

ANNEX 1
Information Requirements for the Hardrock Gold Mine Project Environmental Impact Statement

IR Number: EA(1)-01

Project Effects Link to CEAA 2012: All

Reference to EIS guidelines: Part 2, Section 3.2.

Reference to EIS: Chapter 5; Appendix I, Section 6.0; Appendix N.

Context and Rationale:

- Part 2, Section 3.2 of the EIS Guidelines indicates that, for project activities, “the EIS will include a schedule including time of year, frequency, and duration for all project activities.” Some scheduling information is included in various locations in the EIS, but the sequencing of project activities within phases is unclear, particularly in Chapter 5 of the EIS.
- Appendix I, Section 6.0, Figure 6-1 provides “a final closure schedule” that shows when certain project components will be active, in rehabilitation and in post-closure monitoring. Project activities occurring in decommissioning and abandonment phases should be separated, and clearly indicated.
- The visual simulation video attached to Appendix N is a useful tool to communicate the evolution of construction, operations and closure work in the project. The information contained in this video should be translated into written form, either as one or several figures similar to Appendix I, Figure 6-1 or as one or several tables. These figures or tables would provide a consolidated schedule of all project activities, from the beginning of the construction phase through abandonment, with a clear indication of timing, duration and sequencing with as much precision as available. This consolidated schedule should also indicate when key mitigation measures will be active, if they are not active throughout the time that the project activity is occurring.
- A consolidated schedule will provide reviewers with clarity about the timing and locations of emissions that are anticipated during the project.

Specific Question/ Request for Information:

A. Provide a consolidated schedule of all project activities, from the beginning of the construction phase through abandonment, with a clear indication of timing, duration and sequencing with as much precision as available.

IR Number: EA(1)-02

Project Effects Link to CEAA 2012: All

Reference to EIS guidelines: Part 2, Section 6.4; Part 2, Section 7.

Reference to EIS: Chapter 24.

Context and Rationale:

- Section 6.4 of the EIS Guidelines state that “each [mitigation] measure should be specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation, and implementation.”
- Also, Part 2, Section 7 of the EIS Guidelines state that “in a second table, the EIS will summarize all key mitigation measures and commitments made by the proponent which will more specifically mitigate any significant adverse effects of the project on valued components (i.e., those measures that are essential to ensure that the project will not result in significant adverse environmental effects).”
- When making her EA decision, the Minister of the Environment and Climate Change (the Minister) must decide if, taking into account the implementation of any mitigation measures that she considers appropriate, the project is likely to cause significant adverse environmental effects. In advising the Minister, the Agency provides a significance analysis on each valued component based on the EIS. As such, the EIS must clearly identify mitigation measures necessary to support the proponent’s conclusions for each valued component. In the EIS Guidelines, these mitigation measures are referred to as “key mitigation measures.”
- If the project is allowed to proceed, the Minister’s decision will also include legally-enforceable conditions, crafted using any key mitigation measures identified in the Agency’s advice to the Minister or that the Minister deems appropriate. GGM would be required to comply to these conditions throughout the life of the Project, should the Project be allowed to proceed.

- The EIS Table of Concordance (Appendix B1, row 185) refers to Section 24.1 for the summary described in the paragraph above. No indication of key mitigation measures could be found in Section 24.1. However, Section 24.2, Table 24-2 identifies “key commitments”, several of which are neither mitigation measures, monitoring nor follow-up programs. It is unclear whether the mitigation measures named in Table 24-2 were selected because they were determined to be necessary to ensure that the project will not result in significant adverse environmental effects.
- The list of key mitigation measures is expected to be a subset of all mitigation measures described in the EIS. For example, the Agency anticipates that some or all of the mitigation measures identified to reduce changes to air quality are essential to ensure that there will not be significant adverse environmental effects to human health.

Specific Question/ Request for Information:

A. Review and revise mitigation measures linked to effects described in section 5 of CEAA, 2012 to remove ambiguity and ensure that proposed mitigation measures are specific (including timing, location, circumstances, and measureable outcome or threshold).

B. Provide a list of all key mitigation measures and commitments which will more specifically mitigate any significant adverse effects of the project on valued components related to section 5 of the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012) (i.e., those measures that are essential to ensure that the project will not result in significant adverse environmental effects). The rationale for determining whether a mitigation measure is key should be found in the section of the EIS related to the mitigation measure. The Agency recommends that this summary be included in a new table.

IR Number: EA(1)-03

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current use of lands and resources for traditional purposes

Reference to EIS guidelines: Part 2, Section 1.3.

Reference to EIS: Section 18.1; Appendix C10, CEAA_5.

Context and Rationale:

- The Agency’s comment EA(0)-05 (CEAA_5) on the draft EIS asked to identify “local and Indigenous communities, traditional territories, treaty lands, and Indian reserve lands in Section 2.3 of the EIS.” This comment is consistent with the requirements given in Part 2, Section 1.3 of the EIS Guidelines.
- The response to this comment in Appendix C10 points the reviewer to “Figures 18-1 to 18-4 of the draft EIS/EA”. Figures 18-3 and 18-4 are not included in the final EIS. Section 18.1, Figure 18-1 of the final EIS does illustrate local and Indigenous communities, treaty lands and Indian reserve lands, but does not provide traditional territories. A visual representation of the traditional territories is important in understanding how Project activities may affect the current use of lands and resources for traditional purposes.

Specific Question/ Request for Information:

A. Identify, on a map, traditional territories that have been identified to GGM. Indicate any Indigenous groups for which this information was not provided, or for which this information was asked to be kept confidential.

IR Number: EA(1)-04

Project Effects Link to CEAA 2012: All

Reference to EIS guidelines: Part 2, Section 8.2.

Reference to EIS: Chapters 7 to 19; Chapter 23; Appendices M1 to M14.

Context and Rationale:

- Chapter 23 presents preliminary environmental management and monitoring plans (EMMPs), which are stated to include follow-up and monitoring programs. However, the EMMPs referred to in Chapter 23 and found in appendices M1 to M14 contain limited information about monitoring, which does not constitute a conceptual program as per Part 2, Section 8.2 of the EIS Guidelines. Limited information on follow-up programs, as defined under the Canadian Environmental Assessment Act, 2012 (CEAA, 2012) are found in these appendices.

- A follow-up program, for the purposes of the EA under CEAA 2012, should determine the accuracy of the conclusions of the environmental assessment and the effectiveness of the mitigation measures. However, Table 23-1 “Conceptual EA Follow-Up Program Elements” lists an overview of “follow-up/Monitoring elements” without making the distinction between the two types of activities. The assessment of potential environmental effects in Chapters 7 to 19, and the summary in Table 23-1 does not identify which uncertainties are verified through each follow-up program. In addition, it does not identify which uncertainties should be verified through studies to be included in a follow-up program. A commitment to develop a plan is not sufficient; detailed measures must be identified.
- Note that other comments in Annex 1 of this package of information requirements will point out questions or comments on follow-up programs related to specific valued components.

Specific Question/ Request for Information:

- A. In chapters 7 through 19 of the EIS (effects assessment chapters), summarize the follow-up programs that are proposed as per the definition of follow-up program under CEAA 2012. Identify the uncertainties which must be confirmed through each follow-up program.
- B. Create a detailed follow-up program as per the EIS Guidelines that includes all the follow-up studies from the effects assessment chapters, and that is separate from the monitoring program.

IR Number: FH(1)-01

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 3.2.1; Part 2, Section 6.2.2.

Reference to EIS: Section 5.4.3; Section 5.6.7; Section 5.7.1.1; Section 5.7.1.4.

Context and Rationale:

- The timing and operational details provided in Chapter 5 and Appendix M9 about partial relocation of historical tailings into the new tailings management facility (TMF) appear incomplete. The historical MacLeod High and Low tailings and historical Hardrock tailings overlap with the Highway 11 realignment, Overburden Storage Area 1 and the open pit.
- Section 5.6.7 states that construction of the Highway 11 realignment will commence in “Year -3 through to the end of Year -2”. For Overburden Storage Area 1 and the open pit, Section 5.4.3 states that “topsoil and overburden in the open pit area will be removed during construction to expose the bedrock, allowing for mining to commence”.
- The timing proposed for the partial relocation of historical tailings to the new TMF is “Years 2 to 4 of operation”, as stated in Section 5.7.1.1. It is further stated in Section 5.7.1.4 that “Excavated tailings will be placed in haul trucks in a controlled manner to prevent spillage losses to the environment during hauling to the new TMF”.
- As the excavation of historical tailings will commence during pre-construction and construction phases of the Project, and hauling to the new TMF is expected during Years 2 to 4 of the operations phase, it is unclear where and how the tailings will be stored between their excavation and their relocation into the new TMF.
- This information is important to understand as the layers of excavated historical tailings that are exposed to air can undergo oxidation and acid rock drainage or metal leaching, which can result in changes in water quality.
- Additionally, it is stated in Chapter 9, Section 9.1.2 that “The historical tailings will be placed in the TMF on top of the fresh tailings (minimum thickness of 2m) in the area between the TMF inner dam and southeast dam). It is also stated in Chapter 5, Section 5.7.1.4: “GGM will carry out additional testing of historical tailings including laboratory work to simulate storage conditions in the new (Tailings Management Facility) TMF to confirm geochemical behavior prior to moving material in Year 2.”
- No evidence was found in Chapters 9 and 10 and Appendices F4, F5 and F6 to show how 2 metres of fresh tailings will be an adequate surface for deposition of historical tailings. Additional laboratory work is proposed prior to moving the historical tailings to the new TMF but ideally, this laboratory work should have already been completed in order to inform the assessment of environmental effects of seepage, including loadings of arsenic and other contaminants that can potentially change the quality of surface water. It is also noted that alternatives for the management of excavated historical tailings were not considered in case the geochemical analyses do not support the relocation of historical tailings into the new TMF.
- It is important that baseline testing be completed so that the groundwater model can accurately predict the changes in water quality and the resulting effects on fish and fish habitat.

Specific Question/ Request for Information:

- A. Provide more details about the location and storage of the historical Macleod and Hardrock tailings between the time they are excavated and the time they are disposed into the new TMF;

- B. Describe mitigation measures to ensure no release of contaminants from the excavated historical MacLeod and Hardrock tailings, in the time that they are stored before being disposed into the new TMF;
- C. Describe any monitoring that will be undertaken to ensure that the excavated historical MacLeod and Hardrock tailings are properly stored, with no release of contaminants, in the time that they are stored before being disposed into the new TMF;
- D. Evaluate the changes to water quality that could result from exposing layers of excavated MacLeod and Hardrock tailings to air, and inducing oxidation and acid rock drainage/metal leaching;
- E. Provide a rationale for the use of a 2-metre layer of fresh tailings for deposition of historical tailings in the new TMF. Describe how additional laboratory work necessary to simulate storage conditions in the TMF, and to confirm geochemical behavior of historical tailings, will be incorporated into the groundwater model and effects assessment;
- F. Provide a description and an assessment of alternative means for managing historical tailings, in case that geochemical analysis is not supportive of relocating historical tailings to the new TMF.

IR Number: FH(1)-02

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2; Part 2, Section 6.3.1.

Reference to EIS: Section 5.2.2; Section 5.4.3; Section 5.7.1.4; Section 9.1.2; Appendix M9, Section 7.2.1.

Context and Rationale:

- There are uncertainties about the collected data and the effects assessments regarding the leftover historical tailings. Performing project activities (e.g. excavation) around leftover historical tailings can mobilize previously stable tailings and cause additional loading of contaminants to the surrounding environment.
- It is stated in Section 5.4.3 that “An estimated 7.24 Mm³ of overburden” and “[...] 2,356 Mm³ of topsoil will be stored at designated locations within the overburden storage areas” and “[...] placement of overburden as described will provide an enhanced cover system to reduce infiltration through the historical MacLeod tailings and will decrease metal loadings to Kenogamisis Lake”.
- It is unclear how the use of overburden and topsoil will reduce the loadings to Kenogamisis Lake, as there is no evaluation in the EIS to assess the performance of covering the leftover historical tailings with overburden or topsoil. In fact, it is noted in Appendix M9, Section 7.2.1 that “[...] topsoil is not suitable for rehabilitation and will be used where appropriate in other areas of the Project”.
- Consideration of loadings for the suite of potential contaminants that could arise from the leftover historical tailings is necessary to verify that the project will lead to improvement in water quality in Kenogamisis Lake, with no potential effects on fish and fish habitat.

Specific Question/ Request for Information:

- A. Provide an evaluation of covering the leftover historical tailings with overburden and topsoil;
- B. Update the water quality assessment, including the potential loading of contaminants from the leftover historical tailings to seepage and/or surface water, taking the response from Question A into consideration;
- C. Provide the effects on fish and fish habitat, if applicable, due to changes in water quality requested in Question B;
- D. Describe mitigation measures to prevent adverse effects on fish and fish habitat, if necessary;
- E. Characterize residual effects, if any, after the mitigation measures have been implemented;
- F. Reassess the significance determination, if necessary, taking responses from Questions A to E into account;
- G. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-03

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2.

Reference to EIS: Section 9.1.2; Section 9.1.5.2; Section 9.2.2.6; Section 9.4.3.3.

Context and Rationale:

- Section 9.1.5.2 presents the temporal boundaries for the assessment of groundwater as follows:
 - Construction: Years -3 to -1;
 - Operation: Years 1 to 15;
 - Active Closure Years: 16 to 20;
 - Post-closure: Years 21 to 36.
- It is understood that these temporal boundaries have been used for groundwater modelling. However, it is unclear whether the proposed groundwater model captured the time period during which maximum change in water quality is expected from seepage released from the tailings management facility (TMF), waste rock storage areas (WRSAs) and overburden storage areas, and what measures will be in place to minimize such changes. This information is important to understand as variability in groundwater travel times can take years and decades in some circumstances.
- Section 9.4.3.3 states that “while the TMF is located adjacent to Kenogamisis Lake, the long travel times are the result of the TMF reclaim pond being maintained over 1.0 km from Kenogamisis Lake. The TMF reclaim pond provides the driving head for groundwater recharge to the underlying aquifer system and will result in deeper groundwater flow paths that bypass the seepage collection system and result in discharge to surface water features.” The same section further states: “The deposition of historical tailings in the TMF is simulated at the locations shown on Figure 9-20. Particles originating from where the historical tailings are deposited are captured by the seepage collection system and will not result in additional loading to the Southwest Arm of Kenogamisis Lake during operation.”
- The following concerns are noted from the statements above:
 - 1) Section 9.4.3.3, Figure 9-20 and Appendix F4, Section 5.3.2.3, Figure 5-19 provide maps showing particle traces during operation phase. The seepage collection system is assumed to collect 100% of these particle traces as it is stated that no “additional loadings to the Southwest Arm of Kenogamisis Lake during operation” are expected. This appears to be an exception to the statement made in Chapter 9, Section 9.1.2 that “seepage collection system is predicted to capture 88% of the total seepage from the TMF”
 - 2) It appears that only during operation phase is consideration given to the short flow paths that will be intercepted by seepage collection ditches. This assumption discounts the potential loadings from the short flow paths after operation phase. These short flow paths are important as the partially relocated MacLeod and Hardrock tailings appear to be heavily contaminated based on baseline information provided in Table 9-9 of Chapter 9, Section 9.2.2.6, and can release contaminants as they were in their original location after the operation phase.
- There are not enough details provided in Appendices F4, F5, F6 or Chapters 9 and 10 of the EIS to sufficiently review and validate these assumptions and conclusions regarding the partially relocated tailings in the groundwater model for the operation phase and beyond.
- Section 9.4.2.1 states that “closure of water management facilities will result in the removal of contact water collection systems that may result in groundwater originating from the WRSAs, TMF, overburden storage, and historical tailings discharging to the natural environment”. Without active interception of seepage from the interception ditches after the operation phase, the water quality in the surrounding areas is likely going to be affected in the closure phase and beyond.
- This information is required because the variability in travel times, seepage interception and ground conditions may postpone the release of contaminants to a later time many years after the operations phase, but it is important that the seepage is captured whenever it moves out to the surrounding waterbodies and before it adversely affects fish and fish habitat.

Specific Question/ Request for Information:

- A. Provide the year(s) during which maximum change in water quality in Kenogamisis Lake is expected from seepage released from the TMF, WRSAs and overburden storage areas;
- B. Provide a revised groundwater modelling run, if necessary, taking into account the year(s) during which maximum changes in water quality is expected, as stated in question A;
- C. Reassess the time period during which seepage collection ditches would be closed, taking the responses from questions A and B into account;
- D. Taking the response from comment FH(1)-02 into account, explain how 100% of particle traces from the historical tailings deposited into the new TMF are expected to be captured by the seepage collection system;
- E. Provide more details about how partially relocated historical tailings have been incorporated into the groundwater model for operation phase and beyond, including a revised groundwater modelling run with a comparison of changes in water quality in Kenogamisis Lake before and after the inclusion of partially relocated historical tailings into the new TMF;
- F. Describe the predicted changes in water quality in Kenogamisis Lake after revisions to groundwater model are made as per Questions A to D;

- G. Provide the effects on fish and fish habitat, if applicable, taking responses from Questions A to E into account;
- H. Describe mitigation measures to prevent adverse effects on fish and fish habitat, if necessary;
- I. Characterize residual effects, if any, after the mitigation measures have been implemented;
- J. Reassess the significance determination, if necessary, taking responses from Questions A to H into account;
- K. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-04

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 3.2; Part 2, Section 6.2.2.

Reference to EIS: Section 5.3.

Context and Rationale:

- Section 5.3, Figure 5-2 indicates that the proposed Overburden Storage Area 3 west of the tailings management facility (TMF) and Overburden Storage Area 2 adjacent to waste rock storage area (WRSA) D (Contingency) do not appear to have means to collect contact water.
- It is important to identify all effluent collection systems, as surface drainage and seepage from the overburden storage areas can change the water quality of the surrounding waterbodies and result in effects to fish and fish habitat.

Specific Question/ Request for Information:

- A. Provide details on how contact water from Overburden Storage Areas 2 and 3 will be collected, including a revised Figure 5-2 that contains this information;
- B. Describe the changes in water quality if contact water from the Overburden Storage Areas 2 and 3 is not collected;
- C. Provide the effects on fish and fish habitat, if applicable, due to changes in water quality as described in Question B;
- D. Describe mitigation measures to prevent adverse effects on fish and fish habitat, if necessary;
- E. Characterize residual effects, if any, after the mitigation measures have been implemented;
- F. Reassess the significance determination, if necessary, taking responses from Questions A to E into account;
- G. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-05

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 3.1; Part 2, Section 6.2.2.

Reference to EIS: Section 5.3.

Context and Rationale:

- Section 5.3 states that “project components have been sited outside the 120 m surface rights reservation area for Kenogamisis Lake on claim to lease lands [...] and outside a 30 m setback from the high water mark for patent lands. [...] Limited exceptions include:
 - the water-related intake and treated effluent discharge pipeline to Kenogamisis Lake
 - eastern extension of the open pit (to be confirmed with ongoing Project planning and engineering design)

- southern lobe of WRSA B
- contact water collection ponds B2 and D2”.
- In this section, high water berms are proposed as mitigation measures for the last three of these four exceptions. It is unclear if any mitigation measures are proposed to reduce changes in water quality from construction, operation and decommissioning activities related to the water-related intake and treated effluent discharge pipelines to Kenogamisis Lake, and whether the effects assessment took any mitigation measures into account.
- This information is important to understand potential changes in water quality and effects to fish and fish habitat from an activity being undertaken within the 30 m setback.

