GREENSTONE GOLD MINES, HARDROCK PROJECT

MITIGATION, MONITORING AND COMMITMENT LIST

In the Final EIS/EA, the commitments, mitigations and monitoring that are planned for each Valued Component were included in each Valued Component chapter (Chapters 7 – 19 of the Final EIS/EA). In addition, a summary of the Key Commitments was included as Table 24-2 in Chapter 24 – Summary of Environmental Effects and Commitments.

The Ministry of the Environment, Conservation and Parks (MECP, previously MOECC) and the Canadian Environmental Assessment Agency has requested that these commitments, mitigations and monitoring be compiled into a consolidated report. The tables in this Commitment, Mitigation and Monitoring List are presented by Valued Component, along with five additional sections for “Soil Management”, “Explosives Management”, “Spill Prevention and Response”, “Consultation” and “Other”. Items with an asterisk (*) indicate commitments, mitigation or monitoring that have been added since the submission of the Final EIS/EA and are generally items that are documented in responses to agency and Aboriginal community comments. In certain cases, there are duplicate commitments, mitigations and monitoring items between various Valued Components where an item applies to more than one Valued Component. These will be consolidated by GGM to streamline reporting as the Project advances through detailed engineering, construction and operation. It is also understood that the mitigations and monitoring items will be subject to adaptive management throughout the life of the Project in accordance with best practice for environmental management for mining.

Table 1: Mitigation, Monitoring and Commitments Related to the Atmospheric Environment

ATMOPSHERIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
1-1	Mitigation	Implement a fugitive dust best management plan.	All	EIS/EA Section 7.4.2.2
1-2	Mitigation	Use dust suppressants (e.g., water) during situations that have an increased potential to generate airborne dust.	All	EIS/EA Section 7.4.2.2
1-3	Mitigation	Limit vehicle speeds.	All	EIS/EA Section 7.4.2.2, 7.4.3.2
1-4	Mitigation	Effective and timely equipment maintenance to maintain mining equipment in good working condition.	All	EIS/EA Section 7.4.2.2, 7.4.3.2
1-5	Mitigation	Where possible, reduce haul routes to and within the PDA.	All	EIS/EA Section 7.4.2.2, 7.4.3.2

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ATMOPSHERIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
1-6	Mitigation	Implement administrative controls, including a no idling policy to reduce mobile equipment and other-use vehicle emissions.	All	EIS/EA Section 7.4.2.2, 7.4.3.2
1-7	Mitigation	Equip primary crusher with a dust collection system (baghouse or equivalent) to control fugitive emission during ore crushing.	Operation	EIS/EA Section 7.4.2.2
1-8	Mitigation	Equip secondary crusher with a dust collection system (baghouse or equivalent) and protective covers, to control potential dust emissions during secondary crushing and ore transferring.	Operation	EIS/EA Section 7.4.2.2
1-9	Mitigation	Enclose mill feed ore storage area.	Operation	EIS/EA Section 7.4.2.2
1-10	Mitigation	Equipping high pressure grinding rolls (HPGR) with wet scrubbers (or equivalent) to control dust emissions from the grinding operations.	Operation	EIS/EA Section 7.4.2.2
1-11	Mitigation	Use a wet scrubber (or equivalent) on the induction furnace to control emissions.	Operation	EIS/EA Section 7.4.2.2
1-12	Mitigation	New mobile equipment onsite will meet applicable Transport Canada off-road vehicle emission requirements.	Operation	EIS/EA Section 7.4.2.2
1-13	Mitigation	Manage fugitive dust generated during the transport of historical tailings.	Operation	EIS/EA Section 7.4.2.2
1-14	Mitigation	Implement fugitive dust emission control from roads, material handling and storage areas/stockpile which may include, application of water sprays, use of surfactants (as a contingency), dust sweeping, gravel application, truck wheel washing stations, and enclosure of dust sources. The site roads will be maintained in good condition, with regular inspections and maintenance to limit the loose dust on the roads.	Operation	EIS/EA Section 7.4.2.2
1-15	Mitigation	Use of temporary electrical grid connection to reduce the need for diesel generators.	Construction, Active Closure	EIS/EA Section 7.4.3.2

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ATMOPSHERIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
1-16	Mitigation	Use high efficiency equipment, where feasible, to reduce fuel usage.	Construction, Operations, Active Closure	EIS/EA Section 7.4.3.2
1-17	Mitigation	Track fuel use to identify anomalies in fuel use.	All	EIS/EA Section 7.4.3.2
1-18	Mitigation	Utilize appropriately sized trucks.	Operation	EIS/EA Section 7.4.3.2
1-19	Mitigation	Use high efficiency electrical motors throughout the Project.	Operation	EIS/EA Section 7.4.3.2
1-20	Mitigation	Use variable speed drive pumps with high-efficiency linings.	Operation	EIS/EA Section 7.4.3.2
1-21	Mitigation	Regular monitoring of the compressed air circuit so that leaks are repaired in a timely manner.	Operation	EIS/EA Section 7.4.3.2
1-22	Mitigation	Install light-sensitive switches on road lights so that lights do not operate during the day.	Operation	EIS/EA Section 7.4.3.2
1-23	Mitigation	Use of low emission/cleaner fuel alternatives to conventional fuels where practical, such as use of LNG in equipment and vehicles	Operation	EIS/EA Section 7.4.3.2
1-24	Mitigation	Construction lighting will be specified to use only as much lighting as is necessary for safe and efficient construction activities, and to locate portable lighting equipment where, to the extent feasible, it is not visible at nearby receptors.	Construction, Active Closure	EIS/EA Section 7.4.4.2
1-25	Mitigation	Use of directional light fixtures to avoid the transmission of light outside of the PDA.	Construction, Active Closure	EIS/EA Section 7.4.4.2
1-26	Mitigation	Design exterior lighting systems for Project operation to include directional lighting to limit light trespass and to avoid glare.	Operation	EIS/EA Section 7.4.4.2
1-27	Mitigation	Incorporate proper shielding via the use of full horizontal cutoff fixtures into the Project lighting plan (where practicable).	Operation	EIS/EA Section 7.4.4.2

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ATMOPSHERIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
1-28	Mitigation	Position portable lighting to limit visibility at surrounding residences.	Operation	EIS/EA Section 7.4.4.2
1-29	Mitigation	In the detailed roadway design, tree cover will be left in place where practicable to reduce the line-of-sight from receptors to the onsite roads.	Operation	EIS/EA Section 7.4.4.2
1-30	Mitigation	Lighting of the realigned Highway 11 will be implemented according to current MTO standards.	Operation	EIS/EA Section 7.4.4.2
1-31	Mitigation	Adhere to the International Code for Cyanide Management.	Operation	EIS/EA Appendix M7, Section 7.1.2.1
1-32	Mitigation	Kiln operators will regularly review the operational performance data of the kiln and associated equipment.	Operation	EIS/EA Appendix M7, Section 7.1.2.1
1-33	Mitigation	Water will be utilized on grading and bulldozing operations as required. Loading of haul trucks will be performed within the open pit using hydraulic shovels. The drop distance between the bucket and the bed of the haul truck will be minimized by the equipment operator or as much as possible.	Operation	EIS/EA Appendix M7, Section 7.1.2.2
1-34	Mitigation	A dust collector will be used to control dust from the lime silo during loading.	Operation	EIS/EA Appendix M7, Section 7.1.2.2
1-35	Mitigation	A dust collection system will be used in the lime preparation area to control emissions from the lime storage tank.	Operation	EIS/EA Appendix M7, Section 7.1.2.2
1-36	Mitigation	A buffer of existing vegetation will be maintained on each side of internal unpaved haul roads where feasible.	Operation	EIS/EA Appendix M7, Section 7.1.2.2
1-37	Mitigation	Under very dry meteorological conditions, as needed, tailings spigot discharge can be adjusted to provide adequate wetting of the tailings to suppress dust generation.	Operation	EIS/EA Appendix M7, Section 7.1.2.2

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ATMOPSHERIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
1-38	Mitigation	Progressive restoration of TMF cells will be conducted as cells are closed during the operations phase.	Operation	EIS/EA Appendix M7, Section 7.1.2.2
1-39	Commitment	Vehicle movements on WRSAs, main overburden storage area, and ore stockpile may be restricted during the nighttime as much as practicable to avoid travel on the sides of the WRSAs/ore stockpile facing off-property or the peak.	All	EIS/EA Section 7.4.4.2
1-40	Commitment	Those elements relevant to the Conceptual GHG MMP and Air Quality MP will be assembled into a 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.	All	EIS/EA Appendix M6, Section 8.2
1-41	Commitment	The Conceptual GHG Management and Monitoring Plan will be assessed annually to verify implementation and the continued suitability, adequacy and effectiveness of the Plan.	All	EIS/EA Appendix M6, Section 8.3
1-42	Monitoring	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.	All	EIS/EA Appendix M6, Section 8.3
1-43	Monitoring	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 the GHG Management and Monitoring Plan.	All	EIS/EA Appendix M6, Section 8.1.1.1

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ATMOPSHERIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
1-44	Monitoring	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.	All	EIS/EA Appendix M6, Section 8.1.1.2
1-45	Monitoring	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.	All	EIS/EA Appendix M6, Section 8.1.1.2
1-46	Monitoring	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 the GHG Management and Monitoring Plan.	All	EIS/EA Appendix M6, Section 8.1.1.2
1-47	Monitoring	Continual monitoring of pH of cyanide mixing / storage tanks to maintain alkaline solution.	Operation	EIS/EA Appendix M7, Section 7.1.2.1
1-48	Monitoring	The minimum air quality monitoring program will be comprised of a combination of high volume air samplers (or equivalent), dust deposition gauges and real time particulate monitors. Air quality monitoring stations will be installed to measure both the background (predominantly upwind) ambient particulate matter and that from the Project operations. The number and location of the ambient monitoring stations will be determined during the permitting phase of the Project.	Operation	EIS/EA Appendix M7, Section 8.1
1-49	Monitoring	A meteorological monitoring station will be installed and maintained to provide real time and periodic meteorological data to assist in day-to-day operational measures and for data interpretation. The location/siting criteria for the meteorological tower will be reviewed with the MOECC prior to installation and start of Project construction.	Operation	EIS/EA Appendix M7, Section 8.1

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ATMOPSHERIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
1-50	Monitoring	Reporting requirements under O.Reg 452/09 and 143/16 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.	All	EIS/EA Appendix M6, Section 8.1.1.3
1-51	Monitoring	If the applicable air standards for ambient air quality criteria are exceeded for one or more contaminants, then the MOECC will be notified and an investigation into the root cause will be undertaken. The notification of exceedances will be reported to the MOECC District Manager within 7 days of the exceedance(s) being identified. If it is determined that GGM was the likely cause, then the MOECC will be formally notified as per the requirements of Section 28 of O. Reg. 419/05. Appropriate corrective actions will be undertaken in following the requirements of Section 28 of O. Reg. 419/05.	All	EIS/EA Appendix M7, Section 6.2
1-52	Monitoring	Annual reports will be generated include both a summary and analysis of the ambient monitoring program for the previous year as required by the MOECC Operations Manual (MOECC, 2008). Annual reports are due to the MOECC by May 15th of the year following the reporting year.	Operation	EIS/EA Appendix M7, Section 8.2.1
1-53	Monitoring	On an annual basis the Project will be required to report to the National Pollutant Release Inventory (NPRI). Reports to the NPRI are typically due on June 1st of the year following the reporting calendar year.	Operation	EIS/EA Appendix M7, Section 8.2.2
1-54	Monitoring	For substances that meets the thresholds of the federal NPRI reporting program, GGM will also report the substance to Ontario's Toxics Reduction Program under O. Reg. 455/09 of the TRA. Through this program, GGM will: - Submit an annual report of the substance to the MOECC. - Prepare a Toxic Substance Reduction Plan (TSRP) by December 31st of the same year that the substance is reported to the MOECC.	Operation	EIS/EA Appendix M7, Section 8.2.2
1-55	Commitment*	During the permitting phase of the Project, the emissions estimates will be refined using detailed design data and the Environmental Compliance Approval	Construction	IR# AZA-AFN-GFN_28

