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May 10, 2018

Steve Lines  
Environmental Assessment and Permitting Manager  
Greenstone Gold Mines  
2381 Bristol Circle, Suite B203  
Oakville, ON L6H 5S9  
[steve.lines@ggmines.com](mailto:steve.lines@ggmines.com)

Sent by E-mail

Dear Mr. Lines,

**SUBJECT: Outcome of the Technical Review of the response to Information Requirement #1 of the Hardrock Gold Mine Project Environmental Impact Statement**

The Canadian Environmental Assessment Agency (the Agency) has completed the technical review of the response to Information Requirement #1 (IR-1) of the Hardrock Gold Mine Project (the Project) Environmental Impact Statement (EIS) documentation from Greenstone Gold Mines (GGM), and has determined that the information provided is insufficient for the purpose of moving forward with the federal environmental assessment (EA).

To facilitate moving forward with the EA, the Agency has prepared information requirements (IRs), contained in this letter and the attached Annex, in consultation with Environment and Climate Change Canada, Natural Resources Canada, Health Canada, Fisheries and Oceans Canada, and Transport Canada. The Agency has also taken into consideration comments and questions received from the Province of Ontario and from Indigenous groups.

The attached IRs are categorized and sorted by their links to environmental effects that are to be taken into account under section 5 of the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), factors to be considered under section 19 of CEAA 2012, and potential adverse impacts of the project on potential or established Aboriginal and treaty rights protected by Section 35 of the *Constitution Act, 1982*.

This letter and Annex 1 collectively form the **second Information Requirement (IR-2)** and are developed based on technical questions arising from the review of GGM's response to IR-1. In accordance with subsection 23(2) of *CEAA 2012*, the Agency requires that GGM submit complete responses to the requirements contained in IR-2.

Coordination with the Provincial Process

If the Province of Ontario requires a submission of a full amended EIS to meet the requirements of the provincial EA process, the Agency will accept a digital copy of the amended EIS, and would encourage GGM to incorporate any changes resulting from federal IRs into the amended EIS. However, please note that the Agency would still require that a self-contained response table be submitted to fulfill the requirements described in the paragraph above, and references to the amended EIS would be acceptable only to support the response given in the table. The Agency further requests that the timing of the submission of a full amended EIS and the response to IR-2 be coordinated and informed following discussions with the Agency and the Province.

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Registry provisions

In accordance with CEAA 2012, comments received and other documents submitted or generated to inform the EA are part of the project file. Accordingly, information submitted to the Agency that is relevant to the EA of the Project is available to the public upon request and may also be posted on the online public registry under reference number 80068. The Agency will remove information, such as home addresses, telephone numbers, email addresses and signatures prior to public disclosure. Please contact me directly prior to submitting any documents that contain confidential or sensitive information that you believe should not be made public.

Next Steps

The federal EA timeline is stopped on day 179 as of May 10, 2018, and will not recommence until the Agency reviews the formal submission of the response to the IR-2 and is satisfied that responses are sufficiently complete to proceed with the EA.

As per the Agency's "*Operational Policy Statement: Information Requests and Timelines, February 2016*"<sup>1</sup>, the Agency will take up to a maximum of 15 days to complete the conformity review of GGM's response to IR-2 without the timeline for the EA resuming. If the Agency has not come to a conclusion after 15 days, the timeline will resume.

The Agency is willing to meet with GGM to discuss the path forward and schedule meetings on specific EA thematic areas with all government reviewers, GGM and their consultants to clarify expectations for the IR responses.

If you have any further questions, please contact me directly at 647-262-8219 or [Hardrock@ceaa-acee.gc.ca](mailto:Hardrock@ceaa-acee.gc.ca).

Sincerely,

<Original signed by>

Marc Léger  
Project Manager

Attachments:

Annex 1 – Second Round of Information Requirements (IR-2) for the Hardrock Gold Mine Project Environmental Impact Statement

cc: Gavin Battarino, Ontario Ministry of the Environment and Climate Change  
Ian Horne, Greenstone Gold Mines

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<sup>1</sup> <https://www.canada.ca/en/environmental-assessment-agency/news/media-room/media-room-2016/information-requests-timelines.html>