Specific Question/ Request for Information:

- A. Provides changes in water quality (e.g. sedimentation) caused by construction, operation and decommissioning activities related to water-related intake and treated effluent discharge pipelines to Kenogamisis Lake;
- B. Provide the effects on fish and fish habitat from changes in water quality as discussed in question A;
- C. Describe mitigation measures to reduce the effects on fish and fish habitat from changes in water quality described in question A;
- D. Characterize residual effects, if any, after the mitigation measures have been implemented;
- E. Reassess the significance determination for fish and fish habitat and, if necessary, taking response from questions A to D into account;
- F. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-06

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2.

Reference to EIS: Section 10.1.7.2.

Context and Rationale:

- Section 10.1.7.2 indicates that a significant environmental effect to surface water quality is when “treated effluent discharge water quality consistently exceeds MMER [...] or [...] consistently exceeds regulatory criteria”.
- Any exceedance of MMER (Schedule 4) would be considered non-compliance with this regulation, according to Environment and Climate Change Canada (ECCC).
- In addition, the term “consistently” is not defined in this context. Without this clarity, there is uncertainty about what threshold is being proposed for comparison.
- This definition is important for the evaluation of the magnitude criteria of the significance assessment for surface water quality and fish and fish habitat.

Specific Question/ Request for Information:

- A. Clarify the use of the term “consistently” in the definition provided for significant environmental effect to surface water quality;
- B. Revise the magnitude for significance assessment of Surface Water Quality, if necessary, taking the response from Question A into account.

IR Number: FH(1)-07

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2; Part 2, Section 6.3.1.

Reference to EIS: Section 4.2.5; Section 22.4.5.1; Appendix F10, Section 9.2.5.

Context and Rationale:

- Section 22.4.5.1 states that “the Goldfield Creek diversion channel will be sized to convey the 100 year 24-hour rainfall event (which would have the greatest peak flow), and to safely release the peak flow from the regulatory storm event and the Inflow Design Flood corresponding to the PMF [Probable Maximum Flood] without overtopping the diversion dam located north of the TMF [Tailings Management Facility].”

- It is also indicated that the design of the diversion channel accounts for both upstream flows (from the diverted part of the Goldfield Creek watershed) and contributing flows from the TMF emergency spillway. In Appendix F10, Section 9.2.5 it is further stated that: “The hydrology of the existing and proposed Goldfield Creek diversion and Southwest Arm Tributary has been assessed using the Hydrologic Modelling System (HEC-HMS)”
- While the diversion channel design criteria appear reasonable, no specific details have been found on the model and the results. For example, there is no information provided on the flow rate, depth, velocity and flood extent that are expected along the Southwest Arm Tributary, as well as the hydrometeorological parameters (such as the 100-year 24 hours rainfall value) used to calculate these quantities in the model. The only result shown is the high flow mapping provided in Appendix F10, Figure 9-1 derived from the modelling effort. In the EIS’s selection of alternatives (Chapter 4, Section 4.2.5) and Appendix G3, it is stated: “Final channel design and location details will be determined based on site-specific information to be collected during the permitting period (e.g., geotechnical data) and considering ongoing consultation.”
- It is understood that this high flow mapping may be intended to support determinations of effects on fish and fish habitat. However, in order to understand potential changes on water quality due to the potential mixing of contact waters with non-contact waters on the project site, a clear understanding is needed in terms of how the model results were derived and what assumptions were included in its creation.

Specific Question/ Request for Information:

- Provide details on the flow rate, depth, velocity and flood extent that are expected along the Southwest Arm Tributary;
- Provide the hydrometeorological parameters (such as the 100-year 24 hour rainfall value) that were used in the model to calculate the values mentioned in Question A.

IR Number: FH(1)-08

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2.

Reference to EIS: Section 5.3; Appendix I, Sections 6.1; Appendix M9, Section 7.3

Context and Rationale:

- Appendix M9, Section 7.3 states that “The MacLeod low tailings on the south side of Highway 11 will be removed and relocated. The MacLeod low tailings located to the north of the MacLeod high tailings adjacent to Barton Bay will remain in place with the exception of small areas immediately adjacent to the MacLeod high tailings. These may need to be removed during placement of the buttressing that is proposed for the Highway 11 realignment. The historical MacLeod low tailings between Barton Bay and the Highway 11 realignment will be rehabilitated as required”.
- It is unclear under what conditions would rehabilitation of the historical MacLeod low tailings between Barton Bay and the Highway 11 realignment be considered necessary or required.
- The site plan included in Section 5.3, Figure 5-2 shows subsurface seepage collection system for MacLeod high tailings which is meant to limit contaminants loadings into the surrounding surface water bodies. No such subsurface seepage collection system is presented for the MacLeod low tailings. This is concerning as there are uncertainties associated with the performance of covering the historical tailings with topsoil and overburden (see comment FH(1)-02). Also, no information was provided in the EIS regarding possible effects on metal leaching from maintenance and snow/ice control measures taken for Highway 11.
- This information is important to understand the changes in water quality at Barton Bay and the effects on fish and fish habitat.

Specific Question/ Request for Information:

- Describe the conditions under which the rehabilitation of the historical MacLeod low tailings between Barton Bay and Highway 11 realignment will become necessary or required, and describe what this rehabilitation will entail. Include a consideration of how maintenance and snow/ice control measures for Highway 11 may affect metal leaching in the surrounding historical MacLeod high and low tailings;
- Describe the changes in water quality in Barton Bay based on response to Question A;
- Provide the effects on fish and fish habitat taking response from Questions B into account;
- Provide a rationale for not including a subsurface seepage collection system for MacLeod low tailings between Barton Bay and Highway 11 realignment, while also describing the potential risks to water quality from not including it;
- Describe additional mitigation measures to minimize effects on fish and fish habitat, if necessary,
- Characterize residual effects, if any, after the mitigation measures have been implemented;

G. Reassess the significance determination, if necessary, taking responses from Questions A to F into account;

H. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-09

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 8.2.

Reference to EIS: Section 11.2.2; Appendix M1, Section 8.1.2.2.

Context and Rationale:

- Appendix M1, Section 8.1.2.2 indicates there will be “water quality monitoring (quarterly) of Barton Bay, the Central Basin, Outflow Basin, and downstream of Kenogamisis Lake [...] streams and lakes in the LAA [Local Assessment Area] including the Goldfield Creek Tributary, Goldfield Creek diversion channel, Southwest Arm Tributary inflow to the Southwest Arm of Kenogamisis Lake and Mosher Lake”.
- Some other fish-bearing watercourses and waterbodies in the LAA which could be affected by the Project such as Lake A-322, GFP-4, WC-Z, WC-O, and WC-C have not been considered for water quality monitoring. These watercourses and waterbodies are comprised of fish according to Chapter 11, Section 11.2.2.2, Table 11-6. These could be impacted by the project due to their proximity to project components and also form important connections between waterbodies that allow fish passage. For example, Chapter 11, Section 11.2.2.1 states that “Fish can pass through the Goldfield Creek Tributary from Kenogamisis Lake upstream to Lake A-322 under most flow conditions”.
- There is no rationale provided for why monitoring is not proposed at these smaller watercourses and waterbodies to confirm predicted effects on fish and fish habitat.

Specific Question/ Request for Information:

A. Update the monitoring plan with details (location, frequency, parameters, etc.) of water quality sampling at Lake A-322, GFP-4, WC-Z, WC-O, and WC-C, or provide a rationale for not doing so.

IR Number: FH(1)-10

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2.

Reference to EIS: Chapter 9, Section 9.2.2.7.

Context and Rationale:

- Section 9.2.2.7 states that “The groundwater mass loading is estimated based on the mean baseline concentrations from historical Little Long Lac, MacLeod and Hardrock tailings [...]”. There are the following uncertainties with this approach:
 - 1) It is unclear whether baseline concentrations for historical tailings were measured at different depths. This is an important factor because concentrations of contaminants likely vary across depth. Concentration values from shallow tailings would be biased conservatively due to dilution of contaminants from recharge. Concentration values from deeper tailings would more accurately reflect concentrations in long-term tailings porewater.
 - 2) It appears that the mean concentration across the entire tailings depth profile was used to derive groundwater mass loadings. The Agency is unsure about why the mean concentrations were considered more appropriate to use than the concentrations in the deeper portions of the tailings.
- It is important to understand the geochemistry of the historical tailings in order to evaluate the changes in water quality and effects on fish and fish habitat.

Specific Question/ Request for Information:

A. Clarify whether the baseline concentrations from historical Little Long Lac, MacLeod and Hardrock tailings were measured at different depths;

B. Provide a rationale for why the mean concentrations across the entire tailings depth profile is considered more appropriate to use than the concentrations in the deeper portion of the tailings.

IR Number: FH(1)-11

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.1.4.

Reference to EIS: Section 9.2.2.3; Section 9.2.2.7; Appendix F4, Section 3.2.6.

Context and Rationale:

- Section 9.2.2.3 provides the hydraulic conductivity values (“K values”) for shallow bedrock. These K values were measured at “depth intervals of 2.5 to 40 m”. However, Appendix F4, Section 3.2.6 identified shallow bedrock to be “approximately 10 m thick”.
- It is unclear if the K values assigned to shallow bedrock are based on those measured to a depth of 10 metres or deeper. K values at depths greater than 10 metres should not be included in this shallow bedrock dataset as these would be more representative of deeper bedrock and could result in an underestimation of the appropriate K value.
- This information is important to understand, as K values are used to estimate travel times that it may take for the effluent to reach surface water bodies and potentially affect fish and fish habitat.

Specific Question/ Request for Information:

A. Clarify the depth at which K values were measured for shallow bedrock;

B. Provide K values up to a depth of 10 m and discuss how these K values compare to those used as initial and calibrated values for the groundwater model;

IR Number: FH(1)-12

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2; Part 2, Section 6.3.1.

Reference to EIS: Section 9.2.2.6.

Context and Rationale:

- There may be changes to water quality and effects on fish and fish habitat from deposition and resuspension of sediments in various project components.
- Section 9.2.2.6 describes the reduction in concentration of parameters of potential concern (PoPCs) in groundwater seepage coming out of historical MacLeod high tailings. It states that “these data support the natural attenuation of these redox sensitive PoPCs as groundwater discharges to surface water receivers and geochemical controls result in precipitation and removal of parameters that are only mobile in reducing environments”.
- As groundwater discharges to surface water features, some contaminants can precipitate to sediment. This contaminated sediment can then become problematic for biota in the water. Additionally, they are also a source for sediment-water interactions, as the precipitated contaminants can re-dissolve or be re-suspended in the water column. This information was not found in Chapter 9, 10 or Appendix F4, F6 and E14. The sediment-water interactions should be considered to ensure that the loading of contaminants in water are not underestimated and the effects to fish and fish habitat are minimized.

Specific Question/ Request for Information:

A. Identify the contaminants with potential to precipitate to sediment as groundwater discharges to surface water receivers, and contaminants that can re-dissolve or re-suspend in the water column;

B. Describe the changes in water quality and sediment from precipitation, re-dissolving or re-suspending each contaminant identified in Question A;

C. Provide the effects on fish and fish habitat, if applicable, due to changes in water quality as described in Question B;

D. Describe mitigation measures to prevent adverse effects on fish and fish habitat, if necessary;

E. Characterize residual effects, if any, after the mitigation measures have been implemented;

F. Reassess the significance determination, if necessary, taking responses from Questions A to E into account;

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G. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-13

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2.

Reference to EIS: Section 5.9.3.2; Section 9.4.3.3.

Context and Rationale:

- Section 9.4.3.3 states that “once the pit lake has filled and begins to discharge (Year 33), 23% of the groundwater recharge from WRSAs [waste rock storage areas] A to C will continue to discharge to the open pit, with the balance discharging to surface water features.”
- It is noted in Section 5.9.3.2 that once the pit lake has filled, it will be connected with Southwest Arm of Kenogamisis Lake “through a channel”, thereby making the open pit a “surface water feature”. Thus, all groundwater recharge from these WRSA A and C will be discharged to a surface water feature and could potentially contribute additional loadings of contaminants to Southwest Arm of Kenogamisis Lake.
- It is important to ensure that the EIS clearly reflects all contaminant loadings to surface water features and assesses potential changes to water quality adequately in order to assess the effects on fish and fish habitat.

Specific Question/ Request for Information:

A. Revise the water quality analysis to reflect that after year 33, all drainage and associated loadings from WRSAs A and C and the pit lake will ultimately discharge into the Southwest Arm of Kenogamisis Lake;

B. Describe the changes in water quality at Southwest Arm of Kenogamisis Lake after consideration of loadings from WRSAs A and C and pit lake;

C. Provide the effects on fish and fish habitat, if applicable, due to changes in water quality as described in Question B;

D. Describe mitigation measures to prevent adverse effects on fish and fish habitat, if necessary;

E. Characterize residual effects, if any, after the mitigation measures have been implemented;

F. Reassess the significance determination, if necessary, taking responses from Questions A to E into account;

G. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-14

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.1.2; Part 2, Section 6.1.4; Part 2, Section 6.2.2.

Reference to EIS: Section 9.4.1.1; Appendix C10; Appendix E6.2, Section 3.2.

Context and Rationale:

- The timing and the use of data obtained from the field kinetic testing program is unclear. Appendix E6.2, Section 3.2 states that “The field kinetic testing program initiated in 2013 will continue through 2017”. Appendix C10, response to Agency comment FH(0)-46 (CEAA_56) further states that “after a review of the 2016 and 2017 results, modification to the testing program will be completed as required”. It is unclear whether the field kinetic testing program will cease in 2017. Also, it is unclear under what conditions that modifications be considered required or necessary, and what these modifications would entail.
- Section 9.4.1.1 indicates that “no reduction in loading due to precipitation reactions or reduction in oxidation kinetics are applied for the historical tailings, WRSAs [waste rock storage areas], ore stockpile, and tailings management facility (TMF) beyond those estimated from the 2015 geochemical testing program and field data. Based on geochemical testing it has been demonstrated that loading rates will decline over time. As a result, by not including further decreases in loading rates long-term water quality predictions and loading to the environment are overestimated and provides a conservative approach for the assessment”. The extent of conservatism

built into this approach is unclear, as it appears that decreases in loadings have been applied using two years of data available up to 2015. This does not appear to encompass a possible scenario of metal leaching unexpectedly increasing over time.

- Geochemical investigations, including field kinetic testing programs, should continue to be undertaken to gain a better understanding of the long-term geochemistry over the life of the mine operations and as closure activities are undertaken. Ongoing monitoring of the geochemistry will help to inform final closure objectives and strategies.
- This information is important to understand changes in water quality that may be caused due to metal leaching and the corresponding effects on fish and fish habitat.

Specific Question/ Request for Information:

- A. Provide a timeline for the field kinetic testing program and include a rationale for the proposed timeline;
- B. Describe the conditions under which the modifications to the field kinetic testing program will be considered required or necessary and explain what these modifications will involve;
- C. Describe what measures will be taken if the results of ongoing field kinetic testing program show an unexpected increase in metal leaching over time.

IR Number: FH(1)-15

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2.

Reference to EIS: Section 5.4.15.1; Appendix M1, Section 3.2.

Context and Rationale:

- Section 5.4.15.1 states that “the proposed treatment process will include addition of ferric sulphate ($\text{Fe}_2(\text{SO}_4)_3$) and recycled sludge from a clarifier to form a floc of ferric hydroxide ($\text{Fe}(\text{OH})_3$) which acts to tie colloidal particles together and as an active surface which forms surface complexes with many metals, such as arsenic. Sulphuric acid or sodium and potassium hydroxide can also be added to optimize the pH for arsenic removal (the optimum pH for arsenic removal depends on the arsenic speciation).”
- Arsenic precipitation is a complex process that has the potential to build-up a large volume of contaminated sludge. Moreover, this process is strongly dependent on pH and on the oxidation state of the iron, as only ferric iron (Fe^{3+}) can complex with arsenic. It can then become difficult to control the treatment of large volumes of effluent and achieve efficient arsenic removal to meet the discharge requirements.
- More information is needed about the volume and quality of sludge that will be generated. Insufficient details are provided in Chapter 5 or Appendix M1 regarding the arsenic precipitation and sludge recirculation process. This information is required to ensure that the effluent meets the discharge criteria and adverse effects on fish and fish habitat can be minimized.

Specific Question/ Request for Information:

- A. Describe what measures will be taken to control the arsenic precipitation and sludge recirculation process in order to ensure that the volume and quality of built-up sludge will not hinder the treatment plant’s ability to meet the effluent discharge requirements.

IR Number: FH(1)-16

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.1.2; Part 2, Section 6.1.4.

Reference to EIS: Appendix F5, Section 5.1.1; Appendix F5, Section 5.1.3.7.

Context and Rationale:

- Appendix F5, Section 5.1.1 states that “as groundwater from the historical tailings is predicted to discharge to the open pit and the subsurface seepage collection system, precipitation of ferrous iron as iron hydroxides will result due to oxidizing conditions. The precipitation of iron hydroxides will adsorb other trace elements, such as arsenic, resulting in reduced concentrations of these elements in surface water.”

- It is unclear how ferrous iron (Fe^{2+}) will adsorb arsenic and form ferric hydroxide. To substantiate this claim, a speciation modelling of iron oxidation and arsenic adsorption in groundwater from historical tailings discharging to the open pit is required.
- In addition, Appendix F5, Section 5.1.3.7 states that “at closure the open pit will be filled with water to form a permanently stratified pit lake with the lower portion of the lake chemically and physically disconnected from the upper portion”. No contingency measures are identified in the EIS in case a permanently stratified pit lake cannot be achieved through the proposed open pit filling.
- This information is important to understand as the pit lake is proposed to ultimately be connected with Southwest Arm of Kenogamisis Lake, where it can cause degradation of water quality and affect the fish and fish habitat.

Specific Question/ Request for Information:

- Provide a speciation modelling of iron oxidation and arsenic adsorption in groundwater from the historical tailings discharging to the open pit;
- Describe contingency measures for a situation where the open pit cannot be permanently stratified and the lower portion of the pit lake cannot be chemically disconnected from the upper portion.

IR Number: FH(1)-17

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.1.2.

Reference to EIS: Appendix E6.3, Section 3.2.

Context and Rationale:

- Appendix E6.3, Section 3.2 states that “Total concentrations of trace elements were measured in 264 samples. This testing involved aqua-regia digestion of pulverized samples followed by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) analysis”.
- Aqua regia provides a partial and incomplete digestion, and this method is weaker than alternative wet acid digestion methods because it would not be able to digest a number of contaminants of concern. This may result in an underestimation of contaminant concentrations.
- This information is important to ensure that concentrations of contaminants are sufficiently considered in the effects assessment for water quality and fish and fish habitat.

Specific Question/ Request for Information:

- Provide a rationale for using aqua regia to conduct a partial digestion of samples, instead of a total digestion method.

IR Number: FH(1)-18

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.1.2; Part 2, Section 6.2.2.

Reference to EIS: Appendix E6.3, Section 4.4.1.

