the loading of contaminants from groundwater to surface water was considered in the surface water assessment.
IR-40	IAAC	Part 1, Section 3.2.3 Spatial and temporal boundaries	Section 6.5.5.1.1 Spatial Boundaries	The EIS Guidelines require a description of the spatial boundaries, including local and regional study areas, of each valued component to be used in assessing the potential adverse environmental effects of the project and provide a rationale for each boundary. In its description of the LAA for groundwater, Section 6.5.5.1.1 of the EIS states that "*the extent of the LAA is approximately 3 km which is larger than the 800-setback radius from blasting as required by Nova Scotia*." It is unclear if this is indicating that the LAA extends 3 kilometres in all directions from potential blasting, and therefore encapsulates the required setback of 800 metres from blasting.	a) Clarify the statement "the extent of the LAA is approximately 3 km which is larger than the 800-setback radius from blasting as required by Nova Scotia". Explain why blasting was considered in defining the LAA for groundwater.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				This information is needed to fully understand the spatial boundaries provided and how they relate to potential effects on groundwater.	
IR-41	IAAC	Part 2, Section 7.5 Significance of residual effects	Section 6.5.5.4.1 Groundwater Quantity Section 6.5.5.4.2 Groundwater Quality	The EIS Guidelines require the identification of criteria used to assign significance ratings to any predicted adverse effects, with clear and sufficient information to enable review of the Proponent's analysis of the significance of effects. Section 6.5.5.4.1 of the EIS indicates that the criteria for determining the magnitude of residual effects of Project activities on groundwater quantity is a change in the groundwater table such that it has a negative effect on a groundwater receptor such as drinking water wells or surface water features such as streams and/or wetlands. However, Sections 6.5.8.1.3.2 and 6.5.8.1.4 of the EIS state that effects of changes to groundwater quantity on surface water features are assessed later in the surface water and wetland sections of the EIS, and these potential adverse effects are therefore not addressed in the residual effects analysis for groundwater. It is unclear why surface water features are included in the criteria for determining significance of residential effects on groundwater if the subsequent analysis deems that these types of effects are indirect and instead assessed as part of another valued component. Section 6.5.5.4.2 of the EIS indicates that magnitude criteria for groundwater quality include consideration of Health Canada's 2017 *Guidelines for Canadian Drinking Water Quality Summary Table.* In Section 6.5.3.1.9, it was noted that Health Canada issued a new guideline for manganese in 2019; the Agency notes that other parameters, including cadmium and copper, were also updated since 2017. It is unclear whether the most recent guideline values for specific parameters have been considered. This information is needed to determine if effects are significant.	a) Clarify how the magnitude criteria has been applied in the groundwater analysis, or revise the definition of magnitude to accurately reflect that effects on surface water features are not considered in residual effects predictions for groundwater quantity. b) Clarify that the current Health Canada guidelines for specific parameters, as found in the online version of Health Canada's summary table, have been considered in assigning the magnitude criteria for groundwater quality.
IR-42	IAAC ECCC	Part 2, Section 7.1.5 Groundwater and Surface water Part 2, Section 7.2.2 Changes to groundwater and surface water	Section 6.5.7.1 Groundwater Quantity Section 6.5.7.1.1 Mitigation Section 6.5.7.2 Groundwater Quality Section 6.5.7.2.1 Mitigation	The EIS Guidelines require a description of changes to groundwater quality associated with the storage or release of any mine effluents or drainage including surface runoff. Table 6.5-10 of Section 6.5.5.2 of the EIS provides the potential groundwater interactions with project activities at the Touquoy Mine site. The simulated concentrations are given for the south-western property line. However, it is unclear if the calculations take into consideration the existing concentrations of the COPC in the receiving waters when determining the concentration. Table 6.5-10 should be revised to contain the concentration of each parameter in the receiving water predevelopment (or a range of concentrations), concentration in receiving water from the most recent sampling during mine operations, predicted concentration of effluent at the outfall, predicted concentration of effluent 100 m from the outfall and predicted concentration at the south-western property boundary. Section 6.5.5.4 of the EIS defines significance as a residual effect of the change in groundwater quantity if the water table is not expected to return to near baseline water levels. Section 6.5.6.2 of the EIS indicates that the concentrations of all parameters at the property line after 500 years of travel are predicted to be less than the Canadian Drinking Water Guidelines. The average concentrations in the discharge to Moose River stabilize after about 150 years. Based on this definition it would seem that the effects could be considered significant as 500 years to return to baseline is well beyond a reasonable amount to time to monitor the site.	a) Revise Table 6.5-10 of Section 6.5.5.2 of the EIS to provide the concentration of each parameter in the receiving water predevelopment (or a range of concentrations), concentration in receiving water from the most recent sampling during mine operations, predicted concentration of effluent at the outfall, predicted concentration of effluent 100 m from the outfall and predicted concentration at the south-western property boundary of the Touquoy mine site. b) Describe any mitigations that will be employed to treat the effluent at the Touquoy Mine Site as a result of depositing the FMS tailings concentration or provide the rationale why mitigations are not required given that concentrations are not predicted to stabilize in Moose River for 150 years and at the property line for 500 years. If mitigation measures are already in place, provide a description and revise the significance determination if required.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				Although several mitigation measures related to the groundwater quantity and quality effects assessment (e.g. toe drain, seepage collection ponds, water management system which collects stockpile and waste rock storage area runoff and infiltrated water via a perimeter ditch system, cut off trenches, PAG cover) are proposed at the FMS Mine Site, Section 6.5.7.1.1 states that no specific mitigation is required at the Touquoy Mine Site. This information is needed to determine if the mitigations proposed are sufficient to prevent long-term adverse effects on groundwater quality and quantity.	
IR-43	IAAC	Part 2, Section 7.1.5 Groundwater and surface water	Appendix B.7 – Section 3.2.3.2 Natural Runoff Section 6.6.8.2.2.3 Local Catchment Predictions – Water Quality (pg. 349)	The EIS Guidelines require seasonal surface water quality, including analytical results (e.g. water temperature, turbidity, pH, dissolved oxygen profiles) and interpretation for representative tributaries and water bodies including all sites that will receive mine effluents or runoff. Section 3.2.3.2 of Appendix B.7 of the EIS states that "*baseline surface water quality data is not available for WC [watercourse] 12; as such, the baseline dataset for SW2 is used to represent the quality of natural runoff associated with the WC12 watershed.*" However, based on Figures 6.6-4 and 6.6-6, SW-2 is located at the outfall of the hydroelectric dam at Seloam Lake. Justification is required as to why this is a more suitable location than other streams that were monitored such as SW4. Justification is also required as to why no baseline surface water data was collected at WC12 given that it was required for Appendix B.7 Hydrological and Surface Water Quality predictions at WC12. In addition, average water quality data is presented in Table 5 of Section 3.2.3.2 of Appendix B.7 of the EIS rather than the range of values which could be expected to occur throughout the year. The use of averages in the Hydrological and Surface Water Quality Modelling Assessments for WC12 can result in an underestimation of the effects as the toxicity to fish generally occurs when concentrations in surface water are at their highest rather than at average levels. This information is needed to ensure that the baseline data used in the assessment is representative and can support the surface water quality assessment.	a) Provide baseline data for WC12. b) Update the Hydrological and Surface Water Quality Modelling Assessments for WC12 using the highest concentrations in modelling when assessing potential effects on fish and fish habitat.
IR-44	IAAC	Part 1, Section 4.3 Study strategy and methodology	Appendix B.9 – Methods and Model Inputs (pg. 2)	The EIS Guidelines require a description of the methodology used to assess project-related effects. Assumptions will be clearly identified and justified. All data, models and studies will be documented such that the analyses are transparent and reproducible. All data collection methods will be specified. The uncertainty, reliability, sensitivity and conservativeness of models used to reach conclusions must be indicated. The section entitled methods and model inputs in Appendix B.9 of the EIS states that the realignment design was not modelled, rather, the range of stream velocity estimated through the revised design was compared from those modelled using the KP (2020) design for applicability to this downstream hydraulic assessment. No rationale was provided as to why this method was selected or why it is appropriate. This information is needed to determine the adequacy of the methodology used for the realignment design.	a) Provide a rationale as to why the comparison with the KP (2020) design for applicability to the downstream hydraulic assessment is appropriate or update the modelling for the conditions anticipated to occur during each phase of mine construction, operations, closure/reclamation, and post-closure.
IR-45	IAAC	Part 2, Section 7.1.5 Groundwater and surface water	Appendix B.9 – Sediment Mobility (pg. 5)	The EIS Guidelines require a discussion of the hydrogeologic, hydrologic, geomorphic, climatic and anthropogenic controls on groundwater flow as well as changes to surface water quality, including seasonal changes in runoff entering watercourses. The section entitled Sediment Mobility in Appendix B.9 of the EIS states that the simulated stream velocity in the north and south channel is predicted to be equal to or above 0.1 m/s under	a) Provide the geomorphic analysis of water features for north and south channel. b) Provide a description of the composition and potential mobility of sediments and the stability of the existing stream system.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				baseline and operational conditions which is sufficient to mobilize silts and clays. It goes on to state "*with geomorphic analysis underway on these water features, additional detail will become available on the composition and potential mobility of sediments and the stability of the existing stream system.*" The EIS does not provide details on the composition of potential mobility of sediments nor the stability of the existing stream system. This information is required assess the potential effect on water quality.	
IR-46	IAAC KMKNO NCNS	Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix I.5 – Section 6.0 Effluent Water Quantity and Quality Appendix B.6 – Final – Surface Water Quality Modelling Assessment Report	The EIS Guidelines require the presentation of all direct and indirect effects on water quantity that could occur as a result of project components. Section 6.0 of Appendix I.5 of the EIS describes the potential tailings deposition scenarios considered which are as follows: • "*Base Scenario: The tailings deposited in the Touquoy pit from processing the ore concentrate from the FMS [Fifteen Mile Stream] deposit only* • *Cumulative Effects Scenario: The tailings deposited in the Touquoy pit from processing the FMS [Fifteen Mile Stream] ore concentrate blended with Cochrane Hill project ore concentrate, and ores from the Beaver Dam and Touquoy mine projects.*" Based on the minimum three-year delay expected for Cochrane Hill; it is unlikely that Cochrane Hill concentrate will be blended with FMS concentrate. In addition, pending regulatory approval, the Touquoy tailings may be deposited in the Touquoy pit prior to the FMS or the Beaver Dam tailings or concentrate. The scenarios should be revised to reflect the current plans of Atlantic Gold and break down the effect of adding tailings or concentrate from each of the mines when they could be reasonably predicted to be deposited temporally. The groundwater flow model in I.4 does not consider that the hydraulic conductivity around the pit would be increased by up to 10 metres due to increased blasting fractures (Section 6.5.8.1.2). Based on Google Earth the edge of the pit is only 50 metres from Moose River on its western side. Therefore an increase in hydraulic conductivity over 10 metres could significantly increase the speed at which mine contact water reaches Moose River during the period when the pit is being filled with FMS tailings and post-closure. Therefore, the model and the assimilative capacity modelling may both underestimate the input of mine water to Moose River. Section 9.1 of Appendix I.5 of the EIS provides the Cormix model assumptions. The model inputs use the same average flow in Moose River when considering the higher flow condition and lower flow condition, only the climate normal effluent flow is changed. Section 8.0 of Appendix I.5 states the pit effluent and the river flow are driven by the same meteorological factors. Therefore, it is unclear why the higher flow condition would not assume a higher flow in Moose River and vice versa with the lower flow condition. Temperature effects at the effluent discharge point and within the mixing zone, including downstream watercourse impacts, were not clearly identified in the EIS. The assumption that both the effluent and receiver would have the same temperature of 10 °C and the same density of 1000.5 kg/m^3 does not seem to be supported by data. The temperature of the water would be expected to be at or below freezing in winter and the temperature in the pit in summer would be expected to be warmer than in Moose River given that there is likely some contribution of groundwater to the baseflow of Moose River that would moderate the temperature.	a) Describe additional potential tailings deposition scenarios: • FMS concentrate only; • Touquoy tailings plus FMS concentrate; • Touquoy and Beaver Dam tailings plus FMS concentrate; and • Touquoy and Beaver Dam tailings plus FMS and Cochrane Hill concentrate. b) Calculate the additional loading of contaminants that may occur if the blasting of the pit increases the hydraulic conductivity causing a hydraulic connection between the pit and Moose River. c) Provide the rationale for using the same average flow in Moose River when assessing the higher and lower flow condition. d) Assess the mixing model using summer and winter temperatures for the pit water and Moose River, in addition to the average condition of 10 °C to assess the effects of differences in temperature to the mixing model. e) Assess stream effects related to baseflow changes, water temperature fluctuations and the associated impacts to fish and fish habitat. f) Update Appendix A of Appendix I.5 of the EIS with more recent available data. Update the CORMIX model to reflect the more recent data.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				The drawdown of the water table caused by the mine pit dewatering would potentially cause an increase in the surface water temperature. Appendix B.6 of the EIS covered operations effluent effects, but did not assess stream effects related to baseflow, or water temperature, which can increase with decreases in baseflow, thus increasing the potential for cold-water species habitat destruction. Appendix A of Appendix I.5 provides water quality parameters and statistics data. However, only data from 2016-2017 is included. More recent data since the mine began operations is available. This appendix and the CORMIX model should be updated with the more recent data. This information is required assess the potential effect on surface water quality.	
