

**HARDROCK PROJECT  
Final Environmental Impact  
Statement / Environmental  
Assessment**

Chapter 23.0:  
Follow-Up and Monitoring  
Programs and Environmental  
Management Plans

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## **23.0 FOLLOW-UP AND MONITORING PROGRAMS AND ENVIRONMENTAL MANAGEMENT PLANS**

This chapter provides a preliminary framework and scope for environmental management and monitoring plans (EMMPs), including environmental assessment (EA) follow-up and monitoring programs developed through the federal EA process for all Project phases as per the Environmental Impact Statement (EIS) Guidelines (Appendix A1) and approved provincial Terms of Reference (ToR, Appendix A2).

Greenstone Gold Mines GP Inc. (GGM) is committed to minimizing environmental effects through the implementation of mitigation measures, monitoring and adaptive management for the Project within EMMPs for construction and operation. Through the EMMPs, the Project's environmental risks and opportunities are addressed in a comprehensive, systematic, planned and documented manner to meet the following objectives:

- carry out the Project in compliance with existing legislation, consistent with federal and provincial guidelines, best practices and GGM corporate policies
- document measures to mitigate environmental effects
- enhance benefits from the Project
- structure reporting to inform adaptive management and continual improvement.

The EMMPs guide environmental management for the Project and are progressively developed as the Project moves through the EIS/EA process, permitting, and construction, and are updated based on continual improvement during operation through adaptive management.

EMMP development begins during the EIS/EA process with the preparation of Conceptual EMMPs (Appendix M). These EMMPs are broad in their level of detail, commitment-based and focused on the construction and operation phases of the Project. They include input received from consultation during the Draft EIS/EA preparation and review stage. The closure phase is addressed in the "Hardrock Project - Conceptual Closure Plan" (Conceptual Closure Plan, Appendix I). The level of detail in the EMMPs expands as Project planning and design advance and as permit conditions become known.

The Project will be subject to a range of monitoring programs, each with its own scope and objective. These include environmental monitoring carried out under specific permit requirements and more general regulatory compliance, as well as overall operational monitoring that is necessary to confirm performance goals are being achieved. The objectives of the various programs will be complementary to reduce duplication, used collectively to inform Project planning and implement the long-term environmental management requirements of the Project.

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### **23.1 OBJECTIVES AND CONTEXT**

Under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), an EA must consider the need for, and the requirements of, follow-up and monitoring programs. In accordance with the EIS Guidelines (Appendix A1), the EIS shall present a preliminary follow-up program and an outline of the preliminary environmental monitoring program. A follow-up program under CEAA 2012 has the following objectives:

- to verify the accuracy of the EA predictions
- to determine the effectiveness of measures taken to mitigate the adverse environmental effects of a project.

These objectives have been expanded to include:

- compliance with environmental approvals, permits and authorizations
- adaptive management measures in the case that environmental effects differ from that predicted, or incorporate new information that becomes available
- support environmental management plans used to manage environmental effects of the Project.

As described in the EIS Guidelines (Appendix A1), the goal of the environmental monitoring program is to confirm that the Project is implemented as proposed and that mitigation measures to reduce environmental effects are effectively implemented, and to provide action plans and emergency response procedures. The follow-up and monitoring programs and EMMPs are intended to demonstrate the commitment of GGM to an appropriate process of verifying that the changes to the environment due to the Project are as predicted and that adverse effects are limited through the implementation of mitigation measures that are assessed and measured against performance objectives to track 'success'. The 14 Conceptual EMMPs presented in Appendix M include relevant performance objectives.

Provincial expectations regarding a monitoring framework that will be carried out for the approved project are described in *Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario* (Code of Practice) (MOE 2014). Similar to federal expectations, monitoring objectives include verifying predicted environmental effects, and whether or not additional measures or refinements to mitigation measures are required. Also, as stated in the Code of Practice and the approved ToR (Appendix A2), the monitoring framework includes "compliance monitoring" (compliance with environmental approvals, permits and authorizations) and where appropriate, "effects monitoring" (monitoring to determine the environmental effects of the "undertaking").

## **23.2 ADAPTIVE MANAGEMENT**

As discussed in the EIS Guidelines, "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" (Appendix A1). Adaptive management is a planned and systematic process for continuously improving environmental management practices and adjusting monitoring by learning from outcomes. Adaptive management provides the flexibility to address/accommodate new circumstances, to adjust monitoring, implement new mitigation measures or modify existing measures. GGM will identify and correct incidents with appropriate measures aimed to prevent reoccurrence and/or similar occurrences. The Adaptive Management Framework (Figure 23-1), provides a formalized approach to:

- formally track and monitor activities
- report and as needed investigate incidents, including non-conformance and non-compliance events
- develop and implement corrective and preventive actions
- continue monitoring and update relevant EMMPs.