Context and Rationale:

- Appendix E6.3, Section 4.4.1 states that “linear regression between measured and calculated results show that calculated sulphur is 26% higher than measured sulphide sulphur, indicating uncertainty in sulphide sulphur measurement. [...] Since calculated sulphide sulphur is higher than measured sulphide sulphur (Figure 4-1), Acid Potential of the tailings was derived from calculated sulphide sulphur (Equation 3-1) as a measure of conservatism”.
- This conservatism in the estimate of acid rock drainage (ARD) potential may result in a higher-than-necessary volume of non-potentially acid generating (NPAG) material directed to the tailings management facility (TMF), for neutralization, increasing the total volume of material in the TMF.
- It is unclear whether the TMF is designed to handle the potentially overestimated volume of materials that may be required in the TMF to neutralize the PAG materials. If not, it is unclear whether efforts have been made to reduce the uncertainty in the sulphide sulphur measurements followed by a re-evaluation of management of PAG material.

- This information is important to understand the changes in water quality that may be caused by handling of PAG and NPAG material and the corresponding effects on fish and fish habitat.

Specific Question/ Request for Information:

- A. Describe whether the TMF has the capacity to handle the volume of materials that may be required to neutralize the potentially overestimated PAG materials.
- B. If necessary, describe how the uncertainty associated with sulphide sulphur measurements could be reduced, and how this reduction could change the management approach of PAG and NPAG materials in the TMF.

IR Number: FH(1)-19

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.2.2.

Reference to EIS: Appendix M2, Section 5.0.

Context and Rationale:

- Appendix M2, Section 5.0 states that “Construction of project components, such as roads or pads for the process plant area, may use non-potentially acid generating (non-PAG) rock with low metal leaching (ML) potential”. It is unclear what threshold is used to define “low” metal leaching (ML) potential.
- It is further noted in the same section that “to develop criteria for identifying mine rock that would be appropriate for construction of Project components, the results from humidity cell tests and concentrations for parameters of potential concern (PoPC) in the solid from waste rock [...] were used. The average concentrations in the humidity cell leachate were compared to the PWQO to identify waste rock lithologies and grades that have the potential to result in runoff with concentrations of PoPCs above the PWQO”.
- Understanding what criteria or thresholds have been set to define “low” potential for ML is important to understand any effects on water quality and fish and fish habitat that can result from the use of waste rock in construction of project components.

Specific Question/ Request for Information:

- A. Explain the criteria or thresholds used to define “low ML potential” to protect water quality and fish and fish habitat from the use of waste rock in construction of project components;
- B. Describe an alternative plan for construction of project components in a scenario where insufficient non-PAG material rock with low ML potential is found to carry out construction of project components.

IR Number: FH(1)-20

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.1.4; Part 2, Section 6.2.2.

Reference to EIS: Section 10.4.3.3.

Context and Rationale:

- Section 10.4.3.3 states that “during construction and operation phases of the Project, surface water runoff from Project components and contact water will be collected in perimeter collection ditches and collection ponds, which provide primary settling for TSS”. The same section further states that “during closure [...] the seepage collection ponds and ditches for the TMF [tailings management facility] will be decommissioned and runoff will be directed overland to natural drainage features”. Table 10-48 of the same section provides the final discharge locations for contact water and seepage collection ponds.
- It is reasonable to assume that as the seepage collection ponds are decommissioned and connected with the natural environment, sediments that were allowed to settle in these ponds during construction and operation phases of the Project could reappear and mobilize into surface waterbodies. It is unclear whether this has been factored into the effects assessment for water quality and fish and fish habitat.

Specific Question/ Request for Information:

A. Describe appropriate measures that will be taken to ensure that sediments that settle in the collection ponds during construction and operation phases of the Project do not enter the surface water features after decommissioning.

IR Number: FH(1)-21

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions.

Reference to EIS guidelines: Part 2, Section 6.3.1; Part 2, Section 6.3.4.

Reference to EIS: Section 11.1.2; Section 23.5; Appendix F7, Section 3.6.2.2.1; Appendix M12, Appendix B, Section B.2.

Context and Rationale:

- Chapter 11, Section 11.1.2 states that “Additional pre-construction fish collections are planned to obtain data on species Aboriginal communities have identified as being traditionally important (e.g., White Sucker). This will include whole body fish analysis to reflect the ways some Aboriginal people prepare and consume fish.”
- Appendix M12, Appendix B, Section B.2 mentions that “Additional fish tissue data for smaller lakes was collected in 2016” but it is noted in Chapter 11, Table 11-3 that the “lab results for tissues collected in 2016 were not yet available at time of report production”. Whole walleye samples could not be found in Table 11-3 of the same Chapter. This information is required to understand effects of the project on the health of Aboriginal peoples, and is further considered in comment HE(1)-01.
- In addition, Chapter 23, Section 23.5 states that “Based on comment from consultation, fish sampling programs will be expanded to obtain data on species Aboriginal communities have identified as being traditionally important”. The timeline for when this data will be collected and whether and how it is intended to be incorporated into the relevant parts of the EIS is not mentioned in the EIS.
- Further, Biinjitiwaabik Zaaging Anishinaabek (BZA) and Bingwi Neyaashi Anishinaabek (BNA) noted that “Methylmercury concentrations ranged from 0.015 to 0.89 mg/kg wwT across the three lakes” (Appendix F7, Section 3.6.2.2.1). A number of walleye samples in this data set contained methylmercury above the partial (0.25 mg/kg) and total (0.52 mg/kg) restrictions for consumption by women of childbearing age and children under 15. BZA and BNA would like further details regarding the methods and amount of monitoring that will be conducted to assess changes in mercury and other metals in fish tissues.
- BZA, BNA, Animbiigoo Zaagi’igan Anishinaabek (AZA), Aroland First Nation (AFN) and Ginoogaming First Nation (GFN) also raised concerns related to monitoring of methylmercury in the Goldfield Creek Diversion Pond and Southwest Arm Tributary due to potential flooding of organic soils. BZA and BNA propose that this monitoring should be harmonized with other monitoring programs as part of the Aquatic Monitoring and Management Plan. They also propose conducting wetland surveys to identify vulnerable areas with organic soils in advance, which can then be stripped prior to realignment to prevent methylmercury formation.
- This information is important to understand the potential effects on fish and fish habitat and on the health of Indigenous peoples from its consumption.

Specific Question/ Request for Information:

- A. Provide the fish data collected in 2016, including whole-body data for walleye, white sucker and other fish identified as traditionally important by Indigenous groups;
- B. Provide a timeline for the collection of additional fish tissue baseline data in Kenogamisis Lake;
- C. Explain how the additional fish tissue baseline data will be incorporated into the relevant sections of the EIS, including the HHERA.
- D. Re-evaluate the frequency of follow-up monitoring for fish tissue sampling at 2-year intervals as suggested by BZA and BNA;
- E. Provide further details regarding the methods and amount of follow-up monitoring required to assess changes in mercury and other metals in fish tissues;
- F. Explain how potential effects on the health of Indigenous peoples from consumption of fish with methylmercury concentrations will be evaluated and reported in the follow-up monitoring reports.
- G. Assess the risk of potential flooding of organic soils near Goldfield Creek Diversion Pond and Southwest Arm Tributary and formation of methylmercury.
- H. Include follow-up monitoring of surface water and fish in Goldfield Creek Diversion Pond and Southwest Arm Tributary for potential formation of methylmercury.

IR Number: FH(1)-22

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(c)(iii) the current use of lands and resources for traditional purposes.

Reference to EIS guidelines: Part 2, Section 6.2.2; Part 2, Section 6.3.1.

Reference to EIS: Section 5.3; Appendix F6, Section 4.2.2.

Context and Rationale:

- Section 5.3, Figure 5-2 shows that the Goldfield Creek Diversion channel will connect with Southwest Arm Tributary before discharging into Southwest Arm of Kenogamisis Lake.
- Red Sky Métis Independent Nation (RSMIN) notes that the point where Southwest Arm Tributary connects with Southwest Arm of Kenogamisis Lake is in vicinity of the Treated Effluent Discharge Location. In Appendix F6, Section 4.2.2, Figure 4-2, water near the Treated Effluent Discharge Location in Southwest Arm of Kenogamisis Lake appears to move northeast of the discharge point, where it is likely to come in contact with water entering from Southwest Arm Tributary, within the mixing zone of arsenic.
- This is concerning to RSMIN as the proposed flow pathway in the draft Fisheries Offset Plan will lead to fish passing through Southwest Arm Tributary and into the Southwest Arm of Kenogamisis Lake. These fish would be exposed to more arsenic than they would be presently if they took the existing pathway in Goldfield Creek. Exposure to arsenic could cause detrimental effects to fish and fish habitat as well as to people who consume such fish.

Specific Question/ Request for Information:

- A. Describe the additional exposure to arsenic by fish that would migrate from the proposed habitat in the draft Fisheries Offset Plan through the Southwest Arm Tributary into the Southwest Arm of Kenogamisis Lake, in comparison to existing fish pathways in Goldfield Creek;
- B. Describe mitigation measures for exposure of fish migrating through the proposed fish habitat offset into Southwest Arm Tributary to increased concentration of arsenic at the Southwest Arm of Kenogamisis Lake;
- C. Characterize residual effects after the mitigation measures have been implemented;
- D. Reassess the significance determination, if necessary, taking responses from questions A to C into account;
- E. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-23

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 8.2.

Reference to EIS: Appendix M12, Section 8.1; Appendix M12, Appendix B, Section B.6.

Context and Rationale:

- Appendix M12, Appendix B, Section B.6 states that “post-construction fish tissue monitoring schedule will be determined through adaptive management, whereby detailed fish tissue studies will only be conducted if there is a confirmed effect in close proximity to the Project, or if there is a confirmed change in water quality in a particular lake or lake basin”. It is unclear what is meant by “confirmed effect” and “confirmed change”, and how that will be measured. Part 2, Section 8.2 of the EIS Guidelines requires a “description of the characteristics of the monitoring program where foreseeable”.
- It is further mentioned in Appendix M12, Section 8.1, Table 8-1 that for fish tissue sampling, “No set frequency for follow-up monitoring but may be harmonized with EEM program on a three-year cycle”. Figure 8-1 of the same Appendix shows that Annual Monitoring Reports Review will be conducted for Aquatic (Fish and Fish Habitat) to determine if a response plan is required or monitoring will continue. There appears to be uncertainty in the information presented about monitoring frequency for fish and fish habitat, and the specific conditions under which the monitoring program will be modified.
- This information is needed to ensure that appropriate measures and controls are in place in order to decrease the potential for adverse effects on fish and fish habitat.

Specific Question/ Request for Information:

- A. Provide measurable thresholds, including a rationale for the chosen thresholds, for “confirmed effect” and “confirmed change” in the quoted statement, and explain how these changes and effects will be measured;
- B. Provide details of the frequency of the monitoring program for fish and fish habitat, and describe specific circumstances under which the monitoring program will require modification.

IR Number: FH(1)-24

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 6.1.5; Part 2, Section 6.3.1.

Reference to EIS: Appendix F7, Executive Summary; Appendix F7, Section 3.6.1.1.

Context and Rationale:

- Biinjitiwaabik Zaaging Anishinaabek (BZA) and Bingwi Neyaashi Anishinaabek (BNA) raised a concern regarding walleye sampling data at Wildgoose and Kenogamisis Lakes.
- Appendix F7, Executive Summary states that “although walleye from Kenogamisis Lake bioaccumulated significantly more arsenic and mercury than Wildgoose Lake walleye, levels observed did not have an adverse biological effect on this species. Age and growth rates did not differ significantly between areas, nor did condition or relative gonad and liver sizes”.
- Appendix F7, Section 3.6.1.1 states that “Wildgoose Lake fish were significantly longer than fish from Goldfield Lake and Kenogamisis Lake ($p < 0.05$)” and “Total length and weight for Wildgoose Lake walleye were significantly larger than those from Kenogamisis Lake and Goldfield Lake ($p < 0.05$)”.
- As there are statistically-significant variations in total length and weight between walleye at Wildgoose and Kenogamisis Lake, it is plausible that these differences are due to bioaccumulation of arsenic, mercury and other parameters of concern. Further rationale is needed for why these variations are not considered an adverse biological effect on this species.
- This information is important as walleye are a locally abundant species, and used for traditional purposes by Indigenous peoples.

Specific Question/ Request for Information:

- A. Clarify whether the statistically-significant variations in total length and weight for walleye at Wildgoose and Kenogamisis Lakes are due to bioaccumulation of arsenic, mercury and other parameters of concern;
- B. Provide a rationale for why variations in total length and weight between walleye found in Wildgoose and Kenogamisis Lakes would not be considered an adverse biological effect;
- C. Reassess the significance determination for fish and fish habitat and health of Aboriginal peoples consuming walleye, if necessary, taking response from questions A and B into account;
- D. Update the follow-up program for potential effects to fish and fish habitat, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: FH(1)-25

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat.

Reference to EIS guidelines: Part 2, Section 8.2

Reference to EIS: Section 23.5.

Context and Rationale:

- Section 23.5 states that “GGM has facilitated the participation of local Aboriginal communities in baseline monitoring for the Project and will work with communities to provide the opportunity to form a joint Aboriginal Environment Committee as the Project progresses. If parties are not open to forming a committee, GGM will work with local Aboriginal communities individually throughout the Project.”
- Animbiigoo Zaagi’igan Anishinaabek (AZA), Aroland First Nation (AFN) and Ginoogaming First Nation (GFN) have raised questions related to how specifically will they be involved in the groundwater and surface water monitoring. These communities have also raised a concern regarding the lack of surface water quality monitoring in Begooch Zaagaigan (Lake A-322) as this lake was identified as a fish spawning area by AZA, AFN and GFN.

Specific Question/ Request for Information:

- A. Describe how AZA, AFN, GFN will be involved in the groundwater and surface water monitoring;
- B. Describe the feasibility of including a surface water monitoring station at Lake A-322.

IR Number: TW(1)-01

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Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds; Species at Risk Act (SARA) Section 79(2).

Reference to EIS guidelines: Part 2, Section 6.3.2; Part 2, Section 6.3.3.

Reference to EIS: Section 13.4.2.3; Chapter 23.

Context and Rationale:

- Section 13.4.2.3 states that “the Project will result in the direct loss of barn swallow nesting habitat; two buildings that support 15 active nests will be removed.”
- This contradicts the information in Table 13-10 which lists the maximum direct and indirect loss of barn swallow breeding habitat as 0 ha. Table 13-11 also includes no information on barn swallows with the justification in footnote A that “there is no measurable effect on barn swallow nesting habitat”.
- In addition, Section 13.4.2.3 states that “the implementation of mitigation measures such as the creation of replacement habitat for the damage or destruction of existing structures that provide nesting habitat will reduce adverse effects to barn swallow habitat and result in no measurable change to barn swallow nesting habitat availability in the Local Assessment Area (LAA).”
- This is used as a justification for a low magnitude and low duration for the loss of barn swallow habitat within the residual effects assessment (Table 13-14).
- However, Chapters 13 and 23 contain very little information on the nature of these “replacement habitats” or how effective they will be in replacing the barn swallow nesting habitat within the Project Development Area (PDA). In order to assess the effectiveness of these replacement habitats, the proponent must provide further information on the breeding habits of the barn swallow.
- This information is necessary to understand a residual effect on a species that is a migratory bird and a species at risk.

Specific Question/ Request for Information:

A. Provide further information on the density of barn swallows throughout the Project Development Area;

B. Describe how the replacement habitats would be similar to the habitat that will be removed during construction and sufficient to mitigate the removal of 15 active nests within the PDA;

C. Describe any additional mitigation measures to be applied in order to reduce the effect of breeding habitat loss on barn swallows (if applicable);

D. Include a complete assessment of residual effects on barn swallow habitat after the mitigation measures have been implemented;

E. Describe the follow-up program for potential effects to barn swallows, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: TW(1)-02

Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds; Species at Risk Act (SARA) Section 79(2).

Reference to EIS guidelines: Part 2, Section 6.3.2; Part 2, Section 6.3.3

Reference to EIS: Section 13.5.

Context and Rationale:

- Section 13.5 states “Canada warbler (SAR) [is] ranked S4B (apparently secure -uncommon, not rare) in Ontario (Table 13-6) and suitable breeding habitat is common within the RAA [Regional Assessment Area]. Birds displaced by the Project are likely to find breeding habitat elsewhere within the LAA [Local Assessment Area] or RAA.”
- This reasoning is used to justify a determination of non-significance for the loss of breeding habitat for Canada Warblers in the significance assessment. However, it fails to consider that other suitable habitats in LAA and RAA may be already at carrying capacity with similar birds. This could mean that a large portion of the habitat outside the Project Development Area (PDA), while considered suitable in theory, is not able to sustain the Canada warbler.
- This information is necessary to understand a residual effect on a species that is a migratory bird and a species at risk.

Specific Question/ Request for Information:

- A. Revise the determination of significance of the residual effects on Canada warblers caused by project activities while taking into account the potential for exceeding the carrying capacity of suitable warbler breeding habitat in the LAA and RAA;
- B. If suitable habitat is at carrying capacity in the LAA and RAA, describe additional mitigation measures to be applied in order to reduce the effect of habitat loss on Canada warbler habitat;
- C. Revise the assessment of residual effects taking into account the additional mitigation measures identified in B above;
- D. Describe the follow-up program for potential effects to Canada warblers, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: TW(1)-03

Project Effects Link to CEAA 2012: Species at Risk Act (SARA) Section 79(2).

Reference to EIS guidelines: Part 2, Section 6.1.7

Reference to EIS: Section 13.4.2.3; Appendix E8.1, Section 3.2.3.3.

Context and Rationale:

- Appendix E8.1, Section 3.2.3.3 states that “the remaining old mine shaft feature, Bat ID#4 was not surveyed as it was located on private property, outside the PDA [Project Development Area], where permission was not granted for access (see Figure 3-3). Further assessment of Bat ID#4 will be discussed with MNRF.”
- This quote suggests that Greenstone Gold Mines is working closely with MNRF to determine more specifically how the bat species at risk are using habitats within the Local Assessment Area (LAA). However, it is unclear as to what is being discussed or investigated, or when results or findings will be made available.
- Appendix E8.1 was issued in January 2016, and further information does not appear to be included in the Final EIS. This information is required to consider whether the bat habitat evaluation is complete, and inform the effects assessment on a species at risk.

Specific Question/ Request for Information:

- A. Provide updated information regarding on ID#4. If work continues to be done and new information is not available, perform a precautionary assessment (i.e. assume the information is complete) using conservative assumptions.
- B. Describe how this information changes the baseline bat habitat presented in the EIS, and revise the assessment of the effects of the project on potential habitat loss for SARA-listed bats.
- C. Based on the information identified in A and B, describe new or enhanced mitigation measures to reduce the effect of habitat loss on SARA-listed bats (if applicable).
- D. Revise the assessment of residual effects taking into account the mitigation measures identified in C.
- E. Describe the follow-up program for potential effects to SARA-listed bats, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. If follow-up is not required, provide a rationale.

IR Number: TW(1)-04

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 6.3.2; Part 2, Section 6.3.4.

Reference to EIS: Section 13.1.3; Section 13.4.

Context and Rationale:

- Section 13.4 states that “The TMF [tailings management facility] reclaim pond was excluded as aquatic habitat because it would not provide the vegetation required to support breeding nor would it provide a food source for resident or migratory waterfowl. Waterfowl exposures are expected to be limited to direct contact with the tailings pond water.” However, while the TMF reclaim pond may be of limited use for breeding and foraging, it may be used as a staging area for waterfowl, particularly in conditions of high winds, low temperatures or precipitation.

