

# HARDROCK PROJECT CONCEPTUAL GREENHOUSE GAS MANAGEMENT AND MONITORING PLAN



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## **1.0 INTRODUCTION AND ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN OVERVIEW**

Greenstone Gold Mines (GGM) is committed to minimizing environmental effects through the implementation of mitigation measures, monitoring and adaptive management for the Hardrock Project (the Project) within Environment Management and Monitoring Plans (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:

- The Project is carried out in compliance with existing legislation, consistent with Federal and Provincial guidelines, best practices and GGM corporate policies;
- Measures to mitigate environmental effects are documented;
- Benefits from the Project are enhanced; and
- Reporting is structured 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, permitting, and construction, and updated based on continual improvement during operations through adaptive management.

EMMP development begins during the EIS/EA stage with the preparation of Conceptual Environmental Management Plans. 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 stage. The closure phase is addressed in the Conceptual Closure Plan. The level of detail in the EMMPs advance as the Project moves through more detailed engineering and planning and as permit/regulatory requirements are available.

### **1.1 Environmental Management and Monitoring Plans**

The Project's Environmental Management System, includes a comprehensive set of management and monitoring plans collectively referred to as Environmental Management and Monitoring Plans (EMMPs). The EMMPs outline environmental protection measures to mitigate potential environmental effects.

The EMMPs include:

- Water Management and Monitoring Plan;
- Conceptual Waste Rock Management Plan;
- Conceptual Emergency Response Plan;
- Conceptual Waste Management Plan;
- Conceptual Erosion and Sediment Control Plan;
- Conceptual Greenhouse Gas Management and Monitoring Plan;

- Conceptual Air Quality Management and Monitoring Plan;
- Conceptual Spill Prevention and Response Plan;
- Conceptual Soil Management Plan;
- Conceptual Noise and Vibration Management and Monitoring Plan;
- Conceptual Explosives and Blasting Management Plan;
- Conceptual Aquatic Management and Monitoring Plan;
- Conceptual Biodiversity Management and Monitoring Plan; and
- Conceptual Archaeology and Heritage Resource Management Plan.

These Plans are considered “living” documents and will be updated as needed in support of environmental management activities during future permitting, development and operation phases.

## **2.0 PROJECT SUMMARY**

Mining of the Hardrock deposit has been designed as an open pit. The process plant will operate 365 days per year with a Life of Mine (LOM) of approximately 15 years. The mill throughput ranges from 24,000 tonnes per day (tpd) for approximately the first two years of operation (i.e., Mill Phase 1), increasing to 30,000 tpd for the balance of operation (i.e., Mill Phase 2). The overall Project development schedule will consist of the following main phases, during which various Project activities will be completed:

- Construction: Years -3 to -1 with early ore stockpiling commencing after the first year of construction.
- Operation: Years 1 to 15, with the first year representing a partial year as the Project transitions from construction to operation.
- Closure:
  - Active Closure: Years 16 to 20, corresponding to the period when primary decommissioning and rehabilitation activities are carried out.
  - Post-Closure: Years 21 to 36, corresponding to a semi-passive period when the Project is monitored and the open pit is allowed to fill with water creating a pit lake.

The key components of the Project are as follows:

- open pit
- waste rock storage areas (WRSAs) (designated as WRSA A, WRSA B, WRSA C and WRSA D)
- topsoil and overburden storage areas
- ore stockpile
- crushing plants and mill feed ore storage area

- process plant
- tailings management facility (TMF)
- water management facilities for contact water including collection ditches and ponds
- power plant and associated infrastructure
- liquefied natural gas plant
- explosives facility
- buildings and supporting infrastructure
- water supply and associated infrastructure
- sewage treatment plant
- effluent treatment plant
- lighting and security
- site roads and parking areas
- watercourse crossings and habitat compensation/offsets
- Goldfield Creek diversion
- onsite pipelines
- fuel and hazardous materials
- aggregate sources
- temporary camp

Project activities include the relocation of existing infrastructure currently located within the PDA, including a portion of Highway 11, a Ministry of Transportation (MTO) Patrol Yard, and Hydro One Networks Inc. (Hydro One) facilities.