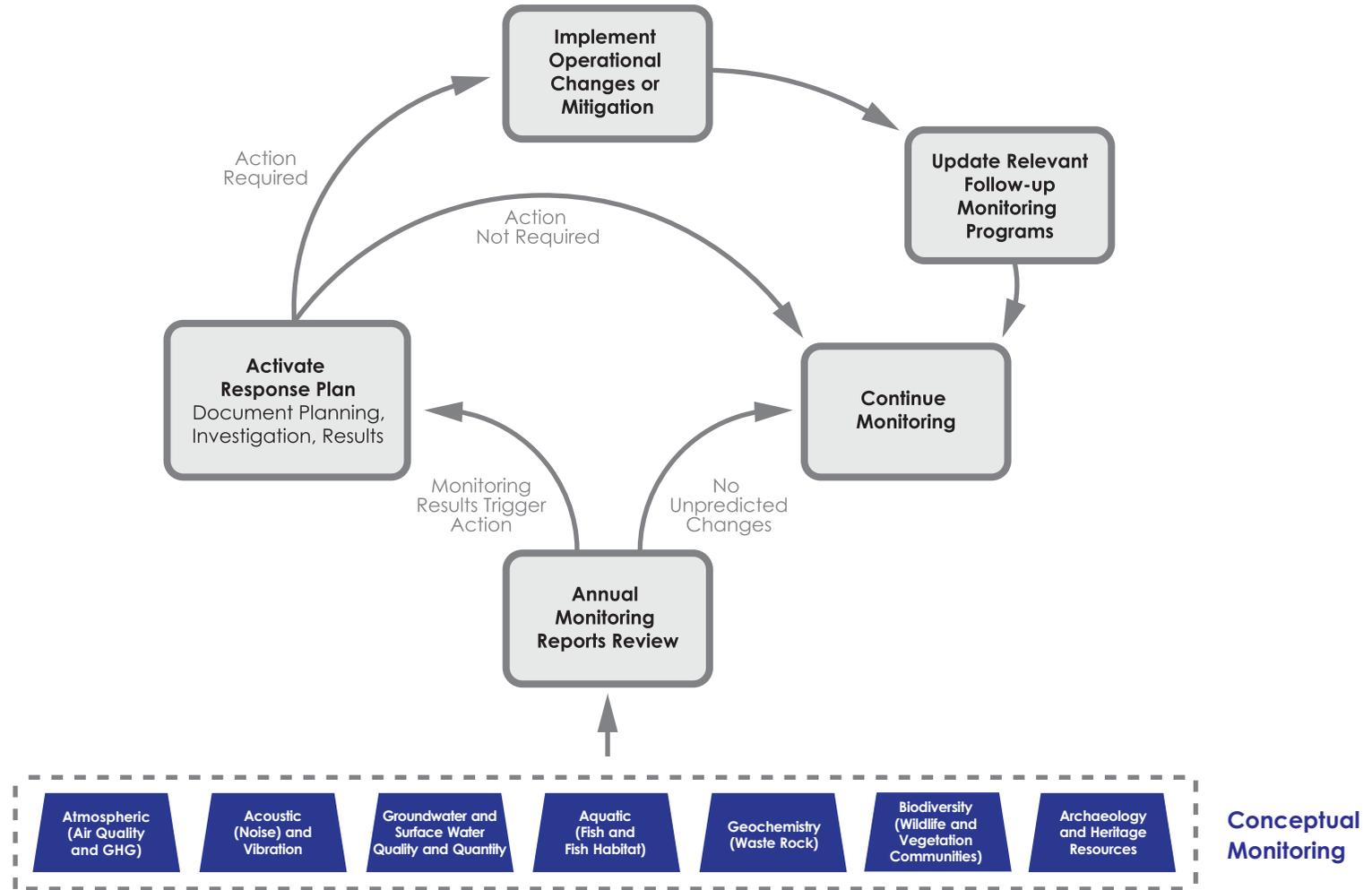
GGM is committed to the continual improvement of its environmental management and performance. As part of the GGM Adaptive Management Framework, the EMMPs will be assessed regularly to verify implementation and the continued suitability, adequacy and effectiveness of the EMMP. The review will identify elements of the EMMPs in need of revision, and evaluate performance against established performance objectives.

The objectives of a review are to:

- maintain compliance with regulatory requirements
- identify opportunities for improvement in the management plan
- incorporate community considerations.

The GGM review will include:

- each of the EMMPs
- legislation, approvals, environmental compliance approval changes
- community complaints, enquiries and corrective actions
- community and regulatory liaison and feedback.



Client/Project  
Greenstone Gold Mines GP Inc. (GGM)  
Hardrock Project

Figure No.  
**23-1**

Title  
**Adaptive Management Framework**

Note:  
Monitoring is conceptual and will be expanded as needed

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### **23.3 REPORTING**

The form and frequency of follow-up reporting will be determined as the Project progresses through EA and permitting; however, it is anticipated that those elements relevant to the EMMPs will be assembled into a formal summary report and provided to interested parties on an annual basis during construction and operation and during closure in years when monitoring is carried out. The reporting will be used to inform adaptive management reviews.