- Migrating waterfowl that choose the TMF pond for staging may not use other habitual staging grounds traditionally used for hunting by Indigenous groups. According to the unnumbered table in section 13.1.3, four Indigenous groups have identified waterfowl and geese as species of interest.

Specific Question/ Request for Information:

A. Discuss how the use of the TMF reclaim pond by staging waterfowl and migratory bird populations would affect their pattern of behavior and use of habitat, and therefore potentially affect hunting activities by Indigenous groups. This should also be considered when assessing effects of the Project on current use of lands and resources for traditional purposes (see comments HE(1)-05 and HE(1)-08).

IR Number: TW(1)-05

Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS guidelines: Part 2, Section 6.1.6; Part 2, Section 6.3.2; Part 2, Section 6.4.

Reference to EIS: Section 13.4.3; Chapter 24.

Context and Rationale:

- Section 13.4.3.2, Table 13-12 states, as a mitigation measure for a change in mortality risk: “Report wildlife-vehicle collisions, near misses or observations of a wildlife road mortality on Project roads to the Environmental Department, Implement adaptive management measures where high frequency locations of wildlife-vehicle interactions are identified.”
- Section 6.4 of the EIS Guidelines states that “adaptive management is not considered as a mitigation measure, but if the follow-up program [...] indicates that corrective action is required, the proposed approach for managing the action should be identified.”
- The statement from the EIS does not describe any specific measure that would reduce collisions. There is no indication of how a “high frequency location” would be determined, or what measures would be implemented.
- There is also no indication how, once measures have been identified at high frequency locations, monitoring will be established to ensure measures are working as intended, and that follow-up plans are in place to verify effects predictions and mitigation measures. ..

Specific Question/ Request for Information:

- Provide information about the identification of high-frequency locations of wildlife-vehicle interactions (e.g. which metrics will be used, what thresholds will be applied, how often will an assessment/determination be made).
- Provide information about the incorporation of wildlife-vehicle collision reporting in environment management plans, including frequency of reporting (e.g. location of collision, species involved).
- Provide details on potential mitigation measures to be applied at high-frequency collision locations.
- Describe the follow-up program to evaluate the effectiveness of the proposed mitigation measures.

IR Number: TW(1)-06

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 6.2.3; Part 2, Section 6.3.4.

Reference to EIS: Section 12.4.3; Appendix M13, Section 7.1.2

Context and Rationale:

- Animbiigoo Zaagi’igan Anishinabek, Aroland First Nation and Ginoogaming First Nation have concerns regarding the potential introduction or spread of terrestrial invasive species with the Project Development Area (PDA) and surrounding area, due to movements across the PDA. These could be caused by contractors coming on and off site, as well as materials and equipment coming from other regions. The concern regarding invasive species is that they could create an imbalance in the plant diversity of the PDA and Local Assessment Area (LAA) as they spread and thereby reduce the availability of the plant species of interest that the Indigenous groups harvest.
- These Indigenous groups recommend implementing the “Clean Equipment Protocol for Industry”, developed by the Ontario Invasive Plant Council for the Canada-Ontario Invasive Species Centre and the Ontario Ministry of Natural Resources in 2013, to mitigate this risk.

- In addition, the Conceptual Biodiversity Management and Monitoring Program proposes a mitigation measure to “assess presence of invasive species and target removal through manual, mechanical and/or chemical methods and proper disposal.” When describing mitigation measures, clearly identify them with sufficient detail, not simply the intention of developing a plan or program, to support analysis of the sufficiency of those measures, and to determine whether follow-up is required to verify these measures. If there is uncertainty with those measures, develop a follow-up program with clear measures, in sufficient detail.

Specific Question/ Request for Information:

- A. Describe mitigation measures to avoid the introduction or spreading of terrestrial invasive species in the PDA due to Project activities. In particular, considering implementing the “Clean Equipment Protocol for Industry”, or provide a rationale for not implementing it for this project.
- B. Provide additional information on the monitoring and management of invasive species, including which metrics will be used to determine when to apply an abatement/removal technique (e.g. selection of target species, minimum density or spread) consideration of various non-chemical techniques as well as application of chemicals, and proper disposal.

IR Number: TW(1)-07

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 6.2.3; Part 2, Section 6.3.4.

Reference to EIS: Chapter 13; Appendix I, Section 7.3.2; Appendix M13

Context and Rationale:

- Chapter 13 of the EIS indicates that terrestrial and wildlife residual effects are mitigated by progressive reclamation and reclamation at closure. However, there are very few details on the terrestrial monitoring program that should be undertaken as part of the Conceptual Closure Plan and used to document the overall success of closure and rehabilitation plans and to verify if they will effectively mitigate the wildlife impacts (e.g. vegetation diversity/cover, wildlife habitat, wildlife movement).
- Also, the Closure Plan (Appendix I) and the Biodiversity Management and Monitoring Plan (Appendix M13) refer to each other for additional information on mitigation and monitoring activities; however neither conceptual document contains sufficient information to have confidence that the terrestrial and wildlife impact predictions will be validated and verified. When describing mitigation measures, clearly identify them with sufficient detail, not simply the intention of developing a plan or program, to support analysis of the sufficiency of those measures, and to determine whether follow-up is required to verify these measures. If there is uncertainty with those measures, develop a follow-up program with clear measures, in sufficient detail.
- Animiigoog Zaagi’igan Anishinabek, Aroland First Nation and Ginoogaming First Nation are concerned that changes in wildlife habitat and wildlife movement may impact their ability to hunt affected species.

Specific Question/ Request for Information:

- A. Provide additional information on progressive reclamation and reclamation at closure activities, including details in the Closure Plan, about mitigation measures to reduce the impact of the Project on wildlife (e.g. decrease in vegetation diversity and cover, loss or alteration of wildlife habitat, disruption of wildlife movement patterns).
- B. Provide additional details in the Conceptual Biodiversity Management and Monitoring Plan to ensure that the effectiveness of the reclamation of terrestrial environment and its effect on the impact predictions for wildlife habitat and wildlife movement will be verified.

IR Number: TW(1)-08

Project Effects Link to CEAA 2012: 5(1)(c)(ii) Physical and Cultural Heritage.

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Section 13.2.2.1 Appendix M13, Section 7.1.3

Context and Rationale:

- Eagles are identified as a species of cultural significance to Animbiigoo Zaagi'igan Anishinabek, Aroland First Nation and Ginoogaming First Nation. Field surveys described in Section 13.2.2.1, and illustrated in Figure 13-5, confirmed the presence of a bald eagle nesting site approximately 200 m outside the Project Development Area (PDA), and within the Local Assessment Area (LAA).
- The Conceptual Biodiversity and Monitoring Plan Management (section 7.1.3) and Table 13-9 state that “if an active bald eagle nest occurs within 800 m of Project construction of operation activities, develop protection measures”. No information is provided about these protection measures, and therefore it is not possible to assess the efficacy of these measures.

Specific Question/ Request for Information:

- A. Describe, in detail, the measures that protect and preserve the identified eagle nesting site. Discuss if those measures will also have potential impacts to traditional knowledge and cultural heritage.
- B. As eagles are identified as culturally significant, ensure that the presence of the bald eagle nesting site, any mitigation measures and residual effects are considered in responding to comments HE(1)-01, HE(1)-04 and HE(1)-09.

IR Number: TW(1)-09

Project Effects Link to CEAA 2012: 5(1)(a)(iii) Migratory Birds.

Reference to EIS guidelines: Part 2, Section 6.1.6; Part 2, Section 6.3.2; Part 2, Section 6.4.

Reference to EIS: Section 13.4.3; Chapter 24

Context and Rationale:

- Section 13.4.3.2, Table 13-12 states, as a mitigation measure for a change in mortality risk: “Monitor wildlife use (primarily targeting waterfowl but also species such as moose and bear) and water quality of the TMF [tailing management facility], open aquatic areas and other key Project locations and implement adaptive management measures (e.g., deterrents and/or exclusionary measures) as required”.
- Section 6.4 of the EIS Guidelines states that “adaptive management is not considered as a mitigation measure, but if the follow-up program [...] indicates that corrective action is required, the proposed approach for managing the action should be identified.”
- Further information should be provided, as part of a follow-up program, as to how wildlife use and water quality will be monitored, the locations where monitoring will occur, which mitigation measures are being verified for efficacy, and some details on the additional mitigation measures and follow-up studies and the circumstances in which they would be implemented.

Specific Question/ Request for Information:

- A. Describe deterrent / exclusionary measures to be applied to mitigate wildlife mortality risk at the TMF, open aquatic areas and other key Project locations. If no mitigation measures are applied, provide a rationale.
- B. Provide more specific information about the proposed monitoring of wildlife use at the TMF, open aquatic areas and other key Project locations.
- C. Describe the follow-up program(s) to evaluate the effectiveness of the proposed mitigation measures.

IR Number: TW(1)-10

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Section 12.4.2.3.

Context and Rationale:

- According to Section 12.4.2.3, the anticipated loss of swamp due to the project is approximately 90% in the Project Development Area (PDA). This is a significant loss of habitat for plant species such as cranberry and wild rice, which are traditionally important for Biinjitiwaabik Zaaging Anishinaabek and Bingwi Neyaashi Anishinaabek.

Specific Question/ Request for Information:

- A. Discuss how the anticipated loss of wetland may affect significant plant species such as cranberry and wild rice habitat.

B. Describe any mitigation and/or wetland compensation measures that will be applied to counter the loss of wetland.

C. Discuss the impact on use of land and resources by Indigenous groups with and without mitigation/wetland compensation. Provide information regarding how each Indigenous group may be impacted, the mitigation measures proposed for each Indigenous group, and details of any follow-up programs that would be required.

IR Number: TW(1)-11

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 8.2.

Reference to EIS: Appendix M13.

Context and Rationale:

- Animbiigoo Zaagi igan Anishinaabek, Aroland First Nation, and Ginoogaming First Nation noted that GGM has committed to monitoring waterfowl and large mammal use of the tailings management facility (TMF) and open aquatic areas in the Conceptual Biodiversity Management and Monitoring Plan (Appendix M13). They recommend that this monitoring should be extended to include other traditionally important, wetland-dependent flora and fauna (as identified by these groups) and also focus on the lost wetlands.

Specific Question/ Request for Information:

A. Specify the specific flora and fauna of importance to be monitored at the TMF and open aquatic areas as identified by Indigenous groups.

B. Describe how monitoring as part of the Conceptual Biodiversity Management and Monitoring Plan include traditionally important wetland flora and fauna for Animbiigoo Zaagi igan Anishinaabek, Ginoogaming First Nation and Aroland First Nation.

IR Number: TW(1)-12

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 8.1

Reference to EIS: Section 12.1.2.

Context and Rationale:

- Additional information is required regarding GGM's efforts to recreate wetland habitat along the Goldfield Creek diversion channel and aggregate pits S1, S4 and T2, as outlined in Section 12.1.2.
- Any efforts to compensate for wetland habitat loss (and the loss of traditionally harvested species, such as wild rice and cranberry) should be undertaken in close consultation with Indigenous groups. Loss of these harvests may have effects to current use of lands and resources for traditional purposes, or lead to a socio-economic effect to the community.

Specific Question/ Request for Information:

A. Provide additional detail about the re-creation of wetland habitat, identifying the project phases and activities proposed in each phase.

B. Describe a follow-up plan to verify the long-term establishment of the re-created wetlands.

C. Describe how consultation with Indigenous groups will be included in the re-creation of wetlands.

IR Number: TW(1)-13

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 8.1.

Reference to EIS: Section 13.1.3.

Context and Rationale:

- Section 13.1.3 lists wildlife species identified as having traditional value or interest to Aboriginal communities, while Section 13.1.4, Table 13-1 summarizes the potential environmental effects of the Project on wildlife and wildlife habitat, the measurable parameters, and the rationale for their selection.
- Section 13.1.3 states that “the effects to [rabbit (i.e., snowshoe hare), ruffed grouse, great grey owl, beaver, marten, black bear, lynx, and wolf] are addressed through habitat assessments of similar species because they occupy similar habitat.” However, in the case of mammals, only moose, caribou and bats were retained as measurable parameters. Large mammals such as moose and bear have large home ranges, however, these species behave quite differently within those ranges and within an annual timespan. The other animals have insufficient similarities in terms of biology and life habits for large mammals to be an adequate surrogate species. Small mammals and other categories of wildlife should be assessed separately.
- Indigenous hunting activities are not limited to large mammals, and therefore assessment of effects on only those species is not representative of the current use of lands and resources by Indigenous peoples.

Specific Question/ Request for Information:

A. Provide an assessment of the potential environmental effects on wildlife and wildlife habitat of traditional value or interest to Aboriginal communities, including rabbit (i.e., snowshoe hare), ruffed grouse, great grey owl, beaver, marten, black bear, lynx, and wolf. Select appropriate representative organisms of wildlife based not only on common habitat but also on biological cycle and life habits.

B. In responding to comments HE(1)-01, HE(1)-03, HE(1)-05 and HE(1)-09, consider how the potential environmental effects assessed above would cause effects to socio-economic conditions and the current use of lands and resources for traditional purposes, particularly with regards to hunting, as well as potential impacts to Aboriginal and Treaty rights.

IR Number: HE(1)-01

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples health and socio-economic conditions; 5(1)(c)(ii) Physical and Cultural Heritage; 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes; 5(1)(c)(iv) Any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural significance.

Reference to EIS guidelines: Part 2, Section 5; Part 2, Section 6.1.8; Part 2, Section 6.3.4.

Reference to EIS: Section 3.6.2; Section 3.6.4; Chapter 16; Section 17.2; Section 18.2.2; Appendix O.

Context and Rationale:

- Appendix O provides some information relating to effects of changes to the environment on Indigenous people. However, Appendix O and related chapters of the EIS do not clearly provide a complete assessment of effects of changes to the environment on Indigenous peoples. For each assessment, there are references to multiple locations within the EIS and it is not clear what GGM’s conclusions are.
- Specific examples are:
 - Appendix O, Sections 4 to 7 do not link to predictions made on effects to health conditions for Aboriginal peoples described in Chapter 19;
 - Chapter 16 does not link to Appendix O, Section 4.4, where information was added with respect to effects of changes to the environment on the current use of lands and resources for traditional purposes;
 - Chapters 17 and 18 do not link to Appendix O, Section 4.3, where information was added with respect to physical and cultural heritage.
- With respect to the assessment of impacts to potential or established Aboriginal and Treaty rights there is no separate assessment.
- Sections 6.1.8 and 6.3.4 of the EIS Guidelines requires for each of the effects of the changes to the environment on Aboriginal peoples: health and socio-economic conditions; physical and cultural heritage; current use of lands and resources for traditional purposes; and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance. The assessments need to be completed for each Indigenous group and include the following:
 - baseline information collected and incorporated into the assessment;
 - articulation of effects of changes to the environment
 - methodology including significance criteria and rationale;
 - mitigation measures;

- clear articulation of residual effects and validation of effects by Indigenous groups; and
- cumulative effects assessment.
- Section 5 of the EIS Guidelines requires a separate assessment of potential adverse impacts of the project on potential or established Aboriginal or Treaty rights the Agency which includes:
 - baseline information collected and incorporated into the assessment;
 - methodology and rationale;
 - clear articulation of impacts and mitigation measures; and
 - validation of conclusions on impact by Indigenous groups.
- The Agency requests that GGM submit a revised Appendix O that incorporates the information listed above, in order to have one complete and clean document that provides a complete assessment of effects of changes to the environment on Indigenous peoples.

Specific Question / Request for Information:

A. For responses to comments HE(1)-02 to HE(1)-11, revise Appendix O to contain separate complete assessments for Aboriginal peoples with respect to:

- a. health and socio-economic conditions;
- b. physical and cultural heritage;
- c. current use of lands and resources for traditional purposes;
- d. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; and
- e. potential severity of impacts on Aboriginal and Treaty rights.

B. In revising Appendix O with separate complete assessments for each of the above, the Agency expects that relevant information contained in other chapters of the EIS will be consolidated into each assessment.

IR Number: HE(1)-02

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples health and socio-economic conditions; 5(1)(c)(ii) Physical and Cultural Heritage; 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes; 5(1)(c)(iv) Any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural significance.

Reference to EIS guidelines: Part 2, Section 5; Part 2, Section 6.1.8; Part 2, Section 6.3.4; Part 2, Section 6.5.

Reference to EIS: Chapter 17; Appendix O.

Context and Rationale:

- As stated above in comment HE(1)-01, the Agency requires the inclusion of baseline information with respect to the assessments of effects of changes to environment on Aboriginal peoples and impacts to potential or established Aboriginal or Treaty rights.
- Therefore any information provided in written comments submitted to the Agency by Indigenous groups should be incorporated, to the extent possible, to update baseline information and the assessment of effects of changes to the environment on
 - a. Aboriginal peoples' health and socio-economic conditions;
 - b. physical and cultural heritage;
 - c. current use of lands and resources for traditional purposes;
 - d. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance;
 - e. potential severity of impacts of the project on Aboriginal and Treaty rights.

- The Agency understands that Red Sky Métis Independent Nation (RSMIN) and Animbiigoo Zaagi igan Anishinaabek (AZA) have provided additional traditional knowledge and baseline information to Greenstone Gold Mines (GGM) since the final EIS was submitted in July 2017.
- Also, comments from AZA, Aroland First Nation and Ginoogaming First Nation state that Chapter 17 does not discuss any cultural heritage sites identified by AZA, and that the EIS does not articulate the value of the Project Development Area (PDA) and Kenogamisis Lake from a knowledge transmission and teaching perspective.
- Also, the Métis Nation of Ontario provided information in their written comments on the EIS with respect to wildlife and plant species that they indicate were not considered in the EIS.

Specific Question/ Request for Information:

A. In responding to comments HE(1)-01 to HE(1)-09, incorporate to the extent possible and demonstrate how the information (including additional information provided in comments on the EIS) provided by Indigenous groups was incorporated into the updated assessments for:

- a. Aboriginal peoples' health and socio-economic conditions;
- b. physical and cultural heritage;
- c. current use of lands and resources for traditional purposes;
- d. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance; and
- e. potential impacts of the project on Aboriginal and Treaty rights.

IR Number: HE(1)-03

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples health and socio-economic conditions.

Reference to EIS guidelines: Part 2, Section 6.1.8; Part 2, Section 6.3.4; Part 2, Section 6.5.

Reference to EIS: Chapter 16; Chapter 18; Appendix J; Appendix O.

Context and Rationale:

- Appendix O does not provide a clear assessment of potential effects of changes to the environment on Aboriginal peoples' socio-economic conditions. It is unclear how the assessment of socio-economic effects was carried out. The information presented in Appendix O in relation to socio-economic effects does not include a methodology or identify residual effects clearly, which would include significance criteria (i.e. geographic extent, magnitude, duration, frequency, and reversibility), the application of mitigation measures, or reference to a cumulative effects assessment.
- Additionally, when reviewing the traditional knowledge information provided by Indigenous groups in Appendix J, there is information collected in these assessments that appear to have not been carried into the assessment of effects of changes to the environment on socio-economic conditions. For example, the Ginoogaming First Nation Social Impact Assessment (Appendix J8) raises the potential socio-economic effect of having to purchase meat from the grocery store to compensate for the inability to harvest moose and fish.
- Animbiigoo Zaagi igan Anishinaabek, Aroland First Nation and Ginoogaming First Nation raise concerns of how socio-economic effects caused by loss of wild foods will be mitigated.