IR-47	IAAC	Part 1, Section 3.1 Designated project	Appendix I.6 – Section 3.0 Conceptual Tailings Deposition Plan and 3.1 Normal Operation (Spring, Summer, and Fall)	The EIS Guidelines state that the scope of the EIS includes changes to processes and infrastructure at the Touquoy Mine site related to the FMS, including: storage of tailings in the Touquoy Mine pit and related water management. Section 3.0 of Appendix I.6 of the EIS states that the Touquoy pit has a volume of 8.962 million cubic metres and that the expected volume of tailings from the FMS is 0.411 million cubic metres. However, the volume of tailings expected to be deposited in the Touquoy pit from the Touquoy mine, Beaver Dam mine, and Cochrane Hill mine is not provided. In addition, the amount of water the pit is expected to accommodate is not provided. This information is required to determine the amount of tailings to be stored in the Touquoy pit from the Touquoy, Beaver Dam, and Cochrane Hill mines and to understand the current status of the water management at the Touquoy site.	a) Provide the volume of tailings that is proposed to be deposited in the Touquoy pit from the Touquoy, Beaver Dam and Cochrane Hill mines, as well as the volume of water the pit is expected to accommodate.
IR-48	IAAC	Part 2, Section 7.1.5 Groundwater and surface water	Appendix I.6 – Section 6.0 Model Sensitivity and Limitations Appendix I.4 – Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Fifteen Mile Stream Tailings in Touquoy Open Pit	The EIS Guidelines require the presentation of baseline information in sufficient detail to determine how the Project could affect groundwater and surface water. Section 6.0 of Appendix I.6 of the EIS uses a groundwater contribution provided from the groundwater model. However, the value used does not reflect the value provided in the updated Appendix I.4. Appendix I.6 should be revised to contain up-to-date assumptions so that the results can be considered representative of actual site conditions. This information is required to ensure accurate baseline groundwater contribution values are provided.	a) Clarify why different groundwater contribution values were used in the water balance and quality model versus the groundwater flow and solute transport model. b) Explain how these differences could impact the conclusions and mitigation measures.
IR-49	IAAC	Part 2, Section 7.2.2 Changes to groundwater and surface water Part 2, Section 7.6.2 Effects of the environment on the project	Section 6.6.5.2.5 Seloam Brook Realignment Design: Low Flow, Mean Annual Discharge and Flood Events	The EIS Guidelines require the presentation of all direct and indirect effects on water quantity that could occur as a result of project components that could require a federal authorization/decision. The EIS Guidelines also require an assessment of how extreme weather conditions such as drought could adversely affect the Project and how this in turn could result in effects to the environment. The EIS states there were four flow scenarios modelled to assess the functionality of the Seloam Brook Diversion. The annual dry conditions were modelled to confirm 1 in 20 year annual dry conditions. However, extreme dry years are not represented in the model. This information is required to determine the effects of extreme dry conditions on the functionality of the Seloam Brook Diversion and its impacts to fish and fish habitat.	a) Provide rationale for how extreme dry years are represented in the model or provide variability analysis and modelled results for extremely dry years. Based on results and as required, update the analyses of environmental effects including: • the effects of the environment on the Project; • accidents and malfunctions; and • fish and fish habitat.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-50	ECCC KMKNO	Part 2, Section 7.1.5 Groundwater and surface water	Appendix I.5 – Fifteen Mile Stream Gold Project Assimilative Capacity Study of Moose River – Touquoy Pit Discharge (pg. 4)	The EIS Guidelines require an assessment of how the Project could affect surface water quality. The EIS quotes the Canadian Council of Ministers of the Environment (CCME) (2003) which defines the mixing zone as, "*an area contiguous with a point source (effluent) where the effluent mixes with ambient water and where concentrations of some substances may not comply with water quality guidelines or objectives.*" The dimensions of the mixing zone at the discharge watercourse should be tied back to a risk-based selection in the watercourses, vs an arbitrary assignment of 100 metres. The mixing zone/dispersion of effluent analysis was not described in detail in the EIS. Typically, the proposed location of the discharge pipe, diffuser arrangements, and plume analysis using 2D or 3D modelling (including effects of vary discharge volumes, concentrations and understanding temperature effect) would be clearly stated, whereas they are not within the EIS. CCME (2003) states that "*Conditions within the mixing zone should not result in bioconcentration of POPC to levels that are harmful to organisms, aquatic-dependent wildlife, or human health. Also, accumulation of toxic substances in water or sediment to toxic levels should not occur in the mixing zone*." It is unclear whether the quality of the effluent would enable the mixing zone to achieve the conditions cited in CCME (2003). This information is required to ensure an adequate prediction of effects and adherence to CCME guidelines.	a) Explain how the effluent quality will be at such a level that these two conditions cited in CCME (2003)[16] will consistently be met in the mixing zones for both FMS and Touquoy. b) Provide a mixing zone/dispersion of effluent analysis using a model that includes the effects of varying discharge volumes, concentrations and temperatures.
IR-51	ECCC KMKNO Public	Part 2, Section 7.1.5 Groundwater and surface water Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix C.2 – Evaluation of Potential for Aquatic Effects as a Result of Aquatic Releases Related to the Fifteen Mile Stream Gold Project	The EIS Guidelines require the provision of predicted changes to surface water as a result of the Project being carried out. The EIS states "*Intrinsik Corp. further concluded that while the predicted levels in the receiver slightly exceed the 75th percentile of baseline, they remain within the range of baseline and are unlikely to pose a risk to aquatic life. As a result of these predictions, no water treatment is predicted to be necessary during the Operations Phase*." Some of the uncertainties associated with aquatic effects assessment (Appendix C.2) are outlined in Section 5 of this document. Among these is the observation that uncertainty in water quality modelling for FMS and Touquoy may create further uncertainty in the aquatic effects assessment which depends on this modelling. In addition to the identified uncertainties, predictions have been made on annual and monthly averages. There is a concern that spikes of elevated contaminants in receiving waters may happen periodically. Some of these surface water contaminants may accumulate in sediments further creating long term risks. This is especially a concern as no sediment quality modelling is planned. Due to the uncertainties in the modelling and aquatic effects assessment, there is insufficient rationale to conclude that water treatment is unnecessary in the operations phase. Additional information is required to support this conclusion. This information is required to ensure an adequate prediction of effects to surface water quality.	a) Provide a rationale to support the conclusion that no water treatment is required during the operations phase. b) Provide a plan for water treatment during operations to address uncertainties with the predictions. The plan should include monitoring parameters and frequency; conditions under which treatment would be required; and how a treatment system would be deployed effectively and efficiently to address concerns with water quality.

[16] Canadian Council of Ministers of the Environment (CCME). 2003. *Canadian Water Quality Guidelines for the Protection of Aquatic Life: Guidance on the Site-Specific Application of water quality guidelines in Canada: Procedures for deriving numerical water quality objectives*. In: Canadian Environmental Quality Guidelines. Winnipeg

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-52	ECCC	Part 2, Section 7.1.5 Groundwater and surface water Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix C.2 – Section 5 Uncertainties and Limitations (pg. 42)	The EIS Guidelines require the presentation of baseline information in sufficient detail to determine how the Project could affect surface water. Appendix C.2 of the EIS discusses limitations on conclusions. In particular, baseline water quality data for the Fifteen Mile Stream study area are based on a limited dataset (6-9 samples). This does not provide a representative assessment of baseline water quality. It was also noted that non-detect data in this dataset was reported at half detection limits. This adds uncertainty to the assessment. There may be other methods for representing non-detect data. This information is required to ensure environmental effects are predicted based on accurate baseline information.	a) Provide information on how the following sources of uncertainty affect the effects assessment conclusions and whether mitigation is required: • the limited dataset used as baseline studies and the lack of overall representation of baseline water quality; and • the reporting of non-detect data at half detection limits.
IR-53	ECCC ESFWA	Part 2, Section 7.1.5 Groundwater and surface Water	Section 6.6.2.6 – Touquoy Mine Site Surface Water Quality Baseline Methodology (pg. 261)	The EIS Guidelines require the presentation of baseline information in sufficient detail to determine how the Project could affect surface water. The EIS states "*The Touquoy Mine Site is currently in operation and will be used for the processing of FMS concentrate and deposition of the associated tailings. As such, the baseline conditions for the Touquoy Mine Site for the Project operations will be the conditions expected near the end of the Touquoy ore processing operations. However, the surface water quality in Moose River is not anticipated to be adversely affected by the operation of the Touquoy Mine Site. Therefore, the baseline conditions in Moose River for the Project at the Touquoy Mine Site are anticipated to be similar to the existing conditions*." From this, it is understood that existing conditions will be used as baseline conditions in evaluating potential effects to Moose River from this project. This leads to some uncertainty based on discussions in other sections of the EIS that use the results from the 2017 baseline surface water quality results as baseline. This information is required to adequately identify the surface water baseline.	a) Confirm which baseline data set is considered existing conditions for Moose River for the environmental effects assessment of relevant valued components. b) Explain any differences in how baseline data has been selected across valued components, as applicable.