### **23.4 COMPLAINT RESPONSE AND CORRECTIVE ACTIONS**

GGM intends to continue its engagement with interested parties and government agencies throughout Project construction, operation and closure. The key objectives of the community relations program are identified below:

- provide transparency and accountability in relation to GGM's environmental management and social responsibility performance
- continue to provide opportunities to discuss interests and resolve issues related to the Project
- work in partnership with the Municipality to have the Project contribute to the achievement of mutual successes.

To support these objectives, GGM has developed a complaint response approach that applies to all individuals working for or on behalf of GGM as well as Project activities and infrastructure under GGM management. The approach includes:

1. Receive the Complaint – the Community Relations office in Geraldton will remain an accessible physical site (also accessible by email and phone) where interested parties can speak directly with team members about their concerns. The Project website will continue to be updated regularly, and newsletters will be developed to keep interested parties updated on Project milestones.
2. Log and Acknowledge the Complaint – additional information to describe the complaint will be recorded and formally acknowledged by GGM. This initiates the internal assessment and, if needed, investigation and allows a response/resolution to be developed and communicated to appropriate external parties.
3. Preliminary Assessment - in the event of a complaint, the Community Relations office will advise the Mine Manager (or delegate) who will conduct a preliminary review of the complaint and Project conditions/activities to determine if the Project is the source of the complaint. As needed, the Mine Manager (or delegate) may explore other possible sources not associated with the Project.

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4. Investigate - if it is determined that a complaint is due to Project activities, the Mine Manager (or delegate) initiates an inspection and corrective actions as needed. This may include revisions to mitigation measures where feasible.
5. Respond and Resolve - in all instances, a follow-up with the complainant explaining the findings and remedial actions will be made and documented.

### **23.5 INFLUENCE OF CONSULTATION AND CONSIDERATION OF ABORIGINAL INFORMATION**

Consultation has been ongoing prior to and throughout the EA process, and will continue with government agencies, local Aboriginal communities, and stakeholders through the life of the Project. Chapter 3.0 (community and stakeholder consultation) provides more detail on the consultation process covering open houses, site visits, targeted meetings, newsletters, questionnaires, presentations, and capacity funding for technical reviews and community-based studies among other consultation activities. The Record of Consultation (Appendix C) includes comments received during the development of the Draft EIS/EA and responses provided.

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, as appropriate. Information received has been considered by the Project team. An overview of the key comments that influenced follow-up and monitoring between the Draft EIS/EA and the Final EIS/EA is summarized below.

**Atmospheric/Acoustic Environments** – A number of comments were received with regard to monitoring dust. A “Hardrock Project Conceptual Air Quality Management Plan” (Conceptual AQMP) is provided in Appendix M7 with a Conceptual Ambient Monitoring Plan included as an appendix. A “Hardrock Project Conceptual Greenhouse Gas Management and Monitoring Plan” (Conceptual GHGMMP) is also provided in Appendix M6.

Comments were also raised with regard to blasting noise and vibration. A description of explosives transport, storage and use (i.e., blasting) is presented in the “Hardrock Project Conceptual Explosives and Blasting Management Plan” (Conceptual EBMP, Appendix M11). This conceptual plan also presents internal and external communications approaches to advise of upcoming blast events. Although the blast design is predicted to meet the Ministry of the Environment and Climate Change’s (MOECC) criteria and blasting will occur during the daytime, blasting will be monitored as required by MOECC’s guidelines provided in *Blasting, Model Municipal Noise Control By-Law (NPC-119)* (NPC-119; MOE 1978). A “Hardrock Project Conceptual Noise and Vibration Management and Monitoring Plan” (Conceptual NVMMMP) is provided in Appendix M10 to verify sound over pressure and vibration is within regulatory criteria.

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Comments raised during consultation have also resulted in the inclusion of air and noise/vibration monitoring for the Geraldton area and MacLeod Provincial Park (Conceptual AQMP [Appendix M7] and Conceptual NVMMP [Appendix M10]) to validate Final EIS/EA predictions (and adaptive management measures such as the use of specialized back-up alarms and bed liners on the trucks operating at waste rock storage area (WRSA) A. The development plan for WRSA A will consider strategies to limit potential noise disturbance on MacLeod Provincial Park and other nearby residents. This may include reducing night-time work during the camping season on the east portion of the WRSA and/or the establishment of rock berms.

**Groundwater** – Comments raised included enquiries regarding the water quality within the groundwater under the direct influence of surface water (GUDI) well at MacLeod Provincial Park. GGM will continue monitoring water quality in a location just outside the lagoon where the GUDI well is located, and provide potable water for the Park should an unforeseen event occur where Project activities affect water quality at this well.

Agencies also requested additional information regarding contingency plans for groundwater related to the tailings management facility (TMF) and WRSAs. In response, a “Hardrock Project - Water Management and Monitoring Plan” (WMMP) is included in Appendix M1. The plan includes regulatory requirements for monitoring, as well as information on adaptive management and contingency plans.