Specific Question/ Request for Information:

A. In a revised Appendix O, provide a revised assessment for effects of changes to the environment on Aboriginal peoples' socio-economic conditions that includes:

- use of site specific baseline information of Indigenous groups' socio-economic conditions;
- a methodology with significance criteria and rationale;
- specific and measurable mitigation measures;
- a rationale and analysis of conclusions for residual effects;

- a follow-up program for potential effects to Indigenous peoples' socio-economic conditions, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures;
- input from Indigenous groups on the methodology (including significance criteria), analysis (including information used), mitigation measures, follow-up programs and conclusions for residual effects; and
- specifically answer how socio-economic effects caused by loss of wild foods for Animbiigoo Zaagi igan Anishinaabek, Ginoogaming First Nation and Aroland First Nation will be mitigated.

B. Consider the effects of changes to the environment on socio-economic conditions as part of the cumulative effects assessment.

C. Incorporate to the extent possible information provided by Indigenous groups, including traditional knowledge, in the assessment (see comment HE(1)-02).

IR Number: HE(1)-04

Project Effects Link to CEAA 2012: 5(1)(c)(ii) Physical and Cultural Heritage; 5(1)(c)(iv) Any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural significance.

Reference to EIS guidelines: Part 2, Section 6.1.8; Part 2, Section 6.3.4; Part 2, Section 6.5.

Reference to EIS: Chapter 17; Appendix E13; Appendix J; Appendix O.

Context and Rationale:

- Appendix O does not provide a clear assessment of potential effects of changes to the environment on physical and cultural heritage, and on any structure, site or thing of historical, archaeological, paleontological or architectural significance by Aboriginal peoples.
- Baseline information with respect to Aboriginal peoples physical and cultural heritage and any structure site or thing that is of historical, archaeological, paleontological, architectural significance is presented in several sections of the EIS; however, it is unclear where an effects assessment is located and potential residual effects are identified.
- The assessment also does not consider the effects of changes to the environment on the overall quality of experience of the use of physical and cultural heritage, or any structures, sites or things of historical, archaeological, paleontological or architectural significance, where appropriate. Any change in the environment such as air quality, noise or visual aesthetics could result in an effect to the overall quality of experience and should be considered. An example of this is effects from noise, dust and visual aesthetics of the mine on the experience of an Indigenous person conducting certain practices at a burial or sacred site. The assessment also does not capture effects of changes to the environment on intangible aspects of physical and cultural heritage, such as cultural, language, and knowledge transmission that is associated with particular place such as a burial or sacred site.
- The determination of significance of residual effects in Section 17.5 is not organized by Indigenous group. The information provided in Appendix O in relation to Aboriginal peoples physical and cultural heritage, and any structure, site, or thing that is of historical, archaeological, paleontological, architectural significance does not include a methodology or a conclusion for residual effects, including significance criteria (i.e. geographic extent, magnitude, duration, frequency, and reversibility), the application of mitigation measures, or reference to a cumulative effects assessment.
- Currently, the definition for magnitude described in Section 17.1.6, Table 17-2 refers to loss or change in access, and to change in cultural heritage value or interest. The quality of experience, or the value of the location, should also be incorporated into the significance criteria.

Specific Question/ Request for Information:

A. In a revised Appendix O, provide a revised assessment of effects of changes to the environment on the physical and cultural heritage, and on any structure, site or thing of historical, archaeological, paleontological or architectural significance by Aboriginal peoples that includes the following:

- use of site specific baseline information of Indigenous groups' use of physical and cultural heritage and any structure site or thing of historical, archaeological, paleontological or architectural significance including seasonality/timing;
- a methodology with significance criteria and a rationale (including spatial boundaries, and consideration of quality of experience and value of location);
- inclusion of effects of changes to the environment on overall quality of experience and intangible aspects of the use of physical and cultural heritage or structures, sites or things of historical, archaeological, paleontological or architectural significance;

- specific and measurable mitigation measures;
- a rationale, analysis and conclusions for residual effects for each Indigenous group;
- a follow-up program, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures; and
- input from Indigenous groups on the methodology (including significance criteria), mitigation measures, follow-up programs and conclusions for residual effects.

B. Consider effects of changes to the environment on the physical and cultural heritage, and any structure, site or thing of historical, archaeological, paleontological or architectural significance by Aboriginal peoples as part of the cumulative effects assessment.

C. Incorporate to the extent possible information provided by Indigenous groups, including traditional knowledge, in the assessment (see comment HE(1)-02).

IR Number: HE(1)-05

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 6.1.8; Part 2, Section 6.3.4; Part 2, Section 6.5.

Reference to EIS: Chapter 18; Appendix J; Appendix O.

Context and Rationale:

- Appendix O does not provide a clear assessment of potential effects of changes to the environment on the current use of lands and resources for traditional purposes by Aboriginal peoples.
- Chapter 18 and Appendix O of the EIS provide baseline information with respect to Aboriginal peoples' current use of lands and resources for traditional purposes. Chapter 18 also provides an assessment and some conclusions of effects of changes to the environment on the current use of lands and resources for traditional purposes. However, the assessment does not look at the effects of changes to the environment on the overall quality of experience of the current use. Any change in the environment such as air quality, noise or visual aesthetics could result in an effect to the overall quality of experience and should be considered. An example of this is effects from noise, dust and visual aesthetics of the mine on the experience of fishing in nearby waterbodies. The assessment also does not capture effects of changes to the environment on intangible aspects of current use, such as cultural, language, and knowledge transmission from traditional use practices such as hunting, fishing and trapping.
- Currently, the definition for magnitude provided in Section 18.1.7, Table 18-3 only speaks to ability to undertake TLRU activities, but does not consider the quality of experience or value of the location of a use in the significance criteria. In Section 18.6, there are not determinations of significance for each indicator; this information is only found in Chapter 24, the final summary table, which was not referenced in the Table of Concordance. There is no clear rationale of what is a significant effect, in terms of the weighting or value is given to each of the significance criteria.
- The Métis Nation of Ontario have raised concerns that the assessment does not explore indirect sensory disturbances, or how changes in biophysical conditions can cause sensory disturbances.
- The Métis Nation of Ontario also raised the concern that a Local Assessment Area (LAA) based on biophysical VCs is too large, and therefore dilutes potential effects. The Métis Nation of Ontario recommends that spatial boundaries for the LAA should be developed considering the current use of lands and resources for traditional purposes for Indigenous groups.

Specific Question/ Request for Information:

A. In a revised Appendix O, provide a revised assessment of effects of changes to the environment on the current use of lands and resources for traditional purposes by Aboriginal peoples that includes the following:

- use of site specific baseline information of Indigenous groups' current use of lands and resources for traditional purposes including preferred locations and seasonality/timing;
- a methodology with significance criteria and a rationale (including spatial boundaries, and consideration of quality of experience and value of location);
- inclusion of effects of changes to the environment on overall quality of experience and intangible aspects of the current use of lands and resources for traditional purposes;
- specific and measurable mitigation measures;
- a rationale, analysis and conclusions for residual effects for each Indigenous group;
- a follow-up program, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures; and

- Input from Indigenous groups on the methodology (including significance criteria), analysis, mitigation measures, follow-up programs and conclusions for residual effects.

B. Consider effects of changes to the environment on the current use of lands and resources for traditional purposes by Aboriginal peoples as part of the cumulative effects assessment.

C. Incorporate to the extent possible information provided by Indigenous groups, including traditional knowledge, in the assessment (see comment HE(1)-02).

IR Number: HE(1)-06

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix O, Section 2.2; Appendix O, Section 3.1.

Context and Rationale:

- Appendix O, Section 2.2 names the requirements listed in Part 2, Section 6.3.4 of the EIS Guidelines, stating that “with respect to Aboriginal peoples, a description and analysis of how changes to the environment caused by the project will affect the current uses of land and resources for traditional purposes, including, but not limited to:
 - a. any effects on resources (fish, wildlife, birds, plants or other natural resources) used for traditional uses (e.g. hunting, fishing, trapping, collection of medicinal plants, use of sacred sites);
 - b. any effects of alterations to access into the areas used for traditional uses, including development of new roads, deactivation or reclamation of access roads and changes to waterways that affect navigation;
 - c. any effects on cultural value or importance associated with traditional uses or areas affected by the project (e.g. inter-generational teaching of language or traditional practices, communal gatherings);
 - d. how project construction timing correlates to the timing of traditional practices, and any potential impacts resulting from overlapping periods;
 - e. the regional value of traditional use of the project area and the anticipated effects to traditional practice of the Aboriginal group, including alienation of lands from Aboriginal traditional use;
 - f. indirect effects such as avoidance of the area by Aboriginal peoples due to increased disturbance (e.g. noise, presence of workers); and
 - g. an assessment of the potential to return affected areas to pre-disturbance conditions to support traditional practices.”
- Appendix O, Section 3.1, Table 3-1 identifies, as rationale for inclusion for “Current use of lands and resources for traditional purposes”, elements (a) to (d) named above. No rationale is provided for excluding elements (e) to (g). It is unclear whether elements (e) to (g) were considered in Appendix O.

Specific Question/ Request for Information:

A. In responding to comments HE(1)-01, HE(1)-05 and HE(1)-09, include in the description and analysis of how changes to the environment caused by the project will affect the current uses of land and resources for traditional purposes the following elements:

- the regional value of traditional use of the project area and the anticipated effects to traditional practice of the Aboriginal group, including alienation of lands from Aboriginal traditional use;
- indirect effects such as avoidance of the area by Aboriginal peoples due to increased disturbance (e.g. noise, presence of workers); and
- an assessment of the potential to return affected areas to pre-disturbance conditions to support traditional practices.

IR Number: HE(1)-07

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 6.1.8; Part 2, Section 6.3.4.

Reference to EIS: Appendix O, Section 3.2

Context and Rationale:

- Appendix O, Section 3.2, Table 3-2 summarizes which interactions between Valued Component and effects of changes to the environment on Aboriginal peoples are considered. The only Valued Component listed as interacting with current use of lands and resources for traditional purposes is “Traditional Land and Resource Use”.

- As section 5(1)(c)(iii) of CEAA, 2012 looks at changes to the environment on current use of lands and resources for traditional purposes by Aboriginal peoples, interactions with relevant biophysical valued components should be included. Any change to a biophysical valued component, even if it does not cause an exceedance of a federal or provincial guideline or objective, could have an effect on the current use of lands and resources for traditional purposes, and must be considered.

Specific Question/ Request for Information:

A. In responding to comments HE(1)-01, HE(1)-05 and HE(1)-09, incorporate, at a minimum, interactions of atmospheric environment, acoustic environment, surface water, fish and fish habitat, vegetation and wildlife into the assessment of effects of changes to the environment on the current use of lands and resources for traditional purposes by Aboriginal peoples.

IR Number: HE(1)-08

Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes.

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix O, Section 7.1.2.1.

Context and Rationale:

- In assessing the effects to current use of lands and resources for traditional purposes resulting from the removal or alteration of habitat, the “regional value of traditional use of the project area” must be considered, as indicated in Section 6.3.4 of the EIS Guidelines.
- For example, Appendix O, Section 7.1.2.1 states that “the removal of habitat that supports plant species of interest to Aboriginal communities from the Project Development Area (PDA) is not anticipated to affect the viability of populations of these species in the vegetation communities in the LAA [Local Assessment Area] and RAA [Regional Assessment Area]”. It is not indicated whether this particular habitat is a preferred location.

Specific Question/ Request for Information:

A. In responding to comments HE(1)-01, HE(1)-05 and HE(1)-09, demonstrate the consideration of preferred habitat or sites for plant harvesting, hunting, trapping, fishing and other current use or practice of Aboriginal and Treaty rights sites in your assessment of effects of changes to the environment on the current use of lands and resources for traditional purposes and impacts to Aboriginal and Treaty rights.

IR Number: HE(1)-09

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples health and socio-economic conditions; 5(1)(c)(ii) Physical and Cultural Heritage; 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes; 5(1)(c)(iv) Any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural significance.

Reference to EIS guidelines: Part 2, Section 5.

Reference to EIS: Section 3.6.2; Section 3.6.4; Section 18.1.3.4; Appendix B1; Appendix O.

Context and Rationale:

- Section 5 of the EIS guidelines requires that the proponent “engage with Aboriginal groups that may be affected by the project, to obtain their views on potential adverse impacts of the project on potential or established Aboriginal or Treaty rights.” Additionally, it states that “the EIS will document: [...]
 - each group’s potential or established rights (including geographical extent, nature, frequency, timing), including maps and data sets (e.g. fish catch numbers) when this information is provided by the group to the proponent;
 - based on its own perspective, the potential adverse impacts of each of the project components and physical activities, in all phases, on potential or established Aboriginal or Treaty rights. This assessment is to be based on a comparison of the exercise of identified rights between the predicted future conditions with the project and the predicted conditions without the project”.
- The EIS must provide a separate assessment of potential impacts of project components and physical activities, in all phases, on potential or established Aboriginal or Treaty Rights. Section 18.1.3.4 provides some baseline information on the Indigenous groups’ Aboriginal and Treaty rights. However, in reference to the EIS Guidelines requirements quoted above, the Table of Concordance (Appendix B1, Rows 86 and 87) directs the reader to the

assessments of current use of lands and resources for traditional purposes and physical and cultural heritage and any structure, site or thing that is of archaeological, paleontological or architectural significance. While these assessments can inform an assessment of impacts to Aboriginal and Treaty rights, they are not proxies for an assessment of impacts to Aboriginal and Treaty rights.

- Should an Indigenous group express concerns regarding confidentiality of the information they provide with respect to the nature and practice of asserted or established Aboriginal or Treaty rights, GGM should respect the confidentiality and find alternative means to incorporate this information.

Specific Question/ Request for Information:

A. In a revised Appendix O, provide an assessment of impacts of the Project on Aboriginal and Treaty rights which includes:

- baseline information regarding the practice of Aboriginal and Treaty rights including information provided by Indigenous groups such as preferred sites and seasonality or timing;
- methodology and rationale used to assess impacts of the Project on Aboriginal and Treaty rights;
- mitigation and/or accommodation measures proposed specifically to address any potential impacts of the Project on Aboriginal and Treaty rights;
- conclusions for any potential impacts of the Project on Aboriginal and Treaty rights;
- input from Indigenous groups on the methodology (including significance criteria), analysis, and conclusions relating to the assessment of potential impacts of the Project on Aboriginal and Treaty rights.

B. Incorporate to the extent possible information provided by Indigenous groups, including traditional knowledge, in the assessment (see comment HE(1)-02).

IR Number: HE(1)-10

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples health and socio-economic conditions; 5(1)(c)(ii) Physical and Cultural Heritage; 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes; 5(1)(c)(iv) Any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural significance.

Reference to EIS guidelines: Part 2, Section 6.4.

Reference to EIS: Chapter 24; Appendix O, Section 6.0.

Context and Rationale:

- Appendix O, Section 6.0 states that the full list of mitigation measures contained in Chapter 24 would not be repeated in Appendix O. However, Appendix O, Section 6.0 also states that “mitigation and follow-up [that] has been recommended as a result of specific interactions with Aboriginal peoples, or because of input received through Aboriginal consultation” are provided in Appendix O, Section 6.0, Table 6-1. The mitigation measures in Table 6-1 are not included in the full list of mitigation measures in Chapter 24.
- The mitigation measures proposed in both Chapter 24 and in Appendix O do not clearly articulate which effect of changes to the environment on:
 - a. Aboriginal peoples’ health and socio-economic conditions;
 - b. physical and cultural heritage;
 - c. current use of lands and resources for traditional purposes;
 - d. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance;
 - e. potential severity of impacts of the project on Aboriginal and Treaty rights;
- that the mitigation measure is expected to reduce, and how the proposed effect will be reduced.

Specific Question/ Request for Information:

In responding to comments HE(1)-01, HE(1)-03, HE(1)-04, HE(1)-05 and HE(1)-09:

A. Provide a list of all mitigation measures for effects of changes to the environment on:

- a. Aboriginal peoples' health and socio-economic conditions;
- b. physical and cultural heritage;
- c. current use of lands and resources for traditional purposes;
- d. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance;

and on potential impacts of the Project on Aboriginal and Treaty rights.

B. Identify which mitigation measures were proposed by Indigenous groups.

C. Explain which effect that each proposed mitigation measure is expected to reduce, and how the proposed effect will be reduced.

IR Number: HE(1)-11

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples health and socio-economic conditions; 5(1)(c)(ii) Physical and Cultural Heritage; 5(1)(c)(iii) Current Use of Lands and Resources for Traditional Purposes; 5(1)(c)(iv) Any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural significance.

Reference to EIS guidelines: Part 2, Section 5; Part 2, Section 6.3.4.

Reference to EIS: Section 18.1.4.1.

Context and Rationale:

- Section 18.1.4.1 states that “GGM is committed to maintaining alternate access within the PDA [Project Development Area] to the Southwest Arm of Kenogamisis Lake during construction and operation”. The Métis Nation of Ontario raised concerns with respect to consultation on alternate access, particularly in relation to the proximity of an MNO cultural gathering site to the Project. It is unclear if the Métis Nation of Ontario, or any other Indigenous group that could experience an effect to access within the PDA was consulted on the alternate access.

Specific Question/ Request for Information:

A. In responding to comments HE(1)-01, HE(1)-03, HE(1)-04, HE(1)-05, and HE(1)-09, describe how Indigenous groups were consulted with respect to effects to accessing current use, and physical and cultural heritage or any structure site or thing of historical, archaeological or paleontological significance for Indigenous peoples.

IR Number: HE(1)-12

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples health and socio-economic conditions.

Reference to EIS guidelines: Part 2, Section 6.3.4; Part 2, Section 6.5.

Reference to EIS: Chapter 24; Appendix O, Section 8.0.

Context and Rationale:

- With regards to mental, social, and spiritual well-being, Appendix O, Section 8 states that “GGM has held and will continue active discussions with local Aboriginal communities to identify potential issues and ways to address them throughout the life of the Project as outlined in the Record of Consultation”.
- Animbiigoo Zaagi igan Anishinaabek, Aroland First Nation and Ginoogaming First Nation note the strong reliance of Indigenous communities on lands and resources make community members more susceptible to potential, and possibly unexpected, project impacts. Adverse effects to the local environment could result in the inability of Indigenous communities to use lands for hunting, fishing, gathering, as well as recreational and cultural/traditional activities. Existing and new chemophobia may result in Indigenous community members avoiding areas perceived to be impacted by the Project. The Indigenous communities have raised the concern that the resulting impact to the overall well-being of these communities could be devastating in terms of impacts to health (mental and physical) and nutrition. This must be considered when developing and implementing monitoring programs, adaptive management strategies, communication plans and compensation packages.
- It is unclear, from the mitigation measures listed in Chapter 24 or in Appendix O, Section 6.0, if the proponent has developed the “ways to address” these potential issues. All potential effects need to be assessed and addressed during the environmental assessment, and appropriate mitigation measures and follow-up programs to be designed.