### **3.0 MANAGEMENT AND MONITORING PLAN PURPOSE**

#### **3.1 Purpose**

The purpose of the GGM Hardrock Project Conceptual Greenhouse Gas Management Plan is to reduce and record the Project greenhouse gas (GHG) emissions to comply with relevant Greenhouse Gas (GHG) emissions management and reporting legislation.

#### **3.2 Performance Objectives**

Objectives and targets are established to drive continuous improvement in environmental performance and are consistent with the overall strategic goals of the Project. Objectives are measurable (where possible), monitored, communicated, and updated as appropriate.

In support of GGM's overarching environmental objective (to work to prevent or mitigate any environmental impacts, meet or exceed regulatory requirements and strive to continually improve our environmental practices and performance), GGM has established the following performance objectives for the management of greenhouse gas that considers the Project's interactions and compliance obligations:

- Maintain compliance with applicable greenhouse gas emissions management and reporting legislation;
- Optimize fuel economy across the mine fleet to reduce consumption, costs and greenhouse gas emissions;
- Reduce vehicle travel within the project footprint through optimization of site layout and design; and
- Identify greatest contributions to greenhouse gas emissions and seek opportunities to reduce emissions.

#### **4.0 SCOPE**

The scope of the <insert Plan name> applies to the area of the Project that will undergo changes through construction and/or operation to accommodate the advancement of Project and associated monitoring. The Conceptual GHG Management and Monitoring Plan applies to the construction and operation phases of the Project with closure phase included in the Conceptual Closure Plan.

The Conceptual GHG Management and Monitoring Plan applies to individuals working for or on behalf of GGM, including employees and contractors, which have a role and/or accountability for the development, implementation and maintenance of this EMMP.

GGM will make reasonable efforts that suitably qualified (licenced where applicable) contractors are used for the transport of materials, supplies and waste materials, and that contractors have appropriate controls and management plans in place to reduce the likelihood of incidents during transport. Similarly, Project components under the management and maintenance by third parties are outside the scope of this EMMP. The scope of the Conceptual GHG Management and Monitoring Plan applies to Project infrastructure and management under the care and maintenance of GGM.

#### **5.0 PLANNING**

##### **5.1 Organizational Roles and Responsibilities**

All persons working for or on behalf of GGM, including employees and contractors, have a role in the successful implementation and maintenance of the Conceptual GHG Management and Monitoring Plan. Table 5-1 outlines roles and responsibilities for activities:

**Table 5-1. Conceptual Roles and Responsibilities**

Role	Responsibility
Construction Manager (during Construction)/ Mine Manager (all other Project phases)	Implement GHG mitigation procedures as specified in the plan. Delegate staff to educate and train employees on procedures. Delegate staff to monitor progress on GHG reductions. Evaluate mitigation procedures on a continuous basis to determine effectiveness and implement changes to mitigation as needed.
Environment Manager and other persons as delegated	Execute mitigation procedures. Through training and education, ensure supervisors/staff/workers are aware of importance of GHG reduction and that culture is embedded into the workday. Monitor progress on GHG reductions. Evaluate mitigation procedures on a continuous basis to determine effectiveness. Provide update to Construction Manager/Mine Manager on effectiveness of mitigation measures. Ensure compliance with monitoring and reporting obligations.
Mine Supervisors/ Foreman and other personnel as delegated	Become familiar with GHG mitigation procedures and reduction goals. Integrate energy efficiency and GHG reductions into the work culture. Ensure workers have the required training and tools to execute the GHG reduction procedures. Provide feedback.
Personnel / Contractors	Be aware of the Project GHG mitigation procedures and reduction goals. Integrate energy efficiency into facets of the workday.

## 5.2 Compliance Obligations

The Conceptual GHG Management and Monitoring Plan is developed and implemented to comply with applicable legislative, regulatory, permit and other relevant obligations, outlined in the following sections.

### 5.2.1 Environmental Assessment Process Requirements

#### 5.2.1.1 Provincial Terms of Reference

As described in the Approved Terms of Reference, the EA includes a variety of environmental protection and management measures to guide the planning, design, construction, operation and closure of the Project (section 4.1.4) and identification of a monitoring framework related to compliance and effects monitoring (section 8.2).