Disturbance of soil affected by historical mine activities during site preparation also has the potential to affect groundwater quality, if not properly managed. A “Hardrock Project Conceptual Soil Management Plan” (Conceptual SMP, Appendix M9) has been prepared, which provides a description of mitigation and management strategies consistent with Project commitments to manage affected soils and reduce the potential for effects on groundwater quality.

**Surface Water** – While effects are predicted to be limited to Kenogamisis Lake with overall improvement of arsenic loading, additional downstream monitoring stations were added in 2016 to address comments from LLFN during consultation about conditions downstream of Kenogamisis Lake, Kenogamisis River, and outflow to Long Lake. These stations are in addition to the monitoring stations located within Kenogamisis Lake and outlet basin (WMMP, Appendix M1).

**Fish and Fish Habitat** – Regulatory monitoring activities needed to track changes to fish and fish habitat form the “Hardrock Project Conceptual Aquatic Management and Monitoring Plan” (Conceptual AMMP, Appendix M12). Based on comments from consultation, fish sampling programs will be expanded to obtain data on species Aboriginal communities have identified as being traditionally important (e.g., White Sucker). This will include the analysis of whole bodied fish to reflect the ways Aboriginal people prepare and consume fish (Conceptual AMMP, Appendix M12).

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The Conceptual AMMP will work in conjunction with, and complement, the monitoring of the approved Fish Habitat Offset Plan. This latter plan will be advanced with Project planning and design, consultation and permitting. To support these next phases, the "Draft Hardrock Project: Fisheries Act, Paragraph 35(2)(b) Authorization and MMER Schedule 2 Draft Fisheries Offset Plan" (Draft Fisheries Offset Plan) is presented in Appendix F10.

**Vegetation Communities** – Aboriginal communities requested additional information on the establishment and monitoring for vegetation and response in the event that rehabilitation strategies do not result in intended outcomes. A "Hardrock Project Conceptual Biodiversity Management and Monitoring Plan" (Conceptual BMMP) is included in Appendix M13 and a Conceptual Closure Plan is provided in Appendix I. To address comments regarding revegetation, the Conceptual Closure Plan includes progressive rehabilitation during operation that includes test plotting studies to evaluate the most effective revegetation strategy. The results will be used to update and inform the revegetation approach within the BMMP to optimize topsoil/overburden/nutrient placement and mixture, seed mixture, and planting regime. GGM also included consideration of constructed wetland treatment at closure. Based on comments received, the potential for constructed wetland treatment is also discussed in the Conceptual Closure Plan (Appendix I), with additional information related to constructed wetland pilot studies developed during operation if surface water quality monitoring indicates this need.

**Wildlife** - Through consultation, GGM recognizes that Aboriginal communities are interested in participating in a moose health (i.e., tissue sampling) monitoring study in the region. Given the large ranges of these animals and mandate of the Ministry of Natural Resources and Forestry (MNRF), GGM will participate in an MNRF-led study with local Aboriginal communities during Project operation. The Conceptual BMMP (Appendix M13) outlines the ongoing wildlife monitoring during construction and operation.

A number of comments were received from agencies and Aboriginal communities with regard to waterfowl and migratory bird use of the TMF. As presented in Chapter 13.0, waterfowl exposures are expected to be limited to direct contact with the tailings pond water as it is anticipated that the birds will move to adjacent water bodies that provide breeding habitat and/or food sources. The Conceptual BMMP (Appendix M13) includes a discussion regarding monitoring waterfowl activity on the TMF to confirm this assumption. Adaptive management measures have been developed to deter waterfowl from coming in contact with tailings pond water in the Conceptual BMMP (Appendix M13). Although exposure is limited, the human health and ecological risk assessment (HHERA, Chapter 19.0) evaluated potential Project effects on avian species from changes in water quality resulting from Project activities. The evaluation includes water from the tailings pond and water from other Project components.

Comments were also received from Aboriginal communities with regard to wildlife monitoring. Wildlife protection measures and monitoring is addressed in the Conceptual BMMP (Appendix M13).

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**Heritage Resources** – GGM understands the importance of heritage resources to Aboriginal communities. As a result of consultation input, a “Hardrock Project Conceptual Archaeology and Heritage Resources Management Plan” (Conceptual AHRMP) has been prepared (Appendix M14). It provides a description of mitigation and management strategies consistent with Final EIS/EA commitments and regulatory requirements. GGM will also work collaboratively with local Aboriginal communities to develop a protocol for communications should previously undocumented archaeological resources be discovered.

**Traditional Land and Resource Use** – GGM will be undertaking monitoring programs for valued components (VCs) that may be linked to potential effects on traditional uses such as for fish, water, sediment and vegetation/wildlife.

During consultation activities four “land use” sites were identified by LLFN within the Project development area (PDA). Follow-up meetings held on April 18 and 19, 2017 have confirmed that these are not sacred sites and further detail is confidential. GGM and LLFN have agreed upon a path forward for these sites.