**ANNEX 1**

**Second Round of Information Requirements (IR-2) for the Hardrock Gold Mine Project Environmental Impact Statement**

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
IR-2 Reference #: FH(2)-01	GGM ID#: CEAA_5	IR-1 Reference #: FH(1)-01	Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat	Reference to EIS Guidelines: Part 2, Section 6.1.6; Part 2, Section 6.3.2; Part 2, Section 6.4.	Reference to EIS: Chapter 5, Section 5.4.15.2	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- The Agency notes that the historical tailings have been releasing contaminants in their current location. Consequently, with regards to the excavated tailings, which are proposed to be temporarily managed in interim storage locations, the Agency has a number of uncertainties regarding changes in water quality and the proposed monitoring and follow-up plan.</li> <li>- Greenstone Gold Mines' (GGM's) response to FH(1)-01 A-B describes temporary storage locations for excavated historical tailings. The response indicates that approximately 4000 cubic metres (m<sup>3</sup>) of material will be excavated during the installation of the MacLeod High Tailings (MHT) seepage collection drain and will be stored on top of the existing MHT. Further, the "material would be permanently capped as part of the MHT enhanced cover", while other excavated material would be stored within the footprint of waste rock storage area (WRSA) C before being permanently relocated to the new tailings management facility (TMF), upon accumulation of a 2 m layer of fresh tailings.</li> <li>- GGM's response to FH(1)-01 D also states that "the contact time of the upper exposed layer of relocated historical tailings with the atmosphere will be short, up to five years". It is also stated in the response to FH(1)-01 C that "monitoring of the temporary storage areas will consist of visual monitoring by an engineer to verify the integrity of the temporary storage facilities and water management infrastructure".</li> <li>- The Agency is concerned with this approach, because the geochemical process of acid generation and metal leaching can begin to occur immediately upon de-saturation. Depending on the composition of the exposed tailings, there is the potential for weathering, metal leaching and acid generation to occur within the five years of exposure, which can result in degradation of water quality in the surrounding waterbodies. This requires a more stringent monitoring and follow-up plan than the proposed visual monitoring. The monitoring and follow-up plan should verify that the excavated tailings (temporarily stored within the MHT prior to and after permanent capping), and the tailings stored within the WRSA C footprint (prior to relocation to the new TMF) do not inadvertently result in changes to water quality in the surrounding waterbodies. This point will be further addressed</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Describe the changes in water quality that could result from exposing the relocated historical tailings to the atmosphere for up to five years;</p> <p>B. Provide the effects on fish and fish habitat, if applicable, due to changes in water quality as described in Question A;</p> <p>C. Clarify whether the construction effluent treatment plant will remain in place until the relocation of the historical tailings is completed. If not, propose an alternative for treatment of collected contact water from the sump;</p> <p>D. Describe mitigation measures to prevent adverse effects on fish and fish habitat, if necessary;</p> <p>E. Characterize residual effects, if any, after the mitigation measures have been implemented;</p> <p>F. Reassess the significance determination, if necessary, taking responses from Questions A to D into account;</p> <p>G. Provide details of a conceptual follow-up plan, as requested in Question A of FH(2)-26.</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						<p>through a question in FH(2)-26.</p> <ul style="list-style-type: none"> <li>- In addition, it is mentioned in the response to FH(1)-01 A-B that contact water will be collected from the tailings stored in the temporary storage pad in a sump and “pumped [...] to the construction effluent treatment plant”. Chapter 5, Section 5.4.15.2 of the environmental impact statement (EIS) states that “construction effluent treatment plant will be used to treat effluent from [...] seepage and surface water from the historical tailings during the construction phase”. However, since the partial relocation of the historical tailings to the new TMF is expected to occur in years 2 to 4 of the operations phase, it is unclear whether the construction plant will remain in place until the historical tailings are permanently relocated to the new TMF.</li> <li>- The Agency seeks further information on the management of contact water from the temporary storage locations for historical tailings, as seepage from the historical tailings is a critical aspect of the Project, and has the potential to adversely affect the water quality of fish-bearing waterbodies.</li> </ul>	
IR-2 Reference #: FH(2)-02	GGM ID#: CEAA_6	IR-1 Reference #: 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 5.4.3; Appendix L, Sections 3.6.1.1 and 3.7.1.1.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- The Agency has uncertainties with the use of topsoil in covering the historical tailings as topsoil in numerous places on the project site is reported to contain an increased amount of contaminants of concern, particularly arsenic.</li> <li>- It is stated in Section 5.4.3 of the EIS that “An estimated 7.24 Mm<sup>3</sup> of overburden” and “[...] 2,356 Mm<sup>3</sup> of topsoil will be stored at designated locations within the overburden storage areas”. Appendix L, Sections 3.6.1.1 and 3.7.1.1 mention that, in 2015, “arsenic and antimony typically exceed MOE Table 6/8 SCS” in near surface soils in the immediate vicinity of the historical Hardrock plant site (376 µg/g to 1,610 µg/g) and the former MacLeod-Mosher plant site (323 µg/g to 6,670 µg/g).</li> <li>- It is unclear if arsenic contamination in soil has been accounted for in the proposal to store and use topsoil as cover material for historical tailings. This is important for the Agency to evaluate the cover system for historical tailings and ensure that the seepage water quality is not underestimated.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Clarify whether arsenic contamination in soil has been factored into the proposal of storing topsoil in designated locations within the overburden storage areas and using this soil to cover the historical tailings;</p> <p>B. Taking the response from Question A into consideration, update the water quality assessment, including the combined effect of seepage through the contaminated topsoil and interstitial water from leftover historical tailings leading into surface water in the surroundings;</p> <p>C. Provide the effects on fish and fish habitat, if applicable, due to changes in water quality requested in Question B;</p> <p>D. Describe mitigation measures to prevent adverse effects on fish and fish habitat, if necessary;</p> <p>E. Characterize residual effects, if any, after the mitigation measures have been implemented;</p> <p>F. Reassess the significance determination, if necessary, taking responses from Questions A to E into account;</p> <p>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, and measures that would be taken if specified objectives are not reached. If follow-up is not required, provide a rationale.</p>
IR-2 Reference #:	GGM ID#: CEAA_5,	IR-1 Reference	Project Effects Link to CEAA 2012:	Reference to EIS	Reference to EIS: Chapter 5,	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM’s response to FH(1)-01 E states that “geotechnical testing</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Assess the efficacy of using a 2 m layer of new tailings as a</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
FH(2)-03	CEAA_7	#:FH(1)-01, FH(1)-03	5(1)(a)(i) Fish and Fish Habitat	<b>Guidelines:</b> Part 2, Section 8.2.	Section 5.7.1.4; Appendix E1, Figure 4-2.	<p>evaluated the hydraulic conductivity of 2 m of new tailings with load and determined that a hydraulic conductivity of <math>1 \times 10^{-8}</math> m/s can be obtained". It is also stated in the same response that "the hydraulic conductivity of the new tailings with load is of similar order of magnitude as till and/or a geomembrane and therefore will provide sufficient seepage mitigation". The Agency has uncertainties with the efficacy of the 2 m of new tailings as a seepage mitigation feature, as this is an uncommon approach and its validity has not been adequately substantiated in the EIS or IR-1 response through comparative examples from other projects or published sources.</p> <ul style="list-style-type: none"> <li>- While it is recognized that the seepage collection system also exists as a mitigation feature, the Agency has uncertainties with the assumption that 100% of the seepage from the relocated historical tailings will be collected due to the following reasons: <ul style="list-style-type: none"> <li>- The assumption that the 2 m layer of new tailings will capture 100% of seepage from historical tailings is unsubstantiated;</li> <li>- The response to FH(1)-03 indicates that revision of the groundwater model was not considered necessary and therefore, a model run to show that 100% of seepage from the historical tailings will be captured was not provided;</li> <li>- Chapter 5, Section 5.7.1.4 of the EIS states that: "laboratory work to simulate storage conditions in the new TMF to confirm geochemical behavior" has not been conducted yet;</li> <li>- The need for a liner at the TMF base was not considered necessary by GGM;</li> <li>- In Appendix E3.1, Figure 4-2, deep overburden troughs (specifically borehole BH14-03 on cross-section A-A') are observed in the vicinity of the area designated for storage of relocated historical tailings in the new TMF. These troughs may make it challenging for the seepage collection ditches to intercept the seepage from the relocated historical tailings;</li> <li>- The response to FH(1)-01 A-B states that "at a minimum, [...] 4000 m<sup>3</sup> of material related to the installation of the new MacLeod high tailings (MHT) seepage collection drain, and potentially a larger quantity in the area of the existing highway" may require management. It is plausible that at the detailed engineering stage, a higher volume of historical tailings material may require management.</li> </ul> </li> <li>- Because of these reasons, it is possible that seepage of unknown volume and concentrations from the relocated historical tailings, combined with the 12% of seepage from the TMF expected to bypass collection ditches that is already</li> </ul>	<p>seepage mitigation feature for the relocated historical tailings, using examples from other projects or published sources;</p> <p>B. Re-evaluate the inclusion of a liner to minimize adverse changes in water quality from contaminated seepage leading into natural environment;</p> <p>C. Revise the groundwater model to include the relocated historical tailings and reassess the capability of seepage mitigation measure to capture 100% of the seepage from the relocated historical tailings, with consideration of factors such as the volume of historical tailings to be relocated to the new TMF and their geochemical behavior has not been confirmed yet, and deep overburden troughs exist in vicinity of the area designated for storage of relocated historical tailings;</p> <p>D. Describe the changes in water quality, particularly in Goldfield Creek Tributary and Southwest Arm of Kenogamis Lake, taking responses from Questions A to C into consideration;</p> <p>E. Provide the effects on fish and fish habitat, if applicable, due to changes in water quality as described in Question D;</p> <p>F. Describe additional mitigation measures to prevent adverse effects on fish and fish habitat, if the modelling results are not supportive of the predicted seepage capture rate from the relocated historical tailings;</p> <p>G. Characterize residual effects, if any, after the mitigation measures have been implemented;</p> <p>H. Reassess the significance determination, if necessary, taking responses from Questions A to G into account;</p> <p>I. Provide details of a conceptual follow-up plan, as requested in Question C of FH(2)-26.</p> <p>J. Provide additional conceptual details on the proposed constructed wetland treatment of the seepage from relocated historical tailings including its location, characteristics of the seepage entering the constructed wetland, capability of and anticipated quality and location of discharge.</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						<p>accounted for in the groundwater model, can cumulatively seep out to Goldfield Creek Tributary and Southwest Arm of Kenogamisis Lake and deteriorate the water quality for fish and fish habitat.</p> <ul style="list-style-type: none"> <li>- It is further stated in GGM's response to FH(1)-01 F that "a constructed wetland to treat seepage from the TMF storage locations and engineered containment cell with lower permeability cover are contingency options for management of relocated historical tailings in the TMF". Recognizing that wetland treatment is proposed as a contingency measure, the Agency has concerns about this proposal, because the TMF appears to be confined in a tight space and the location of this constructed wetland is unidentified. It is also unclear how effective this wetland treatment will be considering different contaminants of concern and temperature variations in the area of the Project.</li> <li>- To reduce the uncertainties described above, the Agency will require additional mitigation measures, and contingency plans in the event that the proposed mitigation measures do not meet their intent. Additionally, the mitigation measures will need to be supported by modelling results that demonstrate that the seepage from the relocated historical tailings will be captured, prior to release into the natural environment.</li> <li>- This information is required to verify GGM's conclusion made in the EIS that the Project will lead to improvement in water quality in Kenogamisis Lake, with no potential adverse effects to fish and fish habitat.</li> </ul>	