IR-54	ECCC	Part 2, Section 7.1.5 Groundwater and Surface Water Part 2, Section 7.2.2 Changes to groundwater and surface water	Section 6.6.5.5 – Touquoy Mine Site Surface Water Quality Effects Assessment Methodology (pg. 303)	The EIS Guidelines require the predictions of changes in surface water quality associated with any mine effluent releases or surface runoff. The EIS states "*Water quality in Scraggy Lake and WC4 were evaluated qualitatively, as the FMS concentrate processing and deposition to the exhausted pit are not expected to change the water quality in the TMF [Tailings Management Facility], nor downstream*." It is unclear why FMS concentrate processing will not change downstream water quality. This information is required to determine if downstream water quality will be effected by the FMS concentrate processing and deposition.	a) Provide the rational to support the assertion that FMS concentrate processing will not change downstream water quality. b) Provide a rationale to support the statement that "*the surface water quality in Moose River is not anticipated to be adversely affected by the operation of the Touquoy Mine Site.*" and confirm how mitigation will be adjusted based on Environmental Effects Monitoring (EEM)/monitoring results collected during future operations.
IR-55	ECCC	Part 2, Section 7.1.5 Groundwater and Surface Water Part 2, Section 7.2.2 Changes to groundwater and surface water	Section 6.6.2.6 – Touquoy Mine Site Surface Water Quality Baseline Methodology (pg. 261) Section 6.6.3.3 – Surface Water Quality	The EIS Guidelines require the presentation of baseline information in sufficient detail to determine how the Project could affect surface water quality associated with any mine effluent releases or surface runoff. The EIS states "*Surface water quality in WC4 and Scraggy Lake are predicted to have different water quality at the end of Touquoy operations (Stantec 2016a). These predictions are used as the baseline conditions for the Project at the Touquoy Mine Site in these watercourses.*" Stantec (2016a) is missing so these predictions cannot be verified.	a) Provide the following reports: • Stantec Consulting Ltd. (Stantec). 2016a. Assessment of Water Quality Downstream of Tailings Management Facility, Touquoy Gold Project. Prepared for Atlantic Mining NS Corp, November 25, 2016. • Stantec Consulting Ltd. (Stantec). 2016b. Water Balance Report Revision 2.0. Atlantic Gold Tailings Management Facility. Fredericton, NB. November 25, 2016. • Technical Supporting Document. Prepared for Atlantic Gold Corp. • Stantec Consulting Ltd. (Stantec). 2018a. 2017 Annual Report - Surface

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
			Section 6.6.3.3.2 – Touquoy Mine Site (pg. 289)	In addition, on page 289 the EIS states "*As discussed in Section 6.6.2.6, the baseline water quality in WC4 and Scraggy Lake are not based on the existing conditions, as they will be changed by the Touquoy Gold Project. Therefore, the baseline water quality in these waterbodies are based on predictions presented by Stantec (2016b)*." Stantec (2016b) is missing so these predictions cannot be verified. Finally, the EIS discusses the 2017 baseline surface water quality results (Stantec 2018a); however this report is missing so the accuracy of the baseline data presented for Touquoy cannot be verified. All groundwater and surface water modelling and the subsequent effects assessment are based on establishing solid baseline conditions. This information is required to verify the baseline water quality predictions.	Water and Groundwater Monitoring. Prepared for Altantic Mining Nova Scotia Corp.
IR-56	ECCC IAAC EAC	Part 2, Section 7.1.5 Groundwater and Surface Water Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix B.5 – Section 4.2 Surface Water Quality (pg. 5)	The EIS Guidelines require a description of changes to surface water quality, including seasonal changes in runoff entering watercourses and the prediction of changes in surface water quality associated with any mine effluent releases or surface runoff. Appendix B.5 of the EIS states "*Section 4.2.1 and 4.2.2 summarize the surface water quality results available as of the end of July 2019. The current data set does not provide sufficient data points to statistically evaluate seasonal influences. Surface water quality monitoring is on-going and future updates may permit increased interpretation of seasonal influences*." Appendix B.5 further states "*Surface water quality results for samples collected by McCallum Environmental in 2017 through 2019 are presented in Appendix A and summarized in Table 2. Certain general parameters, major ions, dissolved metals, and methylmercury have only been reported for four sampling events (September 2018 through June 2019)*." There is no further discussion on how this lack of data could impact the assessment of effects. The documented limitations of the water quality models lead to further questions on the subsequent effects assessment. Without sufficient data on surface water quality, the accuracy of model predictions cannot be determined, and an assessment of effects cannot be completed.	a) Explain how an insufficient data set could impact the water quality model predictions and the assessment of effects. b) Confirm whether predictive modelling will be adjusted as seasonal data improves.
IR-57	ECCC	Part 2, Section 7.1.5 Groundwater and surface water Part 2, Section 7.2.2 Changes to groundwater and surface water	Section 2.6.14.1 – Touquoy TMF (pg. 78)	The EIS Guidelines require an assessment of all direct and indirect effects on water quality and quantity that could occur as a result of project components. The EIS states "*The existing TMF at the Touquoy Mine Site was designed to accommodate projected tailings generated from processing of Touquoy Gold Project. Based on current scheduling considerations, the deposition of FMS concentrate tailings into the TMF may not be possible. An expansion of the Touquoy TMF would be required to accommodate FMS concentrate tailings*." It is unclear whether the surface water modelling in the EIS accounts for the projected expanded operation at the Touquoy site. This information is required to ensure an adequate prediction of effects to surface water quality.	a) Confirm if an expansion of the Touquoy TMF is required to accommodate the FMS concentrate tailings. b) If yes, confirm that the surface water modelling (and any other relevant modelling) accounts for the expanded operation at Touquoy. In the event that the Touquoy expansion does not move ahead, describe the impact to the FMS Project.
IR-58	HC Public	Part 2, Section 7.1.5 Groundwater and surface water	Section 6.5.8.2 Groundwater Quality (pg. 320 pdf)	The EIS Guidelines require a description of changes to surface water quality, including seasonal changes in runoff entering watercourses in addition to predicting changes in surface water quality associated with any mine effluent releases or surface runoff.	a) Provide a comprehensive list (including quantitative information) of potential contaminants and their physical characteristics. Examples of potential contaminants commonly associated with metal mining operations include total and dissolved metals (e.g., aluminum, cadmium, copper), metalloids (e.g., arsenic, selenium, antimony), nutrients (e.g., ammonia, nitrate, nitrite,

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
			Section 6.6.8.2 FMS Mine Site Surface Water Quality (pg. 411 pdf) Appendix B.6 – Final – Surface Water Quality Modelling Assessment Report	Insufficient information is included on whether there are predicted or measured changes to surface water quality due to project activities (includes spills and accidents, where relevant). Section 6.6.8.2. of the EIS presents modelled operation phase surface water quality for the Anti-Dam Flowage effluent discharge location, including predicted annual concentrations (average, 5th percentile and 95th percentile) for major ions, metals and nitrogen species compared to various guidelines (Table 6.6-40, Table 6.6-41). Additionally, the monthly concentrations (average, 5th percentile and 95th percentile) of key parameters as compared to the applicable guidelines are presented graphically in Appendix B (Figures B-1 through B- 88). However, for the majority of these figures, only base-case geochemical source terms were used and the predicted 5% to 95% values are missing. A comprehensive list of potential contaminants and their physicochemical properties, including quantitative information, is required for each project phase and month including predicted concentrations of these parameters (average, 5th percentile and 95th percentile) using both base and upper-case geochemical source terms to accurately assess effects on water quality due to project activities.	phosphorus), and major anions (e.g., chloride, sulphate, fluoride). b) Provide complete model predicted concentrations (average, 5% to 95%) compared to applicable guidelines, summarized by project phase and month, for both the base-case and upper-case source terms.
IR-59	HC	Part 2, Section 7.1.5 Groundwater and surface Water Part 2, Section 7.2.2 Changes to groundwater and surface water Part 2, Section 7.1.10 Mi'kmaq of Nova Scotia Part 2, Section 7.3.5 Mi'kmaq of Nova Scotia Part 2, Section 7.4 Mitigation Measures	Section 6.5.2.1.1 Publically Available Groundwater Data Review (pg. 279 pdf) Section 6.6.4 Consideration of Engagement and Engagement Activities (pg. 362 pdf) Section 6.13.2.2.3 Current Mi'kmaq Land and Resource Use (pg. 797 pdf) Map Book – Figure 6.5-9 Fifteen Mile Stream Spatial Boundaries: Groundwater (pg. 45 pdf) Map Book – Figure 6.6.-1 Fifteen Mile Stream Gold Project Locator Watershed Context (pg. 53 pdf)	The EIS Guidelines require baseline information on drinking water sources (permanent, seasonal, periodic, or temporary) for each Mi'kmaq of Nova Scotia group identified. The EIS Guidelines also require a description of changes to surface water quality and quantity. Insufficient information has been provided about current land and resource use by Mi'kmaq populations of Nova Scotia, including drinking water sources (i.e., surface water and groundwater) and recreational water usage in the Project, local, and regional assessment areas. Consequently, it is not possible to: • Identify and characterize all Indigenous receptors that may be affected by changes in levels of contaminants in drinking water sources and recreational water quality; • Confirm all sources (groundwater and surface water) used for drinking water; • Assess all anticipated changes in predicted or measured groundwater quality; • Identify and characterize all water bodies that are currently being used or may be used in the future for recreational purposes; • Assess all anticipated changes, predicted or measured, in recreational water quality; and, • Assess the adequacy of mitigation measures. This information is required to accurately assess the potential risks to human health related to drinking and recreational water quality, specifically relating to the land and resource use by Mi'kmaq populations.	a) Identify the locations of all current and future Indigenous receptors, as well as all water sources used for drinking or recreation, within the respective groundwater and surface water assessment areas identified in Figure 6.5-9 and Figure 6.6-1. b) Evaluate potential risks to human health associated with consumption of drinking water and use of recreational water in accordance with *Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Drinking and Recreational Water Quality*[17].

[17] *Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Drinking and Recreational Water Quality.* https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-water-quality.html

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-60	ESFWA	Part 2, Section 7.1.5 Groundwater and surface water Part 2, Section 7.2.2 Changes to groundwater and surface water	Section 6.6.6 Project Activities and Surface Water Interactions and Effects	The EIS Guidelines require an assessment of all direct and indirect effects on water quality that could occur as a result of project components. Section 6.6.6 of the EIS is missing a discussion of the fate of the reagents used for ore processing, which will presumably accumulate in the tailings pond and the mine effluent. Potassium Amyl Xanthate is toxic (according to Material Safety Data Sheet) and decomposes into toxic carbon bisulphite. It has been found to be toxic to trout in aquatic environments (for example, see: Webb et al., 1976). The chemical composition and characteristics of frother and coagulant are also not given. This information is required to ensure an adequate prediction of effects to surface water quality.	a) Provide a list of all chemicals used for ore processing and information on their fate, as well as their effects on the environment, such as toxicity to plant and animal life, bioaccumulation, decomposition products, volatility, where they accumulate, etc. b) Provide information on measures that would be implemented to mitigate the effects of these reagents in the environment.
IR-61	KMKNO	Part 2, Section 7.1.5 Groundwater and surface water Part 2, Section 7.2.2 Changes to groundwater and surface water	Appendix C.1 – Evaluation of Potential Human Exposure and Risks Related to Emissions From the Fifteen Mile Stream Mine Pit Project(Dust Deposition; Recreational Water Usage; Country Foods) Appendix C.1 – Table 7-1 Comparison of Predicted Recreational Water Concentrations during Operations and Post Closure to CDWQG	The EIS Guidelines require an assessment of all direct and indirect effects on water quality that could occur as a result of project components. For the predicted water concentrations shown in Table 7-1, a number of metal parameters show decreasing concentrations associated with operations and post-closure; of particular note is the marked decrease in arsenic concentrations. Some discussion on these predictions would help to provide context for the decreases. This information is required to ensure an adequate prediction of effects to surface water quality.	a) Describe the mechanism by which arsenic concentrations are expected to decrease during operations and post-closure.