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ATMOPSHERIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		application submitted to the MOECC for the Project will be required to demonstrate compliance with relevant MOECC air quality standards.		
1-56	Commitment*	Construction phase Best Management Practices Plan (for air quality) is to be submitted to MOECC during permitting.	Construction	IR# MOECC_16
1-57	Commitment*	GGM will share information with and obtain input from Ontario Parks during development of the details of Air Quality Management and Monitoring Plan in relation to MacLeod Provincial Park.	Construction	IR# MOECC_179
1-58	Commitment*	The 2016 ambient monitoring report will be incorporated into the ECA permit application.	Construction	IR# MOECC_133
1-59	Commitment*	Baghouse maintenance will be discussed in the air quality management plan.	Construction	IR# MOECC_21
1-60	Monitoring*	The form and frequency of reporting of the ambient air quality monitoring results will be determined as the Project progresses through permitting and further consideration can be made for real-time monitoring as details are advanced with engineering; however, at minimum, it is anticipated that relevant elements will be assembled into a formal report and made available to interested parties including Aboriginal communities, on an annual basis during construction and operation and during closure in years when monitoring is carried out.	Construction	IR# AZA-AFN-GFN_29
1-61	Monitoring*	The AQMMP for the Project will include sampling to analyze the silt content of the unpaved roads to confirm EA assumptions. The sampling will be included in the appendix of the BMP complete with a technical memo outlining the sampling procedure and locations. Results of silt content analysis completed for the Construction Phase BMP will be included in the updated Operational Phase BMP. Consideration will be given to more frequent sampling of unpaved roads in closer proximity to off-property receptors. The silt sampling requirements will be refined through adaptive management determined based on the roads in proximity to off-property receptors, results of air quality monitoring, and effectiveness of mitigation measures.	All	IR# MOECC_18, MOECC_19, CEAA_103
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 2: Mitigation, Monitoring and Commitments Related to the Acoustic Environment

ACOUSTIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
2-1	Mitigation	Noise mitigation measures (e.g., muffler systems) will be installed on construction and other mobile equipment and equipment will be properly maintained.	All	EIS/EA Section 8.4.2.2
2-2	Mitigation	Select equipment and/or design acoustical enclosures to limit overall noise emissions.	Operation	EIS/EA Section 8.4.2.2
2-3	Mitigation	Limits on the overall noise emissions transferring through doors for building enclosures.	Operation	EIS/EA Section 8.4.2.2
2-4	Mitigation	Air inlet and discharge silencers for exhaust stacks associated with diesel or natural gas-fueled generators.	Operation	EIS/EA Section 8.4.2.2
2-5	Mitigation	All buildings that are used to enclose noise generating equipment will include, at a minimum, an enclosure of standard sheet metal (about 18 to 20 gauge) cladding or an enclosure providing insertion losses specified in Table 4-1 in Appendix F2 of the Final EIS/EA.	Operation	EIS/EA, Appendix F2 Section 4.1.2
2-6	Mitigation	The doors on buildings enclosing noise generating equipment will be kept closed and there will be a door providing a Sound Transmission Class (STC) of STC-20 or better.	Operation	EIS/EA, Appendix F2 Section 4.1.2
2-7	Mitigation	Exhaust stacks associated with diesel or natural gas-fueled generator power house generator inlets, and discharges will have silencers providing the dynamic insertion losses presented in Table 4-2 in Appendix F2 of the Final EIS/EA.	Operation	EIS/EA, Appendix F2 Section 4.1.2
2-8	Mitigation	The generator exhaust at the natural gas-fueled power plant will have a muffler with the insertion loss presented in Table 4-3 in Appendix F2 of the Final EIS/EA.	Operation	EIS/EA, Appendix F2 Section 4.1.2
2-9	Mitigation	Construction equipment will be turned off when not in use (i.e., a no idling policy will be implemented).	Construction	EIS/EA Appendix M10, Section 7.1.1

Table 2: Mitigation, Monitoring and Commitments Related to the Acoustic Environment

ACOUSTIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
2-10	Commitment	Advise nearby residents of major noise generating and blasting activities.	Operation	EIS/EA Section 8.4.2.2, 8.4.3.2
2-11	Commitment	Implement a complaint response procedure to address noise and vibration complaints should they arise.	All	EIS/EA Section 8.4.2.2, 8.4.3.2
2-12	Commitment	Where possible, conduct blasting primarily on weekdays, typically mid-day. GGM will also endeavor to avoid blasting on statutory holidays.	Operation	EIS/EA Section 8.4.2.2
2-13	Commitment	Where possible, major construction activities will be scheduled to take place during daytime hours (i.e., 07:00 h to 19:00 h) to avoid sensitive night-time periods.	Construction, Active Closure	EIS/EA Section 8.4.2.2
2-14	Commitment	If the total area of ventilation openings exceeds 4% of the total façade area, an acoustical louver will be provided.	Operation	EIS/EA Section 8.4.2.2
2-15	Commitment	The development plan for WRSA A will take into account 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, and/or specialized back up alarms or box liners on the trucks operating at WRSA A.	All	EIS/EA Section 8.4.2.2
2-16	Commitment	Each blasting event will be monitored in accordance with the MOECC requirements for the selected sound and vibration limits due to blasting.	Operation	EIS/EA Section 8.4.2.2, 8.4.3.2
2-17	Commitment	GGM will discuss with MTO the possibility of posting warning signs along Highway 11 regarding blasting.	Construction, Operation	EIS/EA Section 8.4.2.2
2-18	Commitment	Work with a blasting contractor to refine the Conceptual Explosives Management Plan to minimize vibration effects on Point of Reception (PoRs).	Construction, Operation	EIS/EA Section 8.4.2.2

Table 2: Mitigation, Monitoring and Commitments Related to the Acoustic Environment

ACOUSTIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
2-19	Commitment	It is anticipated that those elements relevant to the Conceptual NVMMP 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.	All	EIS/EA Section 8.4.2.2
2-20	Commitment	The NVMMP will be assessed annually to verify implementation and the continued suitability, adequacy and effectiveness of the Plan.	All	EIS/EA Appendix M10, Section 8.1
2-21	Monitoring	An ambient noise monitoring program will be conducted for construction activities during summer months; the monitoring will meet the requirements of MOECC publication Procedures, Model Municipal Noise Control By-Law (NPC-103) (MOE 1978d) (NPC-103).	Construction	EIS/EA Appendix F2, Section 4.3
2-22	Monitoring	An ambient noise monitoring program will be conducted during the first year of operation activities for both Phase 1 and 2. The monitoring will meet the requirements of NPC-103.	Operation	EIS/EA Appendix F2, Section 4.4
2-23	Monitoring	Sound level Leq [1 hour] will be monitored using a Type 1 sound level meter at 6 to 10 locations within the project area at a frequency to be determined.	Construction, Operation	EIS/EA Appendix M10, Section 8.1
2-24	Monitoring	Meteorology (wind speed, wind direction, temp., relative humidity) will be measured using a meteorological tower at a location and frequency to be determined.	Construction, Operation	EIS/EA Appendix M10, Section 8.1
2-25	Monitoring	Blasting noise will be measured using a tool capable logging peak sound pressure level at locations and frequency to be determined.	Construction, Operation	EIS/EA Appendix M10, Section 8.1
2-26	Monitoring	Blasting vibration will be measured using a tool capable of logging vibration as peak particle velocity at locations and frequency to be determined.	Construction, Operation	EIS/EA Appendix M10, Section 8.1

Table 2: Mitigation, Monitoring and Commitments Related to the Acoustic Environment

ACOUSTIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
2-27	Monitoring	Sound level meters must be calibrated in the last 3 years by manufacturer or independent accredited laboratory.	Construction, Operation	EIS/EA Appendix M10, Section 8.2.1
2-28	Monitoring	Calibration of the sound level meters must be verified with a portable field-calibrator before and after the measurement period(s).	Construction, Operation	EIS/EA Appendix M10, Section 8.2.1
2-29	Monitoring	The portable field-calibrator must be calibrated within the last year by manufacturer or independent accredited laboratory.	Construction, Operation	EIS/EA Appendix M10, Section 8.2.1
2-30	Monitoring	Noise monitors will be deployed for each major construction activity at (or as near as possible) the nearest Points of Reception from the major construction activity. The length of the monitoring period/timing will be selected, considering the construction schedule, during period(s) for which the majority of the equipment will be operational at a given area.	Construction	EIS/EA Appendix M10, Section 8.3.1
2-31	Monitoring	Noise monitors will be deployed at receptor location(s) which are nearest to operation activities as well as at the periphery of major noise contributing areas including: • process plant area and on-site power generation • roadways (WRSA and tailings)	Operation	EIS/EA Appendix M10, Section 8.4.1
2-32	Monitoring	Monitoring will be conducted for a minimum of 72 hours at the beginning of each phase of operation and periodically thereafter depending on results. The frequency of monitoring and/or requirements for additional monitoring will be reviewed and may be modified based on completed monitoring results and operational changes.	Operation	EIS/EA Appendix M10, Section 8.4.1
2-33	Monitoring	Vibration and overpressure meters will be deployed for initial blasting events located as close as possible to the receptor anticipated to be the most affected. Meters deployed outdoors within a residence property will be within 7 m of the building as per NPC-119. A second meter will be located at or near the PDA boundary proximate to Community Heritage Resource (CHR) 1 and potentially	Construction, Operation	EIS/EA Appendix M10, Section 8.5.2

Table 2: Mitigation, Monitoring and Commitments Related to the Acoustic Environment

ACOUSTIC ENVIRONMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		additional meters in the vicinity of inhabited areas (Rosedale Point neighborhood and Macleod Provincial Park).		
2-34	Monitoring	Blasting monitoring will be conducted during blasting activities until compliance is confirmed at which point monitoring may be reduced or discontinued.	Construction, Operation	EIS/EA Section 7.4.4.2
2-35	Commitment*	GGM will share information with and obtain input from Ontario Parks during development of the details of the Noise and Vibration Management Plan in relation to MacLeod Provincial Park.	Construction	IR# MOECC_179, MNRF_53, MNRF_63
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 3: Mitigation, Monitoring and Commitments Related to Groundwater

GROUNDWATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
3-1	Mitigation	Limit construction footprint (i.e., PDA) to the extent possible to reduce the potential for reductions in groundwater recharge, and limit the number of watersheds overprinted by the PDA.	Construction	EIS/EA Section 9.4.2.2
3-2	Mitigation	Use standard management practices throughout the Project, including drainage control and excavation and open pit dewatering.	All	EIS/EA Section 9.4.2.2
3-3	Mitigation	Use standard construction methods, such as seepage cutoff collars, where trenches extend below the water table to mitigate preferential flow paths.	Construction, Operation	EIS/EA Section 9.4.2.2
3-4	Mitigation	Return water generated from historical underground dewatering (with treatment at the ETP as required) to Kenogamisis Lake during operation to offset a reduction in groundwater discharge.	Operation	EIS/EA Section 9.4.2.2
3-5	Mitigation	Consider accelerating open pit filling at closure to return groundwater levels to baseline conditions in a shorter timeframe.	Closure	EIS/EA Section 9.4.2.2
3-6	Mitigation	Removal of impacted soils from the historical process plant areas and manage in accordance with the Soil Management Plan.	All	EIS/EA Section 9.4.3.2
3-7	Mitigation	Removal of approximately 22% of the historical MacLeod tailings and 77% of the historical Hardrock tailings and placement within the new TMF.	Operation	EIS/EA Section 9.4.3.2
3-8	Mitigation	Installation of an enhanced cover over the remaining historical MacLeod high tailings to reduce infiltration and increase runoff.	Operation	EIS/EA Section 9.4.3.2
3-9	Mitigation	Installation of a subsurface seepage collection system around the base of the historical MacLeod high tailings to collect seepage and groundwater recharge from the tailings.	All	EIS/EA Section 9.4.3.2
3-10	Mitigation	Design of the WRSAs to increase the amount of runoff and reduce the amount of infiltration through the WRSAs, thereby reducing the recharge and loading to groundwater.	All	EIS/EA Section 9.4.3.2
3-11	Mitigation	Installation of contact water collection ditches around the overburden storage area, ore stockpile and WRSAs to collect toe seepage and groundwater recharge from these Project components.	All	EIS/EA Section 9.4.3.2

Table 3: Mitigation, Monitoring and Commitments Related to Groundwater

GROUNDWATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
3-12	Mitigation	Implementation of progressive rehabilitation (placement of a vegetated soil cover) to reduce infiltration into the WRSAs and TMF.	Operation, Closure	EIS/EA Section 9.4.3.2
3-13	Mitigation	Implementation of cyanide detoxification technology to reduce cyanide concentrations and precipitate metals in the process plant.	Operation	EIS/EA Section 9.4.3.2
3-14	Mitigation	Installation of seepage collection ditches around the TMF to collect seepage from the TMF dam and groundwater recharge originating from the TMF.	All	EIS/EA Section 9.4.3.2
3-15	Monitoring	The dewatering rates from the aggregate source areas, historical underground workings and open pit will be monitored and recorded.	Construction, Operation	EIS/EA Appendix M1, Section 8.1.1.2
3-16	Monitoring	Monitor groundwater levels in monitoring wells to document changes in water levels and flow in response to dewatering of the historical underground workings and open pit, aggregate sources, and changes in recharge due to Project components. Monitor using a combination of manual and automated monitoring methods with the frequency and approach modified throughout the life of the Project. During initial periods of monitoring, automated monitoring will be implemented to confirm initial water level responses to dewatering. As effects on levels are confirmed, monitoring may be transitioned to manual methods or discontinued at locations where no effects are observed.	Construction, Operation	EIS/EA Appendix M1, Section 8.1.1.2
3-17	Monitoring	Monitor groundwater quantity and quality to document the effects of changes in groundwater flow and quality associated with the historical MacLeod and Hardrock tailings and Project components. Select monitoring locations near the immediate source area to confirm the quality of water infiltrating to the groundwater system and down gradient of the seepage collection system. The monitoring locations immediately down gradient of the Project component and seepage collection system will be used as trigger monitoring location to identify the need for adaptive management.	Construction, Operation	EIS/EA Appendix M1, Section 8.1.1.2
3-18	Monitoring	Monitoring locations will be maintained until the location is no longer required. If a monitoring location/station is no longer required but is identified as part of a	Construction, Operation	EIS/EA Appendix M1, Section 8.1.1.2