<b>IR-2 Reference #:</b> FH(2)-26	<b>GGM ID#:</b> CEAA_4, CEAA_5, CEAA_6, CEAA_7	<b>IR-1 Reference #:</b> EA(1)-04, FH(1)-01, FH(1)-02, FH(1)-03	<b>Project Effects Link to CEAA 2012:</b> 5(1)(a)(i) Fish and Fish Habitat; 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(iii) Current Use of Lands and Resources for traditional purposes	<b>Reference to EIS Guidelines:</b> Part 2, Section 6.2.2; Part 2, Section 6.3.1. Part 2, Section 8.2.	<b>Reference to EIS:</b> Chapter 23.	<b>Context and Rationale:</b> <ul style="list-style-type: none"> <li>- Based on consultation with Indigenous groups and applicable local groups and resource users, and on baseline information collected for the Hardrock Project, it has been determined that Kenogamisis Lake is an important lake for users for recreational and cultural reasons, has been in the past and will remain important in the future. To verify the predictions made in the EIS regarding changes in groundwater and surface water, and ultimately their effects on fish and fish habitat, human health and on current use of lands and resources for traditional purposes in Kenogamisis Lake, the Agency requires details for a conceptual follow-up and monitoring program.</li> <li>- While considering GGM's responses to FH(2)-01, the Agency needs to understand how GGM will verify that the permanent capping of a portion of the historic tailings as part of the MacLeod Historic Tailings will not cause a new contaminant loading into surrounding waterbodies. The Agency also needs to understand how GGM will verify that the interim storage of</li> </ul>	<b>Specific Question/ Request for Information:</b> <p>A. Provide details of a conceptual follow-up plan that will verify that the permanent capping of a portion of the historic tailings as part of the MacLeod Historic Tailings will not cause a new contaminant loading into surrounding waterbodies.</p> <p>B. Provide details of a conceptual follow-up plan that will verify that the interim storage of relocated historical tailings within the footprint of WRSA C will not cause the release of contaminants into the surrounding waterbodies.</p> <p>C. Provide details of a conceptual follow-up plan that will verify that the 2 m layer of fresh tailings will prevent seepage of the relocated historical tailings in the new TMF.</p> <p>D. Provide details of a conceptual follow-up plan, that ties to the plans described in A to C, that will verify surface water quality in Kenogamisis Lake and other waterbodies of interest will protect fish and fish habitat, human health and current use of land and resources for traditional purposes by Indigenous peoples that may be impacted by the Project.</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						<p>relocated historical tailings within the footprint of WRSA C will not cause the release of contaminants into the surrounding waterbodies.</p> <ul style="list-style-type: none"> <li>- While considering GGM's responses to FH(2)-03 into consideration, the Agency needs to understand how GGM will verify its assumption that the 2 m layer of fresh tailings will prevent seepage of the relocated historical tailings in the new TMF.</li> <li>- While considering GGM's responses in relation to the management of historical tailings, the Agency needs to understand how GGM will verify its predictions on surface water quality and related impacts to valued components including fish and fish habitat, human health and current use for traditional purposes, and the contingency plans to protect those valued components.</li> <li>- In all cases above, the Agency needs to understand the locations where monitoring will occur, at a conceptual level (with as much specificity as possible, but without requiring precise coordinates of each location); which chemical or physical parameters will be monitored; the frequency and duration; contingency plans that would be put in place if the monitoring results are unfavourable; and how Indigenous groups, federal and provincial departments will be involved in the refinement of these follow-up programs.</li> <li>- The Agency requires a description of the follow-up program to ensure that GGM's predictions of effects to fish and fish habitat, human health and current use of lands and resources for traditional purposes in Kenogamisis Lake will be verified. The Agency notes that some elements of the follow-up plans provided in response to this IR will overlap with some monitoring plans that will be required by the Province of Ontario in its environmental assessment decision. GGM is encouraged to consider how it can simultaneously meet the objectives of follow-up plans for the federal environmental assessment and monitoring requiring for the provincial environmental assessment.</li> </ul>	<p>For questions A to D, provide the following at a conceptual level:</p> <ul style="list-style-type: none"> <li>- locations where monitoring will occur;</li> <li>- chemical or physical parameters that will be monitored;</li> <li>- the frequency, timing and duration of the monitoring;</li> <li>- contingency plans that would be put in place if the monitoring results are unfavourable;</li> <li>- how Indigenous groups, federal and provincial departments will be involved in the refinement of these follow-up programs.</li> </ul> <p>This information must be provided to determine how the follow-up program will verify EA predictions, with an understanding that some details may be finalized after the EA as part of permitting processes.</p>
IR-2 Reference #: FH(2)-04	GGM ID#: CEAA_8	IR-1 Reference #: 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.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to FH(1)-04 A states that "the material will be excavated from un-impacted (greenfield) areas and will therefore be clean. Thus, they will not require water management, except for standard/well-proven erosion and sedimentation controls including silt fences to ensure sediment does not enter local watercourses".</li> <li>- Seepage and surface drainage derived from overburden stockpiles will likely contain total suspended solids (TSS), which</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Assess the potential for release of metals from seepage and surface drainage from Overburden Storage Areas 2 and 3;</p> <p>B. Provide details on how contact water, including seepage and surface drainage, from Overburden Storage Areas 2 and 3 will be collected;</p> <p>C. Describe the changes in water quality if contact water from the Overburden Storage Areas 2 and 3 is not collected;</p> <p>D. Provide the effects on fish and fish habitat, if applicable, due to</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						<p>is a deleterious substance under the <i>Metal Mining Effluent Regulations</i> (MMER). In addition, since the Project is partially on a brownfield area, the seepage and surface drainage from these overburden stockpiles may also contain elevated levels of metals, some of which can be deleterious substances under the MMER.</p> <ul style="list-style-type: none"> <li>- While it is recognized that standard erosion and mitigation controls, such as silt fences, will be used to manage TSS loading, it is unclear whether these measures will be sufficient to minimize the TSS loading. It is also unclear whether these measures will be able to protect the surrounding waterbodies from the release of metals.</li> <li>- Environment and Climate Change Canada notes that all effluent, such as surface drainage and seepage derived from Overburden Storage Areas 2 and 3 must be collected and monitored for water quality and flow, in accordance with the MMER, as it can change the water quality of the surrounding waterbodies and potentially result in adverse effects to fish and fish habitat.</li> <li>- It is important to ensure that mine water is collected, as seepage and surface drainage from the overburden storage areas can change the water quality of the surrounding waterbodies and result in effects to fish and fish habitat.</li> </ul>	<p>changes in water quality as described in Question C;  E. Describe mitigation measures to prevent adverse effects on fish and fish habitat, if necessary;  F. 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.</p>
IR-2 Reference #: FH(2)-07	GGM ID#: CEAA_11	IR-1 Reference #: 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: Appendix F10, Section 9.2.5.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to FH(1)-07 provided water depths at various cross sections along the Goldfield Creek Diversion Channel. Given that there is a concern that some mine infrastructure such as Pond M1 could be overtopped during storm events, the water level elevations at the hydraulic cross sections included in the model are required. Figures of the hydraulic cross sections in the vicinity of mine components such as Pond M1 are also required to ensure that contact water and non-contact water do not mix together.</li> <li>- This information is important for the Agency to understand any changes in water quality that could result from overtopping of mine infrastructure, and corresponding effects on fish and fish habitat.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Update Tables 2 through 4 of the attachment "CEAA_11 Data Response to IR FH(1)-07-CEAA_11" by adding a column with the surface water elevations at the hydraulic cross sections;  B. Provide transversal hydraulic cross sections depicting surface water elevations at cross sections adjacent to mine infrastructure along the diversion channel.</p>
IR-2 Reference #: FH(2)-21	GGM ID#: CEAA_25	IR-1 Reference #: FH(1)-21	Project Effects Link to CEAA 2012: 5(1)(a)(i) Fish and Fish Habitat	Reference to EIS Guidelines: Part 2, Section 6.3.1; Part 2, Section 6.3.4.	Reference to EIS: Appendix M12.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to FH(1)-21 E states that "post construction sampling in areas further removed from the PDA would not be conducted unless there was a confirmed effect on fish tissue in the 'near-field' areas, or if water quality monitoring showed a significant increase [<i>sic</i>] POPCs [parameters of potential concern]." While the term "confirmed effect" was defined in GGM's response to FH(1)-23A, it is unclear what is meant by a "significant increase" in POPCs.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Clarify what constitutes a "significant increase in POPCs", and how the requirement for further monitoring of water quality and fish tissue will be determined;  B. Describe the frequency and timing of reviews of results from the monitoring program, how it will be determined whether mercury/methylmercury concentrations represent negligible human health risk, and how Indigenous and non-Indigenous communities would be informed of results.</p>



IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						<ul style="list-style-type: none"> <li>- GGM's response to FH(1)-21 F states that "results from the monitoring program will be reviewed to confirm that Project-related increases in mercury and methylmercury are not occurring. If Project-related increases in mercury and/or methylmercury concentrations are identified, the results will be reviewed to determine if the mercury/methylmercury concentrations continue to represent a negligible human health risk. The results will be communicated to Indigenous and non-Indigenous communities." It is unclear how it will be determined whether mercury/methylmercury concentrations represent a "negligible human health risk", and how results would be communicated to communities.</li> <li>- The Agency seeks to understand the objectives of GGM's proposed fish monitoring program.</li> </ul>	
IR-2 Reference #: TW(2)-01	GGM ID#: CEAA_30	IR-1 Reference #: TW(1)-01	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 6.3.3.	Reference to EIS: Section 8.4.2.3; Section 13.4; Chapter 23.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to TW(1)-01 B states that replacement barn swallow habitat will be "sited within close proximity (i.e. within 1 km) of the location of the lost habitat and within 200 m of suitable foraging habitat." The residual environmental effect is considered "low magnitude, short term (i.e. less than one breeding season) and reversible." However, Section 13.4.1.2 of the EIS states that "indirect effects are conservatively assumed for the duration of the project life through clearing, site preparation and operation." For example, Chapter 13, Section 13.4.5, Table 13-14 states that sensory disturbance will abate following closure. Given the proximity of the existing barn swallow nesting habitat to the "area source" shown in Chapter 8, Section 8.4.2.3, Figure 8-3, and the limited suitable habitat within 200 m, it is likely that sensory disturbance may impact the use of the replacement habitat over the life of the Project.</li> <li>- To fully assess the magnitude and duration of residual environmental effects on barn swallows, the proponent must consider the indirect effects (noise) to barn swallow habitat.</li> <li>- In addition, Chapters 13 and 23 of the EIS, and GGM's response to TW(1)-01 do not address mitigation and monitoring measures associated with the prevention of barn swallow nesting within project infrastructure. This information is necessary to understand residual effects on a species that is a migratory bird and a species at risk.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Rationalize the location of replacement barn swallow habitat keeping in mind the importance of reducing indirect effects such as noise on barn swallow habitat, if applicable, describe mitigation measures proposed to reduce indirect effects;</p> <p>B. Describe mitigation measures that will be implemented to prevent nesting of barn swallows within project infrastructure;</p> <p>C. Revise the determination of significance of the residual effects on barn swallow habitat caused by project activities to account for the potential for sensory disturbance on the proposed replacement breeding habitat;</p> <p>D. Describe how the monitoring program mentioned in the response to TW(1)-01 E will evaluate the effectiveness of the replacement breeding habitat and the proposed mitigation measures, including mitigation measures described in response to questions A and B above. Provide a rationale for limiting the monitoring program to a three-year period. Describe potential steps to be implemented if the replacement breeding habitat or proposed mitigation measures are found to be ineffective.</p>
IR-2 Reference #: TW(2)-06	GGM ID#: CEAA_35	IR-1 Reference #: 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,	Reference to EIS: Section 12.4.3; Appendix M13.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to TW(1)-06 A states that the implementation of the Clean Equipment Protocol for Industry as "not directly applicable" for several reasons, and pointed out that equipment will "operate on compacted sites roads which will avoid the equipment collecting visible dirt clods and plant material."</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Describe mitigation measures to avoid the introduction or spreading of invasive species in the PDA and LAA due to project activities prior to the construction of site roads or in areas that are not serviced by site roads (e.g., Goldfield Creek Diversion Channel, the Sensitive Fen feature);</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
				Section 6.3.4.		<p>However, prior to construction of compacted site roads and during activities when equipment is required to access areas not serviced by access road (e.g., construction and maintenance of the Goldfield Diversion Pond and Channel), it will not be possible to avoid “dirt clods and plant material.”</p> <ul style="list-style-type: none"> <li>- The Conceptual Biodiversity Management and Monitoring Program and the response to TW(1)-06 proposes mitigation measures to “assess presence of invasive species and target removal through manual, mechanical and/or chemical methods and proper disposal.” It is unclear where monitoring will be applied within the Project Development Area (PDA) and Local Assessment Area (LAA). This information is required by the Agency, as invasive species could create an imbalance in the plant diversity of the PDA and LAA as they spread, and thereby reduce the availability of the plant species of interest that the Indigenous groups harvest.</li> </ul>	B. Provide additional information on the visual monitoring program, including frequency of monitoring, and areas within the PDA and LAA to be monitored. Specify if Indigenous groups would have a role in this program.
IR-2 Reference #: TW(2)-08	GGM ID#: CEAA_37, CEAA_46	IR-1 Reference #: TW(1)-08, HE(1)-04	Project Effects Link to CEAA 2012: 5(1)(c)(ii) Aboriginal Physical and Cultural Heritage	Reference to EIS Guidelines: Section 6.1.8; Part 2, Section 6.3.4; Part 2, Section 6.4.	Reference to EIS: Section 13.2.2.1 and 13.4.2.2; Appendix M13, Section 7.1.3; Appendix O, Section 6	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM’s response to TW(1)-08 does not provide details about measures to protect an identified bald eagle nest approximately 200 m outside the Project Development Area (PDA), as GGM indicated that the Ontario Ministry of Natural Resources and Forestry (MNRF) could not confirm whether the nest was still present or active. MNRF has indicated, in an email sent to GGM and the Agency on April 27, 2018, that a breeding pair was observed using the identified nest (MNRF identification #271) on April 14, 2018. Section 7.1.3 of the Conceptual Biodiversity Management and Monitoring Plan (Appendix M13), and mitigation measures listed in Chapter 13, Section 13.4.2.2, Table 13-9 state that “if an active bald eagle nest occurs within 800 m of Project construction of operation activities, develop protection measures”. The Agency requires further details to assess potential effects of the Project on cultural heritage.</li> <li>- MNRF noted in the same email that on March 3, 2017, it identified another eagle nest (MNRF identification #487) approximately 650 m south of the proposed location of the TMF. MNRF did not confirm whether nest #487 was active in 2018. The Agency requires information about GGM’s current understanding of this nest, and whether Indigenous communities have raised this nest with the proponent.</li> <li>- GGM’s follow-up response to TW(1)-08 indicated that MNRF nest #271 “was not identified by Aboriginal communities through Aboriginal consultation program for the Project or in project-specific TK/TLU studies submitted by Aboriginal communities. It would be inappropriate for GGM to ascribe TK or TLU value to environmental features, including the nest</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Provide details of measures to protect and preserve the identified eagle nesting site (MNRF #271), including any steps or process discussed with Indigenous groups, and any protocols that would be required from any anticipated regulatory approvals;</p> <p>B. Describe information that has been provided by Indigenous groups on the cultural significance of bald eagle nests in the PDA or LAA, including MNRF #271 and #487;</p> <p>C. Discuss how GGM has consulted with Indigenous groups, particularly Animiigoo Zaagi’igan Anishinabek, Aroland First Nation and Ginoogaming First Nation, on the cultural significance of the identified eagle nesting site (MNRF #271);</p> <p>D. Clarify, in Appendix O, any potential effects to cultural heritage; how mitigation measures described in answering question A will reduce or avoid these effects; and any residual effects to cultural heritage.</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						identified by MNRF, but as noted it is acknowledged that bald eagles are a species of cultural importance to Aboriginal communities.” The Agency notes that Animbiigoo Zaagi’igan Anishinabek, Aroland First Nation, and Ginoogaming First Nation, in an October 6, 2017 comment to MOECC and the Agency, indicated that “eagles are a species of cultural significance to Animbiigoo Zaagi’igan Anishinabek, Aroland First Nation, and Ginoogaming First Nation. Field surveys confirmed the presence of a bald eagle nesting site (Section 13.2.2.2) approximately 200 m outside the PDA, and within the LAA (Figure 13-5).” These groups then recommended that GGM “consult Animbiigoo Zaagi’igan Anishinabek, Aroland First Nation, and Ginoogaming First Nation regarding the location of this bald eagle nest to determine whether it is culturally significant and identify any potential impacts to traditional knowledge and cultural heritage.” The Agency would like for GGM to clarify its follow-up response, in light of the comment and recommendation by Animbiigoo Zaagi’igan Anishinabek, Aroland First Nation, and Ginoogaming First Nation.	
IR-2 Reference #: TW(2)-09	GGM ID#: CEAA_38	IR-1 Reference #: TW(1)-09	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 6.1.6; Part 2, Section 6.3.2; Part 2, Section 6.4.	Reference to EIS: Section 13.4.3.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM’s response to TW(1)-09 indicates that waterfowl receptors inhabiting the area around the PDA “may land on Project-related ponds for short periods of time, but due to sensory disturbance arising from mining activity as well as the lack of a food source in the ponds, and since there are numerous natural lakes in the area that would likely be preferred by waterfowl, it is not likely that the Project-related ponds would be frequently used or used for long periods of time by waterfowl.” The Agency is of the view that waterfowl may still land on other open aquatic areas and other key project locations during the Project, and water quality monitoring may show that these areas will have poor water quality, which could lead to mortality risk among waterfowl that would land on it. Where deterrent / exclusionary measures are not extended beyond the TMF, GGM’s monitoring program described in the follow-up response to TW(1)-09 B should be extended to other open aquatic areas. This follow-up would alleviate concerns of mortality risk in migratory birds, and in wildlife of interest to Indigenous communities.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Provide details on the implementation of deterrent/exclusionary measures associated with the water quality monitoring program for the open aquatic areas and other key project locations in addition to the TMF, along with a list of open aquatic areas and other key project locations to be monitored;</p> <p>B. Describe how water quality monitoring results will lead to the implementation of deterrent/exclusionary measures within affected areas (<i>i.e.</i>, measures that would be taken if specified objectives are not reached.);</p> <p>C. Describe how the visual monitoring program will account for nocturnal use by wildlife species;</p> <p>D. Describe how the visual survey from a single survey station will allow for observations of wildlife mortality risk at all “open aquatic areas and other key Project locations” in addition to the TMF.</p>