As a result of consultation input received, GGM will provide opportunities to local Aboriginal communities for harvest of food and medicinal plants prior to construction. GGM is also committed to maintaining access within the PDA to the Southwest Arm of Kenogamisis Lake during construction and operation.

Traditional knowledge (TK) sharing will occur throughout the life of the Project and GGM will review the results of TK information received after submission of the Final EIS/EA against the conclusions of the traditional land and resource use assessment to determine whether additional mitigation is required with respect to Project design and EMMPs.

**Human Health and Ecological Risk** – GGM will be undertaking monitoring programs for various media including air, soil, surface water and fish tissue. The data from these monitoring programs will be used to confirm the predicted concentrations used in the HHERA and by extension if risk estimates are reflective of future conditions. GGM recognizes that Aboriginal communities are interested in participating in a moose health (i.e., tissue sampling) monitoring study in the region. Given the large ranges of these animals and mandate of the MNRF, GGM will participate in an MNRF-led study with local Aboriginal communities during Project operation.

**Project Design, Operation and Emergency Prevention and Response** – A number of comments were received from government agencies and Aboriginal communities that identified the need to include additional information on monitoring and follow-up programs in the Final EIS/EA. As a result, GGM has provided Conceptual EMMPs in Appendix M for the construction and operation phase. A Conceptual Closure Plan is provided in Appendix I. The plans will be progressively developed and updated as the Project progresses through permitting and construction. The plans will be updated based on continual improvement during operation through adaptive management.

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The MNRF, Ministry of Northern Development and Mines (MNDM) and Aroland First Nation (AFN) requested further information on emergency response measures including related to tailings management infrastructure, the Goldfield Creek diversion, and extreme weather events. These events have been discussed in the "Hardrock Project Conceptual Emergency Response Plan" (Conceptual ERP, Appendix M3). AFN also provided comments regarding the potential effects of spills and the response methods. The "Hardrock Project Conceptual Spill Prevention and Response Plan" (Conceptual SPRP) provided in Appendix M8 outlines spill prevention, contingency planning, and reporting practices. The MNDM, Métis Nation of Ontario, MOECC and the Canadian Environmental Assessment Agency requested further information on waste rock management. Additional information has been incorporated in the "Hardrock Project - Conceptual Waste Rock Management Plan" (Conceptual WRMP) provided in Appendix M2.

GGM is committed to staffing a senior geotechnical engineering position dedicated to TMF safety and to fund an Independent TMF Review Board (ITRB) for the Project composed of three external experts. The purpose of the ITRB is to review and advise on the design, construction, operation, performance, and closure planning for the TMF, with the objective of long-term safety and environmental protection. The ITRB will be in place prior to construction and provide review and advice through closure. ITRB reports and actions undertaken by GGM to address ITRB feedback will be made available to interested stakeholders.

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.

### **23.6 FOLLOW-UP AND MONITORING PROGRAMS**

Chapters 7.0 through 19.0 in the Final EIS/EA include mitigation measures associated with Project interactions and reducing adverse residual effects on the environment. Follow-up and monitoring is undertaken in order to verify the accuracy of the EA predictions and determine the effectiveness of measures taken to mitigate the adverse environmental effects of the Project. Table 23-1 provides an overview of the conceptual EA follow-up and monitoring programs by VC.

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**Table 23-1: Conceptual EA Follow-up Program Elements**

VC	Follow-up and Monitoring Program Basis	Overview of Follow-up/Monitoring Program	Associated EMMPs
Atmospheric Environment (Chapter 7.0)	<ul style="list-style-type: none"> <li>Change in ambient air quality – increase in ambient levels of particulates, criteria air contaminants and other parameters of potential concern (PoPCs).</li> <li>Climate change (as measured by change in greenhouse gases [GHGs]) – increase in GHG emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring to confirm that air quality and dust from construction, operation and closure activities will meet provincial thresholds at the closest receptors.</li> <li>Implementation of a GHG management and monitoring plan.</li> </ul>	<ul style="list-style-type: none"> <li>Conceptual AQMP (Appendix M7)</li> <li>Conceptual GHGMMP (Appendix M6)</li> </ul>
Acoustic Environment (Chapter 8.0)	<ul style="list-style-type: none"> <li>Change in sound levels – increase.</li> <li>Change in vibration Levels – increase.</li> </ul>	<ul style="list-style-type: none"> <li>Ambient noise monitoring program.</li> <li>Noise and vibration monitoring during blasting activities.</li> </ul>	<ul style="list-style-type: none"> <li>Conceptual NVMMMP (Appendix M10)</li> </ul>
Groundwater (Chapter 9.0)	<ul style="list-style-type: none"> <li>Change in groundwater quantity and/or flow - decrease in groundwater levels and change in flow direction due to a change in recharge and dewatering.</li> <li>Change in groundwater quality – improvement in water quality.</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring groundwater levels to document changes in level and flow in response to dewatering.</li> <li>Monitoring of groundwater quantity and quality to confirm the effectiveness of seepage collection systems and the groundwater quality to the receiving environment.</li> </ul>	<ul style="list-style-type: none"> <li>WMMP (Appendix M1)</li> </ul>
Surface Water (Chapter 10.0)	<ul style="list-style-type: none"> <li>Change in Surface Water Quantity – increase and decrease in flow.</li> <li>Change in Surface Water Quality - due to removal of a portion of historical tailings and effluent discharge from the open pit.</li> </ul>	<ul style="list-style-type: none"> <li>Tracking water quantity and quality with water level recording, stream flow gauging (channel velocity, depth and flow profiling during ice-free and ice-in periods), and water quality sampling.</li> </ul>	<ul style="list-style-type: none"> <li>WMMP (Appendix M1)</li> </ul>