Table 3: Mitigation, Monitoring and Commitments Related to Groundwater

GROUNDWATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		regulatory approval, it will only be removed from the monitoring program once the required amendments are approved.		
3-19	Monitoring	Monitor water quantity (flow rate and total daily volume) and quality (daily grab sample during dewatering with total of three samples per week) of dewatering water during construction in accordance with PTTW and ECA requirements.	Construction	EIS/EA Appendix M1, Section 8.1.2
3-20	Monitoring	Monitor water quantity (flow rate and total daily volume) and quality (monthly) pumped from Mosher No. 1 Shaft and Hardrock No. 1 and No. 2 Shafts during dewatering of historical underground workings and open pit in accordance with the requirements of the PTTW.	Construction	EIS/EA Appendix M1, Section 8.1.2
3-21	Monitoring	Monitor groundwater levels in monitoring wells (monthly or continuous depending on location) within the overburden and bedrock to monitor the effects of open pit dewatering and aggregate source dewatering in accordance with the requirements of the PTTW.	Construction	EIS/EA Appendix M1, Section 8.1.2
3-22	Monitoring	Monitor water levels (continuous) in the historical underground workings to support open pit dewatering.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
3-23	Monitoring	Monitor groundwater levels (monthly or continuous depending on location) and water quality (annually) in monitoring wells upgradient, cross gradient, and downgradient of the TMF, WRSAs, and historical MacLeod and Hardrock tailings to monitor for changes in groundwater quality and flow regime due to Project development.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
3-24	Monitoring	Monitor groundwater levels (monthly or continuous depending on location) and water quality (annually) in background monitoring wells.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
3-25	Monitoring	Records generated from water monitoring activities will be maintained, retained and stored.	Construction, Operation	EIS/EA Appendix M1, Section 8.2.1

Table 3: Mitigation, Monitoring and Commitments Related to Groundwater

GROUNDWATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
3-26	Monitoring	It is anticipated that those elements relevant to compliance monitoring will be assembled into a formal report and provided to interested parties on an annual basis during construction and operation, and during closure in years when monitoring is carried out.	Construction, Operation	EIS/EA Appendix M1, Section 8.2.1
3-27	Commitment*	The design of Pond M1 will be confirmed during detailed design with additional geotechnical testing in the area being completed along with refining operating requirements and water levels for the pond. Based on actual site conditions, the need for a liner to maintain pond volumes and to address potential seepage if required will be confirmed. During detailed design, the configuration of Pond M1 will also be optimized to increase the setback from the Southwest Arm Tributary where feasible.	Construction	IR# AZA-AFN-GFN_15, MNDM_13, MOECC_24, MOECC_69
3-28	Commitment*	The HELP input and output parameters will be documented in a memorandum and provided to support the permitting process.	Construction	IR# MOECC_32
3-29	Monitoring*	Performance of the WRSA and TMF cover design will be evaluated during operations as part of progressive rehabilitation.	Operation	IR# MNDM_21

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
4-1	Mitigation	Reduce Project effluent discharge by reusing contact water in Project processes.	All	EIS/EA Section 10.4.2.2
4-2	Mitigation	Limit construction footprint (i.e., PDA) to the extent practicable.	Construction	EIS/EA Section 10.4.2.2
4-3	Mitigation	Maintain existing drainage patterns with the use of culverts.	All	EIS/EA Section 10.4.2.2
4-4	Mitigation	Maintain access roads by periodically regrading and ditching to improve water flow, reduce erosion and manage vegetation growth.	All	EIS/EA Section 10.4.2.2, 10.4.3.2
4-5	Mitigation	Inspect culverts periodically. Remove accumulated material and debris upstream and downstream of the culverts to prevent erosion, flooding, habitat damage, property damage and mobilization of sediment.	All	EIS/EA Section 10.4.2.2
4-6	Mitigation	Attenuate peak discharges to the environment through use of Project water storage features (i.e., historical underground workings, and contact water collection ponds).	All	EIS/EA Section 10.4.2.2
4-7	Mitigation	Implement progressive rehabilitation to reduce infiltration into the WRSA and TMF by increasing the evapotranspiration capacity.	Operation	EIS/EA Section 10.4.2.2
4-8	Mitigation	Dewater the historical Macleod-Mosher and Hardrock underground workings and maintain approximately 25 m dewatered condition between the active open pit floor and the water level in the underground workings.	Construction, Operation	EIS/EA Section 10.4.2.2
4-9	Mitigation	Collect runoff and groundwater seepage from the open pit, with water directed to the historical underground workings associated with the historical MacLeod-Mosher and Hardrock mines via drainage shafts bored through the active open pit floor.	Operation	EIS/EA Section 10.4.2.2
4-10	Mitigation	Discharge excess water from pond M1 to the Southwest Arm of Kenogamisis Lake following appropriate treatment as required.	Operation	EIS/EA Section 10.4.2.2
4-11	Mitigation	Grade perimeter and access roads to divert runoff away from the open pit.	Operation	EIS/EA Section 10.4.2.2
4-12	Mitigation	Recycle of contact water for ore processing.	Operation	EIS/EA Section 10.4.2.2

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
4-13	Mitigation	Take process water from the TMF, pond M1, and excess water from the historical underground workings and open pit dewatering.	Operation	EIS/EA Section 10.4.2.2
4-14	Mitigation	Balance the timing of recycling from sources to relieve storage pressures on contact water collection ponds, provide a more sustainable, seasonally attenuated mill demand system, and moderate the flows to the ETP.	Operation	EIS/EA Section 10.4.2.2
4-15	Mitigation	Draw potable water from a connection to the Greenstone municipal water supply system.	Construction, Operation	EIS/EA Section 10.4.2.2
4-16	Mitigation	Construct perimeter runoff and contact water collection ditches to collect overland flow, seepage, and intercept shallow groundwater flow, and divert freshwater away from Project components.	Construction, Operation	EIS/EA Section 10.4.2.2
4-17	Mitigation	Construct contact water collection ditches to convey the 1:100 year storm event.	Construction, Operation	EIS/EA Section 10.4.2.2
4-18	Mitigation	Construct water collection ditches with positive gradients to limit standing water, maintain positive flow and act as interception ditches for groundwater.	Construction, Operation	EIS/EA Section 10.4.2.2
4-19	Mitigation	Contact water collection ponds will provide onsite storage of local runoff with the size and residence times designed to provide sediment removal to meet the MMER effluent TSS criterion of 15 mg/L, with removal of particles down to the 5 micron (µ) in size.	Construction, Operation	EIS/EA Section 10.4.2.2, 10.4.3.2
4-20	Mitigation	Contact water collection ponds will contain (without discharge) flows resulting from the 1:100 year, 24-hour storm event, including emergency spillways and maintaining minimum freeboard of 0.5 m. The emergency spillways will enable the collection ponds to attenuate and manage larger storms than the 1:100 year up to the Timmins regulatory storm event (which is a larger runoff event than the 1:500 year event).	Construction, Operation	EIS/EA Section 10.4.2.2
4-21	Mitigation	Contact water collection ponds will have active water storage that considers ice thickness during winter. Under an extreme storm event, such as Timmins Storm, only the stormwater in excess of the available storage at that time will be discharged to the environment via the emergency spillway to protect the collection ponds.	Construction, Operation	EIS/EA Section 10.4.2.2

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
4-22	Mitigation	Configure pond inlet and outlet structures to reduce inlet velocity and scour and meet sedimentation requirements.	Construction, Operation	EIS/EA Section 10.4.2.2
4-23	Mitigation	Construct pond outlets with subsurface inlets to mitigate against chemical stratification in ponds, thermal heating of discharge and ice blockage of outlets.	Construction, Operation	EIS/EA Section 10.4.2.2
4-24	Mitigation	Construct TMF with two cells to allow progressive development and rehabilitation of the TMF during operation to reduce water management requirements.	Operation	EIS/EA Section 10.4.2.2
4-25	Mitigation	Construct TMF dam to maintain water storage to contain the Environmental Design Flood with no discharge through the spillway. To address extreme weather events, maintain an emergency spillway to safely pass the Inflow Design Flood while maintaining minimum freeboards requirements to protect the structural integrity of the dam.	Operation	EIS/EA Section 10.4.2.2
4-26	Mitigation	Construct dam runoff and seepage captured in seepage collection ditches downstream of the dams and pumped back to the TMF via three seepage collection ponds (T1, T2 and T3, Figure 10-34). The normal operation levels in the seepage collection ponds will be lower than those of the surrounding water table. The ponds and design pump capacity will store water for 14 days while water from the pond is pumped back to the TMF.	Operation	EIS/EA Section 10.4.2.2
4-27	Mitigation	Design and operate the TMF with no discharge to the environment during operation through reclaiming and recycling surplus water to meet mill demand.	Operation	EIS/EA Section 10.4.2.2
4-28	Mitigation	Design and construct the temporary ditch to divert runoff from Goldfield Creek watershed between the Goldfield Creek diversion dam and the TMF inner dam towards the upper drainage area of watercourse WC-O.	Construction, Operation	EIS/EA Section 10.4.2.2
4-29	Mitigation	Design and construct of the Goldfield Creek diversion channel extending easterly from the north end of the TMF into the Southwest Arm Tributary to convey the peak flow from the EDF (the more severe of a 100 year 24-hour rainfall event and a 100 year 30-day freshet).	All	EIS/EA Section 10.4.2.2
4-30	Mitigation	Implement habitat offsetting including:	All	EIS/EA Section 10.4.2.2

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		• develop approx. 7.5 ha of new pond habitat at the interface between the existing Goldfield Creek and the new diversion channel (referred to as the Goldfield Creek diversion pond) • construct a new approx. 2.7 km Goldfield Creek (bankfull channel dimension) diversion channel between the Goldfield Creek diversion pond and the existing Southwest Arm Tributary watercourse (SWP1) • reconstruct the existing Southwest Arm Tributary channel between SWP2 and SWP3 to convey larger flows and facilitate the replacement of the existing Lahtis Road crossing • construct two valley wide grade control structures within the existing Southwest Arm Tributary to impound and attenuate flows, and reduce water velocities to mitigate erosion due to increased flows.		
4-31	Mitigation	Mitigate changes in groundwater discharge and flow in surface water features near the aggregate source areas by directing dewatering water to the receiving environment to augment any changes in flows.	Construction, Operation	EIS/EA Section 10.4.2.2
4-32	Mitigation	Implement progressive erosion and sediment control measures during construction.	All	EIS/EA Section 10.4.3.2
4-33	Mitigation	Implement progressive water management over the life of the mine including development of drainage controls for areas only prior to the development and expansion of these features.	All	EIS/EA Section 10.4.3.2
4-34	Mitigation	Use perimeter berms to divert non-contact runoff from disturbed areas.	Operation	EIS/EA Section 10.4.3.2
4-35	Mitigation	Remove approximately 22% of the historical MacLeod tailings and 77% of the historical Hardrock tailings and their placement within the new TMF.	Operation	EIS/EA Section 10.4.3.2
4-36	Mitigation	Promote the collection, storage and reuse of contact water (runoff and seepage), only discharging excess water after reuse and treatment as necessary.	Operation	EIS/EA Section 10.4.3.2
4-37	Mitigation	Use site-distributed contact water collection ponds and historical underground workings to store runoff and provide initial sedimentation.	Operation	EIS/EA Section 10.4.3.2