IR-2 Reference #: TW(2)-11	GGM ID#: CEAA_40	IR-1 Reference #: 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.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM’s response to TW(1)-11 A states that “mitigation to minimize waterfowl interaction with the TMF and other open water ponds includes vegetation removal, and therefore flora will not be present at these locations.” The Agency notes that GGM intends to plant some vegetation at the Goldfield Creek</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Identify all wetlands and open aquatic areas within the boundaries of the PDA, and those areas where vegetation will not be removed. Include areas such as the sensitive wetland feature that are completely bounded by the PDA;</p> <p>B. Provide further details on how the Conceptual Biodiversity</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						<p>Diversion Pond and the Diversion Channel (Appendix F10, Attachment 1). Furthermore, it is noted in Section 10.4.2.3 of the EIS that “the mouth of the Southwest Arm Tributary is dominated by adjacent riparian and open water wetlands, which are expected to provide considerable storage and attenuation to large flood events”, implying that flora will remain in the area. Flora will also be maintained in the sensitive wetland feature that overlaps the PDA. This information would alleviate concerns of mortality risk in migratory birds, and in wildlife of interest to Indigenous communities.</p>	<p>Management and Monitoring Plan will monitor for wetland flora and fauna that have been traditionally important for Indigenous people within the vegetated wetlands and open aquatic areas. In particular, discuss the Goldfield Creek Diversion Pond, the Goldfield Creek Diversion Channel and the sensitive fen feature. Discuss measures that would be taken if a species of importance to Indigenous people were found to be impacted.</p>
<p>IR-2 Reference #: TW(2)-13</p>	<p>GGM ID#: CEAA_42</p>	<p>IR-1 Reference #: TW(1)-13</p>	<p>Project Effects Link to CEAA 2012: 5(1)(c)(iii) Current Use of Lands and Resources for traditional purposes</p>	<p>Reference to EIS Guidelines: Part 2, Section 8.1.</p>	<p>Reference to EIS: Section 13.1.3.</p>	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM’s response to TW(1)-13 A states that “because the measurable parameters chosen (typically focused on some of the most sensitive species) represent the range of vegetation communities, wildlife species, and habitats that are present within the LAA, inferring effects from the measurable parameters to other species using those same habitats provides a comprehensive and conservative approach without being repetitive, and is a widely accepted best practice.”</li> <li>- However, using “woodland (coniferous, deciduous and mixed forests) and treed wetland” as the general habitat association for the majority of wildlife species of interest to Indigenous groups in Section 13.1.3 of the EIS does not capture the specific habitat requirements of several species. Using a larger habitat association may lead to an inaccurate change in habitat assessment, by assuming that these species use a greater proportion of the remaining habitat.</li> <li>- For example: <ul style="list-style-type: none"> <li>- Table 13-8 states that Bald Eagle nesting habitat has an association with woodland (coniferous, deciduous and mixed forests) and treed wetlands. According to the Ontario Ministry of Natural Resources (1987), “nesting Bald Eagles” are associated exclusively with large white pine and trembling aspen trees adjacent to lakes and rivers.</li> <li>- Table 13-8 associates marten habitat with woodland (coniferous, deciduous and mixed forests) and treed wetlands. However, Section 13-11 states that marten “require mature forest stands.”</li> <li>- Table 13-8 associates otter habitat with woodland (coniferous, deciduous and mixed forests), treed wetlands and open water. Thompson (1988) states other habitat includes wetlands and open water systems.</li> </ul> </li> <li>- 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</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Provide an assessment of the potential environmental effects on wildlife and wildlife habitat of traditional value or interest to Aboriginal communities, as provided in Section 13.1.3 of the EIS, based on their specific habitat requirements. Otherwise, provide species-specific rationales for assessing wildlife and wildlife habitat of traditional value or interest to Aboriginal communities on other species;</p> <p>B. Describe additional mitigation measures stemming from the response to question A that can be used to reduce or avoid effects on wildlife and wildlife habitat; any residual effects on current use of lands and resources for traditional use after implementing the mitigation measures; the significance of these residual effects; and any follow-up programs that would validate the conclusions drawn in the assessment of effects on wildlife and wildlife habitat.</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						<p>Indigenous peoples.</p> <ul style="list-style-type: none"> <li>- References: Ontario Ministry of Natural Resources. 1987. Bald Eagle Habitat Management Guidelines. MNR #51599. ISBN 0-7794-2341-0; Thompson, I.D. 1988. Habitat needs of furbearers in relation to logging in boreal Ontario. The Forestry Chronicle 67(2):136-140.</li> </ul>	
IR-2 Reference #: HE(2)-03	GGM ID#: CEAA_45	IR-1 Reference #: HE(1)-03	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: Chapter 24; Appendix O, Section 7.2.3.5.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- The updated Appendix O, Section 7.2.3.5, states that “as discussed in Section 7.1.4.2 [...], residual effects on quality and availability of country foods were determined to be not significant; thus it follows that effects related to costs of purchased foods and travel arising from the quality and quantity of country foods are not significant”.</li> <li>- The assessment needs to directly consider how changes to the environment (loss of access or quality of species) would impact socio-economic conditions of Indigenous groups, not just how effects to current land use would then affect socio-economic conditions. While the potential effects on quality and availability of country foods may be not significant, residual effects on socio-economic conditions could remain, and these need to be assessed on their own.</li> <li>- The Agency also notes that there are also no definitions provided for significance criteria ratings for socio-economic conditions in the updated Appendix O.</li> <li>- The updated Appendix O does not provide a clear and updated summary of effects identified in the assessment, along with the determination of significance of these effects. The Agency recommends that this be provided in the form of a revision to Chapter 24, Table 24-1 of the EIS, which would also be updated with any new or updated effects identified in the updated Appendix O, along with effects identified through responses to the questions in this package of information requirements (IRs).</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Provide an assessment of effects on socio-economic conditions of Indigenous groups that result from changes to the environment that are identified through this environmental assessment;</p> <p>B. Provide definitions for the significance criteria ratings for effects to socio-economic conditions;</p> <p>C. Describe mitigation measures that can be used to reduce or avoid effects on socio-economic conditions; any residual effects to socio-economic conditions after implementing the mitigation measures; the significance of these residual effects; and any follow-up programs that would validate the conclusions drawn in the assessment of effects on socio-economic conditions;</p> <p>D. Update Table 24-1 or provide a summary of socio-economic effects including effects, mitigation measures, and residual effects with significance criteria ratings.</p>
IR-2 Reference #: HE(2)-05	GGM ID#: CEAA_47, CEAA_48	IR-1 Reference #: HE(1)-05, 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: Chapter 24; Appendix O, Sections 7.4.2 and 7.4.3.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- The updated Appendix O, Sections 7.4.2 and 7.4.3, includes effects related to the quality of experience and consideration of cultural importance for Indigenous groups; however it is not clear from the updated Appendix O whether there are any potential effects or any residual effects after mitigation. The Agency recommends that this be provided in the form of a revision to Chapter 24, Table 24-1 of the EIS. The Agency also notes that there are also no definitions provided for significance criteria ratings for effects related to quality of experience and consideration of cultural importance in the updated Appendix O.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Update Table 24-1 or provide a summary of any potential residual effects to quality of experience or culture for Indigenous groups. If there are no residual effects, provide a rationale that describes how mitigation measures for tangible and intangible effects will mitigate effects on quality of experience or cultural effects. Definitions for the significance criteria ratings for current use of lands and resources for traditional purposes also need to be provided.</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