Specific Question/ Request for Information:

- A. In responding to comments HE(1)-01, HE(1)-03, HE(1)-04, HE(1)-05, and HE(1)-09, any effects should be carried forward into an assessment on mental, social and spiritual well-being that identifies, assesses, addresses and /or mitigates any potential effects.
- B. Describe any mitigation measures proposed to address potential future effects to mental, social and spiritual well-being, any follow-up programs that are proposed, and how Indigenous groups will be involved.

IR Number: HE(1)-13

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(iii) Current use of lands and resources for traditional purposes.

Reference to EIS guidelines: Part 2, Section 6.2.1.

Reference to EIS: Appendix F1, Section 4.1.7; Appendix F1, Appendix B.

Context and Rationale:

- In air emission estimate calculations detailed in Appendix F1, Appendix B, for TSP, PM₁₀ and PM_{2.5} (in fugitive emissions), a silt content of 5.8% is assumed, based on the US Environmental Protection Agency (US EPA) AP-42 (Compilation of Air Emission Factors), for taconite mining haul roads. US EPA AP-42 Table 13.2.2-1 provides silt contents ranging from 2.4 to 16% with a mean value of 10%. The Centre for Excellence in Mining Innovation (CEMI, August 2010), suggests a mean silt content of 9.14% for Ontario mining sites.
- As indicated in Appendix F1, Section 4.1.7, Table 4-1, calculations also assume a control efficiency of 90% in summer and 95% in winter for unpaved roads with the implementation of the mitigation measure (watering roads). These control efficiencies are high based on available data, thus a more conservative approach is appropriate. For example, the Australian government NPI Manual for Mining indicates control efficiencies for watering on haul roads of 50-75%, depending on watering rates.
- These assumptions influence the air emission dispersion modelling results. If these assumptions are not reasonably conservative, the predicted concentrations could underestimate the project's potential changes to air quality. This could lead to underestimated effects on human health, and to underestimated effects to current use of lands and resources for traditional purposes in areas where air quality would change.

Specific Question/ Request for Information:

- A. Revise the air emission estimates based on more conservative assumptions for silt content and control efficiency, or provide a technical rationale that the assumptions for silt content and control efficiency are conservative enough to not underestimate effects on human health and current use of lands and resources for traditional purposes;
- B. Describe any changes to the assessment of effects on human health, resulting from any changes described in questions A above;
- C. Discuss appropriate mitigation and follow-up measures to address any changes to air quality in the assessment of effects on human health identified in question B above.
- D. If the air quality assessment model is not updated in question A, describe a follow-up program to verify that air emission estimates are reasonably conservative and predict potential effects on human health. Describe whether there will be periodic sampling of haul roads to establish a consistent silt loading.

IR Number: HE(1)-14

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(iii) Current use of lands and resources for traditional purposes.

Reference to EIS guidelines: Part 2, Section 6.2.1.

Reference to EIS: Appendix C10, CEAA_86; Appendix F1, Section 4.1.4; Appendix F1, Section 4.1.8; Appendix F1, Section 4.2.3

Context and Rationale:

- There are several instances (examples described below) where activities, particular air contaminants emitted from activities, or mitigation measures are excluded from the air quality assessment, due to guidelines from the Ontario Ministry of the Environment and Climate Change (MOECC). The Agency and federal departments defer to MOECC reviewers to determine whether MOECC guidelines have been correctly interpreted and applied for their purposes. However, the exclusion of certain activities and contaminants from the air quality assessment does not allow for a full understanding of changes to air quality that could affect the health of Aboriginal peoples and current use of lands and resources for traditional purposes, which are reviewed under the federal EA.

- Appendix F1, Section 4.1.8 indicates that “appropriate mitigation will be applied to the power plant to reduce NOx and NMHC [non-methane hydrocarbons] emission levels” to meet MOECC Guideline limits, “if the Project is connected to the grid”. Given that NOx is a non-threshold contaminant and may have health effects below criteria, mitigation measures should be implemented regardless of whether the power plant is connected to the grid.
- In Appendix F1, Sections 4.1.4 (for operations phase) and 4.2.3 (for construction phase), it is indicated that potential sources of air emissions "were assessed for their significance following the requirements presented in the MOECC Guideline A-10 and the significant sources were included in this assessment." The rationale relied on qualitative assumptions rather than quantitative supporting data such as expected vehicle frequency usage and emissions comparisons.
- According to the response to Agency comment HE(0)-21 (CEAA_86) in Appendix C10, an MOECC document which "indicates that the significant contaminants emitted to the air from an emergency generator (diesel-fired) are nitrogen oxides" is the rationale to only assess NOx emissions. However, a diesel-fired emergency generator can also emit contaminants other than nitrogen oxides (NOx), such as particulate matter (PM) and polycyclic aromatic hydrocarbons (PAHs). The generating capacity of the emergency generators is not provided in Chapter 5 or in Appendix F1.

Specific Question/ Request for Information:

- A. Describe the generating capacity of the emergency generators that are to be kept for the project.
- B. Describe the considerations that will determine whether the power plant will be connected to the power grid. Describe the difference in air emissions that would be caused by not applying mitigation to the power plant, in a case where the project is not connected to the grid.
- C. Revise the air quality emission assessment to include all project activities for all phases that could emit air contaminants, and all contaminants that could be emitted from those activities, or provide quantitative rationales for any exclusions with a discussion of how these exclusions may affect the assessments of effects on valued components including human health and current use of lands and resources for traditional purposes.
- D. Revise the human health risk assessment and the assessment of effects on traditional use with the updated assessment. Where an activity or a contaminant is excluded, describe how its exclusion could affect the assessment.

IR Number: HE(1)-15

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(iii) Current use of lands and resources for traditional purposes.

Reference to EIS guidelines: Part 2, Section 6.1.1; Part 2, Section 6.2.1.

Reference to EIS: Appendix F1, Section 3.1.4; Appendix F1, Section 3.1.4.8

Context and Rationale:

- The use of urban National Air Pollution Surveillance (NAPS) stations in Winnipeg to estimate background concentrations (Appendix F1, Section 3.1.4, Table 3-5) results in an overestimation of background concentrations of benzene and benzo(a)pyrene.
- Appendix F1, Section 3.1.4.8 states that "background levels of annual average benzene and 24-hour and annual average benzo(a)pyrene exceed the MOECC criteria for these PoPCs [parameters of potential concern]. However [...] the background levels are expected to be conservative and over-estimate actual background levels in the LAA [Local Assessment Area]." Although the selected background levels may overestimate the actual background levels in the Local Assessment Area (LAA), it may result in a less-conservative assessment, as PoPCs may not be dismissed based on the selected elevated background values.

Specific Question/ Request for Information:

- A. Provide the rationale for using the urban station in Winnipeg as the location for estimating background air concentrations, as opposed to a NAPS station closer to Geraldton.
- B. Describe the uncertainty introduced into the air quality assessment and how the human health assessment accounts for the likely overestimation of background concentrations such as benzene and benzo(a)pyrene.

IR Number: HE(1)-16

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(iii) Current use of lands and resources for traditional purposes.

Reference to EIS guidelines: Part 2, Section 6.2.1; Part 2, Section 8.

Reference to EIS: Appendix F1, Section 9.2; Appendix M7, Appendix A.

Context and Rationale:

ANNEX 1 - Information Requirements for the Hardrock Gold Mine Project Environmental Impact Statement

- In Appendix F1, Section 9.2, it is indicated that “an ambient monitoring program will be developed to monitor selected PoPCs [parameters of potential concern] including dust (TSP and/or PM_{2.5}) levels at selected offsite locations during operation.” The Conceptual Ambient Monitoring Plan, provided in Appendix M7, Appendix A, Section 2.1, identifies PM_{2.5} as a contaminant to monitor in some areas, but does not include it as a contaminant to be measured. Further, while GGM acknowledges that Project-related dust (PM₁₀, PM_{2.5} and TSP) contains numerous trace metal compounds, Appendix M7 does not describe how trace metals will be monitored during the Project.
- The final details for monitoring plan such as duration, frequency and location of the sampling has not been finalized in the Conceptual Air Quality Management and Monitoring Plan. It is important that the ambient air quality monitoring is consistent and that the follow-up monitoring plan for air quality is well designed in order to ensure that appropriate mitigation measures are applied to address adverse air quality effects. It is also unclear how the proponent would communicate any exceedances to Indigenous groups or the general public in a timely manner.
- Environment and Climate Change Canada recommends that PM_{2.5} should be measured as part of the monitoring and follow-up program, given the proximity of the project to receptors and concentrations predicted were approaching the limit or exceeded in some cases (it may be higher if a more conservative approach in assessment was used as requested in comment HE(1)-13).
- Animiigoog Zaagi’igan Anishinaabek (AZA), Aroland First Nation (AFN) and Ginoogaming First Nation (GFN) members want to be involved in monitoring air quality during construction, operation and closure phases of the Project. These communities asked that GGM make real-time air quality monitoring results available publicly using a web-based system that First Nations and municipal residents can view to ensure that air quality near the Project site is safe. Without real-time monitoring results being made available publicly, AZA, AFN and GFN members will have no method of alerting people using nearby areas for traditional purposes whether particulate levels are within compliance levels and are safe to breathe. A website could include all parameters of potential concern, including PM₁₀, PM_{2.5}, nitrogen oxides, benzene and hydrogen cyanide.

Specific Question/ Request for Information:

- Describe the feasibility of including monitoring for PM_{2.5}, nitrogen oxides, benzene and hydrogen cyanide for all phases of the project in the air monitoring plan. Describe the feasibility of monitoring these substances and PM₁₀ in real-time.
- Describe the feasibility of including monitoring of trace metals from Project-related dust, or provide a rationale for excluding it.
- Provide details of monitoring parameters, methods, sampling locations, applicable standards, duration, and frequencies for the Conceptual Air Quality Management and Monitoring Plan, and describe how the plan will ensure that appropriate mitigation measures are applied to address adverse air quality effects.
- Describe specifically how GGM will inform Indigenous groups and the public of air quality near the project site, in a manner that will allow for quick communication of exceedances and reinforcement of safety.
- Describe actions that GGM would undertake if concentrations of parameters of particular concern are found to exceed predicted concentrations in the EA, while not exceeding provincial regulated thresholds.

IR Number: HE(1)-17

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(iii) Current use of lands and resources for traditional purposes.

Reference to EIS guidelines: Part 2, Section 6.2.1; Part 2, Section 6.3.4.

Reference to EIS: Section 5.2.1; Section 5.6.1; Section 5.6.3; Appendix F1, Section 1.4.1; Appendix F1, Section 4.2.4.1; Appendix F2, Section 2.8.4

Context and Rationale:

- Sections 5.2.1 and 5.6.1, and Appendix F1, Section 1.4.1, indicate that blasting will occur during the construction phase “if required”. Section 5.6.3 and Appendix F1, Section 4.2.4.1 mention blasting that would occur at the open pit in pre-production, while Appendix F2, Section 2.8.4 states that during the construction phase, “there will be some blasting and stockpiling associated with the land preparation and ore extraction. The duration, magnitude and frequency of these detailed events are not yet defined at the EA stage; however, they are expected to be less in intensity than those planned for Project operation phase.”
- It is unclear what construction activities other than stripping waste rock for the open pit may require blasting; how GGM will determine whether blasting is required; and how excluding these potential blasts may underestimate changes to air quality, noise and vibration in the construction phase. Effects on human health and current use of lands and resources for traditional purposes may be underestimated in locations away from the open pit where blasting may occur. In locations where blasting would only occur during the construction phase, changes to the environment due to blasting in that phase should be assessed, or monitoring for noise and vibration from blasting activities in the construction phase should be undertaken, even if not required by MOECC regulations (Appendix F2, Section 4.4).

Specific Question/ Request for Information:

- A. Describe all blasting activities that may occur during construction, including those that are being considered but have not been determined to be required yet. Provide information on the potential locations for these blasts. Describe how GGM will determine whether blasting will be required for each activity;
- B. Revise air quality, noise and vibration assessments to include any potential blasting activities in the construction activities. If necessary, provide details of monitoring of noise and vibration during blasting activities in the construction phase;
- C. Describe any changes to the assessment of effects to valued components including human health and current use of lands and resources for traditional purposes that may result from blasting activities in the construction phase;
- D. Discuss appropriate mitigation and follow-up measures to address any changes to the assessment of effects on valued components identified in question C above.

IR Number: HE(1)-18

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(iii) Current use of lands and resources for traditional purposes.

Reference to EIS guidelines: Part 2, Section 6.2.1.

Reference to EIS: Appendix F2, Section 2.8.4; Appendix M11, Section 7.3

Context and Rationale:

- Appendix M11, Section 7.3 states that “the Project is closed to public access for mine safety and it can be assumed that the public would not be present in this area. It would therefore not be necessary to provide advance notice [of blasting].” However, the same section notes various means to inform staff of upcoming blasts, including “[...] signage at standard locations around the site, mine radio announcements, and electronic means.” It is unclear why the public and Indigenous groups couldn’t be provided similar advance notice.
- Animbiigoo Zaagi’igan Anishinaabek, Aroland First Nation and Ginoogaming First Nation indicate that many of its members use the land and water near the site for traditional land and resource use activities. Blasting has the potential to disrupt these activities, and degrade the quality of experience in areas impacted by noise and vibration associated with blasting. While it is indicated in the EIS that blasting will occur approximately five times per week (Appendix F2, Section 2.8.4), mainly during lunchtime (Appendix M11, Section 7.3), the same advance notification of blasting activities should be provided to Indigenous groups and the public, in order to alert potential users who plan to carry out traditional activities near the site, or accordingly stay away from the Project Development Area (PDA).
- Blasting activities may also have the potential to affect the natural cycles of traditionally important wildlife species such as walleye or moose. It is unclear how blasting activities may be limited during key time periods such as fish spawning season and moose hunting season, to limit the disruption to traditional land and resource use activities and to traditionally important species.

Specific Question/ Request for Information:

- A. Describe how advance notice of blasting will be provided to Indigenous groups and the public. Describe the frequency and how far in advance these alerts will be provided.
- B. Describe mitigation measures to minimize effects to fish and fish habitat and wildlife, such as timing of blasting activities through the year to take into account key time periods for traditional land and resource use activities such as fish spawning season and moose hunting season, to limit the disruption of traditional activities and traditionally important species.

IR Number: HE(1)-19

Project Effects Link to CEAA 2012: 5(1)(b) Federal Lands /Transboundary.

Reference to EIS guidelines: Part 2, Section 6.2.1; February 11, 2016 letter to Greenstone Gold Mines.

Reference to EIS: Appendix F1, Section 7.3.2; Appendix F1, Appendix O; Appendix M6, Section 6.1.2.2.

Context and Rationale:

- The summary of annual greenhouse gas (GHG) emissions during operation provided in Appendix F1, Section 7.3.2, Table 7-3 is not consistent with the estimated emissions reported in Appendix F1, Appendix O and Appendix M6, Section 6.1.2.2, Table 6-2.
- It appears that the GHG estimates given in Appendix F1, Section 7.3.2, Table 7-3 for mining equipment was based on the assumption that equipment had no GHG emissions reduction controls or mitigation applied. A description of mitigation measures to reduce GHG emissions should be provided, to mitigate some of the potential impacts of the Project to climate change.

- Animbiigoo Zaagi'igan Anishinaabek, Aroland First Nation and Ginoogaming First Nation propose working with GGM on initiatives that help to offset the Project's GHG emissions, such as tree planting, wetland restoration, and carbon offsets.

Specific Question/ Request for Information:

- A. Explain the inconsistencies in GHG emission estimates and revise the tables accordingly;
- B. Provide additional information and estimation for GHGs based on mitigation controls and measures. Apply these factors in calculations and provide GHG estimates to be compared with existing estimates.
- C. Describe mitigation and/or carbon reduction measures that are planned to reduce GHG emissions.

IR Number: HE(1)-20

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix F8, Section 3.5.8.

Context and Rationale:

- The arsenic biotransfer factor for cattle cannot be located in the reference noted in Appendix F8, Section 3.5.8, Table 3-35 (U.S. EPA, 2005a, entitled "Methodology for Predicting Cattle Biotransfer Factors"). That document focuses only on lipophilic contaminants, and the analysis in the study appears to establish biotransfer factors based on the fat content of the animals and the Log Kow of the lipophilic chemical. In addition, the arsenic uptake value, as well as the uptake values of other metals, could not be located from that reference.
- It is also unclear from Appendix F8 how metal bioaccumulation into moose meat is accounted for in the estimation of metal uptake into beef cattle by this study.
- The scientific information related to the derivation of the uptake factors for cobalt, copper, vanadium, and zinc could not be located within the provided reference of Baes et al., 1984.
- Moose and deer liver are typically consumed as traditional foods. Organs have been observed to have higher levels of metals than in meats (Chan et al., 2014). However, information on how the potential differences in uptake into and storage by game organs were not discussed.
- The values in Appendix F8, Table 3-38 are identified only as Fish Tissue (fillet) Exposure-Point Concentrations (mg/kg wet weight) and human receptors were assumed to consume whole fish. In the absence of this walleye whole-body data, it is unclear on how whole-body-fillet, liver and gonad samples were evaluated in Appendix F8, Table 3-38. This is considered further in comment FH(1)-21.
- Uptake factors that account for bioaccumulation and biomagnification up the food chain do not appear to have been considered.
- This information is required to understand potential effects of the project on the health of Aboriginal peoples.

Specific Question/ Request for Information:

- A. Confirm the primary literature source for the arsenic biotransfer factor, and provide a scientific rationale to support the use of the selected arsenic biotransfer factors into beef cattle as proxies for moose transfer factors.
- B. Describe how metal bioaccumulation is accounted for with the use of the biotransfer factor.
- C. Provide scientific rationale for the selection of uptake factors used for cobalt, copper, vanadium and zinc. Include appropriate citations of the primary literature to support the selection of these uptake factors.
- D. Provide additional information on how the potential differences in uptake into and storage by game organs were considered.
- E. Clarify how or whether the walleye fillet, liver and gonad samples were evaluated, and how or whether they were considered as part of the total exposure evaluation.
- F. Clarify whether the uptake factors used account for bioaccumulation and biomagnification up the food chain. If not, discuss how bioaccumulation and biomagnification can be incorporated into the evaluation.
- G. Describe any changes to the assessment of effects on human health, resulting from any changes described in questions A to F above;
- H. Discuss appropriate mitigation and follow-up measures to address any changes to the assessment of effects on human health identified in question G above.

IR Number: HE(1)-21

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions.

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix C10; Appendix F8, Section 3.5.2

Context and Rationale:

- The response to Agency comment HE(0)-33 (CEAA_98) in Appendix C10 indicates that “total dust deposition was based on the maximum annual dust deposition rate”, however, Appendix F8, Section 3.5.2 states that “dust deposition rates were obtained on a site-specific basis as annual average values from the air deposition model”. The purpose of the screening is to compile a conservative list of chemicals for further evaluation using different methods. The maximum observed concentrations of chemicals for each media should be used for the identification of contaminants of potential concern (COPCs). If these assumptions are not reasonably conservative, the predicted concentrations could underestimate the project’s potential effects on human health, and to underestimated effects to current use of lands and resources for traditional purposes where country foods are obtained and consumed.
- Appendix F8, Section 3.5.2 states that in the top 10 cm soil horizon, “no loss of metal due to wind erosion, soil mixing or leaching was assumed to occur.” Site activities such as earthworks and stripping can contribute to the "mixing" of contaminants in soil and thus should be considered and/or assessed.