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
4-38	Mitigation	Treat the dewatering water from the historical underground workings using the construction ETP during construction until the permanent ETP is ready for use.	Construction	EIS/EA Section 10.4.3.2
4-39	Mitigation	Treat effluent discharge where required to effluent criteria as specified in the ECA	Construction, Operation	EIS/EA Section 10.4.3.2
4-40	Mitigation	Maintain effluent discharge rates to below the maximum rate used in the Assimilative Capacity Study (141 L/s).	Construction, Operation	EIS/EA Section 10.4.3.2
4-41	Mitigation	Maintain culverts to avoid debris and sediment accumulation.	Construction, Operation	EIS/EA Section 10.4.3.2
4-42	Mitigation	Implement dust suppression measures for exposed ground areas of the PDA.	Construction, Operation	EIS/EA Section 10.4.3.2
4-43	Mitigation	Implement progressive rehabilitation and closure plans, including progressive rehabilitation (placement of soil cover and vegetation) to reduce infiltration by increasing the evapotranspiration capacity and control runoff.	Construction, Operation	EIS/EA Section 10.4.3.2
4-44	Mitigation	Incorporate a subsurface seepage collection system consisting of a French drain system into the stabilization berm along the toe of the historical MacLeod high tailings during the initial construction works.	Operation	EIS/EA Section 10.4.3.2
4-45	Mitigation	The subsurface seepage system will address both short-term seepage anticipated during construction and highway embankment pre-loading and long-term seepage (operation and closure/post-closure) from the historical MacLeod high tailings. Seepage collected will drain by gravity to two collection ponds located west and east side of the tailings. The collection ponds will be lined with a 40 mil high density polyethylene geomembrane and designed to contain the 100-year 24 hour rainfall event and 7 days of seepage accumulation to account for possible power outrage and prolonged maintenance.	Construction, Operation	EIS/EA Section 10.4.3.2
4-46	Mitigation	The subsurface collection system for the historical MacLeod high tailings will separate seepage from surface water runoff that will be collected within the seepage collection ditches.	Construction, Operation	EIS/EA Section 10.4.3.2

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
4-47	Mitigation	Water from the seepage collection ponds will be pumped to the construction ETP for treatment prior to discharge during construction and either to the process plant to meet reclaim demands or the permanent ETP during operation.	Construction, Operation	EIS/EA Section 10.4.3.2
4-48	Mitigation	Use cyanide detoxification within the mill to the extent practical.	Operation	EIS/EA Section 10.4.3.2
4-49	Mitigation	Implement of the Soil Management Plan, Waste Rock Management Plan, Waste Management Plan and Spill Prevention and Response Plan.	All	EIS/EA Section 10.4.3.2
4-50	Mitigation	Implement a sewage treatment and disposal system to serve the mine site.	Operation	EIS/EA Section 10.4.3.2
4-51	Mitigation	Third party sewage disposal contractor to provide portable washroom facilities with offsite disposal until the STP and sewage discharge line are set-up.	Construction, Closure	EIS/EA Section 10.4.3.2
4-52	Mitigation	Implement the following mitigation measures prior to placement of overburden on the stockpile: • construction of perimeter subsurface collection ditches and pond A1 • construction of a capillary break over the historical MacLeod high tailings • construction of a subsurface seepage collection facility at the historical MacLeod high tailings.	Construction	EIS/EA Appendix M1, Section 8.2.2
4-53	Mitigation	Regular inspection and maintenance of seepage/contact water collection network to have available necessary capacity and proper function of the system	Construction, Operation	EIS/EA Appendix M8, Section 7.1.1
4-54	Mitigation	Storage and management of cyanide reagent will be in accordance with the *International Cyanide Management Code* for the manufacture, transport, and use of cyanide in the production of gold.	Construction, Operation	EIS/EA Appendix M8, Section 7.1.1
4-55	Commitment	The construction ETP will be connected via temporary piping to the construction treated effluent discharge location along the shoreline of the Southwest Arm of Kenogamisis Lake and will meet effluent discharge criteria. During operation, water coming into contact with Project components will be collected and directed through the permanent ETP prior to discharge to the	Construction, Operation	EIS/EA Section 24.2

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		environment. The ETP will treat for metals removal and reduction of total suspended solids prior to discharge and will meet effluent discharge criteria.		
4-56	Commitment	During closure, in the event that actual water quality is different to that predicted, water quality can be addressed by implementing a constructed wetland. Model predictions will be verified through monitoring of water quality and used to refine closure planning through operation. During operation and with the need informed by ongoing geochemical testing, GGM will carry out a wetland pilot study to inform the design criteria for this contingency closure measure.	Operation	EIS/EA Section 24.2 IR# MOECC_209, MNRF_107, MNDM_20, GFN_11
4-57	Monitoring	Monitor pumping rates and water quality from the various contact water collection systems.	Construction	EIS/EA Appendix M1, Section 8.1.1
4-58	Monitoring	Monitor discharge rates and treated effluent water quality from the STP and ETP.	All	EIS/EA Appendix M1, Section 8.1.1
4-59	Monitoring	Monitor surface water levels and flows by water level recording and stream flow gauging (e.g., channel velocity, depth and flow profiling during ice-free and ice-in periods) to document the changes in flows and water levels within the Southwest Arm Tributary, Goldfield Creek Tributary, Mosher Lake, and Kenogamisis Lake. Document the effects of dewatering the historical underground workings and open pit and the changes in surface water flow due to Project infrastructure.	All	EIS/EA Appendix M1, Section 8.1.1
4-60	Monitoring	Monitor surface water quantity and quality to document the effects of changes in surface water flow and quality associated with Project components within the PDA. Confirm model predictions related to water quality in Kenogamisis Lake. Confirm the extent of the mixing zone for the discharge of effluent from the STP and ETP to the Southwest Arm of Kenogamisis Lake and the predicted overall improvement in water quality within Kenogamisis Lake due to the reduction in discharge from the historical tailings.	All	EIS/EA Appendix M1, Section 8.1.1
4-61	Monitoring	Monitor water quantity (flow rate and total daily volume) and quality (daily grab sample during discharge with total of three samples per week) of surface water dewatering during construction prior to discharge	All	EIS/EA Appendix M1, Section 8.1.2

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
4-62	Monitoring	Monitor water quantity (flow rate and total daily volume) from the freshwater intake in the Southwest Arm of Kenogamisis Lake in accordance with the requirements of the PTTW	All	EIS/EA Appendix M1, Section 8.1.2
4-63	Monitoring	Monitor water quantity (flow rate and total daily volume) and quality (daily grab sample during discharge with total of three samples per week) from the STP and ETP discharge to the Southwest Arm of Kenogamisis Lake in accordance with the requirements of the ECA.	All	EIS/EA Appendix M1, Section 8.1.2
4-64	Monitoring	Monitor water quality of the Southwest Arm of Kenogamisis Lake to monitor effluent discharge and the extent of the mixing zone within the receiver at a monthly frequency.	All	EIS/EA Appendix M1, Section 8.1.2
4-65	Monitoring	Monitor water quantity (flow rate through continuous water level monitoring and rating curve development) and quality (monthly grab sample) of the pit lake discharge and TMF at closure.	All	EIS/EA Appendix M1, Section 8.1.2
4-66	Monitoring	Monitoring locations/stations may be added or removed from the monitoring program in accordance with their utility in monitoring the effects of the Project on the environment. If a monitoring location/station is no longer required but is identified as part of a regulatory approval, it will only be removed from the monitoring program once the required amendments are approved.	All	EIS/EA Appendix M1, Section 8.1.2
4-67	Monitoring	Monitor water quantity (flow rate and total daily volume) and quality (spring, summer, and fall grab sample) of contact water collection ponds once they become operational.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
4-68	Monitoring	Monitor pond M1 for quality at a monthly frequency to confirm treatment requirements in the ETP.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
4-69	Monitoring	Monitor water quantity (water levels and total daily reclaim volume) and quality (spring, summer, fall grab sample) from the TMF seepage collection ponds.	Operation	EIS/EA Appendix M1, Section 8.1.2.2

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
4-70	Monitoring	Monitor water quantity (total daily reclaim volume) and quality (spring, summer, fall grab sample) from the historical MacLeod tailings subsurface seepage collection ponds.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
4-71	Monitoring	Visually monitor (weekly) contact water and seepage collection ponds for water levels including water levels, blockage or obstructions of inlets and outlets.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
4-72	Monitoring	Hydrometric monitoring of the water levels of Mosher Lake and Kenogamisis Lake (Kenogamisis Lake will be monitored from the WSC gauge and water levels in Mosher Lake will be monitored continuously by automated methods by GGM).	Operation	EIS/EA Appendix M1, Section 8.1.2.2
4-73	Monitoring	Hydrometric monitoring of water levels and flows (continuous) in streams including the Southwest Arm Tributary (at SWP-3 and D/S within the channel bed) and Goldfield Creek Tributary.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
4-74	Monitoring	Monitor water quality (quarterly) of Barton Bay, the Central Basin, Outflow Basin, and downstream of Kenogamisis Lake at the locations indicated on Figure 8-1 of the Water Management and Monitoring Plan (Appendix M1 of the Final EIS/EA) to document changes in water quality.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
4-75	Monitoring	Monitor water quality (quarterly) of the streams and lakes in the LAA including the Goldfield Creek Tributary, Goldfield Creek diversion channel, Southwest Arm Tributary inflow to the Southwest Arm of Kenogamisis Lake and Mosher Lake.	Operation	EIS/EA Appendix M1, Section 8.1.2.2
4-76	Monitoring	It is anticipated that those elements relevant to compliance monitoring will be assembled into a formal report and provided to interested parties on an annual basis during construction and operation, and during closure in years when monitoring is carried out.	Construction, Operation	EIS/EA Appendix M1, Section 8.2.1
4-77	Mitigation*	Water from each of the surface water discharge points will be managed on site until water quality is found to consistently meet effluent criteria.	Closure	IR# MOECC_209, MNDM_20
4-78	Mitigation*	The temporary storage of historical tailings within WRSA C would include the construction of a temporary storage pad within the footprint of WRSA C, which is situated such that the natural slope of the ground drains back towards the plant site	Construction	IR# MOECC_90, MOECC_191, MNRF_95,

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		and is thus within the footprint of the Project where early water management is already planned. Excavated tailings would be stored on a foundation constructed of a compacted till or clay soil layer to mitigate groundwater seepage within the pad graded towards a contact water collection sump. Contact water would then be pumped from the sump to the construction effluent treatment plant.		CEAA_5, CEAA_90
4-79	Commitment*	Update water quality modelling to further evaluate future pit lake water quality during closure and at the time of discharge as data is developed to validate actual site water quality during operations. This modelling will be used to refine the pit lake water quality at time of discharge, and the need for subsequent treatment or effluent polishing and to support required regulatory approvals.	Closure	IR# MNDM_22, MOECC_212, MOECC_216
4-80	Commitment*	The precise Safety Pond siting is planned to be optimized during detailed engineering to consider the final engineering plans for the haul road, tailings and water reclaim lines, and DFO Offsetting plan.	Construction	IR# MOECC_105, MOECC_109, MNRF_105
4-81	Commitment*	It is anticipated that the sludge will be stored in geotextile bags and transferred to the tailings management facility when operational. The temporary sludge storage location will include seepage collection to contain and collect any contact water which will be directed to the ETP.	Construction	IR# MOECC_26
4-82	Commitment*	The design of Pond M1 will be confirmed during detailed design with additional geotechnical testing in the area being completed along with refining operating requirements and water levels for the pond. Based on actual site conditions, the need for a liner to maintain pond volumes and to address potential seepage if required will be confirmed. During detailed design, the configuration of Pond M1 will also be optimized to increase the setback from the Southwest Arm Tributary where feasible.	Construction	IR# AZA-AFN-GFN_15, MNDM_13, MOECC_24, MOECC_69
4-83	Commitment*	Acceptable discharge criteria for closure will be established through consultation with staff from MNDM to fulfill the requirements of O. Reg. 240/00.	Closure	IR# MNDM_15
4-84	Commitment*	If the tailings safety pond for emergency draining of the tailings line remains within the flood plain of the Southwest Arm Tributary, the facility will be engineered to prevent water over-topping the containment berm during a flood event.	Construction	IR# MOECC_105, MOECC_109, MNRF_105