#### 5.2.1.2 Federal Environmental Impact Statement Guidelines

The EIS Guidelines for the Hardrock Project include development and implementation of follow-up and monitoring programs (section 8.0). The follow-up program verifies the accuracy of the effects assessment and the effectiveness of the measures implemented to mitigate the adverse effects of the Project. The goal of a monitoring program is to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all

phases of the Project and to provide clearly defined action plans and emergency response procedures to account for human and environmental health and safety.

### **5.2.1.3 Draft EIS/EA Report**

Section 24 of the Draft EIS/EA includes a listing of proposed Follow-up Monitoring and Environmental Management Plans, which included a commitment to produce a Conceptual GHG Management and Monitoring Plan. This Plan is intended to cover aspects such as measures to reduce the Project's GHG intensity through final Project design and compliance with relevant GHG emissions management and reporting legislations.

Subsequent to the draft EIS/EA submission, comments were raised by several parties requesting additional clarification on the sources of GHG emissions, calculations and mitigation/offsetting measures. Available information has been incorporated to develop this Conceptual Management and Monitoring Plan.

## **5.2.2 Regulatory Requirements**

### **5.2.2.1 Federal Regulatory Requirements**

In the Copenhagen Accord meeting in January 2010, the Government of Canada set a target of reducing GHG emissions by 17% by 2020 (compared with 2005 levels). As outlined in Canada's Sixth National Report on Climate Change, 2014, the federal government is in the process of implementing a sector by sector approach to reduce national emissions. Facilities emitting more than 50 kt CO<sub>2</sub>e from stationary combustion, industrial process, venting, flaring, fugitive, on-site transportation and waste and waste water sources are currently required to report annually to Environment and Climate Change Canada.

Further, the equipment used will need to comply with a series of regulations aimed at reducing air emissions. The following three regulations are relevant to the mine fleet emissions and have been incorporated into Section 6 of this management plan:

- *Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations, SOR/2010-201; 74, aligned with the US, setting progressively stricter GHG emissions standards for 2011-2016 model years: <http://laws-lois.gc.ca/eng/regulations/SOR-2010-201/index.html>*
- *Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations, SOR/2013-24, apply to 2014 and later model years: <http://laws-lois.gc.ca/eng/regulations/SOR-2013-24/index.htm>*

### **5.2.2.2 Provincial Regulatory Requirements**

In 2009, emitters with emissions greater than 25 kt CO<sub>2</sub>e in Ontario began reporting GHG emissions to the Ministry of the Environment and Climate Change (MOECC), under the Greenhouse Gas Emissions Reporting amendment (O. Reg.452/09) to the *Environmental Protection Act* (EPA). On May 19, 2016 Ontario filed a new quantification, and verification of GHG emissions regulation O.Reg 143/16 made under the *Climate Change Mitigation and Low Carbon*

*Economy Act, 2016* to support the implementation of Ontario's cap and trade program (O.Reg 144/16). O.Reg 143/16 will take effect on January 1, 2017, and applies to activities by persons on and after January 1, 2017. O.Reg 143/16 sets a new reporting threshold 10 kt CO<sub>2</sub>e with a verification threshold of 25 kt CO<sub>2</sub>e. O.Reg 452/09 will be revoked after all reporting under it is complete.

Ontario's new cap and trade legislation (O.Reg 144/16) came into effect on July 1, 2016 with the cap and trade program beginning in 2017, and includes requirements for:

- Greenhouse gas emission caps
- Mandatory and voluntary market participants
- Compliance periods
- Registration rules
- Auction and sale rules
- Strategic reserve of allowances
- Market rules such as holding limits and purchase limits
- Compliance requirements
- Distribution of allowances

Ontario is setting the economy wide cap at 142 megatonnes per year in the first year of the program and will decline to 125 megatonnes by 2020. Companies must have enough allowances (also known as permits or credits) to cover their emissions if they exceed the cap. Initial temporary allowances will be distributed free of charge to help industries transition greener technology while they reduce GHG emissions.

#### **5.2.2.3 Municipal Regulatory Requirements**

There are no known municipal greenhouse gas regulatory requirements.