Specific Question/ Request for Information:

A. Provide a rationale to support the use of the annual average deposition rates versus maximum averages, and include a discussion of the uncertainty associated with the assumptions.

B. Clarify whether site activities such as earthworks and stripping were considered in the assumption of no mixing in top 10 cm mixing zone in soil, and describe the uncertainty that may be introduced by assuming that no soil mixing would occur.

IR Number: HE(1)-22

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix F8, Section 4.1.1

Context and Rationale:

- Given that the EIS has established that there is an ingestion pathway, to support a community-specific estimate of risks from the ingestion of traditional foods by the Indigenous communities, a survey to collect area-specific information from different age groups on consumption patterns should be considered. It is unclear whether the consumption patterns and dietary habits of each Indigenous group, and different age groups within each Indigenous group, were incorporated into the HHRA and validated with each Indigenous group. Health Canada recommends referring to the “First Nations Food, Nutrition and Environment Study” (FNFNES) from Health Canada (Chan et al, 2014) for additional comment regarding the use of select ingestion rates.

Specific Question/ Request for Information:

A. Describe how community-specific information was used to determine consumption patterns and dietary habits for each Indigenous group.

B. Describe how information from different age groups within each community was used. If this was not done in the HHRA, discuss applying an approach where the most vulnerable population is applied to represent the whole community.

C. Describe any changes to the assessment of effects on human health, resulting from any changes described in questions A and B above;

D. Discuss appropriate mitigation and follow-up measures to address any changes to the assessment of effects on human health identified in question C above.

IR Number: HE(1)-23

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

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Reference to EIS guidelines: Part 2, Section 6.3.4

Reference to EIS: Appendix F8, Section 3.5.8.

Context and Rationale:

- Appendix F8, Section 3.5.8 indicates that baseline tissue concentrations from small mammals “were used directly without any allometric scaling to account for possible difference between small mammal tissue and moose tissue.” Data with concentrations of chemicals of potential concern (COPCs) from the actual country foods that are consumed from the impacted area are preferred.
- As an alternative to collecting empirical data for concentrations of COPCs in large mammals that are consumed by humans in the project area, results for concentrations of COPCs in large mammal tissues reported in the First Nations Food, Nutrition and Environment Study (FNFNES) from the same geographical location could be used to represent baseline concentrations. As an additional option, results for COPCs in environmental media (water, soil, sediment, etc.) could be employed in models to derive concentration estimates in country foods.
- This information is required to understand potential effects of the project on the health of Aboriginal peoples.

Specific Question/ Request for Information:

- A. Provide a rationale to support how metal concentrations in moose (particularly moose liver which is often harvested by Indigenous people for consumption) are derived from the small mammal tissue data, and provide a discussion of uncertainties associated with the use of surrogate species.
- B. Provide a discussion of how the uncertainties would be influenced by using other sources of information (FNFNES, or modelled results to obtain concentration estimates based on the results of the COPCs in environmental media) and provide the rationale for not using these other additional sources of information.
- C. Describe any changes to the assessment of effects on human health, resulting from any changes described in questions A and B above;
- D. Discuss appropriate mitigation and follow-up measures to address any changes to the assessment of effects on human health identified in question C above.

IR Number: HE(1)-24

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4

Reference to EIS: Appendix F8, Section 1.2; Appendix F8, Section 4.1.1.

Context and Rationale:

- Given that the EIS has established that there is an ingestion pathway, in Appendix F8, Section 4.1.1, Table 4-1, it is unclear why the Aboriginal/High Use receptor consumption rates used for fish (73.97 g/day), game meat and organs (total of 135.45 g/day), are based on intake rates for heavy consumers, while consumption rate for plants and vegetation (20.4 g/day) is based on intake rates for an Aboriginal person.
- In Appendix F8, Section 1.2, it is indicated that the EIS was updated by “[increasing] the proportion of fish ingestion accounted for by local fish from 10% to 100% for the Aboriginal/High Use receptor...” However, it appears from Appendix F8, Section 4.1.1, Table 4-1 that 10% of fish consumption for the Aboriginal receptor is assumed to be from local fish. It is unclear whether the assumption of 100% local fish was actually used in the HHRA, and that Table 4-1 is in error.
- This information is required to understand potential effects of the project on the health of Aboriginal peoples.

Specific Question/ Request for Information:

- A. Provide a rationale for the use of high-end consumption rates for select foods and average consumption rates for others. Consider inclusion of a sensitivity analysis to identify specific contaminants and exposure pathways/foods that impact and drive risk estimates.
- B. Confirm whether the HHRA used an assumption of 100% fish consumption from the local area for the Aboriginal/High Use Receptor. If not, update the HHRA using this assumption.
- C. Discuss appropriate mitigation and follow-up measures to address any changes to the assessment of effects on human health identified in question C above.

IR Number: HE(1)-25

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples health and socio-economic conditions.

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Chapter 19; Appendix O.

Context and Rationale:

- Section 6.3.4 of the EIS Guidelines requires the proponent to describe and analyze how changes to the environment caused by the project will affect “human health, considering, but not limited to [...] quality and availability of country foods”
- Animbiigoo Zaagi igan Anishinaabek, Aroland First Nation and Ginoogaming First Nation raised concerns that the assessment of effects on human health described in Chapter 19 and in Appendix O, does not consider effects to the health of Indigenous peoples due to a decrease in availability of traditional foods caused by the Project, which would result in a potential change in diet.

Specific Question/ Request for Information:

- A. Describe how changes to the availability of traditional foods could cause effects to the health of Indigenous peoples who rely on these foods as an important part of their regular diet.
- B. Describe any changes to the assessment of effects on human health, resulting from any changes described in question A above;
- C. Discuss appropriate mitigation and follow-up measures to address any changes to the assessment of effects on human health identified in question B above.

IR Number: HE(1)-26

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(iii) Current use of lands and resources for traditional use

Reference to EIS guidelines: Part 2, Section 6.3.4

Reference to EIS: Appendix M13, Section 7.1.1

Comment from Indigenous Group(s):

- Given that the EIS has established that there is an ingestion pathway, Red Sky Métis Independent Nation (RSMIN) raised concerns about the potential impacts to their ability gather wild berries and other edible plant species, including wild rice, blueberries, Saskatoon berries, raspberries and high bush cranberry as a result of on-going forestry and mining operations in the region. RSMIN also gather plants used for medicinal and ceremonial purposes such as cedar boughs and bark, red willow bark (may be red osier dogwood), inner bark of birch, mullein, clover, milk thistle, dandelion leaf, wintergreen, peppermint, balsam fir gum, fireweed/willowherb, sage, and “rabbit berries”.
- RSMIN recommended that the loss of these plant species of importance be mitigated by planting species of importance to their citizens upon the closure of the mine.
- RSMIN also raises concerns about their ability to gathering edible and medicinal plants in areas where no herbicides/pesticides have been applied. Appendix M13, Section 7.1.1 indicates that chemical application methods may be used if needed. RSMIN agrees with GGM’s measure to use mechanical or manual methods for vegetation control where possible. If the use of chemical applications is necessary, RSMIN recommends that herbicides/pesticides be avoided in areas that are known to have plant species of interest, so that the Project Development Area can be utilized for medicinal plant gathering post closure. Indigenous groups should also be informed of the dates and locations of the applications, and the compounds used, so that community members may be informed of the applications.

Specific Question/ Request for Information:

- A. Considering baseline information provided by RSMIN (see comment HE(1)-02), discuss how the Project may affect the ability of RSMIN citizens to gather and use plant species of importance to their community.
- B. Describe potential circumstances where chemical application methods may be used, and how Indigenous groups will be notified about chemical applications. Discuss the residence time of the pesticide after application (e.g., when plants could be expected to return).
- C. Describe any mitigation and/or compensation measures that will be applied to counter the loss of these plant species of importance.
- D. Discuss the impact on use of land and resources by Indigenous groups with and without mitigation/compensation.

IR Number: HE(1)-27

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix F8, Section 4.2.2; Appendix F8, Appendix E

Context and Rationale:

- In Appendix F8, Section 4.2.2, and Appendix F8, Appendix E, no rationale is provided for cases where selected toxicology reference values (TRVs) deviate from Health Canada's guidance.
- According to Appendix F8, Section 4.2.2.2, "if chromium is released to the environment, it will likely be in the form of chromite FeCr_2O_4 . The stable oxide contains Cr^{3+} , which is not considered carcinogenic. As such, chromium will not be evaluated for potential inhalation health concerns." Given that the EIS has established that there are inhalation and ingestion pathways, it would still be expected that there could be exposure to hexavalent chromium (Cr^{6+}) in some concentration. More discussion is needed as to the potential risk of exposure to hexavalent chromium, which is a recognized carcinogen.
- The dermal relative absorption factors (RAFs) for lead and manganese provided in Appendix E references the MOECC document "Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario, April 15, 2011." However, no dermal RAFs were found in the referenced document.
- This information is required to understand potential effects of the project on the health of Aboriginal peoples.

Specific Question/ Request for Information:

- A. Provide rationales for where TRVs were adopted that were different from Health Canada's guidance.
- B. Discuss the potential risk of exposure to hexavalent chromium, particularly with regards to carcinogenicity.
- C. Confirm the reference from which dermal RAFs for lead and manganese were obtained.
- D. Describe any changes to the assessment of effects on human health, resulting from any changes described in questions A and B above;
- E. Discuss appropriate mitigation and follow-up measures to address any changes to the assessment of effects on human health identified in question D above.

IR Number: HE(1)-28

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix F8, Appendix E

Context and Rationale:

- Given that the EIS has established that there is an ingestion pathway through fish consumption, it is important to understand potential uptake from surface water to fish.
- Appendix F8, Appendix E indicates that a basin weighting approach was used to obtain an average baseline arsenic concentration for Kenogamisis Lake. Given that traditional users will be exposed at specific locations rather than evenly throughout the lake, it is not appropriate to derive a weighted average of a COPC concentration in each basin of Kenogamisis Lake for the purpose of screening or establishing a baseline for the HHRA.
- No rationale was provided in Appendix F8 for the surface water to fish uptake approach (shown in a table in Appendix F8, Appendix E). It is also unclear whether the modeling considered uptake by fish of metals in sediment.
- The predicted future case arsenic concentration in fish tissue appears to use a proportioning approach, which introduces uncertainty in the assessment.

Specific Question/ Request for Information:

- A. Revise the HHRA to incorporate either location-specific COPC concentrations or maximum COPC concentrations for all locations in Kenogamisis Lake.
- B. Provide a rationale for using the surface water to fish uptake approach mentioned in Appendix F8, Appendix E.
- C. Describe how uptake by fish of metals from sediment is considered in the modeling of fish tissue concentrations, and whether benthic and pelagic fish were considered differently.

D. Clarify why a proportioning approach was considered for the predictions of fish tissue concentration for the future case. Describe how the proportioning approach can be validated in the country foods follow-up program described in comment HE(1)-32.

E. Describe any changes to the assessment of effects on human health, resulting from any changes described in questions A to D above;

F. Discuss appropriate mitigation and follow-up measures to address any changes to the assessment of effects on human health identified in question E above.

IR Number: HE(1)-29

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix F8, Section 4.4.1; Appendix F8, Appendix E.

Context and Rationale:

- The concentration ratio (CR) approach is typically used when measured data of on-site air concentrations is available. According to Appendix F8, Section 4.4.1, the predicted future case concentrations appear to be based on modeling that incorporated a combination of limited on-site ambient baseline monitoring data, data from the National Air Pollution Surveillance system and EA data on background ambient levels from two other mines located in northern Ontario.
- Worked examples in Appendix F8, Appendix E were only provided for the future case scenario. It is not clear how the CR estimates were calculated for the other exposure scenarios, and if the equations used in those calculations accounted for background air concentrations.
- This information is required to understand potential effects of the project on the health of Aboriginal peoples.

Specific Question/ Request for Information:

A. Include a discussion of the uncertainties introduced in the HHRA by incorporating limited on-site ambient baseline monitoring data, and the consequent level of accuracy in predicting future case exposure point concentrations (EPCs) of COPCs in air.

B. Clarify how the future case modeling accounts for background air concentrations for non-carcinogens.

IR Number: HE(1)-30

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix C10, CEAA_101

Context and Rationale:

- In the response to Agency comment HE(0)-36 (CEAA_101) in Appendix C10, it is indicated that intermittent exposure assumptions were “amortized (dose-averaged) to account for the differences in exposure duration between the intermittent exposures and the continuous daily exposures that were assumed in the development of the [applicable] TRVs [toxicity reference values].” Although it is common industry practice, this approach is not supported by Health Canada (HC). As per HC’s (2010) Detailed Quantitative Risk Assessment guidance, the TRV should match as closely as possible the duration of exposure that humans will receive from the site.
- Given that the EIS has established that there is an inhalation pathway, it is important that amortization of exposures does not underestimate potentials for exceeding threshold effects. In addition, the anticipated effects of the dose-averaged exposure should remain biologically equivalent to the unadjusted exposure. It is also unclear how the potential for short-term periodic exceedances has been addressed on a chemical-specific basis.
- Health Canada recommends that the 2013 “Interim Guidance on Human Health Risk Assessment for Short-term Exposure to Carcinogens at Contaminated Sites” and 2016 memorandum “A Primer for Evaluating Human Health Risk at Contaminated Sites for Chronic and Less-Than-Chronic Exposures to Chemicals” be considered in the HHRA.

Specific Question/ Request for Information:

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- A. Describe how the amortization of short-term exposure is appropriate based on the toxicological properties of COPCs, such as mode of action, the duration of effects, whole-body elimination half-life, the potential for sensitive life stages, the persistence and reversibility of effects, and whether effects are expected to be most related to the peak concentration (short-term exposure) or to the total dose (long-term exposure) of the chemical.
- B. Describe how the potential for short-term periodic exceedances has been addressed on a chemical-specific basis, with no mathematical dose averaging that would potentially suggest lower exposure and subsequent risk estimates.

IR Number: HE(1)-31

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix F8, Section 3.5.1; Appendix F8, Section 4.4.3.1.

Context and Rationale:

- According to Appendix F8, Section 3.5.1, “the health risks associated with the inhalation of particulate-bound metals have been based on predicted annual average metal concentrations in ambient air.” However, possible short-term effects, such as irritation, should also be considered. Exposure periods should correspond to the exposure period for the short-term toxicological effect as much as possible.
- Furthermore, the human health risk assessment (HHRA) identified locations within Geraldton and Rosedale Point which will experience 24-hour PM₁₀ exceedances in both Phase 1 and 2 of the project. The frequency analysis for the 24-hour PM₁₀ exceedance outside of the Project Development Area (PDA) and off-property also mentions potential repeat exposures for the Aboriginal/High Use receptor. However, there is no discussion of potential short-term health effects from the 24-hour PM₁₀ exceedances for these receptors.
- This information is required to understand potential effects of the project on the health of Aboriginal peoples.

Specific Question/ Request for Information:

- A. Describe how the HHRA considers the potential for human health risks associated with short-term exposure to exceedances of COPCs in air. Update the HHRA to clarify the implications of short-term exposure to exceedances of COPCs in air.
- B. Describe mitigation measures that are applied to reduce potential human health risks associated with short-term exposure to exceedances of COPCs in air.

IR Number: HE(1)-32

Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions

Reference to EIS guidelines: Part 2, Section 6.3.4.

Reference to EIS: Appendix F8, Section 6.0; Appendix O, Table 6-1

Context and Rationale:

- The Follow-up and Monitoring plans described in Appendix F8, Section 6.0 does not appear to include monitoring of vegetation, small mammals and other animals that are harvested as country foods. Also, the proposed fish monitoring program in Appendix M12 does not identify which chemicals of potential concern (COPCs) are to be monitored in fish tissue. COPCs that can bioaccumulate and biomagnify up the food chain should be considered.
- A follow-up program related to country foods is proposed to validate the assumptions made in the HHRA, corresponding risk estimates, and allow for adaptive management to adjust mitigation measures appropriately to minimize adverse impacts to human health.

Specific Question/ Request for Information:

- A. In designing the measures contained within follow-up programs, ensure that all negatively impacted valued components are included within the proposed management plans.
- B. Propose a follow-up program related to country foods, to validate the assumptions made in the HHRA, corresponding risk estimates. Incorporate elements of existing monitoring plans for fish, vegetation and wildlife (including moose) that are described elsewhere. Identify the COPCs that would be considered as part of this follow-up program, and provide details of the species to monitor, the frequency and locations of sampling.

IR Number: AM(1)-01

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(c)(i) Aboriginal Peoples Health/socio-economic conditions; 19(1)(a) Accidents and Malfunctions.

Reference to EIS guidelines: Part 2, Section 6.6.1.

Reference to EIS: Section 22.4.1.3.

Context and Rationale:

- Section 22.4.1.3 (the TMF [tailings management facility] Failure Effects Assessment) indicates that the conservative scenario may result in “long-term effects [that] may cause sublethal effects on fish due to [...] chronic toxicity.”
- These long term effects may become even greater considering the proximity of the TMF to the Goldfield Creek Diversion Pond. This concern is also shared by Red Sky Métis Independent Nation (RSMIN) as offsetting measure for lost habitat proposed in Appendix F10, Section 9.2 is to develop “approximately 7.5 ha of new pond habitat at the interface between the existing Goldfield Creek and the new diversion channel”. RSMIN is concerned that if the TMF dam were to fail in any capacity, there is potential for contaminated water to flow into the diversion pond and affect the fish and fish habitat.
- Additionally, no information was found as to whether this may affect human health via consumption of contaminated fish. This pathway of contamination must be elucidated.

Specific Question/ Request for Information:

- A. Provide a clear description of the worst-case scenario(s) for a TMF failure in the context of human health, considering the movement of contaminants from the release of water and sediments to potential receptors. Include the source, quantity, mechanism, pathway, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment.
- B. Assess the risk of TMF failure on the Goldfield Creek Diversion Pond proposed for offsetting of loss of fish habitat.
- C. Describe the change to the receiving environment in the Goldfield Creek Diversion Pond, in the case of a TMF failure – e.g. water quality and quantity, sediment quality and quantity.
- D. Describe how the worst-case scenario(s) of a TMF failure may result in effects to fish and fish habitat and aquatic species, and from these, the resultant effects to current use of lands and resources for traditional purposes and human health.
- E. Describe the safety measures and emergency response procedures to mitigate the potential effects of such a scenario, including on the valued components named in question D.

IR Number: AM(1)-02

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(iii) Migratory Birds; 5(1)(c)(i) Aboriginal Peoples Health/socio-economic conditions; 5(1)(c)(iii) Current Use of Lands and Resources for traditional purposes; 19(1)(a) Accidents and Malfunctions.

Reference to EIS guidelines: Part 2, Section 6.6.1.

Reference to EIS: Section 22.4.1.3.

Context and Rationale:

- The residual adverse effects on surface water from a potential tailings management facility (TMF) failure, as described in Section 22.4.1.3, are expected to be of “high magnitude, potentially extending beyond the Local Assessment Area (LAA) with an increased potential for effects if a failure was to occur near the end of mine life when higher volumes are contained in the TMF and dry weather conditions exist, long-term and potentially irreversible within the PDA [Project Development Area], with the magnitude of effects diminishing outside the PDA.” However, it is unclear how this determination of diminishing magnitude is reached, as the PDA is tightly configured to the TMF components, thus a breach or failure resulting in any movement of solids has very high potential to extend to the LAA (e.g. any breach adjacent to the Goldfield Creek Tributary or Kenogamisis Lake).
- The predicted magnitude, duration and reversibility of effects within the LAA or beyond are not provided. It is therefore not possible to draw conclusions on the impact of this potential malfunction on the environment.