IR-2 Reference #: HE(2)-12	GGM ID#: CEAA_54	IR-1 Reference #: HE(1)-12	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 O, Sections 6, 7.1.3.5, 7.4.3.3 and 9.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to HE(1)-12 A refers the reader to the updated Appendix O to discuss changes to mental, social and spiritual well-being. The Agency acknowledges GGM's statement in Section 7.1.3.5 that "effects to intangible values are not quantifiable in the same way that effects to tangible values are; therefore, identifying proven and effective mitigation measures for intangible values has limitations". However, it is unclear to the Agency how GGM concluded that "mitigation measures aimed at avoiding or reducing effects to tangible values could also help to avoid or reduce effects to intangible values" for specific effects such as loss of connection to culture, decreased social cohesion, and changes to mental or emotional health. GGM's response to HE(1)-12 B refers the reader to updated Appendix O, Sections 6 and 9; however, no mitigation measures or follow-up programs were tied to reducing, avoiding or monitoring changes to well-being.</li> <li>- According to Section 7.4.3.3, a minimum of eight Indigenous groups (Aroland First Nation, Biigtigong Nishnaabeg, Biijitiwaabik Zaaging Anishinaabek, Bingwi Neyaashi Anishinaabek, Constance Lake First Nation, Eabametoong First Nation, Métis Nation of Ontario, Pic Mobert First Nation) have shared with GGM that well-being, cultural continuity, or connection to the land is important to their communities. It is unclear whether GGM's assessment of changes to mental, social and spiritual well-being, as discussed in the updated Appendix O, Section 7.1.3.5, has been presented to and discussed with these communities. It is also unclear whether these communities have proposed mitigation measures and follow-up programs for mental, social and spiritual well-being to GGM, beyond GGM's intent to "[manage] through application of the environmental monitoring program and [monitor] through ongoing engagement with Aboriginal communities."</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Provide specific connections and examples to support the conclusion that "mitigation measures aimed at avoiding or reducing effects to tangible values could also help to avoid or reduce effects to intangible values";</p> <p>B. Demonstrate that GGM's assessment of changes to mental, social and spiritual well-being, as discussed in the updated Appendix O, Section 7.1.3.5, has been presented to and discussed with communities that GGM have identified having well-being as a concern. Discuss mitigation measures and follow-up programs for mental, social and spiritual well-being that have been proposed by Indigenous communities.</p>
IR-2 Reference #: HE(2)-13	GGM ID#: CEAA_55	IR-1 Reference #: HE(1)-13	Project Effects Link to CEAA 2012: CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions; 5(1)(c)(ii) Aboriginal Physical and Cultural Heritage	Reference to EIS Guidelines: Part 2, Section 6.2.1.	Reference to EIS: Appendix F1, Section 4.1.7; Appendix F1, Appendix B.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to HE(1)-13 A provided satisfactory information with regard to further mitigation measures such as wind sheltering, 10-20 m buffer of vegetation to be maintained each side of unpaved haul roads, speed limits and has committed to sampling of haul roads to establish silt content and implementing an ambient monitoring program. However, GGM continues to apply a silt content of 5.8% with control efficiencies of 90-95%, as indicated in Appendix F1, Section 4.1.7, Table 4-1. Environment and Climate Change Canada's experience with other similar projects shows that this level of control efficiencies is high, and that 80-85% is a more</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Provide details of how the assumptions for silt content and control efficiencies will be confirmed as part of the follow-up program;</p> <p>B. Describe additional mitigation measures that GGM can apply if silt content is found to be greater than 5.8%, or that control efficiencies are below 90%.</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						conservative and realistic level. Given that the air quality model already shows occasional exceedances of PM <sub>10</sub> , the frequency of exceedances could increase if more conservative control efficiencies are used, and this may result in effects on human health and impacts to the use of lands and resources for traditional purposes.	
IR-2 Reference #: HE(2)-16	GGM ID#: CEAA_58, CEAA_56	IR-1 Reference #: HE(1)-16, HE(1)-14	Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions	Reference to EIS Guidelines: Part 2, Section 6.2.1; Part 2, Section 8.	Reference to EIS: Appendix F1, Section 4.1 and Section 9.2; Appendix M7, Appendix A.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to HE(1)-16 A indicates that NO<sub>2</sub> was not included in the ambient air monitoring plan "as the maximum predicted concentrations due to the Project alone were well below their applicable regulatory criteria."</li> <li>- On November 3, 2017, the Canadian Council of Ministers of the Environment (CCME) established new Canadian Ambient Air Quality Standards (CAAQS) for NO<sub>2</sub>. Additional information on the CAAQS can be found at: <a href="http://www.ccme.ca/en/current_priorities/air/caaqs.html">http://www.ccme.ca/en/current_priorities/air/caaqs.html</a></li> <li>- The CAAQS for NO<sub>2</sub>, as announced and agreed to by jurisdictions, are more stringent than the objectives/standards used in the final EIS, and should be incorporated into the environmental assessment. The CAAQS were developed for the purpose of protection of human health and the environment. They are supported by air quality management levels, which call for progressively more rigorous actions by jurisdictions as air quality approaches or exceed the CAAQS, thereby ensuring that the CAAQS are not treated as "pollute-up-to" levels.</li> <li>- NO<sub>2</sub> should be included in the ambient air monitoring plan as the new CAAQS for NO<sub>2</sub> are more stringent and concentrations of NO<sub>2</sub> from the project as shown in Appendix F1, Section 6.1.2, Table 6-2 are above the new standards. This table indicates a maximum NO<sub>2</sub> 1-hour averaging concentration of 267.5 µg/m<sup>3</sup>, which exceeds the new CAAQ 2020 standard of 123 µg/m<sup>3</sup>. The predicted maximum annual concentration of 41.9 µg/m<sup>3</sup> would exceed the new CAAQ 2020 standard of 35 µg/m<sup>3</sup>.</li> <li>- GGM's response to HE(1)-14 B indicates why the mitigation is not required under provincial regulation but does not adequately describe the difference in air emissions as requested in the IR, citing only that it is a conservative approach. The proponent does not identify whether the mitigation could be voluntarily implemented to reduce NO<sub>x</sub> emissions, in keeping with CAAQS principles of Keeping Clean Areas Clean and Continuous Improvement.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Describe additional mitigation measures that can be applied to reduce NO<sub>2</sub> concentrations in keeping with CAAQS principles of Keeping Clean Areas Clean and Continuous Improvement, particularly at the gas plant;</p> <p>B. Describe your intentions with regard to monitoring for NO<sub>2</sub> for all phases of the project in the air monitoring plan, in real-time.</p>
IR-2 Reference #: HE(2)-23	GGM ID#: CEAA_65	IR-1 Reference #: HE(1)-23	Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/	Reference to EIS Guidelines: Part 2,	Reference to EIS: Appendix F8, Section 3.5.8.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to HE(1)-23 A provides a rationale for using small mammals to extrapolate metal concentrations of moose liver. Given that potentially impacted Indigenous groups</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Update the human health risk assessment by incorporating known moose flesh and organ data (e.g. FNFNES and NTC country food study) as baseline data for country foods;</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
			socio-economic conditions	Section 6.3.4		consume moose, Health Canada is of the view that the use of surrogate species may introduce additional uncertainties in the exposure assessment for country foods. If site-specific baseline data for moose tissue are difficult to obtain, other sources of moose flesh and organ data (FNFNES and Nookiiwin Tribal Council (NTC) country food study) should be included as the baseline data, since the data from the literature for moose can be more representative than the estimated result from very different animals (e.g. small mammals).	B. If GGM chooses not to update the HHRA in question A, provide details on how the monitoring program will confirm that the use of surrogate species to extrapolate metal concentrations of moose liver is a valid approach in the human health risk assessment.
IR-2 Reference #: HE(2)-30	GGM ID#: CEAA_72	IR-1 Reference #: 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.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- GGM's response to HE(1)-30 A describes intermittent exposure scenarios for receptor groups that are expected to be in the LAA longer than "short-term", but not continuously. Health Canada notes that in the proposed intermittent exposure scenarios, the exposure received on a given day could be 'diluted' by mathematically averaging the exposure over a longer time period. The amortized values were then used to calculate the hazard quotients (HQs), which may have resulted in an underestimation of risks to human health at the site. Refer to the memo "<i>Memorandum: A Primer for Evaluating Human Health Risk at Contaminated Sites for Chronic and Less-Than-Chronic Exposures to Chemicals</i>" (Health Canada, 2016) for further information on how to adequately address dose amortization issues in the intermittent exposure scenarios. Dose averaging should be considered based on chemical-specific information about dose-metric (concentration- vs. dose-dependent toxicity), persistence of effects, elimination half-life and so on.</li> <li>- Additionally, in order to estimate the health risks of 'non-threshold' carcinogens, the life-stage characteristics of receptors, such as the age-dependent adjustment factors for life stage (ADAF), should be included in the calculation to adequately protect human receptors in the most sensitive life stage. Refer to the interim guidance "<i>Human Health Risk Assessment for Short-Term Exposure to Carcinogens at Contaminated Sites</i>" (Health Canada, 2013).)</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Determine suitability of dose-averaging on a chemical-by-chemical basis and re-assess human exposure and health risk in the intermittent exposure scenarios accordingly, applying Health Canada's 2016 memorandum. Include ADAFs in the health assessment of carcinogens. Where dose-averaging is found to be suitable for particular chemicals, provide a discussion of how this determination was made.</p>
IR-2 Reference #: AM(2)-01	GGM ID#: CEAA_75, CEAA_76	IR-1 Reference #: AM(1)-01, AM(1)-02	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 6.6.1.	Reference to EIS: Section 22.4.1.3.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- While GGM provides a description of effects of a TMF failure for other valued components (VCs), it is unclear why it has not provided for Indigenous human health. GGM's original response to AM(1)-01 A states that "effects on human health from a potential accident or malfunction scenario would be addressed through the Emergency Response Plan". Emergency response procedures are not an assessment of effects on human health, but rather form part of the mitigation measures. GGM's follow-</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Describe potential effects to human health that could result from a TMF failure, both within the PDA, and extending into the LAA and beyond, prior to the application of mitigation and emergency measures;  B. Describe which potential effects to human health would be reduced or avoid by each of the proposed mitigation measures. Provide details of the Emergency Response Plan that would reduce or avoid effects to human health;</p>



IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						<p>up response to AM(1)-01 D does not provide any additional information on effects to human health, only indicating that effects on human health are indirectly considered “under the LRU/TLRU [land and resource use/traditional land and resource use] subheading”, and alluding to pathways where human health could be affected. GGM indicates in Section 22.4.1.3 that advisories and restrictions may be needed to address potential effects on human health; this implies that there are potential effects to human health from a TMF failure. The EA should identify these potential effects to human health, explain how proposed mitigation measures would avoid or reduce these potential effects, and describe residual effects after applying the mitigation measures. This also applies to GGM’s response to AM(1)-02 C, in which potential effects to human health extending into the LAA were not assessed, other than in the context of use of land and resources.</p> <ul style="list-style-type: none"> <li>- While GGM’s response to AM(1)-01 B indicates that “the proximity of the TMF to the Goldfield Creek Diversion Pond has been considered as part of the risk assessment”, It remains unclear, from Section 22.4.1.3 of the EIS and from the response to AM(1)-01 B, how a TMF dam failure would affect the Goldfield Creek Diversion Pond. A TMF dam failure, in any capacity, could cause contaminated water to flow into the diversion pond, which would affect the fish and the offset fish habitat. GGM’s response to AM(1)-01 B refers to ITRB Report No 1 as part of its rationale; however, the report does not discuss the fish offsetting plan, or potential effects to the offset habitat in the case of a TMF failure.</li> <li>- It also remains unclear why "Consultation with recreational and traditional land users and the application of a fisheries advisory" (Section 22.4.1.3) is presented as a conditional mitigation measure. More information is required as to how this would be triggered, and why it is proposed only for the TMF failure scenario.</li> <li>- 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 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, with the magnitude of effects diminishing outside the PDA.” However, it remains unclear how the effects to wildlife habitats and migratory birds in the LAA and beyond were assessed. GGM’s response to AM(1)-02 C</li> </ul>	<p>C. Assess the risk posed by a TMF failure on the fish and offsetting fish habitat proposed at the Goldfield Creek Diversion Pond;  D. Commit to revising the detailed engineering of the TMF to take into consideration the conclusions of the assessment in Part A;  E. Clarify when consultation and fishery advisories would be triggered in the event of a TMF failure;  F. Explicitly describe the impacts of a tailings management facility (TMF) failure on wildlife habitats and migratory birds in the LAA.</p>