Fish and Fish Habitat					
IR-62	IAAC	Part 2, Section 7.5 Significance of Residual Effects	Section 6.8.5.2 Thresholds for Determination of Significance, Page 528	The EIS Guidelines require the provision of a detailed analysis of the significance of the residual environmental effects that are considered adverse following the implementation of mitigation measures. The EIS describes the threshold for significance of effects on fish and fish habitat as "*A significant adverse effect from the Project on fish and fish habitat is defined as an effect that results in an unmitigated or uncompensated net loss of fish habitat as defined under the Fisheries Act, and its associated no-net loss policy.*" The EIS also defines a significant adverse effect on fish as a "*result from Project-related destruction of fish that was not authorized under Section 35 of the Fisheries Act.*" A *Fisheries Act* Authorization is a separate process under separate legislation and Fisheries and Oceans Canada (DFO) is unable to make a decision on a permitting application until after the EA decision. Therefore, the proposed significance criteria cannot be evaluated as it relies on a future process whose outcome is unknown.	a) Define significance based on ecological parameters (e.g., fish habitat as defined under the *Fisheries Act*, changes to fish populations). b) Update the analysis using scientific and technical information to support the significance determination on fish and fish habitat.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-63	DFO KMKNO ESFWA Public	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 7.4 Mitigation measures	Appendix J.7 Fish Habitat Offset Plan: Preliminary Concept Update Section 2.2.1.9 Seloam Brook Realignment Section 6.6.6 Project Activities and Surface Water Interactions and Effects Section 6.8.6 Project Activities and Fish and Fish Habitat Interactions and Effects Section 6.8.6.1.2.2 Water Quantity Effects Section 6.8.6 Project Activities and Fish and Fish Habitat	The EIS Guidelines require the identification any potential adverse effects to fish and fish habitat. The EIS Guidelines also require that adverse effects on fish and fish habitat be mitigated. Section 6.8.6 of the EIS does not provide an estimate of the surface area of all potential fish habitat alteration, disruption and destruction likely to result from the Project. Additional information is required to explain how residual project effects to fish and fish habitat will be counterbalanced by offsetting measures to reduce the significance of the adverse environmental effects to fish and fish habitat. It must be demonstrated that the proposed measures are technically and economically feasible, consistent with DFO's Policy[18], and likely able to counterbalance the effects of the Project on fish and fish habitat. The conceptual Fish Habitat Offset Plan does not contain sufficient detail to assess the potential effectiveness of proposed measures to offset impacts to fish and fish habitat and ensure that residual impacts to fish and fish habitat are counterbalanced. The extent of the investigation for watercourse presence or absence was not provided. It is possible that watercourses or connections to waterbodies have gone undetected in the Study Area, provincial wetland mapping or light detection and ranging (LIDAR) terrain modelling could provide this information. This information is required to adequately assess the potential residual effects on fish and fish habitat.	a) Quantify (in square meters) the spatial extent of fish habitat that will be directly and indirectly impacted by project components, undertakings and activities, for each watercourse, waterbody, and wetland containing fish habitat. Tabulate fish habitat that may be affected by hydrological alterations or water control structures. Include updated maps and figures of fish habitat, as appropriate. b) Provide more detailed information (technical feasibility, consistency with DFO's Policy, and likelihood of success) regarding the proposed measures to offset residual impacts to fish and fish habitat in a revised Conceptual Fish Habitat Offset Plan. c) Provide the spatial extent of field investigations (e.g., GPS track files) to clarify the absence or presence of watercourses that potentially contain fish and fish habitat in the Project Area. d) Provide provincial wet areas mapping or LIDAR mapping for the Project Area to authenticate the presence of watercourses that potentially contain fish and fish habitat.
IR-64	DFO KMKNO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 6.8.6 Project Activities and Fish and Fish Habitat Section 6.8.6.1.2.2 Water Quantity Effects	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically considering the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities; and the geomorphological changes and their effects on hydrodynamic conditions and fish habitats. The EIS did not fully describe the hydrological alterations to Watercourse 12 at its upstream extent and its diversion into the Seloam Brook realignment at its downstream extent, as a result of the construction of the Tailings Management Facility. This information is required to adequately assess the potential residual effects on fish and fish habitat.	a) Quantify and describe hydrological alterations to Watercourse 12 from the construction of the tailings management facility at its upstream extent (e.g., change in flows, percentage of the local catchment that will be overprinted and altered) and its diversion into the Seloam Brook realignment at its downstream extent. b) Describe the resulting effects on fish and fish habitat in Watercourse 12 and any associated mitigation and follow-up, as appropriate.
IR-65	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 6.8.3 Baseline Conditions	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically considering the geomorphological changes and their effects on hydrodynamic conditions and fish habitats; and potential effects on riparian areas that could affect aquatic biological resources and productivity taking into account any anticipated modifications to fish habitat. The EIS proposes new project components including the construction of a haul road across the Seloam Brook diversion channel leading to an organic material stockpile. Additional information is	a) Provide the following fish and fish habitat baseline data within Trafalgar Creek: • habitat type, quality, and quantity; • presence and absence of different fish species during different times throughout the year; • hydrological and hydrometric information; • environmental variable and geomorphological variables; and • photographs and sampling data. b) Provide an assessment of the effects to fish and fish habitat in Trafalgar Creek

[18] Policy for applying measures to offset adverse effects on fish and fish habitat under the *Fisheries Act*. https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/policies-politiques-eng.html

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				needed to understand the effects to fish and fish habitat from these project components, specifically within Trafalgar Creek. This information is required to assess the sufficiency of the Proponent's baseline information and understand potential interactions between the Project and fish and fish habitat.	due to the placement of the Organic Material Stockpile, construction of a haul road across the Seloam Brook diversion channel, and the realignment of Seloam Brook.
IR-66	DFO IAAC EAC ESFWA UW SuNNS Public KMKNO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Section 7.4 Mitigation Measures	Section 6.8.7 Mitigation Section 2.2.1.2 Mine Site Roads Section 2.2.1.6 Topsoil and Organic Material Stockpiles Section 2.2.1.9 Seloam Brook Realignment Section 6.6.7.1 FMS Study Area and Touquoy Mine Site Mitigation	The EIS Guidelines require an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures. Details of the proposed erosion and sediment control measures are required so that the effectiveness of the measures can be evaluated, and the potential environmental effects from erosion and accidental sedimentation events can be adequately assessed.	a) Provide site-specific erosion and sediment control measures that will be implemented to avoid and mitigate effects to fish and fish habitat within the FMS Study Area during all phases of the Project. These measures should be described in as much detail as possible, and include figures, diagrams, drawings, etc. b) Provide an assessment of the likely effectiveness of the proposed erosion and sediment control measures at avoiding and mitigating impacts to fish and fish habitat associated with erosion and sedimentation.
IR-67	DFO KMKNO UW SCC	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Appendix J.7 Fish Habitat Offset Plan: Preliminary Concept Update Section 2.2.1.9 Seloam Brook Realignment Appendix D.4 Seloam Brook Diversion Channel Technical Response Appendix J.5 Seloam Brook Realignment Section Model Results Memorandum	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically considering the geomorphological changes and their effects on hydrodynamic conditions and fish habitats; and the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities. The Proponent does not adequately describe why it has chosen to construct energy dissipation features downstream of the Seloam Brook realignment channel or why it intends to flood the North and South Channels of Seloam Brook downstream of the Seloam Brook realignment. Flooding the portions of Seloam Brook downstream of the realignment channel should be avoided and mitigated, and is likely to adversely impact fish habitat. This information is required to adequately assess the potential residual effects on fish and fish habitat.	a) Clarify whether the proposed realignment and diversion of Seloam Brook, and construction of associated infrastructure, will result in tributaries downstream of the realignment channel (i.e., North and South Channel) being intentionally flooded. b) Provide a rationale for the energy dissipation features and the flooding. c) Quantify and characterize the extent of flooding and impacts to fish and fish habitat. d) Provide a description of the water control structures and in-stream habitat features (e.g., rock weirs) that will be constructed within the Seloam Brook diversion channel and downstream of the realignment, including their design, purpose, and spatial footprint.
IR-68	DFO IAAC ASF	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 2.2.1.9 Seloam Brook Realignment Appendix J.7 Fish Habitat Offset Plan: Preliminary Concept Update	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically considering any potential effects on riparian areas that could affect aquatic biological resources and productivity taking into account any anticipated modifications to fish habitat; and any modifications in migration or local movements (upstream and downstream migration, and lateral movements) following the construction and operation of works (physical and hydraulic barriers). The EIS presents insufficient details regarding fish passage and fish habitat throughout the Seloam Brook tertiary watershed.	a) Clearly describe how fish passage, and fish habitat type and quality will be maintained throughout the Seloam Brook tertiary watershed from the diversion of flows into Seloam Brook; the realignment of Seloam Brook; the construction of water control structures, in-stream features, and a haul road; and the installation of a culvert.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
				This information is required to adequately assess the potential residual effects on fish and fish habitat.	
IR-69	DFO EAC ESFWA	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 2.2.1.9 Seloam Brook Realignment Section 2.2.1 FMS Site Appendix D.4	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically considering any modifications in migration or local movements (upstream and downstream migration, and lateral movements) following the construction and operation of works (physical and hydraulic barriers); and any potential effects on riparian areas that could affect aquatic biological resources and productivity taking into account any anticipated modifications to fish habitat. The Proponent does not adequately describe why it has chosen a corrugated steel pipe culvert and energy dissipation pool as the preferred option to maintain fish passage in Seloam Brook at the location of the haul road crossing. As proposed, the culvert may not provide adequate fish passage for all fish species present in the watershed and during all times of the year. Furthermore, as proposed, the culvert will likely require regular and labour-intensive maintenance that begs questions about fish passage over time. Finally, should the culvert be installed as proposed, DFO is unlikely to consider the construction of the realignment channel or any of its in-stream features as measures to mitigate residual impacts to fish and fish habitat. Alternatives to a corrugated steel pipe culvert, such as a bridge or open-bottom culvert, are likely to result in fewer effects on fish and fish habitat and provide better fish passage. This information is required to understand if the Proponent has adequately assessed all technically and economically feasible alternative means to span Seloam Brook.	a) Describe the technical and economic feasibility of installing an alternative structure across Seloam Brook to provide access to the organic material stockpile from the open pit instead of installing a corrugated steel pipe culvert beneath a haul road crossing Seloam Brook. b) Provide a comparative analysis of the options and an assessment of the effects on fish and fish habitat associated with each option. c) Indicate which option is the preferred option and provide a rationale for this choice, and update the description of this project component, if necessary.