Specific Question/ Request for Information:

- A. Provide an assessment of the potential environmental effects of a TMF failure extending into the LAA and beyond. Include the quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment.

- B. Describe the change to the receiving environment in the LAA and beyond, in the case of a TMF failure – e.g. water quality and quantity, sediment quality and quantity.
- C. Describe the resulting impacts to wetlands, sensitive habitats, wildlife (including SAR), fish and fish habitat, aquatic species, migratory birds, human health, and current use of lands and resources for traditional purposes, in the LAA and beyond, in the case of a TMF failure.
- D. Describe the safety measures and emergency response procedures to mitigate the potential effects of such a scenario, including on the valued components named in question C.

IR Number: AM(1)-03

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(iii) Migratory Birds; 5(1)(c)(i) Aboriginal Peoples Health/socio-economic conditions; 5(1)(c)(iii) Current Use of Lands and Resources for traditional purposes; 19(1)(a) Accidents and Malfunctions.

Reference to EIS guidelines: Part 2, Section 6.6.1.

Reference to EIS: Section 22.4.3.3.

Context and Rationale:

- Section 22.4.3.3 (the WRSA [waste rock storage area] or Overburden Storage Areas Slope Failure Effects Assessment) suggests a scenario consisting of a failure of overburden or waste rock into the open pit following closure, disturbing the stratification of the pit lake. This would result in “mixing of the upper and lower layers of the pit lake. This could result in increased concentrations of select elements, potentially above applicable water quality objectives, being discharged to Kenogamisis Lake and requiring treatment.” This scenario is not further elaborated. It is not possible to evaluate the effects to the environment without a clear understanding of the release and movement of contaminants.
- Furthermore, it is not clear whether the stratification in the open pit would reform in the event of a disturbance, or if so, how long it would take. There is also no description of how treatment of the discharge would be applied. As such, there is insufficient rationale for the residual adverse effects on surface water to be described as "short-term".

Specific Question/ Request for Information:

- A. Describe the worst-case scenario of failure of overburden or waste rock into the open pit following closure. Include the quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment.
- B. Clarify whether stratified conditions in the open pit during post-closure can be re-established following a failure of overburden or waste rock into the open pit. If so, estimate the time required to re-establish stratification, and revise duration of effects on surface water.
- C. Describe the change to the receiving environment – e.g. water quality and quantity, sediment quality and quantity in the event of an overburden or waste rock failure.
- D. Describe the resulting impacts to wetlands, sensitive habitats, wildlife (including SAR), fish and fish habitat, aquatic species, migratory birds, human health, and current use of lands and resources for traditional purposes in the event of an overburden or waste rock failure.
- E. Describe the safety measures and emergency response procedures to mitigate the potential effects of such a scenario, including on the valued components named in question D.
- F. Describe how it will be determined whether discharge from the open pit in the event of an overburden or waste rock failure will require treatment.
- G. Describe the treatment to be applied to the discharge from the open pit to Kenogamisis Lake in the case of a failure of overburden or waste rock into the open pit affecting water quality. Include information about the duration of this treatment, in consideration of the questions related to the duration of the disturbance in stratification posed in B above.

IR Number: AM(1)-04

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(iii) Migratory Birds; 5(1)(c)(i) Aboriginal Peoples Health/socio-economic conditions; 5(1)(c)(iii) Current Use of Lands and Resources for traditional purposes; 19(1)(a) Accidents and Malfunctions.

Reference to EIS guidelines: Part 2, Section 6.6.1.

Reference to EIS: Section 5.2.2; Section 22.3.1.2; Section 22.3.1.4; Section 22.3.1.5.

Context and Rationale:

ANNEX 1 - Information Requirements for the Hardrock Gold Mine Project Environmental Impact Statement

- Section 5.2.2 states that “TMF [tailings management facility] reclaim water will be pumped back to the mill to meet the mill demand and will be maintained separate from water collected in pond M1.” However, the only mention of the TMF pipeline is in section 5.4.20, which does not provide a full description. The pipeline is also not indicated on the site plan (figure 5-2). Additionally, failure of this pipeline is not addressed in Section 22.3.1.2 (tailings pipeline failure), Section 22.3.1.4 (treatment plants and pipeline failures) or Section 22.3.1.5 (seepage and contact water collection system failure).

Specific Question/ Request for Information:

- A. Identify, on a map, the location of the pipeline used to pump water from the TMF reclaim pond to the mill.
- B. Describe how the TMF reclaim water will be kept separate from the water collected in pond M1.
- C. Describe the worst-case scenario for failure of this pipeline and the resulting potential effects to the environment, including wetlands, sensitive habitats, wildlife (including SAR), fish and fish habitat, aquatic species, migratory birds, human health, and current use of lands and resources for traditional purposes.
- D. Describe the safety measures and emergency response procedures to mitigate the potential effects of a failure of this pipeline, including on the valued components named in question C.
- E. Describe the remediation measures applicable following a failure of this pipeline.

IR Number: AM(1)-05

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(iii) Migratory Birds; 5(1)(c)(i) Aboriginal Peoples Health/socio-economic conditions; 5(1)(c)(iii) Current Use of Lands and Resources for traditional purposes; 19(1)(a) Accidents and Malfunctions.

Reference to EIS guidelines: Part 2, Section 6.6.1.

Reference to EIS: Section 22.3.1.8; Section 22.3.1.10; Section 22.4.3; Section 22.4.4.

Context and Rationale:

- Section 22.3.1.8 states that “[Open pit] Slope failure [...] may affect the access road around the open pit or the edges of the surrounding WRSAs [waste rock storage areas] or historical tailings. However, potential environmental effects of any historical tailings slumping into the open pit are not assessed in Section 22.3.1.8 (open pit slope failure), Section 22.3.1.10 or Section 22.4.4 (both for loss of stability of historical MacLeod tailings). Feasibility of remediation, particularly during closure and post-closure, is also not discussed.
- In contrast, a similar scenario for slumping of waste rock into the flooded open pit was assessed in Section 22.4.3.3.

Specific Question/ Request for Information:

- A. Provide an assessment of the potential environmental effects of a slope failure affecting the edges of both Macleod and Hardrock historical tailings, resulting in material slumping into the flooded open pit. Describe the worst-case scenarios. Include the quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment.
- B. Describe the change to the receiving environment – e.g. water quality and quantity, sediment quality and quantity.
- C. Describe the resulting impacts to wetlands, sensitive habitats, wildlife (including SAR), fish and fish habitat, aquatic species, migratory birds, human health, and current use of lands and resources for traditional purposes.
- D. Describe the safety measures and emergency response procedures to mitigate the potential effects of the open pit slope failure, including on the valued components named in question C.
- E. Describe remediation measures applicable to the open pit slope failure.

IR Number: AM(1)-06

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(a)(iii) Migratory Birds; 5(1)(c)(i) Aboriginal Peoples Health/socio-economic conditions; 5(1)(c)(iii) Current Use of Lands and Resources for traditional purposes; 19(1)(a) Accidents and Malfunctions.

Reference to EIS guidelines: Part 2, Section 6.6.1.

Reference to EIS: Section 22.4.6.3.

Context and Rationale:

- Section 22.4.6.3 (Vehicle Collision or Mechanical Failure Effects Assessment) does not describe a worst case scenario, but rather provides a generic statement that “the potential for effects would depend on the location of the collision or failure and the nature of the materials being released.” The worst case scenario in this case would be where the access road includes a water crossing which flows to the diverted channel and ultimately to Southwest Arm Tributary and Kenogamisis Lake. This Tributary will also form the fisheries offset, adding importance to the location and significance to potential effects.

Specific Question/ Request for Information:

- A. Provide an assessment of the potential environmental effects of a vehicle collision or mechanical failure at the water crossing of the access road. Include the quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment.
- B. Describe the change to the receiving environment – e.g. water quality and quantity, sediment quality and quantity.
- C. Describe the resulting impacts to wetlands, sensitive habitats, wildlife (including SAR), fish and fish habitat, aquatic species, migratory birds, human health, and current use of lands and resources for traditional purposes.
- D. Describe the safety measures and emergency response procedures to mitigate the potential effects of this scenario.
- E. Describe remediation measures applicable to this scenario.

IR Number: AM(1)-07

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 5(1)(c)(i) Aboriginal Peoples Health/socio-economic conditions; 19(1)(a) Accidents and Malfunctions.

Reference to EIS guidelines: Part 2, Section 6.6.1.

Reference to EIS: Section 22.3.1.5.

Context and Rationale:

- Section 22.3.1.5 states that “A breach of pond M1 would result in a limited volume release along a narrow flow path to the Southwest Arm Tributary, affecting a small area within the PDA, with the potential to effect surface water quality within the Southwest Arm Tributary and Southwest Arm of Kenogamisis Lake.” Further consideration is needed as this Tributary is expected to form part of the fisheries offset, and should there be a large breach it would affect the water quality in this diversion. In addition, given the proximity of Pond M1 to Kenogamisis Lake, it seems reasonable that a large breach would also affect the water quality of Southwest Arm Tributary and Kenogamisis Lake.

Specific Question/ Request for Information:

- A. Provide additional detail regarding the potential release due to a breach of pond M1, considering a worst case scenario with a pond at its fullest expected volume. At a minimum, revise the release volume and dispersion to the Southwest Arm Tributary and Kenogamisis Lake.
- B. Revise the effects assessment of effects of the breach of pond M1 taking in consideration the worst case scenario described in question A.
- C. Discuss the effect of the revised scenario on the Southwest Arm Tributary.

IR Number: AA(1)-01

Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat; 19(1)(g) Alternative means of carrying out the designated project

Reference to EIS guidelines: Part 2, Section 2.2.

Reference to EIS: Section 4.2.8; Appendix K1.2, Section 4.4.

Context and Rationale:

- In the evaluation of alternatives for aggregate sources (section 4.2.8), one of the alternatives is to create new aggregate sources. Appendix K1.2, Section 4.4 identifies two potential till borrow (aggregate) source areas (T1 and T2), and presents characteristics of the till borrow. However, their location is not identified on a map in Appendix K1.2. In the main EIS, aggregate source areas are identified on maps and in the text as T1, S2 and S4, but no descriptions of the aggregates’ characteristics are available. It is unclear whether source area T1 is the same in both documents.

- It is therefore unclear which aggregate sources were used for alternative assessment and how those sites were selected. Without this information, it is not possible to make a clear assessment of potential changes on water quality, which could lead to effects on fish and fish habitat.

Specific Question/ Request for Information:

- A. Provide further information on the sites that were considered for new aggregate sources as part of the alternative assessment, including their location, the characteristics of the aggregate, the potential environmental effects from the use of each site, and the information that was used to determine which new site was selected. Provide an updated map that shows locations of potential till borrow (aggregate) source areas (T1 and T2).
- B. Refine the alternatives assessment analysis, using relevant information that was provided in the answer to question A.

IR Number: EE(1)-01

Project Effects Link to CEAA 2012: 19(1)(i) Effects of Environment on the Project

Reference to EIS guidelines: Part 2, Section 6.6.2

Reference to EIS: Section 21.3.1.5

Context and Rationale:

- Section 21.3.1.5 indicates that “ice jams [are common], which can lead to flooding, especially in northern Ontario”. However, no information is provided regarding how ice jams will be managed at the various water containment infrastructures on site. Further information is needed to ensure that ice jams are managed effectively, in order to prevent potential accidents or malfunctions.

Specific Question/ Request for Information:

- A. Discuss the risks of ice jams at the various water containment infrastructures, particularly in the tailings management facility (TMF) reclaim pond.
- B. Provide information on the management of watercourses and water features in freezing conditions to address ice jams. Describe any avoidance and/or mitigation measures.

IR Number: CE(1)-01

Project Effects Link to CEAA 2012: 19(1)(a) Cumulative Effects

Reference to EIS guidelines: Part 2, Section 6.6.3

Reference to EIS: Section 20.2.5

Context and Rationale:

- Section 20.2.5 states that the Brookbank and Viper Projects were both listed as past and present activities for the cumulative effects assessment “because they are existing exploration projects with no current plans to develop resources.”
- The Agency’s 2016 technical guidance Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act 2012 indicates, in Section 1.4, that a future physical activity is considered reasonably foreseeable if “the submission for regulatory review is imminent. This could be known if the collection of data has already commenced, regulatory authorities have been contacted about information requirements, or through an announcement from the proponent.”
- The NI 43-101 Technical Report for the Hardrock Project, issued on December 21, 2016 suggests that the Brookbank and Viper Projects are reasonably foreseeable. In particular, the NI 43-101 Technical Report proposes, in Section 1.21, “the use of the Hardrock process plant and TMF [tailings management facility] for the future processing of gold from other GGM Property deposits such as Brookbank, or a potential future Hardrock underground resource to improve the LOM average grade” as revenue-related potential opportunities. It further suggests in Section 1.23 and 26.2 of the NI 43-101 Technical Report that the Brookbank Project is considered “as an eventual source of high grade mill feed material when the average grade [at the Hardrock Project] dips in Year 6 and 8 and 9. These potential mines would need to be mined concurrently with the Hardrock Project open pit given the high milling rates. ”

- Furthermore, Animbiigoo Zaagi igan Anishinaabek (AZA) and the Métis Nation of Ontario have stated their concerns regarding the exclusion of Viper and Brookbank projects as future physical activities in the assessment of cumulative effects.
- Since the Brookbank and Viper projects are under consideration for development in the Hardrock Project's NI 43-101 Technical Report, then they may be considered reasonably foreseeable. Otherwise, an appropriate justification must be provided for their exclusion, which accounts for the statements made in the NI 43-101 Technical Report.

Specific Question/ Request for Information:

A. Revise the assessment of cumulative effects to consider residual effects on atmospheric, physical, biological, socio-economic, traditional land and resource use valued components, and potential impacts to Aboriginal and Treaty rights, from the inclusion of Brookbank and Viper Projects as reasonably foreseeable physical activities, or provide a thorough rationale for its exclusion, accounting for comments made in the NI 43-101 Technical Report regarding the Brookbank Project.

IR Number: CE(1)-02

Project Effects Link to CEAA 2012: 19(1)(a) Cumulative Effects

Reference to EIS guidelines: Part 2, Section 6.6.3

Reference to EIS: Section 20.2.5

Context and Rationale:

- Section 20.2.5 states that “consultation feedback related to follow-up and monitoring has been addressed through direct responses (in writing and follow-up meetings) and in the Final EIS/EA”. However, no reference is provided to where this information can be found in the EIS. Further, no information is found in the Cumulative Effects Assessment chapter (Chapter 20) related to follow-up programs and monitoring related to cumulative effects, and no rationale is provided to justify not needing any.
- Part 2, Section 6.6.3 of the EIS Guidelines requires the proponent to “develop a follow-up program to verify the accuracy of the assessment or to dispel the uncertainty concerning the effectiveness of mitigation measures for certain cumulative effects. “

Specific Question/ Request for Information:

A. Describe the follow-up program for cumulative effects, including objectives and any monitoring measures that will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures. For each valued component, if a follow-up and monitoring program is not required for cumulative effects, provide a rationale.

IR Number: FD(1)-01

Project Effects Link to CEAA 2012: 5(2) Linked to Regulatory Permits/Authorizations.

Reference to EIS guidelines: Part 1, Section 3.3.2.

Reference to EIS: Appendix C10, CEAA_115; Appendix F10, Section 6.0

Context and Rationale:

- Agency comment FD(0)-01 on the draft EIS, asked for information to determine potential effects that are directly and indirectly associated with federal decisions (a federal authority's exercise of a power or performance of a duty or function), as described by Section 5(2) of CEAA 2012. These effects may already be described in the EIS, but they are not presented in a manner that the Agency can use to focus the scope of its assessment of effects to be taken into account under subsection 5(2) of CEAA 2012.
- A separate section or appendix should identify the direct effects of the federal decisions (permits authorizations), and the indirect effects (those directly linked or necessarily incidental) of the effects, resulting from the direct effects of federal decisions.

- This stand-alone section or Appendix should identify, in a methodical manner, the direct and indirect effects of each federal decision. Included below are general examples that may help illustrate what is meant by direct and indirect effects. Project component with a federal permits or authorization:
 - lead to the loss of a berry batch, which can lead to reduced food for birds, mammals and humans;
 - requires the removal of a wetland; which can lead to loss of wetland function, changes to hydrology, loss of certain food species eaten by another animal;
 - requires removal of a wetland could lead to loss of nesting locations for birds; subsequent effect on bird populations;
 - releases effluent; change to water quality, water quality leads to an effect on fish tissue and potential health effects to non-Indigenous people from the consumption of those fish (note that health effects to Indigenous people should be captured under Section 5(1)(c), and described in Appendix O).
- Most information on anticipated federal permits, with the likely exception of an Explosives Act permit, appears to be located in Appendix F10, Section 6.0, Table 6-1.
- As per Part 1, Section 3.3.2 of the EIS Guidelines, additional valued components may need to be considered in this assessment, such as:
 - Furbearers and their habitat;
 - Amphibians and their habitat;
 - Reptiles and their habitat;
 - Ungulates and their habitat;
 - Species at risk and their habitat;
 - Non-migratory birds and their habitat;
 - Human health (not limited to Indigenous people);
 - Socio-economic conditions (not limited to Indigenous people);
 - Archaeology (not limited to Indigenous people).

Specific Question/ Request for Information:

A. In a stand-alone section or appendix of the EIS, provide a summary of changes to the environment that are directly linked (direct effects) or necessarily incidental (indirect effects) to any federal decisions, and potential effects of those changes. This assessment should include the information listed in B – H below.

B. Provide a table describing the project activities associated with each federal decision that would be required for the Project. (i.e. road culvert, dam, berm, offset component, tailings impoundment area.) Provide a table and a map identifying the specific project components for which a federal authorization or decision (permit), including the proposed offset measures as a result of the decisions. Include the channel realignment/redirection necessary for the tailings impoundment area.

C. Identify those changes to the environment that are directly linked or necessarily incidental to each federal decision. For example, identify potential changes to the environment arising from the building and operating of the tailings impoundment area, which is authorized by a federal decision under the *Fisheries Act*. This may include, as examples, changes to:

- Water quality and quantity
- Terrestrial habitat, flora and fauna
- Riparian areas and wetlands
- Air Quality

D. Identify potential impacts related to the changes to the environment, including effects to:

- health and socio-economic conditions, including navigation,
- physical and cultural heritage,
- any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, other than the ones captured under paragraph 5(1)(c) of CEAA 2012.

- E. Identify valued components that may be affected by those changes identified in questions C and D. It is possible that new valued components may need to be considered for this assessment.
- F. Given the changes to the environment and potential impacts identified in questions C and D, describe the potential adverse effects to each valued component identified in question E that are directly linked or necessarily incidental to each federal decision, including those that may not have already been identified in the EIS to date, including effects associated with changes to the environment.
- G. Identify the mitigation measures to avoid, reduce or compensate potential adverse effects.
- H. Characterize residual adverse effects after applying mitigation measures.
- I. Describe a follow-up program, including objectives and any monitoring measures, which will be implemented to verify the predictions of effects and evaluate the effectiveness of the proposed mitigation measures, if required.