Table 4: Mitigation, Monitoring and Commitments Related to Surface Water

SURFACE WATER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
4-85	Commitment*	A detailed design brief and engineering drawings of the proposed waste water treatment system will be prepared during permitting stage and submitted to MOECC as part of the Industrial Sewage Works ECA application.	Construction	IR# MOECC_163
4-86	Commitment*	Results of the CORMIX model will be used for determining near field-mixing zone dimensions, and results of the RMA4 model will be used for determining far-field lake-wide water quality predictions	Construction	IR# MOECC_168
4-87	Monitoring*	Monitoring of the temporary storage areas will consist of daily visual monitoring to verify the integrity of the temporary storage facilities and water management infrastructure. Contact water collected from the temporary storage facilities will be pumped to the effluent treatment plan and effluent discharge will be monitored as required by applicable permitting.	Construction	IR# CEAA_90
4-88	Monitoring*	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 MacLeod Provincial Park should an unforeseen event occur where Project activities affect water quality at this well.	All	IR# MNRF_55
4-89	Monitoring*	Monitoring of cyanide, copper, lead, nickel and zinc in effluent are required as per O.Reg. 560/94 and MMER including the reporting of effluent concentrations relative to the regulation limits. However, as none of these parameters were predicted to exceed the PWQO in Pond M1, they were not proposed as specific effluent criteria. Regardless they will be monitored and reported as part of the comprehensive monitoring approach for the Project.	All	IR# MOECC_175, MOECC_213
4-90	Monitoring*	Details on the monitoring locations, parameters, frequencies, triggers, methods, and reporting procedures will be confirmed through the permitting phase, will be documented in the Industrial Sewage Works Environmental Compliance Approval and Permit to Take Water, and will necessarily meet the requirements of O.Reg.560/94, O.Reg. 240/00 and MMER.	Construction	IR# MOECC_30, MOECC_68, MOECC_100, MOECC_176, MNDM_14, CEAA_90
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
5-1	Mitigation	Conduct instream work during periods of low flow to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.	Construction	EIS/EA Section 11.4.2.2
5-2	Mitigation	Within the construction timing window, schedule in-water work to avoid wet, windy, and rainy periods that may increase erosion and sedimentation.	Construction	EIS/EA Section 11.4.2.2
5-3	Mitigation	Design and plan activities and works in waterbodies such that loss or disturbance to aquatic habitat is limited and sensitive habitats are avoided.	Construction, Operation	EIS/EA Section 11.4.2.2
5-4	Mitigation	Comply with spring timing window for in-water work. The timing window for Northwestern Ontario restricts in-water work from April 1 to June 20 for spring spawning species (e.g., Northern Pike and Walleye). This timing restriction would apply to work within and adjacent to water (i.e. within 30 m of water) for the entire PDA. Where a timing window exemption may be required, work with MNRF and DFO to seek an exemption and avoid adverse effects on fish.	Construction	EIS/EA Section 11.4.2.2
5-5	Mitigation	Comply with cold water timing window for in-water work. The timing window for Northwestern Ontario restricts in-water work between September 1 and May 31 for fall spawning species present in the LAA (e.g., Cisco and Lake Whitefish). This timing restriction would will apply to work within and adjacent to Kenogamisis Lake (i.e. within 30 m) and other work areas with the potential to affect Cisco and Lake Whitefish spawning activity. Work in Kenogamisis Lake will follow both the spring and fall avoidance periods, unless approved beforehand by the MNRF and DFO, resulting in an in-water construction window of June 21 to August 30. Where a timing window exemption may be required, work with MNRF and DFO to seek an exemption and avoid adverse effects on fish.	Construction	EIS/EA Section 11.4.2.2
5-6	Mitigation	Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the watercourse.	Construction, Operation	EIS/EA Section 11.4.2.2
5-7	Mitigation	Treat and handle building material used in water in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.	Construction	EIS/EA Section 11.4.2.2
5-8	Mitigation	Follow the Hardrock Project Water Management and Monitoring Plan	All	EIS/EA Section 11.4.2.2

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
5-9	Mitigation	Implement a Spill Prevention and Response Plan immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept onsite.	All	EIS/EA Section 11.4.2.2
5-10	Mitigation	Keep clearing of riparian vegetation to a minimum: use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting.	Operation	EIS/EA Section 11.4.2.2
5-11	Mitigation	Limit the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed.	Operation	EIS/EA Section 11.4.2.2
5-12	Mitigation	Design and construct approaches to waterbodies such that they are perpendicular to the watercourse to reduce loss or disturbance to riparian vegetation.	Construction, Operation	EIS/EA Section 11.4.2.2
5-13	Mitigation	Promptly stabilize shoreline or banks disturbed by activities associated with the Project to prevent erosion and/or sedimentation, preferably through revegetation with native species appropriate for the site.	Construction, Operation	EIS/EA Section 11.4.2.2
5-14	Mitigation	Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage would be restored.	Operation	EIS/EA Section 11.4.2.2
5-15	Mitigation	Where replacement rock reinforcement or armouring is required to stabilize eroding or exposed areas, use appropriately-sized, clean rock, and install rock at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.	Operation	EIS/EA Section 11.4.2.2
5-16	Mitigation	Remove all construction materials from site upon Project completion.	Operation	EIS/EA Section 11.4.2.2
5-17	Mitigation	Undertake all in-water activities, or installation of associated in-water structures, such that interference with fish passage, reduction in channel width, or reduction in flows is limited.	Construction, Operation	EIS/EA Section 11.4.2.2

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
5-18	Mitigation	Retain a qualified environmental professional to confirm that applicable permits for relocating fish are obtained and to capture fish trapped within an isolated/enclosed area at the work site and relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the PDA.	Operation	EIS/EA Section 11.4.2.2
5-19	Mitigation	Undertake all instream activities in isolation of open or flowing water to maintain the natural flow of water downstream and avoid introducing sediment into the watercourse.	Construction, Operation	EIS/EA Section 11.4.2.2
5-20	Mitigation	Avoid using explosives in or near water where possible. To mitigate potential blasting effects on fish, a blasting plan will be developed if and as required. DFO provides guidelines for the use of explosives on their website (http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html).	Construction, Operation	EIS/EA Section 11.4.2.2
5-21	Mitigation	Design the effluent treatment plant (ETP) to treat effluent to levels that will not be acutely toxic in the effluent, will not have chronic toxicity outside the mixing zone, and will meet applicable guidelines outside the mixing zone.	Construction, Operation	EIS/EA Section 11.4.2.2
5-22	Mitigation	Design water intake and treated effluent discharge location to prevent entrainment or impingement of fish and to prevent scour erosion. This includes temporary intakes for dewatering during construction. Water intake structures will be designed following the Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO 1995). Designs will be based on site-specific parameters including anticipated fish use and resident fish species.	Construction	EIS/EA Section 11.4.2.2
5-23	Mitigation	Detoxification of cyanide (used to process the ore and extract gold) in effluent prior to discharge to TMF (closed system during operation; cyanide destruction at closure).	Construction, Operation	EIS/EA Section 11.4.2.2
5-24	Mitigation	Limit access to waterbodies and banks to protect riparian vegetation and limit bank erosion.	Construction, Operation	EIS/EA Section 11.4.2.2
5-25	Mitigation	Maintain equipment to be used in water in a clean condition, free of fluid leaks and aquatic invasive species.	Construction, Operation	EIS/EA Section 11.4.2.2

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
5-26	Mitigation	Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that limits disturbance to the banks and bed of the waterbody.	Construction, Operation	EIS/EA Section 11.4.2.2
5-27	Mitigation	Limit machinery fording of the watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure.	Construction, Operation	EIS/EA Section 11.4.2.2
5-28	Mitigation	Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible banks and beds (e.g., dominated by organic materials and silts). For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.	Construction, Operation	EIS/EA Section 11.4.2.2
5-29	Mitigation	Wash, refuel, and service machinery and store fuel and other materials for the machinery in such a way as to prevent deleterious substances from entering the water.	Construction	EIS/EA Section 11.4.2.2
5-30	Mitigation	Design and install culverts in a way that prevents the creation of barriers to fish movement, and maintains bank full channel functions and habitat functions including: • embedment • re-instatement of low flow channel and native substrates • proper sizing • maintaining adequate channel slope.	Operation, Closure	EIS/EA Section 11.4.2.2
5-31	Mitigation	Follow the Waste Rock Management Plan.	Construction, Operation	EIS/EA Section 11.4.2.2
5-32	Mitigation	Implement an Erosion and Sediment Control Plan for the site to reduce risk of sedimentation of waterbodies during all phases of the Project. ESC measures will be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The ESCP will be based on standard specifications such as Ontario Provincial Standard Specifications (OPSS), in particular, OPSS 805	Construction, Operation	EIS/EA Section 11.4.2.2

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		(Construction Specification for temporary ESC measures), OPPS, PROV 182 (General Specification for Environmental Protection for construction in Waterbodies and on Waterbody Banks) and OPSS 206 (Grading).		
5-33	Mitigation	Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or the built structures.	Operation	EIS/EA Section 11.4.2.2
5-34	Mitigation	Habitat offsetting for the loss of fish habitat that cannot be avoided or mitigated will employ a natural channel design and incorporate habitat attributes as provided in the Draft Fisheries Offset Plan.	Operation, Closure	EIS/EA Section 11.4.2.2
5-35	Mitigation	Implement a Blasting Plan for the Project to reduce risk of lethal or sub-lethal effects on fish, changes in bank stability and composition and sedimentations within Kenogamisis Lake.	Construction, Operation	EIS/EA Section 11.4.2.2
5-36	Mitigation	Sediment and erosion control measures associated with the construction of the Goldfield Creek Diversion will be in place prior to substantial ground disturbance and through the duration of construction	Construction	EIS/EA Appendix F10, Section 8.4.2
5-37	Mitigation	Minimize duration of in water work to the extent practicable.	Construction	EIS/EA Appendix F10, Section 8.4.2
5-38	Mitigation	Stabilize shoreline or banks disturbed by any activity associated with the works.	Construction	EIS/EA Appendix F10, Section 8.4.2
5-39	Mitigation	Remove fish from areas where waterbodies are to be abandoned or isolated from the active creek channel due to the works.	Construction	EIS/EA Appendix F10, Section 8.4.2
5-40	Mitigation	Keep an emergency spill kit on site, and develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance (GGM 2017a).	All	EIS/EA Appendix F10, Section 8.4.2

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
5-41	Mitigation	Use building materials for in-water work that have been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.	Construction	EIS/EA Appendix F10, Section 8.4.2
5-42	Mitigation	Limit blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e., decking).	Operation	EIS/EA Appendix F10, Section 8.4.2
5-43	Mitigation	Back-fill, or stem, blast holes with sand or gravel to grade to confine the blast.	Operation	EIS/EA Appendix F10, Section 8.4.2
5-44	Mitigation	Place blasting mats over top of holes to reduce scattering of blast debris around the area.	Operation	EIS/EA Appendix F10, Section 8.4.2
5-45	Mitigation	Do not use ammonium nitrate based explosives in water due to the production of toxic by-products that may cause serious harm to fish.	Operation	EIS/EA Appendix F10, Section 8.4.2
5-46	Mitigation	Remove all blasting debris and other associated equipment/products from the blast area.	Operation	EIS/EA Appendix F10, Section 8.4.2
5-47	Commitment	As per SOR/2013-191 Paragraph 3(1)(b) and MMER Paragraph 27.1(4) the proponent will provide irrevocable letter(s) of credit issued by a recognized Canadian financial institution to cover the costs of implementing the offsetting plan (or compensation plan). DFO may draw upon funds of the letter of credit provided to cover the cost of implementing the offsetting measures including the associated monitoring and reporting measures included in this plan, for instances where the Proponent fails to implement these required measures. The value(s) of the letter(s) of credit will be determined with DFO and submitted under separate cover with the final application documents and fisheries offset plan.	Construction	EIS/EA Appendix F10, Section 9.1
5-48	Monitoring	Kenogamisis Lake fish community monitoring:	Construction, Operation	EIS/EA Appendix M12, Section 8.1

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		• Pre-construction study allows for adaptive management during operation if results of EEM show an effect. No set frequency for lake-wide study. • Routine EEM monitoring on a three-year cycle through operation. • Timing: Late summer, to be confirmed based on ECCC approved sentinel species and through EEM Study Design approval process. Refer to the Conceptual Aquatic Management and Monitoring Plan (Appendix M12 of the Final EIS/EA) for the detailed study design.		
5-49	Monitoring	Fish tissue sampling: • Comprehensive baseline data allow for adaptive management during operation if results of EEM show an effect or if there is a change in water quality in small lakes. No set frequency for follow-up monitoring but may be harmonized with EEM program on a three-year cycle. • Routine EEM monitoring through Operation (three-year cycle). • EEM monitoring likely to occur late summer or early fall depending on approved sentinel species. Follow-up monitoring to coincide with fish community monitoring in late summer, if required. Refer to the Conceptual Aquatic Management and Monitoring Plan (Appendix M12 of the Final EIS/EA) for the detailed study design.	Construction, Operation	EIS/EA Appendix M12, Section 8.1
5-50	Monitoring	Benthic community monitoring: • Benthic sampling if required as a condition of a Fisheries Act Authorization, will occur in accordance with the approved frequency identified in the Fisheries Act Authorization. • Benthic sampling that occurs as part of EEM would occur in three year cycles, in keeping with an ECCC approved Study Design and EEM Technical Guidance. • Benthic sampling that occurs as part of a Follow-up Program, if required, would be harmonized with the EEM monitoring program (three-year cycles). • Timing: Late summer or fall, in keeping with timing of baseline data collection. Refer to the Conceptual Aquatic Management and Monitoring Plan (Appendix M12 of the Final EIS/EA) for the detailed study design.	Construction, Operation	EIS/EA Appendix M12, Section 8.1