## **6.0 SUPPORT**

### **6.1 Identification/Inventory of Resources**

#### **6.1.1 Jurisdictional Inventories**

A baseline GHG emissions profile for Canada, Ontario and globally from 2005 to 2012 is presented in Table 6-1 and indicates that global GHG emissions were estimated to be 44 billion tonnes of CO<sub>2</sub>e in 2011, excluding land use change and forestry (World Resource Institute 2014) and Canada's contribution to the global GHG emissions is 1.6%.

GHG emissions from the metal ore mining sector are estimated by the Canadian Industrial Energy End-use Data Analysis Centre (CIEEDAC) in Canada and it determined that emissions are approximately 0.5% of the national GHG emissions in 2011 (CIEEDAC 2013).

**Table 6-1. Global, National and Provincial GHG Emissions (2005-2012)**

Year	GHG Emissions (kt CO <sub>2</sub> e)		
	Global <sup>1</sup>	Canada	Ontario
2005	38,696,545	736,000	207,000
2006	39,728,428	728,000	196,000
2007	40,851,919	749,000	200,000
2008	41,221,150	731,000	192,000
2009	40,956,547	689,000	168,000
2010	42,669,718	699,000	175,000
2011	43,816,734	701,000	171,000
2012	NA	699,000	167,000

Notes:

CO<sub>2</sub>e = carbon dioxide equivalent

NA = not available

<sup>1</sup> Includes countries that report GHG emissions

Sources: Environment Canada (2013), Environment Canada (2014a), World Resources Institute (2014)

## 6.1.2 Project GHG Inventory

### 6.1.2.1 Construction and Closure

Project construction will result in GHG emissions from the combustion of diesel fuel in heavy earth-moving equipment and equipment used to erect facilities. GHG emissions from construction will be minimal compared to annual operational emissions and therefore have not been currently quantified.

Ontario's new GHG regulation O.Reg. 143/16 sets a new reporting threshold of 10 kt of CO<sub>2</sub>e therefore GHG emissions during Project construction will be quantified to determine if reporting under the new regulation is required. Mitigation of GHG emissions during the construction phase is presented in Section 6.0.

### 6.1.2.2 Operation

There are two operational phases of the Project, Phase 1 is during approximately the first two years where during which the process plant will be capable of processing 24,000 tpd. During Phase 2 the process plant will ramp up to a capacity of 30,000 tpd starting in approximately Year 3.

Major sources of GHG emissions from the Project operation include:

- Mobile source fuel combustion (mining equipment, heavy haul trucks, dozers, graders, excavators, drills) releasing CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. GHG assumptions are based on an estimate of diesel fuel use for each equipment using the manufacturer's specifications, and generally assuming a 24hr/day 365 days/year operation.
- Natural gas combustion in the power plant (with a capacity of up to 56 megawatts (MW)) releasing, CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O.
- Stationary combustion sources (including dewatering pumps, carbon regeneration process) releasing GHGs.
- Fugitive emissions of un-combusted natural gas are considered minimal and are not considered a major source. However, under O.Reg 143/16 operation of equipment related to the transmission, storage and transportation of natural gas has been added as a specified GHG activity and GHG emissions for the LNG Plant will have to be calculated.

Table 6-2 provides a summary of the Project annual GHG emissions for the operation phase of the Project.

**Table 6-2. Summary of Annual GHG Emissions During Operation**

Source Description	Estimated GHG Emissions (kt CO <sub>2</sub> e / year)	
	Phase 1	Phase 2
Natural gas combustion process – Generating Plant	115.6	138.7
Natural gas combustion processes – LNG mining fleet and carbon regeneration	20.6	24.9
Mining fleet and equipment	83.5	85.4
Other vehicles	0.6	0.7
<b>Total</b>	<b>220.3</b>	<b>249.6</b>

The incremental contribution of the Project operation to total Ontario annual GHG emissions would be 0.1% for the Phase 1 operating scenario, and 0.1% for the Phase 2 scenario, to occur annually over the lifetime of the Project (based on Ontario's 2014 GHG emission level). The incremental contribution of the Project operation to total Canadian annual GHG emissions would be 0.03% for the Mill Phase 1 scenario and 0.03% for the Phase 2 scenario, occurring annually over the lifetime of the Project (based on Canada's 2014 GHG emission level).