IR-70	DFO ESFWA	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 3.2 Project Activities	Appendix D.4 Section 2.2.1 FMS Site Section 2.2.1.3 Local Traffic Bypass Road Section 2.2.1.9 Seloam Brook Realignment	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically considering the geomorphological changes and their effects on hydrodynamic conditions and fish habitats (e.g. modification of substrates, dynamic imbalance, silting of spawning beds). The EIS presents insufficient details (e.g. construction methods and material; footprint; fish passage) regarding the construction of roads within the Project Area and the associated potential effects to fish and fish habitat. The EIS is also missing a description of measures that will be implemented along the roads to manage surface water and sediment to prevent runoff and sedimentation that may result in effects to fish and fish habitat. This information is required to adequately assess the potential interactions between project components and surface water and the resulting potential effects to fish and fish habitat.	a) Provide additional information about the haul road across the Seloam Brook realignment, the preferred option for maintaining fish passage, and how it will interact with surface water during various annual and inter-annual high flow events (e.g., storm events, controlled releases from Seloam Lake reservoir). b) Provide additional information about the construction methods and material that will be used to build the mine access road, the haul road and the bypass road, which will be constructed adjacent to the FMS Study Area. c) Indicate and describe what measures will be implemented along the roads to manage surface water and sediment to prevent runoff and sedimentation that may result in impacts to fish and fish habitat.
IR-71	DFO IAAC ESFWA	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 3.2 Project Activities	Section 2.2.1 FMS Mine Site Section 2.2.1.6 Topsoil and Organic Material Stockpiles	The EIS Guidelines require details of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the Project. The EIS states that a berm will be designed and installed along the eastern end of the organic material stockpile to protect it from predicted flood events. Appendix D.4 suggests the organic material stockpile could be affected during high flow events. Even with the berm, it is unclear whether the flood waters would reach the organic material stockpile. The EIS provided insufficient information regarding the construction of the berms and their location.	a) Provide a description of the materials and methodologies that will be used to construct the berms around the open pit and the organic material stockpile. b) Provide the approximate location and footprint of the berms that will be constructed for the organic material stockpile. c) Describe how the organic material stockpile will interact with surface water during various annual and inter-annual high flow events.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
		Section 7.6.2	Section 2.2.1.9 Seloam Brook Realignment Appendix D.4	This information is required to understand the potential for the berms to cause or prevent effects to fish and fish habitat associated with erosion and sedimentation.	d) Update the effects assessment, mitigation and monitoring for fish and fish habitat, based on the responses to the above.
IR-72	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 3.2 Project Activities	Section 2.2.1.6 Topsoil and Organic Material Stockpiles	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically considering the geomorphological changes and their effects on hydrodynamic conditions and fish habitats (e.g. modification of substrates, dynamic imbalance, silting of spawning beds). The EIS states that the "*north stockpile has been labelled the organic materials stockpile and will hold loose or unsuitable overburden materials (i.e. saturated peat and topsoil material) excavated from wetland areas."* There is no mention of any sediment retention ponds near the topsoil stockpile or the organic material stockpile. This information is required to assess the effectiveness of the erosion and sediment control measures, and assess whether alternative measures were adequately described and assessed.	a) Explain why sediment retention ponds will not be constructed in close proximity the topsoil stockpile and organic material stockpile. b) Explain how runoff from these stockpiles would be managed to adequately control erosion and sedimentation, including the volume of water to be treated and retention times. c) Describe how the stockpiles will be stabilized throughout the life of the Project.
IR-73	DFO IAAC KMKNO Public	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 3.2 Project Activities Part 2, Section 7.4 Mitigation Measures	Section 6.6.7.1 FMS Study Area and Touquoy Mine Site Mitigation Section 6.4.7 Mitigation	The EIS Guidelines require the consideration of measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project. Section 6.4.7 of the EIS states "*during construction, settling pond(s) with geosynthetic liners, will be constructed near the location of the [waste rock storage area] WRSA in order to manage construction water during pit development.* " However, in the environmental management plan (EMP2) of Appendix L.1 of the EIS, it states that "*Operational experience has indicated that settling ponds can be effective for runoff from overburden or topsoil areas but have proven ineffective for runoff from areas containing waste rock (i.e. WRSA, or haul roads)*." The EIS does not explain why settling ponds have been proposed near the waste rock storage area for FMS. Section 6.6.7.1 of the EIS states that contact water from the pit walls, the stockpiles, and tailings management facility will be collected and treated, if required, prior to discharge to the environment during the operations and post-closures phases. However, no further information is provided on sediment retention ponds (e.g. size and depth) or the use of sediment fences. This information is required to adequately assess the effectiveness of the erosion and sediment control measures, and assess whether they will avoid and mitigate residual impacts to fish and fish habitat.	a) Explain why settling ponds near the waste rock storage area are proposed as a mitigation measure at FMS. b) Describe any standard and best management practices that will be used to construct sediment retention ponds, and identify the size and depth of proposed sediment retention ponds needed to collect contact water from the identified sources. c) Describe the methodology that will be used during the installation of any sediment fences, and describe how the sediment fences will be used to avoid and mitigate erosion and sedimentation.
IR-74	DFO SC	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 3.2 Project Activities	Appendix L.1 FMS EMS Framework 3.5 Fugitive Dust Management Plan (EMP 5)	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat and description of mitigation measures that are specific to each environmental effect identified. Appendix L.1 of the EIS states that "*The purpose of the Fugitive Dust Management Plan is to identify potential sources and where necessary, plan for and implement mitigation measures to reduce fugitive dust emissions associated with mining and related activity during all phases of the Project.*" No details regarding mitigation measures for fugitive dust are provided. This information is required to assess the effectiveness of avoidance and mitigation measures.	a) Describe all measures that will be implemented to avoid and mitigate potential effects to fish and fish habitat associated with sources of fugitive dust.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-75	DFO Public ESFWA	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 6.8.6.1.2.2 Water Quantity Effects	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically considering the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities (e.g. reproduction, fry-rearing, movements). The EIS does not adequately describe how the flow reductions in East Brook will impact fish and fish habitat in East Brook, East Lake and downstream of East Lake. This information is required to assess how flow reductions in East Brook will affect fish and fish habitat and estimate the spatial extent of impacts to fish and fish habitat.	a) Describe how the flow reductions in East Brook will impact fish and fish habitat in East Brook, East Lake, and downstream of East Lake. b) Update the effects assessment, any mitigation or follow-up, and determination of significance, as appropriate.
IR-76	DFO	Part 2, Section 7.1.6. Fish and fish habitat Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 6.6.3.1.1 FMS Study Area Section 6.8.3 Baseline Conditions	The EIS Guidelines require a description of fish habitat quality within potentially affected surface waters. Information regarding the methodology for collecting benthic samples and assessing benthic habitat in East Lake and its tributaries was not provided. This information is required to assess the sufficiency of baseline information collected for the Project, and address uncertainties.	a) Provide the methodologies that were used to collect data and assess fish habitat quality in East Lake and its tributaries with respect to benthic habitat complexity.
IR-77	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 7.4 Mitigation Measures	Section 6.6.7.1 FMS Study Area and Touquoy Mine Site Mitigation	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically including a discussion of how vibration caused by blasting may affect fish behaviour, such as spawning or migrations. The EIS Guidelines also state that the EIS will describe mitigation measures that are specific to each environmental effect identified. Additional information is required to describe the measures to mitigate the effects of blasting on fish and fish habitat. It is unclear whether the Proponent intends to use ammonium nitrate as a blasting agent, and whether measures will be implemented to mitigate impacts to fish and fish habitat. It is also unclear whether the Proponent plans to adhere to DFO's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*[19]. This information is required to adequately assess the effectiveness of mitigation measures.	a) Clarify whether ammonium nitrate-fuel oil mixtures will be used at the FMS site. b) Clarify whether DFO's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright and Hopky, 1998) will be followed. If not, provide a rationale for not following these guidelines.
IR-78	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Appendix D.2 FMS Project Preliminary Waste and Water Management Design	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, including the calculations of any potential habitat loss (temporary or permanent) in terms of surface areas (e.g. spawning grounds, fry-rearing areas, feeding), and in relation to watershed availability and significance. Appendix D.2 of the EIS provided insufficient information regarding the identification of watercourses that would be permanently or temporarily diverted as part of the Project, including the Seloam Brook realignment channel. Temporary watercourse diversions will likely disrupt fish habitat and it is unclear if this has been considered in the spatial estimate of effects on fish and fish habitat. This information is required to adequately assess potential effects to fish and fish habitat.	a) Clarify which watercourses will be permanently diverted into the Seloam Brook realignment channel and which watercourses will only be temporarily diverted. b) Provide the duration of any temporary watercourse diversions, and the methodologies that will be used to divert water into the Seloam Brook realignment channel. c) Indicate how temporary diversions are considered in the spatial estimate of impacts to fish and fish habitat.

[19] Wright, D.G., and G.E. Hopky. (1998) *Guidelines for the use of explosives in or near Canadian fisheries waters*. http://publications.gc.ca/collections/Collection/Fs97-6-2107E.pdf Can. Tech. Rep. Fish. Aquat. Sci. 2107: iv + 34p.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-79	DFO EAC KMKNO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Appendix D.4 Seloam Brook Diversion Channel Technical Response Appendix J.7 Fish Habitat Offset Plan: Preliminary Concept Update Appendix J.5 Seloam Brook Realignment Section Model Results Memorandum	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically including the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities (e.g. reproduction, fry-rearing, movements); and any modifications in migration or local movements (upstream and downstream migration, and lateral movements) following the construction and operation of works (physical and hydraulic barriers). The EIS provided insufficient information regarding the flow velocities, potential associated limitations to fish passage, and the associated impacts to fish and fish habitat for the following locations: 1. The outflow of the Seloam Brook culvert for each modelled scenario; and 2. The intakes and outflows of the water control structures downstream of the realignment channel for each modelled scenario. This information is required to adequately assess potential effects to fish and fish habitat.	a) Provide the estimated flow velocities at locations 1 and 2 and describe how these velocities will affect and influence fish passage. b) Indicate how any indirect effects to fish passage associated with the outflow of the Seloam Brook culvert and the outflows of the water control structures are considered in the spatial quantification of effects to fish and fish habitat. c) Compare the estimated flow velocities at locations 1 and 2 to typical flow velocities in Seloam Brook measured at the nearest monitoring station located within Seloam Brook. d) Update the assessment of any direct and indirect impacts to fish and fish habitat upstream and downstream of locations 1 and 2.
IR-80	DFO EAC KMKNO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 7.1.5 Surface Water Baseline Conditions Part 2, Section 3.2 Project Activities	Section 2.2.1.9 Seloam Brook Realignment Appendix D.1	The EIS Guidelines require baseline information including hydrological regimes, monthly, seasonal and annual water flow (discharge) data. The EIS Guidelines also require a prediction of changes to the environment as a result of the Project being carried out, including changes to groundwater and surface water. Finally, the EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, including the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities (e.g. reproduction, fry-rearing, movements). The EIS did not provide water level and streamflow data that was collected in situ from hydrometric stations in Seloam Brook and Moose River. It is unclear whether this data supports the modelling conclusions regarding the function of the Seloam Brook diversion channel as fish habitat. This information is required to assess the technical feasibility of the Seloam Brook diversion channel and address uncertainties related to how the diversion channel will function as fish habitat.	a) Provide water level and streamflow data that was collected in situ from hydrometric stations in Seloam Brook and Moose River, with associated ratings curves. b) Describe whether this data supports the modelling conclusions regarding the function of the Seloam Brook diversion channel as fish habitat by either using the collected data to calibrate/validate the flow model and water management plans or describing how the data compares to assumptions made in the flow model and validates the water management plans. c) Update the effects assessment, mitigation and monitoring for fish and fish habitat, as appropriate.