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
5-51	Monitoring	Sediment • Sediment monitoring will occur in a three-year cycle. • Monitoring will commence within 24 months of the Project becoming subject to the MMER. • The number of stations to be sampled will be identified in the Initial EEM Study Design. • Timing: late summer/early fall at the same time as the benthic community monitoring. Refer to the Conceptual Aquatic Management and Monitoring Plan (Appendix M12 of the Final EIS/EA) for the detailed study design.	Construction, Operation	EIS/EA Appendix M12, Section 8.1
5-52	Monitoring	Aquatic vegetation monitoring: • Aquatic vegetation surveys were completed during baseline and will be repeated on a three-year cycle, preferably in conjunction with the EEM program. • Timing: spring, summer and fall Refer to the Conceptual Aquatic Management and Monitoring Plan (Appendix M12 of the Final EIS/EA) for the detailed study design.	Construction, Operation	EIS/EA Appendix M12, Section 8.1
5-53	Monitoring	Plankton and periphyton monitoring: • Ongoing through pre-construction. Frequency during operation to be determined through adaptive management (i.e., only if water quality indicates impairment) • Timing: spring, summer and fall Refer to the Conceptual Aquatic Management and Monitoring Plan (Appendix M12 of the Final EIS/EA) for the detailed study design.	Construction, Operation	EIS/EA Appendix M12, Section 8.1
5-54	Monitoring	Toxicity monitoring: • As required by MMER, sub-lethal toxicity tests will be conducted two times each calendar year for three years, and once each year after the third year. • Timing: The first testing is to occur no later than six months after the mine becomes subject to MMER regulations.	Construction, Operation	EIS/EA Appendix M12, Section 8.1

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		Refer to the Conceptual Aquatic Management and Monitoring Plan (Appendix M12 of the Final EIS/EA) for the detailed study design.		
5-55	Monitoring	• As-built survey of the Goldfield Creek Diversion Offset will be conducted within 6 months of completion of the offset measures. • Photo documentation will be taken during construction to document that mitigation and avoidance measures were implemented, and that all structures were constructed as per the approved plans. • A comparison of the constructed habitat to the approved plan will be made to confirm that the area of replacement habitat is equal to or greater than that specified in the plan As-constructed Report due to DFO within 6 months of construction	Construction	EIS/EA Appendix F10, Section 10.2
5-56	Monitoring	Monitor physical features of offset measures: • Channel / Pond conditions and water levels / depths remain consistent with the design • Assess hydraulic connection through grade controls and channel transitions to confirm conditions for fish passage. • Fish presence within the offset areas will be monitored once per summer in years 1, 3 and 5 post construction to demonstrate fish usage and abundance. • Spawning survey or juvenile fish survey conducted in years 1, 3 and 5 post construction to assess use of the potential riffle spawning areas Performance Monitoring Reports due to DFO on or before December 31 each year for years 1, 3 and 5 post construction	Construction, Operation	EIS/EA Appendix F10, Section 10.2
5-57	Monitoring	Monitor stability of offset structures: • Observations will be made once per year in years 1, 3 and 5 post construction, to confirm that constructed features are in place and functional. • Stability of the features and general condition will be assessed by mapping and photo documenting the habitats. Consistent vantage points will be used to provide between year comparisons.	Construction, Operation	EIS/EA Appendix F10, Section 10.2

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		• Riparian vegetation cover and plantings success will be monitored by estimating the percent cover of herbaceous ground cover, and the percent survival of planted stock (shrubs). Performance Monitoring Reports due to DFO on or before December 31 each year for years 1, 3 and 5 post construction		
5-58	Monitoring	Fish sampling /observation will be conducted in years 1, 3 and 5 post construction of the Goldfield Creek Offset to demonstrate: • Comparable abundance and diversity in offset areas to the comparable natural habitats. • Complete age class representation by resident fish species to demonstrate reproduction and overwintering survival; Performance Monitoring Reports due to DFO on or before December 31 each year for years 1, 3 and 5 post construction.	Construction, Operation	EIS/EA Appendix F10, Section 10.2
5-59	Monitoring	GGM will maintain the following documentation and provide summaries of the documents in the “as constructed” report. Records include: • A detailed photographic record from consistent vantage points and inspection reports will be kept to document measures and standards employed and their effectiveness to limit the serious harm; • A record of all fish removal efforts carried out with the numbers of fish removed and relocation locations; and • A record of any contingency measures that were implemented and the effectiveness of the measures.	Construction	EIS/EA Appendix F10, Section 8.4.2
5-60	Monitoring	It is anticipated that those elements relevant to the Conceptual AMMP 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 the AMMP.	All	EIS/EA Appendix F10, Section 8.2

Table 5: Mitigation, Monitoring and Commitments Related to Fish and Fish Habitat

FISH AND FISH HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
5-61	Commitment*	In accordance with MMER monitoring requirements, fish tissue collections will be planned for every third year. Sampling methylmercury and other metals in fish from Kenogamisis Lake will also occur at this time. Sampling frequency would be adjusted based on the results of water quality monitoring and previous fish tissue studies.	All	IR# AZA-AFN-GFN_10
5-62	Commitment*	The final offsetting plan will provide linkages between lost habitat with spawning potential and amount of new habitat created to address spawning habitat loss.	Construction	IR# BZA-BNA_2
5-63	Commitment*	Further details on the methods proposed for carrying out the EEM studies under the MMER will be provided in the Study Design for the EEM program that will be submitted to ECCC once the mine becomes subject to MMER EEM requirements. Agreement on the detailed methods and target species can be obtained at that time.	Construction	IR# MOECC_232
5-64	Commitment*	Details of the riparian zone (along the approximately 2 km long new channel alignment (between the GFDP and SWP1) will be provided during the permitting process associated with the Lakes and Rivers Improvement Act and DFO Authorizations.	Construction	IR# AZA-AFN-GFN_15
5-65	Commitment*	Further details to determine the effects on grade control structures (and fish habitat features) in the event of a release from the TMF emergency spillway(s) will be provided during permitting.	Construction	IR# MNRF_5
5-66	Commitment*	The details regarding frequency of monitoring will be further considered as part of the final Offsetting plan development, and will consider input from local Aboriginal communities and ultimately will be determined by DFO.	Construction	IR# BZA-BNA_9
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 6: Mitigation, Monitoring and Commitments Related to Vegetation Communities

VEGETATION COMMUNITIES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
6-1	Mitigation	Restrict vegetation clearing activities to the PDA.	Construction	EIS/EA Section 12.4.2.2, 12.4.3.2, 12.4.4.2
6-2	Mitigation	Mechanical vegetation removal practices when possible.	Construction	EIS/EA Section 12.4.2.2, 12.4.3.2, 12.4.4.2
6-3	Mitigation	Standard forestry practices to remove all merchantable timber inside the PDA.	Construction	EIS/EA Section 12.4.2.2
6-4	Mitigation	Progressive rehabilitation as outlined in the Conceptual Closure Plan.	Operation, Closure	EIS/EA Section 12.4.2.2
6-5	Mitigation	Using clean, coarse fill material for grading to reduce the potential for introducing or spreading non-native, or invasive plant species.	All	EIS/EA Section 12.4.3.2
6-6	Mitigation	Reestablishment of drainage patterns, to the extent feasible.	Closure	EIS/EA Section 12.4.3.2
6-7	Mitigation	Where there is interest, provide opportunities to local communities for harvesting of plants for traditional purposes prior to construction.	Construction	EIS/EA Section 12.4.4.2
6-8	Mitigation	Incorporate plant species of interest to local Aboriginal communities into the Closure Plan as feasible.	Closure	EIS/EA Section 12.4.4.2
6-9	Mitigation	Mark off (with flagging) sensitive areas to be avoided, daily meetings with site clearing crew to review workplans including areas to be avoided, avoid tire rutting, and limiting the overall Project footprint.	Construction	EIS/EA Appendix M13, Section 7.1.1
6-10	Mitigation	If chemical application methods are needed, they will use low toxicity sprays, and subject to the following best management practices: • Spray when winds are light and moving away from sensitive receptors.	Construction	EIS/EA Appendix M13, Section 7.1.1

Table 6: Mitigation, Monitoring and Commitments Related to Vegetation Communities

VEGETATION COMMUNITIES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		• Avoid spraying when no wind is present (spray can remain suspended and move off target when wind changes. • Avoid spraying when relative humidity is <40% and air temperature is >25 degrees Celsius (conditions that lead to rapid evaporation). • Maintain minimally-effective nozzle to target distance. • Change sprayer settings and nozzle depending on weather conditions (fine droplets are prone to evaporation and drift); regularly calibrate equipment. • Use drift reducing additives compatible with herbicide such as soybean oil.		
6-11	Mitigation	Implement erosion and sedimentation control measures.	Construction	EIS/EA Appendix M13, Section 7.1.1
6-12	Mitigation	Install of truck wheel washing stations to avoid tracking of mud.	Construction	EIS/EA Appendix M13, Section 7.1.1
6-13	Mitigation	Select native species for revegetation and assess presence of invasive species and target removal through manual, mechanical and/or chemical methods and proper disposal.	Operation, Closure	EIS/EA Appendix M13, Section 7.1.2
6-14	Mitigation	Use dust collection/control systems to reduce potential dust emissions during ore crushing and grinding activities.	Construction, operation	EIS/EA Appendix M13, Section 7.3.1
6-15	Mitigation	Enclose of dust sources such as the mill feed ore storage area.	Operation	EIS/EA Appendix M13, Section 7.3.1
6-16	Mitigation	Apply water sprays, chemical suppression, and application, to control fugitive dust emission from road ways	All	EIS/EA Appendix M13, Section 7.3.1
6-17	Mitigation	Use dust suppressants (e.g., water) on roadways during situations that have an increased potential to generate airborne dust	All	EIS/EA Appendix M13, Section 7.3.1

Table 6: Mitigation, Monitoring and Commitments Related to Vegetation Communities

VEGETATION COMMUNITIES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
6-18	Commitment	Discuss with the MNRF and the enhanced Forest Resource Licence holder the establishment of a forested buffer along the alignment of the Goldfield Creek diversion to the Southwest Arm Tributary and wetland B136.	Construction	EIS/EA Section 12.4.2.2
6-19	Commitment	Groundwater levels under the fen will be monitored and the monitoring data will be used together with wetland vegetation monitoring to track the predicted effects on the fen and, if necessary, water level mitigation measures will be implemented.	All	EIS/EA Section 12.4.3.2
6-20	Commitment	Provide the opportunity for local Aboriginal communities to hold a ceremonial event prior to construction.	Construction	EIS/EA Section 12.4.4.2
6-21	Commitment	The surface of the TMF will be revegetated, primarily with grasses.	Closure	EIS/EA Appendix M13, Section 7.6
6-22	Commitment	The WRSA benches and plateaus will be revegetated seeding primarily with grasses and legumes, but may also include planting of conifer trees in linear islands along the benches and on the plateaus to provide seed stock as part of the long term successional development strategy.	Closure	EIS/EA Appendix M13, Section 7.6
6-23	Commitment	Disturbed ground in other areas will be revegetated based on the local ecosite, but should allow for the establishment of adjacent vegetation communities to reclaim these areas.	Operation, Closure	EIS/EA Appendix M13, Section 7.6
6-24	Commitment	The borrow source areas will be revegetated in accordance with the MNRF Best Management Practices for Aggregate Activities in Caribou Habitat where feasible.	Operation, Closure	EIS/EA Appendix M13, Section 7.6
6-25	Commitment	During operation, GGM will carry out test plotting studies to evaluate the most effective revegetation approach for various application areas (i.e., dry slope aspects, coarse soils, wet flat areas). The results of these studies will be used to update and inform the revegetation approach within the Closure Plan related to topsoil/overburden/nutrient mixture, seed mixture, planting species, irrigation, mulching and fertilization requirements. The selected seed mixture will be comprised of non-invasive species to promote the development of natural revegetation.	Operation	EIS/EA Appendix I, Section 5.6

Table 6: Mitigation, Monitoring and Commitments Related to Vegetation Communities

VEGETATION COMMUNITIES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
8 6-26	Monitoring	A monitoring program will be developed to monitor the success of revegetation considering the end land use goals. The program will be designed to assess revegetated areas such as the WRSAs and TMF and process plant area, which would be inspected during late spring and summer during active rehabilitation and at a reduced frequency post-closure.	Closure	EIS/EA Appendix I, Section 7.3.2
6-27	Monitoring	It is anticipated that those elements relevant to the BMMP will be assembled into a formal report and provided to interested parties on an annual basis during construction and operation, and during closure in years when monitoring is carried out.	Construction, Operation	EIS/EA Appendix M13, Section 8.2
6-28	Commitment*	GGM will consider incorporating aspects of the Clean Vehicle Protocol for the next iteration of the Biodiversity Management Plan prior to construction.	Construction	IR# RSMIN_11
6-29	Commitment*	The Biodiversity Management and Monitoring Plan will consider an approach to categorize land areas within the PDA in terms of the nature and degree of disturbance that will be caused by the development and operation of the mine, and define appropriate revegetation strategies and practices for each category. The plan will take into consideration: • identify areas where vegetative cover will be removed • maintaining or restoring forested areas where appropriate • revegetation strategies for specific vegetation communities (wetlands, upland forest, lowland forest, floodplains) • minimizing the establishment of non-native or invasive plant species • practices for the control of vegetation where necessary for the safe operation of the mine • monitoring • communications and complaint protocols. GGM will consult with the MNRF to further develop the plan.	Construction, Operation	IR# MNRF_24
6-29	Mitigation*	To avoid the introduction or spreading of invasive species due to Project activities prior to the construction of site roads or in areas that are not serviced by site roads, exterior surfaces of equipment will be brushed or washed of soil and debris, to the	All	IR# CEAA_95