IR-2 Reference #	IR-1 GGM ID #	IR -1 Reference #	Project Effects Link to CEAA 2012	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/ Request for Information
						indicated that these biota were implicitly “considered”, however no further distinct information was provided.	
IR-2 Reference #: AM(2)-03	GGM ID#: CEAA_77	IR-1 Reference #: AM(1)-03	Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions	Reference to EIS Guidelines: Part 2, Section 6.6.1.	Reference to EIS: Section 22.4.3.3.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- While GGM’s response to AM(1)-03 B indicates that “stratified conditions in the open pit during post-closure are expected to be re-established within a few months after a potential failure”, and that “permanent stratification is re-established by the next spring after artificial mixing on meromictic lake”, it does not address how long any negative effects to surface water would last, or if the contaminant levels reaching Kenogamisis Lake prior to and after re-stratification would pose a hazard to human health. GGM’s follow-up response to AM(1)-03 D indicates that “the assessment provided in Section 22.4.3.3 inherently considers the effects on human health under the LRU/TLRU subheading”, and alludes to pathways where human health could be affected. GGM indicates in Section 22.4.3.3 that the slope failure “could affect fishing for recreational and traditional purposes in a localized area”, which implies that there are potential effects to human health from a slope failure. The EA should identify these potential effects to human health, explain how proposed mitigation measures would avoid or reduce these potential effects, and describe residual effects after applying the mitigation measures.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Provide a revised estimate of the duration of effects of the worst-case scenario on surface water quality;</p> <p>B. Specify whether the worst-case scenario would result in contaminant concentrations in the exposure pathway to humans such as would affect them. Update the scenario with a discussion of potential effects to human health as needed;</p> <p>C. Discuss mitigation measures to be applied to avoid such effects described in part B.</p>
IR-2 Reference #: AM(2)-06	GGM ID#: CEAA_80	IR-1 Reference #: AM(1)-06	Project Effects Link to CEAA 2012: 5(1)(c)(i) Aboriginal Peoples Health/ socio-economic conditions	Reference to EIS Guidelines: Part 2, Section 6.6.1.	Reference to EIS: Section 22.4.6.3.	<p><b>Context and Rationale:</b></p> <ul style="list-style-type: none"> <li>- The Agency understands that GGM’s response to AM(1)-06 refers to the access road along waste rock storage area (WRSA) C, which would cross over watercourse G (WC-G). The Agency would like to clarify its original question AM(1)-06, in that it was directed at a potential spill at the Haul Road Crossing over the proposed “backwater effect” pond, as shown in Appendix F10, Figure 3-1.</li> <li>- The Agency puts forward the same questions, with this clarification.</li> </ul>	<p><b>Specific Question/ Request for Information:</b></p> <p>A. Provide an assessment of the potential environmental effects of a vehicle collision or mechanical failure at the Haul Road Crossing indicated in Appendix F10, Figure 3-1. Include the quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment;</p> <p>B. Describe the change to the receiving environment – e.g. water quality and quantity, sediment quality and quantity;</p> <p>C. Describe the resulting impacts to wetlands, sensitive habitats, wildlife (including species at risk), fish and fish habitat, aquatic species, migratory birds, human health, and current use of lands and resources for traditional purposes;</p> <p>D. Describe the safety measures and emergency response procedures to mitigate the potential effects of this scenario;</p> <p>E. Describe remediation measures applicable to this scenario.</p>