The conclusions of the EIS/EA is that the Project is a negligible emitter of GHGs relative to Canadian or global totals, and thus offsetting the Project GHG emissions is not warranted. Furthermore, the contribution of an individual project to climate change cannot be measured according to federal guidance for assessing climate change effects (FPTCCCEA, 2003).

## 6.2 Competence, Training and Awareness

GGM requires that persons working under its management, including employees and contractors, have the knowledge, understanding, skills and abilities to complete work in a manner that protects the environment. Examples of Energy and GHG Emissions-related Training are as follows (taken from Energy and GHG Emissions Management Reference Guide – June 2014):

**Table 6-3. Related Training**

Role	Related training
Personnel	General awareness training as a one-time introductory initiative Operation of production processes and equipment for optimal energy efficiency
Energy leaders	Energy skills training, including consumption analysis, and remedial action cost/benefit analysis techniques
Operations management	Budgeting energy cost and consumption relative to production levels Analyze and control energy performance and cost
Technical personnel	Maintenance of energy consuming technologies Energy controlling and data management technologies Identification of auxiliary system and production process energy use reduction opportunities Six sigma training (or equivalent)

Materials to support the training described above might include (Taken from Energy and GHG Emissions Management Reference Guide – June 2014):

- General awareness presentations or materials for company-wide dissemination such as:
  - Company newsletters with dedicated sections on energy and GHG emissions management
  - Energy efficiency or GHG emissions reduction components in company publications
- Fundamental financial assessment training manuals and presentations
- Energy management handbooks and training manuals
- Equipment specific energy efficiency training manuals and specification sheets
- Operator training manuals

Natural Resources Canada has also developed an Employee Awareness Program (EAP) toolkit to assist companies with implementing energy efficiency measures available at:  
<https://www.nrcan.gc.ca/energy/efficiency/industry/training-awareness/5163>

## **7.0 IMPLEMENTATION OF MITIGATION MEASURES**

### **7.1 General Approach**

#### **7.1.1 Construction**

The Project plan has implemented some energy substitutions that will reduce the amount of GHGs generated during construction. Electricity will be supplied from a temporary grid connection via the local distribution system. This will reduce the need for diesel generators and thereby reduce the amount of GHGs created. Other measures to reduce GHG emissions include:

- use of high efficiency equipment, where feasible
- fuel use tracking to identify anomalies in fuel use
- limit vehicle speeds
- where possible, reduce haul routes
- maintain equipment and follow the manufacturers specified maintenance procedures
- implement a “no-idling” policy

#### **7.1.2 Operation**

During the operation phase, electricity will be generated from an onsite natural gas fueled generating plant with a heat recovery and distribution system. This type of system is efficient and will considerably reduce the GHGs created compared to traditional diesel powered electricity generation. In addition GGM will follow the manufacturers specified maintenance procedures for its large sources of GHG emissions, such as the generating plant equipment to make sure they are working efficiently and at optimal conditions. Other measures to reduce GHG emissions include:

- o Implement an equipment maintenance schedule to maximize fuel efficiency
- o Implement a no-idling policies to avoid the unnecessary release of GHG emissions when equipment is not used
- o Where possible, reduce haul routes
- o Utilize appropriately sized trucks
- o Limit vehicle speeds
- o Use of high efficiency electrical motors throughout the Project
- o Use of variable speed drive pumps with high-efficiency linings
- o Installing light-sensitive switches on road lights so that lights do not operate during the day
- o Use low emission/cleaner fuel alternatives to conventional fuels where practical, such as use of LNG in equipment and vehicles

## **7.2 Closure**

Mitigation and monitoring activities associated with decommissioning, reclamation and rehabilitation during the closure phase is presented in the Conceptual Closure Plan. It is anticipated that the mitigation measures implemented during construction would be applicable to closure activities.