Table 6: Mitigation, Monitoring and Commitments Related to Vegetation Communities

VEGETATION COMMUNITIES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		extent practical, prior to equipment entering areas that are not/not yet serviced by site roads.		
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 7: Mitigation, Monitoring and Commitments Related to Wildlife and Wildlife Habitat

WILDLIFE AND WILDLIFE HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
7-1	Mitigation	Obtain proper authorizations under the ESA, including Ontario Regulation 242/08 (as applicable) for damage or destruction of habitat protected under the ESA and implement measures required by the authorization.	Construction	EIS/EA Section 13.4.2.2
7-2	Mitigation	If an active bald eagle nest occurs within 800 m of Project construction or operation activities, develop protection measures.	Construction, Operation	EIS/EA Section 13.4.2.2
7-3	Mitigation	Prior to construction flag environmentally sensitive areas adjacent to work areas (e.g., key habitat features such as dens, roosts, stick nests, beaver dams, hibernacula) prior to clearing and construction, and evaluate the features for additional mitigation measures (e.g., timing windows and/or setbacks).	Construction	EIS/EA Section 13.4.2.2
7-4	Mitigation	Retain actual or potential wildlife trees (e.g., cavity trees or snags) in areas where it is safe to do so.	Construction	EIS/EA Section 13.4.2.2
7-5	Mitigation	Incorporate MNRF Best Management Practices for Mineral Exploration and Development Activities and Woodland Caribou in Ontario (MNR 2013c) in the development of the Biodiversity Management and Monitoring Plan (BMMP) and apply specific mitigation measures developed in consultation with MNRF.	Construction	EIS/EA Section 13.4.2.2
7-6	Mitigation	Managing vegetation cover along the boundaries of high activity areas (e.g., access roads) where adjacent to wildlife habitat to reduce sensory (noise and visual) disturbance.	Operation	EIS/EA Section 13.4.2.2
7-7	Mitigation	Avoid use of herbicides where feasible or practical.	Operation	EIS/EA Section 13.4.2.2
7-8	Mitigation	Progressive rehabilitation of disturbed areas used during construction.	Operation	EIS/EA Section 13.4.2.2
7-9	Mitigation	Use of directional light fixtures to avoid the transmission of light outside of the PDA.	Operation	EIS/EA Section 13.4.2.2
7-10	Mitigation	Implement mitigation measures in the Conceptual Explosives and Blasting Management Plan, Conceptual Spill Prevention and Contingency Plan, and Conceptual Waste Management Plan.	All	EIS/EA Section 13.4.3.2

Table 7: Mitigation, Monitoring and Commitments Related to Wildlife and Wildlife Habitat

WILDLIFE AND WILDLIFE HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
7-11	Mitigation	Report the discovery of active nests during all Project phases to the Project Environmental Department who will refer to the BMMP for direction on follow-up actions.	All	EIS/EA Section 13.4.3.2
7-12	Mitigation	Report the discovery of occupied habitat features (e.g., active dens, beaver dams) during all Project phases to the Project Environmental Department for direction on follow-up actions.	All	EIS/EA Section 13.4.3.2
7-13	Mitigation	Maintain the Project site in a manner that reduces the risk that wildlife will encounter potential hazards, such as ropes, wires and holes.	All	EIS/EA Section 13.4.3.2
7-14	Mitigation	Avoid situations that can lead to the creation of problem wildlife. Although food wastes are the typical wildlife attractant implicated in the creation of problem wildlife, there are other attractants that may be a concern, specifically roadside wildlife carcasses and vegetation. Project personnel and contractors will be required to report roadside wildlife sightings or interactions to the Project Environmental Department for initiation of follow-up actions to address these concerns.	All	EIS/EA Section 13.4.3.2
7-15	Mitigation	Report wildlife-vehicle collisions, near misses or observations of a wildlife road mortality on Project roads to the Environmental Department. Implement adaptive management measures where high frequency locations of wildlife-vehicle interactions are identified.	All	EIS/EA Section 13.4.3.2
7-16	Mitigation	Require Project personnel and contractors working in active zones (e.g., mine site) to relay wildlife sightings to other workers as soon as possible (e.g., by radio).	All	EIS/EA Section 13.4.3.2
7-17	Mitigation	Implement road safety measures (e.g., speed limits and signage) and yield the right of way to wildlife on Project roads to reduce wildlife road mortality.	All	EIS/EA Section 13.4.3.2
7-18	Mitigation	Obtain a permit under the *Fish and Wildlife Conservation Act* for the removal of any raptor nests or beaver dams required for the Project. Removal to be conducted following timing restrictions and any other mitigation specified in the permit and as determined during consultation with MNRF.	All	EIS/EA Section 13.4.3.2
7-19	Mitigation	Address incidental take of migratory birds. GGM recognizes that scheduling vegetation clearing and site preparation activities outside the breeding period for	Construction	EIS/EA Section 13.4.3.2

Table 7: Mitigation, Monitoring and Commitments Related to Wildlife and Wildlife Habitat

WILDLIFE AND WILDLIFE HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		migratory birds is the best way to reduce the risk of incidental take. If activities that could result in incidental take cannot be avoided, GGM will prepare a Bird Nest Mitigation Plan that outlines how risk of incidental take will be managed in accordance with Environment and Climate Change Canada guidance.		
7-20	Mitigation	To the extent feasible, recover and relocate turtles and amphibians encountered during fish salvage/rescues.	Construction	EIS/EA Section 13.4.3.2
7-21	Mitigation	Carry out the removal of structures supporting barn swallow nesting outside of the active nesting season (approximately May- August; O.Reg. 242/08, s.23.5).	Construction	EIS/EA Section 13.4.3.2
7-22	Mitigation	Carry out the removal of mature deciduous and mixed forest communities or buildings outside the core maternity roosting season for bats (May 1 to August 31), to the extent practical. Additional mitigation may be required for occupied features. This measure will also reduce the risk to other species that use trees for denning or shelter (e.g., marten).	Construction	EIS/EA Section 13.4.3.2
7-23	Mitigation	Clear area of wildlife before blasting.	Construction, Operation	EIS/EA Section 13.4.3.2
7-24	Mitigation	Where Project site roads occur through forest or treed wetland communities, a regular vegetation cutting regime will occur along the edges of project site roads both to increase driver visibility and to reduce the attractiveness of the area for moose to browse.	Operation	EIS/EA Section 13.4.3.2
7-25	Mitigation	To reduce use of the ponds by waterfowl for foraging or breeding, no vegetation will be planted on the embankments of the TMF or the water management collection ponds. Vegetation that naturally regenerates around seepage and water collection ponds and the TMF will be removed as required.	Operation	EIS/EA Section 13.4.3.2
7-26	Mitigation	Monitor wildlife use (primarily targeting waterfowl but also species such as moose and bear) and water quality of the TMF, open aquatic areas and other key Project locations and implement adaptive management measures (e.g., deterrents and/or exclusionary measures) as required.	Operation	EIS/EA Section 13.4.3.2

Table 7: Mitigation, Monitoring and Commitments Related to Wildlife and Wildlife Habitat

WILDLIFE AND WILDLIFE HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
7-27	Mitigation	When designing water crossings include consideration of design features that promote wildlife (e.g. amphibian, turtle, furbearers) movement.	Construction, Operation	EIS/EA Section 13.4.4.2
7-28	Mitigation	Provide low areas in the ploughed snow banks of access and haul roads if excessive snow buildup is encountered. These low areas will facilitate wildlife movements across and out of road corridors.	All	EIS/EA Section 13.4.4.2
7-29	Mitigation	Implement management practices for helicopter activity around wildlife including low level flying restriction where safe to do so.	All	EIS/EA Appendix M13, Section 7.1.3
7-30	Mitigation	Restrict project vehicles to designated areas and limit off road use by Project personnel.	All	EIS/EA Appendix M13, Section 7.1.3
7-31	Mitigation	Maintain the Project site, through proper handling and storage of industrial materials and debris, in a manner that reduces the risk that wildlife will encounter potential hazards, such as ropes, wires and holes.	All	EIS/EA Appendix M13, Section 7.1.3
7-32	Mitigation	Construction lighting will be specified to use only as much lighting as is necessary for safe and efficient construction activities.	Construction	EIS/EA Appendix M13, Section 7.2
7-33	Mitigation	Prior to construction flag environmentally sensitive areas adjacent to work areas (e.g., key habitat features such as dens, roosts, stick nests, beaver dams, hibernacula) prior to clearing and construction, and evaluate the features for additional mitigation measures (e.g., timing windows and/or setbacks)	Construction	EIS/EA Appendix M13, Section 7.2
7-34	Commitment	Report Species at Risk occurrences at the Project site to the MNRF.	All	EIS/EA Section 13.4.3.2
7-35	Commitment	Provide wildlife awareness and safety training to Project personnel and contractors.	All	EIS/EA Section 13.4.3.2
7-36	Commitment	Upon discovery of injured wildlife, take measures to protect the individual from further harm and do not perform any work in the immediate location of the injured species that would subject it to further harm. Contact the Environmental Department	All	EIS/EA Section 13.4.3.2

Table 7: Mitigation, Monitoring and Commitments Related to Wildlife and Wildlife Habitat

WILDLIFE AND WILDLIFE HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		to determine and implement required actions (e.g., if feasible, the capture and relocation of an injured species to a safe area and/or an appropriate care facility by the qualified person).		
7-37	Commitment	Consult with MNRF on the direction provided in Ontario's White-nose Syndrome Response Plan (MNRF 2015b) and its applicability to the Project.	Construction	EIS/EA Section 13.4.3.2
7-38	Commitment	Incorporate MNRF Best Management Practices for Mineral Exploration and Development Activities and Woodland Caribou in Ontario (MNR 2013c) in the development of the BMMP and apply specific mitigation measures developed in consultation with MNRF (a Conceptual BMMP is provided as Appendix M13).	Construction	EIS/EA Section 13.4.3.2
7-39	Commitment	Close mine shafts so that the potential for bat hibernacula is considered and the site is closed in compliance with the ESA, 2007.	Closure	EIS/EA Section 13.4.3.2
7-40	Commitment	The potential for closure activities to contravene the ESA will be evaluated prior to closure and closure activities will either be conducted in ways to avoid adverse effects on a SAR or its habitat, or if that is not possible, GGM will work with MNRF to obtain required authorizations.	Operation	EIS/EA Section 13.4.3.2
7-41	Commitment	Only a qualified biologist will undertake bird nest searches prior to vegetation clearing undertaken during the breeding period for migratory birds (May 1 to August 31), and to review potential bat habitat trees to make a determination on occupancy before removal during the maternity roosting period (June 1 to July 31, or as defined by local MNRF office).	Construction	EIS/EA Appendix M13, Section 6.2
7-42	Monitoring	Recording Project-related wildlife-vehicle collisions or near misses: • Drivers of Project-related vehicles will report wildlife-vehicle collisions, near misses or observations of a wildlife road mortality including details such as the circumstances of collision (date, time, road conditions, lighting, weather); characteristics of the animal(s) struck by the vehicle (species, number, injury severity); and location (detailed description of the location of incident, the surrounding habitat, UTM if possible).	All	EIS/EA Appendix M13, Section 8.1.2

Table 7: Mitigation, Monitoring and Commitments Related to Wildlife and Wildlife Habitat

WILDLIFE AND WILDLIFE HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
7-43	Monitoring	Maintain a wildlife observation log for the Project and associated infrastructure (e.g., access roads): • Project personnel and contractors will be encouraged to report sightings of wildlife on and around the Project during construction and operation. In particular, discovery of occupied habitat features (e.g., active dens, beaver dams) for direction on follow-up actions. • Project personnel and contractors working in active zones (e.g., mine site) to relay wildlife sightings to other workers as soon as possible (e.g., by radio). • Project personnel and contractors to report wildlife incidents and encounters related to garbage or other attractants so that corrective action can be initiated. • Report SAR occurrences at the Project site to the MNRF.	All	EIS/EA Appendix M13, Section 8.1.2
7-44	Monitoring	Monitor wildlife use of the TMF, open aquatic areas and other key Project locations: • During operation of the mine, use of open aquatic areas associated with the Project such as the tailings management pond and collection ponds will be monitored for use by wildlife, with an emphasis on waterfowl and large mammals such as moose. Wildlife observed will be recorded (species, number, behaviour) • 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 groups during Project operations.	All	EIS/EA Appendix M13, Section 8.1.2

Table 7: Mitigation, Monitoring and Commitments Related to Wildlife and Wildlife Habitat