IR-81	DFO EAC KMKNO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 7.1.5 Surface Water Baseline Conditions Part 2, Section 3.2 Project Activities	Section 2.2.1.9 Seloam Brook Realignment Appendix D.1 Moose River Consolidated Phase II Preliminary Engineering Hydrometeorology Report	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, including the geomorphological changes and their effects on hydrodynamic conditions and fish habitats (e.g. modification of substrates, dynamic imbalance, silting of spawning beds); and the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities (e.g. reproduction, fry-rearing, movements). The EIS does not provide data from Nova Scotia Power's operation of the Seloam Lake dam, which would impact the technical feasibility of the realignment. This information is required to assess the technical feasibility of the Seloam Brook diversion channel and address uncertainties related to how the diversion channel will function as fish habitat.	a) Provide the Nova Scotia Power raw data and describe how it was used in the modelling of flow. b) Update the feasibility assessment of the Seloam Brook diversion channel using the most recent data from Nova Scotia Power's operation of the Seloam Lake dam. c) Explain how the realignment will function as fish habitat across all anticipated flow scenarios. d) Update the effects assessment, mitigation and monitoring for fish and fish habitat, as appropriate.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-82	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 7.6.1. Effects of potential accidents or malfunctions	Section 6.17 Accidents and Malfunctions	The EIS Guidelines require an analysis of the risks of accidents and malfunctions, a determination of their effects, and presentation of preliminary emergency response measures. The risk ratings of potential accidents and malfunctions do not consider the potential effects to the aquatic environment, including fish and fish habitat, from an open pit slope failure. This information is required to assess potential effects to fish and fish habitat and the effectiveness of mitigation measures.	a) Describe the potential interactions between groundwater, surface water in Seloam Brook, and the open pit. b) Discuss the potential of an open pit mine slope failure due to groundwater inflow. c) Describe the measures that will be implemented to de-water the open pit should slope failures occur, and how these measures will consider potential interactions between in-mine water and fish and fish habitat, and effects to fish and fish habitat.
IR-83	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 6.17 Accidents and Malfunctions Appendix D.4	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat, specifically including the modifications of hydrological and hydrometric conditions on fish habitat and on the fish species' life cycle activities (e.g. reproduction, fry-rearing, movements). It is unclear if streamflow reductions in the Seloam Brook realignment channel due to groundwater inflows into the open pit were considered in the model. This information is required to assess potential effects to fish and fish habitat.	a) Clarify whether streamflow reductions in the Seloam Brook realignment channel due to groundwater inflows into the open pit were considered in the model. b) If the streamflow reductions were not considered, estimate the reduction in streamflow and revise the associated flow predictions and fish and fish habitat effects assessment, as appropriate.
IR-84	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 6.8.3 Baseline Conditions	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat including the calculations of any potential habitat loss (temporary or permanent) in terms of surface areas (e.g. spawning grounds, fry-rearing areas, feeding), and in relation to watershed availability and significance. The EIS contains fish habitat evaluations based on baseline data collected from 2018 and 2019. The EIS also remarks that baseline data collection is ongoing through 2020, however, this data has not been provided. This information is required to assess the adequacy of baseline information and assess potential effects to fish and fish habitat.	a) Provide the results of the habitat evaluations that were undertaken in summer 2020. b) Update the effects assessment, mitigation and monitoring for fish and fish habitat, as appropriate.
IR-85	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 7.4 Mitigation measures Part 2, Section 3.2 Project Activities	Section 6.6.6 Project Activities and Surface Water Interactions and Effects	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat as well as measures that are technically and economically feasible to mitigate any significant adverse environmental effects of the Project. The Proponent did not adequately describe why it has chosen to construct clay borrow pits over top of (i.e., watercourse 3) and in close proximity to watercourses (i.e., watercourses 2 and 42). The EIS provided insufficient information about the interactions between surface water and the clay borrow pits that will be constructed on the Project site, and the adverse effects to surface water quality and fish and fish habitat that may result from any such interactions, including from erosion and sedimentation. This information is required to assess the potential direct and indirect residual effects of the borrow pits on aquatic habitat.	a) Provide a rationale for constructing clay borrow pits over top of (i.e., watercourse 3) and in close proximity to watercourses (e.g., watercourse 2 and 42) and describe the potential adverse effects to surface water quality and fish and fish habitat that may result from such interactions. b) Describe the measures that will be implemented to prevent and/or control erosion and sedimentation associated with clay borrow pits.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-86	DFO	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat	Section 6.8.7 Mitigation	The EIS Guidelines require the identification of any potential adverse effects to fish and fish habitat. The fish rescue and relocation plan is missing information pertaining to capture, handling, transportation, release and locations. This information is required to assess the effectiveness measures to avoid and mitigate impacts to fish and fish habitat.	a) Provide a description of planned fish rescue measures (e.g., detail capture, handling, transport, release methods, capture and release locations and timing). b) Predict the effectiveness of the planned fish rescue, including an estimate of fish mortality for various species and life stages from the Project in the event that fish rescue is ineffective or that an introduction and transfer licence cannot be obtained.
IR-87	DFO EAC KMKNO ASF ESFWA	Part 2, Section 7.3.1 Predicted effects on valued ecosystem components – Fish and fish habitat Part 2, Section 9 Follow-up and Monitoring Programs	Section 6.8.7 Mitigation	The EIS Guidelines require the development of a follow-up program to verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the Project. The EIS provided insufficient detail regarding the plan to monitor fish within the FMS study area and the plan to monitor the effectiveness of the mitigation measures. The Proponent needs to develop an "environmental effects monitoring" plan to assess potential effects of the Project on fish. This plan should monitor a variety of variables related to presence, abundance, species richness, size, life stage, etc. The Proponent needs to develop a follow-up program to assess the functioning and effectiveness of mitigation measures. These plans should use various methodologies, techniques and tools. Benthic macroinvertebrates are an indicator of the health of aquatic habitats. The presence, relative abundance, and diversity of benthic macroinvertebrates should be considered in the development and implementation of sampling, monitoring and follow-up programs. This information is required to assess the effectiveness of monitoring and follow-up programs related to fish and fish habitat.	a) Describe in detail the plan to monitor fish within the FMS Study Area, and the plan to monitor the effectiveness and functioning of the measures to avoid and mitigate impacts to fish and fish habitat.
IR-88	HC KMKNO	Part 2, Section 7.1.6 Fish and Fish Habitat Part 2, Section 7.3.1. Fish and fish habitat	Appendix C.1 Human Health Risk Assessment (Section 10.0. – Conclusions) Section 6.6.2.3.2. - Regional Hydrology Section 6.8.6.1.2.3 Water Quality Effects	The EIS Guidelines require baseline information in sufficient detail to support the effects assessment and a discussion of the anticipated changes in the composition and characteristics of fish populations. Appendix C.1 of the EIS indicates that "…*due to a lack of available fish tissue from the Anti-Dam Flowage*…" fish tissue samples collected at Scraggy Lake will be used as a surrogate to calculate site-specific bio-concentration factors for Anti-Dam Flowage. A scientific rationale was not provided explaining how the fish populations and their respective water quality conditions are similar enough to be used as a surrogate for one another when predicting fish bio-concentration factors. Information regarding how representative the surrogate site and samples are is necessary to determine the suitability of using the data in the calculation of site-specific bioconcentration factors. Section 6.8.6.1.2.3 of the EIS describes the indirect effects of water quality of fish. This section does not contain information related to the potential for sub-lethal or long-term impacts of exceedances of metals in the baseline sediment on larval stages or fish. This information is required to assess the potential effects to fish and fish habitat.	a) Provide scientific rationale explaining how the fish populations and water quality conditions of Scraggy Lake can be used as a surrogate for predicting fish bioconcentration factors for the Anti-Dam Flowage, as well as an explanation about why there is a lack of available fish tissue data from the Anti-Dam Flowage. b) Update the effects assessment for fish and fish habitat to include information related to the potential sub-lethal or long-term effects on fish populations resulting from exceedances of metals found in sediment.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-89	KMKNO	Part 2, Section 7.3.4 Species at Risk	Section 6.12.3.1.1 Table 6.12-2	The EIS Guidelines require a description of the potential adverse effects on species listed by the Nova Scotia Endangered Species Act, 1998, and listed as S1, S2, or S3 by the Atlantic Canada Conservation Data Centre (ACCDC). Gaspereau (alewife) are missing as a considered priority species from Table 6.12-2 of the EIS. This species is ranked as S3 (vulnerable) according to the ACCDC. This information is required to adequately assess the potential effects to fish and fish habitat.	a) Update the effects assessment for fish and fish habitat in consideration of Gaspereau. b) Alternatively, provide rationale for why an updated effects assessment is not required.
Migratory Birds and their Habitat					
IR-90	IAAC Public	Part 1, Section 3.2.3 Spatial and temporal boundaries	6.11.5.1.1 Effects Assessment Methodology - Boundaries	The EIS Guidelines require a description of the spatial boundaries, including local and regional study areas of each VC to be used in assessing the potential adverse environmental effects of the Project and a rationale for each boundary. The EIS uses the following spatial boundaries for the assessment of effects to birds: the Project Area, which is comprised of the FMS Study Area and Touquoy Mine Site; the LAA; and the RAA. The EIS states: "*The LAA consists of a 2 km buffer around the FMS Study Area, and a 500 m buffer surrounding the Touquoy Mine Site component of the PA [Project Area]. The LAA boundaries were defined considering the maximum expected extent of direct and indirect impacts to birds.*" Rationale explaining why the LAAs were limited to 2 kilometres from the FMS Study Area and 500 metres from the Touquoy Mine Site was not provided. This information is required to assess the potential impacts of the Project on migratory birds.	a) Provide rationale for how the LAAs were chosen, including why the maximum expected extent of direct and indirect impacts to birds was limited to 2 kilometres from the FMS Study Area and 500 metres from the Touquoy Mine Site.
IR-91	IAAC KMKNO EAC	Part 2, Section 7.1.7 Migratory birds and their habitat	6.11.5.2 Effects Assessment Methodology - Thresholds for Determination of Significance	The EIS Guidelines require a description of the methodology used to assess project-related effects, and to include an analysis of the pathway of the effects of environmental change on each VC. As per the Agency's document, *Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012*[20], magnitude is one of the key criteria for determining significance. The magnitude of an environmental effect should be clearly expressed in measureable or quantifiable terms, whenever possible. The EIS states that the loss of habitat compared to natural variation was used to assess the magnitude of a predicted change in avifauna as either negligible, low, medium, or high. A quantitative prediction of temporary or permanent bird habitat loss was not provided in the EIS; therefore, it is unclear how magnitude was determined for each effect. The rationale for identifying an environmental effect's magnitude should be clearly documented. Quantitative prediction of temporary or permanent bird habitat loss (e.g. hectares of habitat change) is required to assess the effects of the Project on migratory birds.	a) Update the effects assessment on migratory birds to include a quantitative prediction of temporary or permanent bird habitat loss, for all migratory bird species and for avian SAR. b) Using measurable or quantitative terms, provide rationale to explain how magnitude was determined for each potential environmental effect to migratory birds.