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**Table 23-1: Conceptual EA Follow-up Program Elements**

VC	Follow-up and Monitoring Program Basis	Overview of Follow-up/Monitoring Program	Associated EMMPs
Fish and Fish Habitat (Chapter 11.0)	<ul style="list-style-type: none"> <li>Lethal and sub-lethal effects on fish - sub-lethal effects on fish due to PoPC inputs from treated effluent and non-point sources.</li> <li>Permanent alteration of fish habitat - permanent alteration of fish habitat due to nutrient inputs from treated effluent and non-point sources.</li> <li>Loss of fish habitat – no residual effects identified because lost habitat will be offset.</li> </ul>	<p>Monitoring to demonstrate the effective implementation and function of the avoidance and mitigation:</p> <ul style="list-style-type: none"> <li>Kenogamisis Lake fish community monitoring</li> <li>Fish tissue sampling</li> <li>Benthic community monitoring</li> <li>Sediment</li> <li>Aquatic vegetation monitoring</li> <li>Plankton and periphyton monitoring</li> <li>Toxicity monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Draft Fisheries Offset Plan (Appendix F10)</li> <li>Conceptual AMMP (Appendix M12)</li> </ul>
Vegetation Communities (Chapter 12.0)	<ul style="list-style-type: none"> <li>Change in abundance or condition of vegetation communities - removal of upland and wetland vegetation.</li> <li>Change in function, connectivity and quality of vegetation communities - wetland communities altered/converted to other wetland or upland community types due to changes in surface water and groundwater and vegetation affected by dust deposition, invasive species, and fragmentation.</li> <li>Change in abundance of plant species of interest - removal of plant species of interest to Aboriginal communities.</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of Project footprint during construction and operation.</li> <li>Assess presence of invasive species and target removal through manual, mechanical and/or chemical methods and proper disposal.</li> <li>Monitoring of surface and groundwater.</li> <li>Monitoring to determine the success and stability of rehabilitated areas.</li> </ul>	<ul style="list-style-type: none"> <li>Conceptual BMMP (Appendix M13)</li> <li>WMMP (Appendix M1)</li> <li>Conceptual Closure Plan (Appendix I)</li> </ul>

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VC	Follow-up and Monitoring Program Basis	Overview of Follow-up/Monitoring Program	Associated EMMPs
Wildlife and Wildlife Habitat (Chapter 13.0)	<ul style="list-style-type: none"> <li>• Change in habitat - the direct, indirect loss or alteration of wildlife habitat.</li> <li>• Change in mortality risk - increase in risk.</li> <li>• Change in movement - disruption of existing wildlife movement patterns.</li> </ul>	<ul style="list-style-type: none"> <li>• Recording Project-related wildlife-vehicle collisions or near misses and maintaining a wildlife observation log.</li> <li>• Monitoring wildlife use of the TMF, open aquatic areas and other key Project locations.</li> <li>• Wildlife use surveys will include periodic monitoring of breeding/migratory birds.</li> <li>• Monitoring compensation habitat for Barn Swallow.</li> </ul>	<ul style="list-style-type: none"> <li>• Conceptual BMMP (Appendix M13)</li> </ul>
Labour and Economy (Chapter 14.0)	<ul style="list-style-type: none"> <li>• Change in Labour and change in Economy - effects will largely be positive.</li> </ul>	<ul style="list-style-type: none"> <li>• Ongoing dialogue with agencies, local Aboriginal communities and stakeholders will continue throughout the Project.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Community Services and Infrastructure (Chapter 15.0)	<ul style="list-style-type: none"> <li>• Changes in capacity of housing and accommodations, municipal and provincial services and infrastructure and, transportation services and infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Ongoing dialogue with agencies, local Aboriginal communities and stakeholders will continue throughout the Project.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Land and Resource Use (Chapter 16.0)	<ul style="list-style-type: none"> <li>• Change in recreational land use, commercial land use and navigation.</li> </ul>	<ul style="list-style-type: none"> <li>• GGM will maintain open communication with local and regional authorities and land and resource users throughout the life of the Project to identify and address issues pertaining to the Project's influence on land and resource use.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

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**Table 23-1: Conceptual EA Follow-up Program Elements**