## **8.0 MONITORING, EVALUATION AND REPORTING**

### **8.1 Monitoring, Measurement, Analysis and Evaluation**

#### **8.1.1 Ontario Greenhouse Gas Reporting**

To comply with Greenhouse Gas Reporting under O.Reg 452/09 and the recent O.Reg 143/16 there are prescribed sampling, analysis and measurement requirements (MOECC, 2015). Submission of a GHG report is required every year by June 1, for the previous year's reporting period.

##### **8.1.1.1 Fuel Sampling Frequency Requirements**

###### Natural Gas Generating Plant

As per the Ontario Guideline for Greenhouse Gas Emissions Reporting 2015 (Ontario GHG Guideline, MOECC 2015), since the natural gas supplier is sampling and analyzing the natural gas stream, the facility will be required to obtain results from this program semi-annual (minimum) frequency or greater. The supplier data for high heat value will be used to calculate GHG emissions specified in the Ontario GHG Guideline for emissions from the generating plant.

###### Diesel

As per the Ontario GHG Guideline (MOECC 2015) fuel sampling for diesel or fuel oil will not be required therefore the default high heat values in the Ontario GHG Guideline can be used. This requirement will be reviewed on an annual basis as part of the ongoing review and revision to this Management and Monitoring Plan.

##### **8.1.1.2 Fuel Consumption Monitoring Requirements**

###### Natural Gas Generating Plant

As per the Ontario GHG Guideline (MOECC 2015), the record of purchases or sales invoices for natural gas from the gas supplier can be used to calculate the total annual natural gas used. This value is used to calculate the annual GHG emissions.

### Fuel Oil

Fuel oil consumption will be determined by either direct measurement or measured stock changes according to the following expression: *Fuel Consumption in the Report Year = Total Fuel Purchases – Total Fuel Sales + Amount Stored at Beginning of Year – Amount Stored at Year End.*

Based on the current understanding of the Project, calibration of fuel oil meters (as per the Ontario GHG Guideline) will not be required, but this requirement will be reviewed annually as part of the ongoing review and revision to this Management and Monitoring Plan.

#### **8.1.1.3 Electricity Generation**

During the operations phase of the Project, electricity will be generated using five operational and two standby natural gas fired generators (7.4 MW each). As per the Ontario GHG Guideline (MOECC, 2015) these units will be categorized under electricity generation or ON.40. Therefore there will be additional reporting requirements under O.Reg 452/09 and 143/16, they include:

- The nameplate generating capacity in megawatts (MW) and net electricity generated in the calendar year in megawatt hours (MWh);
- The useful thermal output as applicable, in MJ.

It is not anticipated that a Continuous Emissions Monitoring System (CEMS) will be a regulatory requirement for the natural gas generating plant. The implementation of a CEMS and associated monitoring and reporting requirements will be considered with ongoing Project planning and design.

#### **8.1.2 Internal Monitoring**

##### **8.1.2.1 Compressed Air Circuit Monitoring**

During the operations phase, GGM will regularly monitor the compressed air circuit so that leaks are repaired in a timely manner. Regular monitoring of the compressed air system will maximize the operating efficiency of the compressors and reduce electricity consumption, and GHGs.

#### **8.2 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 Conceptual GHG Management and Monitoring Plan 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. Receiving, documenting and responding to communication from external interested parties, including complaints, will also form part of reporting under this Plan.

### 8.3 Continual Improvement

Adaptive management is a planned and systematic process for continuously improving environmental management practices by learning from their 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 and lasting measures aimed to prevent reoccurrence and/or similar occurrences. The Adaptive Management Framework (Figure 8-1), 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; and
- continue monitoring and update relevant EMMPs.

Corrective actions will be assigned as appropriate, including actions to prevent their reoccurrence. Corrective actions will vary according to the results of incident investigation and in consideration of other incidents related to the GHG management.

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

Figure 8-2 presents the overall approach to developing and advancing the EMMPs from the final EIS/EA to the construction Phase of the Project. The first stage of EMMP development begins with preparation of Conceptual Environmental Management Plans as part of the final EA/EIS. These Conceptual EMMPs are commitment-based and broad in their level of detail. The EMMPs guide environmental management for the Project and are progressively developed as the Project moves through the EA/EIS, permitting, and construction, and updated based on continual improvement during operations through adaptive management.