[20] *Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012*. https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/determining-whether-designated-project-is-likely-cause-significant-adverse-environmental-effects-under-ceaa-2012.html#_Toc004

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-92	ECCC	Part 2, Section 7.1.7 Migratory birds and their habitat	Figure 6.11-6 FMS Study Area Priority Avifauna Species of Conservation Interest	The EIS Guidelines require a description of birds and their habitats found or likely to be found in the Project Area, including their abundance, distribution, life stages, and year-round use of the area. The EIS contains limited information about the field survey results. The EIS should contain details about each survey location, point count point, and survey date. Priority species observed during field surveys are shown in Figure 6.11-6 of the EIS. The figure contains overlapping data points which makes it difficult for reviewers to assess the information. The EIS does not contain a visual representation of the field survey locations in relation to current bird habitats in the Project Area. This information is required to assess the effects of the Project on migratory birds and their habitat.	a) Provide a table containing detailed field survey results, including data about each survey location, date, and point count location. Data should include species, number of individuals, sex, and age (adult, juvenile) if known. Discuss any conditions (e.g. wind, noise) that may have influenced survey results. b) Provide the information in Figure 6.11-6 of the EIS in a way that is easy to interpret by the reader. This may be accomplished by providing separate maps for each bird group (e.g. landbirds, shorebirds, waterfowl) or by using colour coding and shapes to clearly distinguish between groupings and species on the map. c) Provide maps showing each survey location (e.g. each point count location, each fixed monitoring station location) in relation to proposed infrastructure and current habitat types.
IR-93	ECCC	Part 2, Section 7.3.3 Migratory birds Part 2, Section 7.3.4 Species at risk Part 2, Section 7.4 Mitigation measures Part 2, Section 7.6.3 Cumulative effects assessment	Section 6.12.3.4 Baseline Conditions - Priority Avifauna Species Sections 6.12.6.4 Project Activities and SAR/SOCI Interactions and Effects - Priority Avifauna Section 6.12.7.4 Mitigation - Priority Avifauna	The EIS Guidelines require an assessment of direct and indirect adverse effects on migratory birds and SAR (including those listed as S1, S2 or S3 by the ACCDC), as well as a description of mitigation measures that are specific to each environmental effect identified. The EIS Guidelines also require an assessment of the Project's cumulative effects on migratory birds and SAR. Table 6.12-12 of the EIS indicates that Greater Yellowlegs (ranked S3B by ACCDC) were detected during point count surveys in 2017, and incidentally detected during the summer of 2018. The EIS does not describe the potential effects of the Project on the Greater Yellowlegs and its breeding habitat, nor does it provide specific mitigation measures to avoid or lessen direct and indirect effects to the species. A cumulative effects analysis for the Greater Yellowlegs was not presented in the EIS. Greater Yellowlegs were also detected at and are expected to be affected by the proposed Beaver Dam Mine Project. This information is required to assess the effects of the Project on migratory birds, SAR, and their habitat.	a) Describe the potential interactions and impacts to the Greater Yellowlegs and its breeding habitat as a result of the project activities. b) Describe mitigation measures, including proposed buffers (where applicable), to avoid or lessen direct and indirect effects on Greater Yellowlegs and its habitat. In instances where loss of breeding habitat cannot be avoided, clarify why avoidance is not possible and develop a plan for the use of conservation allowances. c) Conduct a cumulative effects assessment on the Maritimes population of Greater Yellowlegs, including past, present and future activities. d) Describe any additional measures required to mitigate cumulative effects on Greater Yellowlegs and its habitat.
IR-94	ECCC	Part 2, Section 7.3.3 Migratory birds Part 2, Section 7.4 Mitigation measures	Section 6.11.6 Project Activities and Avifauna Interactions and Effects Section 6.11.7 Mitigation	The EIS Guidelines require the identification of any direct or indirect effects to migratory birds, including the collision risk of migratory birds with any project infrastructure and vehicles. The EIS Guidelines also require a description of mitigation measures that are specific to each environmental effect identified. A transmission line is required for the Project; however, collision of birds with this additional infrastructure is not assessed in the EIS. This information is required to determine the adverse effects of the proposed transmission line on migratory birds.	a) Update the effects assessment to include potential adverse effects of the transmission line on migratory birds. b) Provide the mitigation measures to avoid adverse effects to migratory birds caused by the transmission line.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-95	ECCC	Part 2, Section 7.1.7 Migratory birds and their habitat	Figure 6.11-1 FMS Study Area Avian Baseline Program Locations: Breeding Bird Survey Figure 6.11-3 FMS Study Area Avian Baseline Program Locations: Fall Migration Surveys Figure 6.11-4 FMS Study Area Avian Baseline Program Locations: Spring Migration Surveys	The EIS Guidelines require information about birds and their habitats that are found, or likely to be found, in the study area. This information may be based on existing sources, but existing data must be supplemented by surveys, if required. East Lake is located within the FMS Study Area; however, the EIS does not provide survey data for birds at this location. This baseline information is required to assess the effects of the Project on migratory birds and their habitat.	a) Provide the survey data for bird species recorded in the East Lake section of the Project Area. Alternatively, provide rationale as to why this area was not included in the survey plan. Update the effects assessment as appropriate. b) Provide additional measures to mitigate cumulative effects to bird species in the East Lake section of the Project Area, as appropriate.
IR-96	ECCC	Part 2, Section 7.4 Mitigation measures	Table 6.11-10 Mitigation for Avifauna	The EIS Guidelines require descriptions of mitigation measures that are specific to each environmental effect identified. The EIS identifies the following mitigation measure for migratory birds: "*Conduct routine inspections of the open pit area to remove any trapped or injured birds. If identified, determine a plan for removal in consultation with an avian expert*." Additional information about how stranded migratory birds would be identified and removed is required. A monitoring program for stranded migratory birds should be developed prior to the beginning of the Project. This information is required to adequately assess the effectiveness of the proposed mitigation measures, and to assess the effects of the Project on migratory birds.	a) Provide information as to how stranded migratory birds will be identified and removed.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-97	ECCC Public	Part 2, Section 7.3.3 Migratory birds Part 2, Section 7.3.4 Species at risk Part 2, Section 7.4 Mitigation measures	Section 6.11.6 Project Activities and Avifauna Interactions and Effects Section 6.11.7 Mitigation Sections 6.12.6.4 Project Activities and SAR/SOCI Interactions and Effects - Priority Avifauna Section 6.12.7.4 Mitigation - Priority Avifauna	The EIS Guidelines require a description of mitigation measures to avoid, or lessen potential adverse effects on migratory birds, including SAR and their critical habitat. These measures are required to be consistent with any applicable recovery strategy and action plans. Some measures proposed by the Proponent are contrary to measures and best management practices that would support avoiding harm to migratory birds, their eggs and nests, in accordance with the *Migratory Birds Regulations*[21]. • The Proponent only commits to avoidance of clearing and grubbing activities during the nesting season if practicable, or avoidance of construction activities on native vegetation during the regional breeding season where practicable. ECCC notes that birds do not only nest in native vegetation. • The Proponent proposes to conduct nest surveys if clearing during the breeding season cannot be avoided. 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. Generally, ECCC does not recommend active nest searches because there is a low probability of locating all nests, and searches are likely to cause disturbance to nesting birds. In many circumstances, incidental take is likely to still occur during industrial or other activities even when active nest searches are conducted prior to these activities. Additional information is required to ensure the mitigation measures and best management practices comply with the *Migratory Bird Regulations*.	a) Describe how mitigation measures and best management practices comply with the *Migratory Birds Regulations*. Explain why only native vegetation would be avoided during construction activities, and why it is appropriate to conduct active nest surveys during breeding season. b) Update the mitigation measures for migratory birds to comply with the *Migratory Birds Regulations*, as appropriate.
IR-98	ECCC EAC	Part 2, Section 7.3.3 Migratory birds Part 2, Section 7.4 Mitigation measures	Table 6.11-11 Residual Environmental Effects for Avifauna Section 6.11.6 Project Activities and Avifauna Interactions and Effects Section 6.11.7 Mitigation Sections 6.12.6.4 Project Activities and SAR/SOCI Interactions and Effects - Priority Avifauna Section 6.12.7.4 Mitigation - Priority Avifauna	The EIS Guidelines require a description of mitigation measures to avoid, or lessen potential adverse effects on migratory birds, including SAR and their critical habitat. Table 6.11-11 of the EIS states that habitats that support migratory birds will be re-established during reclamation; however, information as to how this will be done and whether such habitat re-establishment has been proven to be an effective mitigation measure for habitat loss, in particular for bird SAR and species of conservation interest (SOCI) was not provided in the EIS. This information is required to assess the effectiveness of habitat re-establishment as a mitigation measure, and to assess the effects of the Project on migratory birds.	a) Describe how migratory bird habitat will be re-established during reclamation, with emphasis on habitats for bird SAR and SOCI. b) Provide evidence (e.g., previous open pit mines that have been decommissioned and where bird habitat has been re-established) demonstrating the effectiveness of the proposed habitat re-establishment and timeframe for completion. c) Provide a discussion on instances where conservation allowances would be preferable mitigation for bird SAR and SOCI due to the timeframes involved in re-establishing habitats on-site.

[21] *Migratory Bird Regulations*. https://laws.justice.gc.ca/eng/regulations/C.R.C.,_c._1035/index.html

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
Species at Risk					
IR-99	ECCC	Part 2, Section 7.1.7 Migratory birds and their habitat Part 2, Section 7.1.8 Species at Risk Part 2, Section 7.3.3 Migratory birds Part 2, Section 7.3.4 Species at risk Part 2, Section 7.4 Mitigation measures	Section 6.12 Species of Conservation Interest and Species at Risk	The EIS Guidelines require an assessment of the potential adverse effects of the Project on federally listed species at risk and those species listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) classified as extirpated, endangered, threatened, or of special concern (flora and fauna) and their critical habitat including direct and indirect effects on the survival and recovery of federally listed species. The EIS will also identify and describe mitigation measures to avoid or lessen those adverse effects. The Project, as proposed, will result in a loss of wetland function [i.e., habitat for landbird SAR, such as the Canada Warbler (*Species at Risk Act* (SARA)-listed, Threatened) and Olive-sided Flycatcher (SARA-listed, Threatened)]. For wetlands that cannot be avoided and for those where direct and indirect effects cannot be entirely minimized, conservation allowances for affected wetland habitat for landbird SAR would be an important element to consider to satisfy the requirement to minimize effects to wetland-associated landbird SAR in the Project Area as per S. 79 of SARA. Habitat alterations related to mine construction and operation may result in the creation of habitat for migratory bird SAR. Landbird SAR may nest in the Project Area, including on Project infrastructure. The Proponent does not propose a monitoring program for SAR. The Proponent should implement a migratory bird monitoring program throughout the lifespan of the Project to observe migratory bird SAR use of the Project Area. The Proponent should develop and implement beneficial management practices and mitigation measures to reduce the potential for migratory birds and SAR to nest in the Project Area. While there is no mention of Bank Swallow (SAR-listed, Threatened) in the EIS, this species is known to be attracted to industrial sites such as pits and quarries, where they build nest burrows in stockpiled product or banks and may be present in the Project Area. The Proponent should confirm the presence/absence of Bank Swallow in the Project Area prior to undertaking activities and consider beneficial management practices and mitigation measures to reduce potential impacts. This information is required to ensure that effects of SAR are mitigated properly and to assess residual effects on those species.	a) Provide rationale for why habitat for landbird SAR cannot be avoided. b) Develop and provide a plan for the use of conservation allowances in cases where loss of wetland habitat for landbird SAR is unavoidable. c) Provide mitigation/management measures to: • reduce the potential for migratory birds and avian SAR to nest in the Project Area; • detect nests and nest burrows (e.g. for Bank Swallows) in modified habitats or on Project infrastructure in the Project Area; and • protect nests and chicks until they have fledged and naturally left the area. d) Develop a follow-up and monitoring program to verify the effects predications and effectiveness of mitigation measures on landbird SAR and their habitat. This should include monitoring to verify the attraction and use of the Project Area by landbird SAR (including modified habitats and infrastructure). In instances where success of proposed mitigation has a measure of uncertainty, provide a discussion of proposed adaptive management measures that could be implemented in a timely manner in the event that adverse effects are detected.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-100	ECCC	Part 2, Section 7.3.4 Species at risk	Section 6.12 Species of Conservation Interest and Species at Risk	The EIS Guidelines require an assessment of the potential adverse effects of the Project on federally listed SAR. Blue-felt Lichen (SARA-listed, Special Concern) was detected at 11 locations in the Project Study Area. Where a 100 m buffer surrounding individuals of this species "is not practicable", the Proponent is considering including affected individuals in a Blue-Felt Lichen Translocation Plan. This is not the recommendation of Nova Scotia Department of Lands and Forests biologists in recent communication regarding a similar plan for the Beaver Dam Mine. The Proponent should develop and implement mitigation measures to reduce the impact to Blue-felt Lichen and monitor the effectiveness of those measures. This information is required to ensure that effects of SAR are mitigated properly and to assess residual effects on those species	a) Update the effects assessment and mitigation for Blue-felt Lichen to reflect the recommendation of Nova Scotia Department of Lands and Forests biologists (see L&F -43 from the provincial IRs). b) Develop a follow-up and monitoring program to verify the effects predictions and effectiveness of mitigation measures on Blue-felt Lichen. In instances where success of proposed mitigation has a measure of uncertainty, provide a discussion of proposed adaptive management measures that could be implemented in a timely manner in the event that adverse effects are detected.