VC	Follow-up and Monitoring Program Basis	Overview of Follow-up/Monitoring Program	Associated EMMPs
Heritage Resources (Chapter 17.0)	<ul style="list-style-type: none"> <li>With the proposed mitigation measures, no residual effects on archaeological resources and Euro-Canadian architectural and/or historical resources for all phases of the Project are anticipated.</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring during construction activities to confirm no archeological resources are discovered.</li> <li>Monitoring construction buffer at heritage building to confirm no effects on built heritage resource.</li> </ul>	<ul style="list-style-type: none"> <li>Conceptual AHRMP (Appendix M14)</li> </ul>
Traditional Land and Resource Use (Chapter 18.0)	<ul style="list-style-type: none"> <li>Changes to plant harvesting activities, fishing activities, hunting and trapping activities, cultural or spiritual sites or areas.</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing dialogue with local Aboriginal communities with respect to monitoring will continue throughout the Project.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
Human and Ecological Health (Chapter 19.0)	<ul style="list-style-type: none"> <li>Change in human and ecological health.</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring programs can be used to track potential changes in media concentration and to evaluate the assumptions in this HHERA. Future monitoring and management programs are planned for various media including air, soil, surface water and fish tissue. The data from these monitoring programs will be used to confirm the predicted concentrations used in this risk assessment and by extension if risk estimates are reflective of future conditions.</li> </ul>	<ul style="list-style-type: none"> <li>WMMP (Appendix M1)</li> <li>Conceptual AQMP (Appendix M7)</li> <li>Conceptual AMMP (Appendix M12)</li> <li>Conceptual SMP (Appendix M9)</li> </ul>

NOTE:  
N/A Not Applicable

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**23.7 ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS**

Table 23-2 describes the Conceptual EMMPs for the Project. These include the mitigation and monitoring to verify the accuracy of the Final EIS/EA predictions (Chapters 7.0 to 19.0) as well as operational monitoring to confirm that operational (i.e., Project) performance goals are being achieved.

These EMMPs are commitment-based and broad in their level of detail focused on the construction and operation phases of the Project. The closure phase is outlined in the Conceptual Closure Plan (Appendix I). These conceptual plans are provided in Appendix M and are summarized in Table 23-2 below.

**Table 23-2: Conceptual EMMPs**

Conceptual EMMP	Purpose	Appendix
Water Management and Monitoring Plan (WMMP)	<p>The purpose of the WMMP is to:</p> <ul style="list-style-type: none"> <li>• provide a reliable water supply for Project operation</li> <li>• use system capacities to maintain a flexible and robust system that allows for the reduction of peak flows requiring treatment and management</li> <li>• where possible, keep contact and non-contact waters separate to reduce the volume of water under management and to reduce the effect of the Project on local waters</li> <li>• manage and treat contact water and sanitary effluent streams to meet regulatory effluent requirements and be protective of the receiving environment.</li> </ul>	M1
Conceptual Waste Rock Management Plan (WRMP)	<p>The purpose of the Conceptual WRMP is to provide the geochemical testing and characterization program that will be implemented to guide the use, storage, and management of waste rock for the Project. Specifically, the Conceptual WRMP identifies:</p> <ul style="list-style-type: none"> <li>• acid rock drainage (ARD)/metal leaching criteria to guide the management of waste rock, including the identification of waste rock appropriate for construction purposes</li> <li>• procedures to be implemented during operation to classify and manage various waste rock lithologies based on ARD potential</li> <li>• methods to manage ARD from WRSAs based on the geochemical properties of the material.</li> </ul>	M2

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**Table 23-2: Conceptual EMMPs**

Conceptual EMMP	Purpose	Appendix
Conceptual Emergency Response Plan (ERP)	<p>The purpose of the Conceptual ERP is to:</p> <ul style="list-style-type: none"> <li>• facilitate prompt, efficient and safe response actions for addressing emergencies or compliance issues</li> <li>• identify the organization, responsibilities and reporting procedures of the emergency response team</li> <li>• define appropriate communications protocols, including procedures to contact relevant regulatory agencies and Aboriginal communities related to an accident or malfunction event and follow-up actions that will be taken</li> <li>• provide site information on the facilities and contingencies in place should an emergency or compliance issue occur</li> <li>• provide support and information on available resources, facilities and trained personnel in the event that an emergency occurs.</li> </ul>	M3
Conceptual Waste Management Plan (Conceptual WMP)	<p>The purpose of the Conceptual WMP is to facilitate the effective management of solid non-hazardous wastes generated from the Project including setting performance objectives, ensuring compliance with regulatory requirements and adhering to the waste management principles of Reduce, Reuse, Recycle, Recover. The Conceptual WMP outlines:</p> <ul style="list-style-type: none"> <li>• compliance obligations and methods for managing compliance with these requirements</li> <li>• performance objectives of the Conceptual WMP</li> <li>• estimates of the quantity and type of solid non-hazardous waste to be generated</li> <li>• methods for characterizing and segregating hazardous waste from the solid waste management stream</li> <li>• appropriate disposal, recycling, or re-use options for wastes generated</li> <li>• tracking environmental performance and evaluating mitigation measures to enable the implementation of adaptive follow-up programs as needed.</li> </ul>	M4
Conceptual Erosion and Sediment Control Plan (Conceptual ESCP)	<p>The purpose of the Conceptual ESCP is to provide measures and Management Practices to limit site erosion and protect the watercourses from sedimentation for the protection of the environment.</p>	M5
Conceptual Greenhouse Gas Management and Monitoring Plan (GHGMMP)	<p>The purpose of the Conceptual GHGMMP is to reduce and record the Project GHG emissions to comply with relevant GHG emissions management and reporting legislation.</p>	M6