## **9.0 REFERENCES**

Federal-Provincial-Territorial Committee on Climate Change in Environmental Assessment (FPTCCCEA). 2003. Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners. November 2003.

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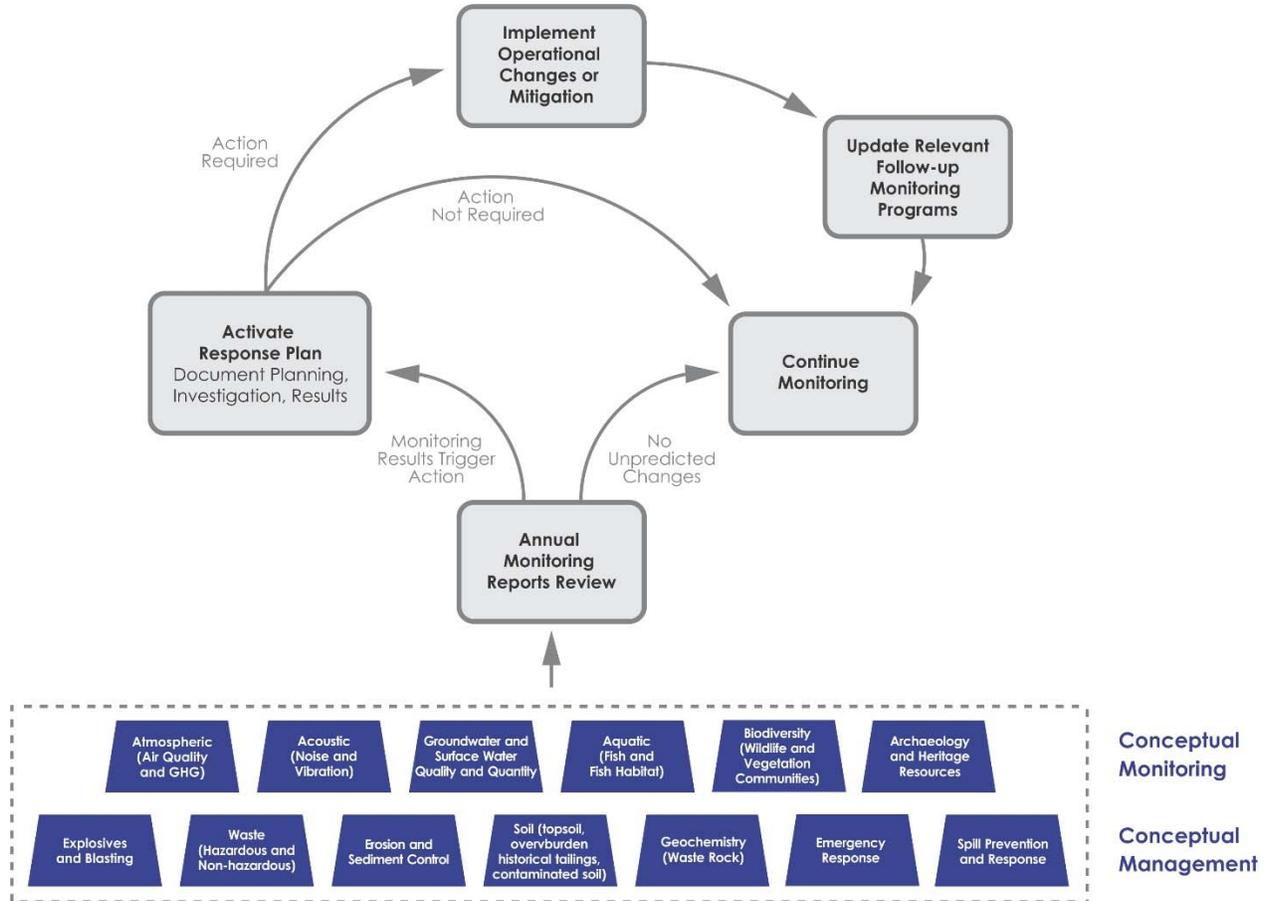
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**10.0 FIGURES**



**Figure 8-1: Hardrock Project Adaptive Management Framework**





**Figure 8-2: Environmental Management and Monitoring Plan Development EA to Construction**