Accidents and Malfunctions					
IR-101	ECCC	Part 2, Section 7.6.1 Effects of potential accidents or malfunctions	Section 6.17 Accidents and Malfunctions Section 6.17.5.1.1 Fuel and/or Other Spills Page 816	The EIS Guidelines require an analysis of the risks of accidents and malfunctions, a determination of their effects, and a presentation of preliminary emergency response measures. Specifically, the EIS must include an identification of the magnitude of an accident and/or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the accident and malfunction events and would potentially result in an adverse environmental effect. The EIS indicates that "*Volatilization of fuel oil and/or other substances should they be spilled would be localized to the area directly around the spill. In addition, only a minor portion of diesel fuel oil, the most widely used substance for the Project, is considered volatile*." According to various safety data sheets, gasoline is considered to have a much higher vapour pressure than diesel and is considered extremely flammable. It is heavier than air and therefore capable of travelling longer distances in low lying areas and has the potential to catch fire. Diesel, on the other hand, due to its lower vapour pressure, may not generate enough vapour to catch fire. The Proponent should consider the properties of gasoline that may cause adverse impact to the surrounding environment at a further distance. This information is required to accurately determine the effects of potential accidents involving gasoline.	a) Provide rationale for determining that volatilization of fuel spilled will be localized directly around the spill in consideration of a 5000 litre gasoline spill. b) If volatilization of fuel is not localized, update the effects of potential accidents involving a 5000 litre gasoline spill to reflect the increased distance and magnitude of such a spill.
IR-102	ECCC	Part 2, Section 7.6.1 - Effects of potential accidents or malfunctions	6.17.5.1.1.3 Mitigation and Emergency Response (Page 818)	The EIS Guidelines require an analysis of the risks of accidents and malfunctions, a determination of their effects, and a presentation of preliminary emergency response measures. Specifically, the EIS must include an identification of the magnitude of an accident and/or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the accident and malfunction events and would potentially result in an adverse environmental effect. The EIS states that a 500-1000 metre radius exclusion zone from a spill location will be established in the event of a fuel spill. No information was provided on how these evacuation distances were determined. This information is required to determine the validity of the stated exclusion zones.	a) Provide rationale on the radius exclusion zone distances using references to a field response guideline or any other document.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-103	ECCC	Part 2, Section 7.6.1 Effects of potential accidents or malfunctions	Section 6.17.8 Risk Assessment	The EIS Guidelines require the identification of the probability of potential accidents and malfunctions related to the Project, including an explanation of how those events were identified, potential consequences (including the environmental effects as defined in Section 5 of CEAA 2012), the plausible worst case scenarios and the effects of these scenarios. In Section 2.4.2.1.13 Fuel Supply, Storage and Distribution of the EIS, it is stated that "*A propane storage facility will be located near the process building.*" No information on the total quantity of propane stored is available and propane tank failure is not included in risk rating in Section 6.17.8 of the EIS. A large number of propane tanks impinged by a fire could cause a liquid boiling expanding vapour explosion that could cause severe damage to the surrounding environment. This information is required to accurately determine the effects of potential accidents involving propane storage.	a) Provide information on the total quantity of propane that would be stored at the propane storage facility located near the process building. b) Provide rationale for the omission of propane tank failures in the risk rating provided for various accidents and malfunction scenarios in Section 6.17.8 of the EIS. c) If necessary, update the assessment of accidents and malfunctions to include propane tank failures.
IR-104	ECCC	Part 2, Section 7.1.7 Migratory birds and their habitat Part 2, Section 7.3.3 Migratory birds Part 2, Section 7.4 Mitigation measures Part 2, Section 7.6.1 Effects of potential accidents or malfunctions	Section 6.11.6 Project Activities and Avifauna Interactions and Effects Section 6.11.7 Mitigation Section 6.12.6.4 Priority Avifauna Section 6.12.7.4 Priority Avifauna	The EIS Guidelines require an analysis of the risks of accidents and malfunctions, a determination of their effects, and a presentation of preliminary emergency response measures. In the case of fuel and tailings spills into waterbodies, the EIS does not provide a consideration of effects on the migratory birds that use them and no suggested mitigation for the effects of spills on birds. Many migratory bird species interact with water, particularly waterfowl, shorebirds and other waterbirds. A spill (fuel or tailings) could have significant impacts on the survival of these birds in the Project Area. Any adverse effect to fish can also be an adverse effect to migratory bird species that use wetlands, rivers and lakes. This information is required to accurately determine the effects of potential accidents involving fuel and tailings spills into waterbodies.	a) Provide an assessment of the effect of spills (fuel and tailings) on migratory birds. b) Provide a discussion of detailed mitigation measures to protect migratory birds in the Project Area from a fuel or tailings spill. Update the spill response plan, as required.
IR-105	ECCC	Part 2, Section 7.1.5 Groundwater and surface water Part 2, Section 7.2.2 Changes to groundwater and surface water	Section 6.17.4.3 Water Management Pond Failure Section 6.17.4.3.1 Threshold for Determination of Significance Section 6.17.4.3.2 Potential Interactions and Effects Page 801-803	The EIS Guidelines require an analysis of the risks of accidents and malfunctions, a determination of their effects, and a presentation of preliminary emergency response measures. Specifically, the EIS must include an identification of the magnitude of an accident and/or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the accident and malfunction events and would potentially result in an adverse environmental effect. The EIS states "*All phases of the Project have the potential for a water management pond failure. The volume of suspended solids expected to settle out of solution in a concentrated area should a failure at the water management ponds occur is considered minimal. As a result, potentially adverse effects to the sediment quality portion of the geology, soil, and sediment quality VC are considered low. The maximum effect of a water management pond failure as it relates to VCs above would be heavy siltation of wetlands and Seloam Brook and subsequent stresses on fish and other aquatic species*." The volume of sediment that could be released and area that could be impacted need to be quantified to assess the effects of potential water management pond failure and to assess the resulting effects assessment and mitigation measures.	a) Provide an estimate of the volume of sediment that may be released in the event of a failure and the area that could be affected. b) Update the resulting effects assessment and mitigation measures, as appropriate.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Information Requirement
IR-106	ESFWA	Part 2, Section 7.4 Mitigation measures Part 2, Section 7.6.1. Effects of potential accidents or malfunctions	Section 9.1 Summary of Environmental Impact Statement Appendix L.1 - Environmental Management System (EMS) Framework Document	The EIS Guidelines require a description of the Project's environmental protection plan and its environmental management system. The plan will provide an overall perspective on how potentially adverse effects would be minimized and managed over time. The EIS Guidelines also require a description of contingency and emergency response procedures. Table 9.1-1 of the EIS (Summary of Mitigation Measures by Valued Component) summarizes all key mitigation measures and commitments made by the Proponent which will more specifically mitigate any significant adverse effects of the Project on VCs to ensure that the Project will not result in any significant residual adverse environmental effects post-mitigation. There are many references to Appendix L.1 in Table 9.1-1. Several draft EMPs that were referenced in Table 9.1-1 are missing from Appendix L.1. This information is required to evaluate whether the EMPs are sufficient to prevent significant adverse environmental effects.	a) Provide the following missing draft EMPs: • EMP 3 Acid Rock Drainage Prediction and Mine Rock Management Plan • EMP 8 TMF Operation, Monitoring and Surveillance Manuals • EMP 9 Surface Water and Groundwater Management and Contingency Plans • EMP 10 Health and Safety Plan • EMP 11 Emergency Response Plan • EMP 13 Archaeological and Cultural Heritage Resources Management Plan • EMP 18 Explosives Management Plan • EMP 19 Reclamation and Closure Plan • EMP 20 Recovery Plan • EMP 21 Stakeholder Engagement Plan • EMP 22 Indigenous Peoples Engagement Plan
Effects of the Environment on the Project					
IR-107	KMKNO Public	Part 2, Section 7.6.2 Effects of the environment on the project	Section 7.1.3.2 Effects of Climate Change on the Project Section 7.1.2.2 Extreme Temperatures, Storms, and Wind	The EIS Guidelines require to take into account local conditions and natural hazards and how they could adversely affect the Project, and in turn potentially result in effects to the environment. Section 7.1.3.2 of the EIS notes that based on regional data, it is unable to make strong conclusions about future climatic conditions. The EIS also notes that the tailings management facility and Seloam Brook realignment were designed with 15% increase in peak flow design to accommodate potential effects resulting from climate change. No rationale was provided as to why only these two project components (and not the post-closure pit design and associated discharge) were modified to accommodate potential effects from climate change. Section 7.1.2.2 of the EIS details extreme temperatures, storm and winds. This information is provided in the context of current metrological understanding and does not appear to take into account how climate change may alter these extremes. This information is required assess the potential effects of the environment on the Project.	a) Describe how climate change was considered in the design for project components (other than the tailings management facility and the Seloam Brook realignment). b) Update the effects assessment for effects of the environment on the Project, using the precautionary principle and taking into consideration the potential effects of climate change on extreme weather events. Include additional mitigation measures, as required.
IR-108	KMKNO Public	Part 2, Section 7.6.2 Effects of the environment on the project	Section 2.2.1.9 Seloam Brook Realignment Section 6.6.5.2.6 Seloam Brook Realignment Section Modelling Section 6.6.8.1.2.3 Q200 Flood Flow Scenario for the Seloam Brook Realignment	The EIS Guidelines require to take into account local conditions and natural hazards and how they could adversely affect the Project, and in turn potentially result in effects to the environment. The EIS describes the floodplain and associated 1:200 year flood event for the Seloam Brook realignment. The EIS does not contain information related to the risk of potential flooding on other project components, such as the open pit and tailings management facility. Also, the EIS does not contain information related to how climate change may affect effluent volumes and concentrations. This information is required assess the potential effects of the environment on the Project.	a) Describe how the risk of flooding was taken into account in the design and layout of project components (other than Seloam Brook realignment). b) Update the effects assessment of the environment on the Project to include how climate change may alter the concentration and discharge rate of effluent during the decommissioning and post-closure stages of the Project.