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**Table 23-2: Conceptual EMMPs**

Conceptual EMMP	Purpose	Appendix
Conceptual Air Quality Management and Monitoring Plan (AQMMP)	<p>The purpose of the Conceptual AQMMP is to:</p> <ul style="list-style-type: none"> <li>• describe requirements for the routine management of sources of airborne dust during construction and operation</li> <li>• describe requirements for monitoring ambient air quality and meteorological conditions in and near the PDA as the basis for assessing potential air quality effects that may be attributable to the Project on surrounding areas</li> <li>• track air quality performance and provide feedback to the Environment Manager which may be used to refine the dust suppression program and other potentially significant air quality sources</li> <li>• describe requirements for provincial and federal air quality and emissions reporting.</li> </ul>	M7
Conceptual Spill Prevention and Response Plan (SPRP)	<p>The purpose of the Conceptual SPRP is to provide the Hardrock Project with guidance in the development of spill prevention, contingency planning and reporting practices for the timely and effective response to spills of pollutants during the Project construction and operation phases for the safety of the environment and Project infrastructure.</p>	M8
Conceptual Soil Management Plan (SMP)	<p>The purpose of the Conceptual SMP is to:</p> <ul style="list-style-type: none"> <li>• retain and preserve suitable soil for use in Project rehabilitation</li> <li>• identify and manage soil impacted by existing or historical anthropogenic activities that require removal to allow development of the Project.</li> </ul>	M9
Conceptual Noise and Vibration Management and Monitoring Plan (NVMMMP)	<p>The purpose of the Conceptual NVMMMP is to:</p> <ul style="list-style-type: none"> <li>• describe requirements for the routine management/ maintenance of sources of noise and vibration during construction and operation</li> <li>• describe requirements for monitoring noise and vibration during various phases of the Project, as the basis of asserting compliance of Project construction and operation against the predictions described in the Final EIS/EA</li> <li>• describe acoustic assessment and reporting requirements for provincial (and federal) approval/compliance</li> <li>• develop a monitoring program to verify the effectiveness of the mitigation measures implemented for the Project and compliance with the requirements and guidance identified in the "Technical Data Report: Hardrock Project – Noise and Vibration Assessment" (Appendix F2)</li> <li>• Identify: minimum equipment performance requirements, monitoring locations, duration and timing of the monitoring, analysis and reporting requirements and training of field personnel</li> <li>• provide guidance for abatement if exceedances are found during compliance verification.</li> </ul>	M10

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**Table 23-2: Conceptual EMMPs**

Conceptual EMMP	Purpose	Appendix
Conceptual Explosives and Blasting Management Plan (EBMP)	The purpose of the Conceptual EBMP is to provide direction for the safe storage, handling and use of explosives and explosive components at the Project, for the safety of the public and Project personnel, and protect both the environment and Project components.	M11
Conceptual Aquatic Management and Monitoring Plan (AMMP)	The Purpose of the Conceptual AMMP is to: <ul style="list-style-type: none"> <li>describe proposed mitigation to protect fish and fish habitat</li> <li>describe proposed methods for monitoring potential effects on the aquatic environment to verify the predictions made within the Final EIS/EA</li> <li>convey the intended management and monitoring plans to stakeholders for consideration in the development of individual, regulatory monitoring requirements (e.g., <i>Fisheries Act</i> Authorization, environmental effects monitoring, Environmental Compliance Approval, Follow-up Program Agreement).</li> </ul>	M12
Conceptual Biodiversity Management and Management Plan (BMMP)	The purpose of the Conceptual BMMP is to: <ul style="list-style-type: none"> <li>Outline mitigation approaches for reducing effects on vegetation and wildlife</li> <li>Outline vegetation and wildlife monitoring program for construction and operation phases to confirm effectiveness of mitigation measures and verify Final EIS/EA conclusions.</li> </ul>	M13
Conceptual Archaeology and Heritage Resource Management Plan (AHRMP)	The purpose of the Conceptual AHRMP is to ensure the protection of archaeological and cultural heritage resources that could potentially be affected by the Project and where necessary, appropriate documentation, salvage and commemoration.	M14

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## **23.8 REFERENCES**

Ministry of the Environment (MOE). 1978b. *Blasting, Model Municipal Noise Control By-Law (NPC-119)*.

Ministry of the Environment. (MOE). 2014. *Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario*.