WILDLIFE AND WILDLIFE HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
7-45	Monitoring	Monitoring wildlife use: • Wildlife use surveys will include periodic monitoring of breeding birds. • Post-construction monitoring follows the same protocols as baseline surveys, so that data will be comparable. • Surveys to assess breeding bird populations during the life of the mine will be conducted following the methods used during the baseline field data collection program and in accordance with Environment Canada's Updated Survey Requirements for Mining Projects which recommend monitoring take place at three-year intervals following the same protocols as baseline surveys. • Although surveys will target breeding birds, wildlife (or signs of wildlife such as tracks, scat etc.) observed during surveys will recorded.	Operation	EIS/EA Appendix M13, Section 8.1.2
7-46	Monitoring	Monitoring of small mammals: • Small mammal surveys and soil/vegetation sampling are used to model baseline concentrations and inclusion of these surveys confirm the assumptions and conclusions of the health risk assessment. This survey was completed as part of baseline work and may be undertaken again during operations.	Operation	EIS/EA Appendix M13, Section 8.1.2
7-47	Monitoring	Monitoring compensation habitat for Barn Swallow • In accordance with the regulatory requirements of O. Regulation 242/08 s.23.5, compensation habitat that is required for Barn Swallow will be surveyed annually for three years to document nesting activity and structure use. Surveys will include an examination of the interior of the compensation structure, recording the number, description and location of active nests and an estimate of the number of Barn Swallows using the structure.	Construction, Operation	EIS/EA Appendix M13, Section 8.1.2
7-48	Monitoring	It is anticipated that those elements relevant to the BMMP will be assembled into a formal report and provided to interested parties on an annual basis during construction and operation, and during closure in years when monitoring is carried out.	Construction, Operation	EIS/EA Appendix M13, Section 8.2
7-49	Commitment*	Prior to any activities required for Pond D1 and WRSA D the activity of Bald Eagle nest 271 will be assessed, and a protection plan developed if the nest is active.	Construction, Operation	IR# CEAA_96

Table 7: Mitigation, Monitoring and Commitments Related to Wildlife and Wildlife Habitat

WILDLIFE AND WILDLIFE HABITAT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
7-50	Commitment*	GGM will work with the MNRF on advancing the details of the Biodiversity Management and Monitoring Plan with respect to the use of wildlife deterrent measures, selective fencing measures if required, response procedures and monitoring practices.	Construction, Operation	IR # MNRF_13
7-51	Monitoring*	Wildlife use of the TMF, including the TMF reclaim pond, will be monitored during mine operation as follows: • Twice a week, starting at spring break-up and continuing until the start of freeze up (approximately April to October), environment staff will survey the TMF reclaim pond and the adjacent tailings beach for waterfowl. The surveyor will use binoculars, and if waterfowl are present, will document their species, age class, behaviour (e.g., resting, feeding, flying over), abundance, and specific location (to be marked on a large-scale site map). The survey will be completed from a single survey station that will be selected based on accessibility, safety, repeatability, and a suitable field of view of the pond surface. Observations of other wildlife will also be recorded. • Project personnel and contractors will be instructed to report sightings of wildlife near or within the TMF boundaries directly to the Environment Manager, by radio or in person. These sightings will be recorded in the wildlife observation log maintained by GGM. Measures to deter wildlife from the TMF will be directed by the Environment Manager as needed. Specific adaptive management triggers will need to be refined prior to TMF operation but may include consistent observations of waterfowl use over a one-month period.	Operation	IR# MNRF_13, CEAA_38
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 8: Mitigation, Monitoring and Commitments Related to Labour and Economy

LABOUR AND ECONOMY				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
8-1	Mitigation	Posting job qualifications and identifying available training programs and providers so that local and Aboriginal residents can acquire the necessary skills and qualify for potential employment.	Construction, Operation	EIS/EA Section 14.4.2.2
8-2	Mitigation	Working with local and Aboriginal businesses to enhance the opportunity to participate in the supply of goods and services for construction and operation.	Construction, Operation	EIS/EA Section 14.4.2.2
8-3	Mitigation	Working with local communities to develop training programs oriented to operational needs.	Construction, Operation	EIS/EA Section 14.4.2.2
8-4	Mitigation	Implement the Project's labour and training framework, which includes partnerships with Aboriginal communities and education institutes, information sharing (e.g., skills databases) and employment preparation and training.	Construction, Operation	EIS/EA Section 14.4.2.2
8-5	Mitigation	Establish a skills inventory that should be retained for active closure.	Closure	EIS/EA Section 14.4.2.2
8-6	Mitigation	Support re-training to establish transferable skills.	Closure	EIS/EA Section 14.4.2.2
8-7	Mitigation	Provide opportunities for voluntary redundancies during ramp-down (e.g., early retirement).	Closure	EIS/EA Section 14.4.2.2
8-8	Mitigation	Provide redundancy payments.	Closure	EIS/EA Section 14.4.2.2
8-9	Mitigation	Provide job search assistance.	Closure	EIS/EA Section 14.4.2.2
8-10	Commitment	GGM has and will continue to work with local and Aboriginal-owned businesses on Project contract opportunities regarding the supply of goods and services, particularly for the operation phase.	Construction, Operation	EIS/EA Section 14.4.3.2
8-11	Commitment	GGM will continue discussions with Ne-Daa-Kii-Me-Naan Inc. to obtain an Overlapping Agreement and to harvest the trees under their pulp mill license.	Construction	EIS/EA Section 14.4.3.2
8-12	Commitment*	GGM commits to building capacity of Aboriginal business to participate in mine procurement.	All	Updated EIS/EA

Table 8: Mitigation, Monitoring and Commitments Related to Labour and Economy

LABOUR AND ECONOMY				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
				Appendix O, Section 6.4 IR# CEAA_52
8-13	Commitment*	GGM is taking steps to maximize hiring of local and Aboriginal people.	All	Updated EIS/EA Appendix O, Section 6.4 IR# CEAA_52
8-14	Commitment*	As part of GGM's annual human resource reporting practice, GGM plans to include data on local, regional and Aboriginal hiring successes. Aboriginal hiring data can be reported by community where individuals identify as Aboriginal and provide community of origin information.	All	IR# BZA-BNA_23
8-15	Commitment*	GGM agrees to make best efforts to employ BZA and BNA members during the exploration activities undertaken by GGM on the Brookbank claim block {"Brookbank"). GGM will agree to provide any BNA/BZA drilling company opportunities to bid on work at Brookbank on an open book basis.	All	GGM letter to BZA and BNA dated June 8, 2018
8-16	Commitment*	GGM agrees to make best efforts to employ BZA and BNA members during the Hard rock Project as part of our commitment to local and aboriginal hiring.	All	GGM letter to BZA and BNA dated June 8, 2018
8-17	Commitment*	GGM welcomes BZA and BNA to be involved in business and contracting opportunities associated with the Hardrock Project (subject to any commitments in any Long-Term Relationship Agreements, or equivalent, it signs with more proximal Indigenous groups) and will provide capacity through a workplan and budget process.	All	GGM letter to BZA and BNA dated June 8, 2018
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 9: Mitigation, Monitoring and Commitments Related to Community Services and Infrastructure

COMMUNITY SERVICES AND INFRASTRUCTURE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
9-1	Mitigation	Maintain communication with relevant agencies and organizations, including municipal authorities, health agencies and school boards, to provide Project information, to identify and address potential Project-related implications for services and infrastructure, and to support responsible organizations in planning for, adapting to, or benefitting from changing demand as a result of the Project.	All	EIS/EA Section 15.4.3.2
9-2	Mitigation	Provide notice to the local school board regarding Project scheduling and human resources planning in order for the school board to prepare for the enrollment of additional students.	Construction, Operation	EIS/EA Section 15.4.3.2
9-3	Mitigation	Develop cooperative protocols with responsible agencies to deal with temporary construction and closure worker access to emergency and other medical services. During construction most, workers will continue to receive general health care in their home communities. Minor injuries or health problems will be addressed through the provision of first-aid at the worksite.	Construction	EIS/EA Section 15.4.3.2
9-4	Mitigation	GGM will offer its employees an Employee Assistance Program, and require pre-employment physicals. Workforce education to encourage healthy lifestyle choices, sensitivity training and strict enforcement of GGM's health and safety policies will also help mitigate adverse social effects.	Construction, Operation, Closure	EIS/EA Section 15.4.3.2
9-5	Mitigation	Demands on emergency response services will be managed by having Project rescue vehicles and trained First Responders at the worksite.	All	EIS/EA Section 15.4.3.2
9-6	Mitigation	Safety orientations will be mandatory and provided for new employees, and select employees will be trained in fuel handling, equipment maintenance, and fire prevention and response measures. Fire prevention and suppression systems will be maintained onsite, including water supplies, sprinklers, fire extinguishers and other firefighting equipment. Flammable material (such as fuels and explosives) will be carefully controlled within the PDA.	All	EIS/EA Section 15.4.3.2
9-7	Mitigation	Consult with local emergency providers so that roles and responsibilities are understood, and the necessary resources are in place.	All	EIS/EA Section 15.4.3.2

Table 9: Mitigation, Monitoring and Commitments Related to Community Services and Infrastructure

COMMUNITY SERVICES AND INFRASTRUCTURE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
9-8	Mitigation	Project planning and management strategies, including in-design mitigation measures and environmental protection measures, will reduce the likelihood of accidents and potential fires to as low a level as is reasonably practical.	All	EIS/EA Section 15.4.3.2
9-9	Mitigation	Demands on police services due to Project activities will be managed by controlling access to the mine site through the use of a security gate and guard house, and by employing onsite security staff. The use of a temporary camp, along with the work rotation, will limit interactions among local residents and non-local Project construction workers as some of the workforce will return to their home communities during their time off.	All	EIS/EA Section 15.4.3.2
9-10	Mitigation	Heat and power for Project operation will be supplied by an onsite natural gas-fuelled power plant and power generation heat recovery distribution system.	Operation	EIS/EA Section 15.4.3.2
9-11	Mitigation	Implement a Waste Management Plan, that sets out procedures for reducing Project-related waste and limiting demands on local landfills.	All	EIS/EA Section 15.4.3.2
9-12	Mitigation	GGM will install a package modular STP for the mine site and there will be no direct interaction between the mine site and the municipal wastewater system.	Operation	EIS/EA Section 15.4.3.2
9-13	Mitigation	A third-party sewage disposal contractor will provide portable washroom facilities during early construction until the STP and sewage discharge line is set up and during active closure when facilities are decommissioned.	Construction, Closure	EIS/EA Section 15.4.3.2
9-14	Mitigation	Provide Project information to the Municipality and local service providers to prepare for increased waste, water, or sewer infrastructure demand.	All	EIS/EA Section 15.4.3.2
9-15	Mitigation	The temporary camp provided by GGM will include dining services and a basic recreation area, which may include a pool table and/or ping pong table, television and exercise equipment.	Construction	EIS/EA Section 15.4.3.2
9-16	Mitigation	Maintain access and use of the front nine holes of the golf course and club house. In the event the contingency WRSA A/C is required during the Project life, GGM will discuss its requirements with the Municipality.	All	EIS/EA Section 15.4.3.2
9-17	Mitigation	Implement standard construction procedures and a Traffic Management Plan to reduce traffic delays during construction of realigned Highway 11. The Traffic	Construction	EIS/EA Section 15.4.4.2

Table 9: Mitigation, Monitoring and Commitments Related to Community Services and Infrastructure

COMMUNITY SERVICES AND INFRASTRUCTURE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		Management Plan will be developed during ongoing planning and engineering design to address traffic staging in order to reduce delays.		
9-18	Mitigation	Provide bussing services between the temporary camp and mine site.	Construction	EIS/EA Section 15.4.4.2
9-19	Mitigation	GGM will encourage carpooling among local resident construction and operation workers.	Construction, Operation	EIS/EA Section 15.4.4.2
9-20	Mitigation	Schedule arrivals/departures of employee traffic to occur earlier than the existing observed a.m. peak hour for local traffic and later than the existing observed p.m. peak hour if needed.	All	EIS/EA Section 15.4.4.2
9-21	Mitigation	Schedule alternating work shifts so that all workers do not arrive in and leave the area at the same time to limit Project-related demands on both highway and air services and infrastructure.	All	EIS/EA Section 15.4.4.2
9-22	Commitment	Burial of nonhazardous solid waste will be completed by a trained employees or contractor and comply with regulatory and access control requirements.	Operation	EIS/EA Appendix M4, Section 7.1.2.1
9-23	Commitment	Hazardous waste will be transported and disposed of in accordance with RRO 1990, Reg. 347, and the Transportation of Dangerous Goods Act, 1992, with manifests filled in and copies retained at site for records and inspection as requested.	Construction, Operation	EIS/EA Appendix M4, Section 7.1.2.2
9-24	Commitment	The site will be routinely inspected for cleanliness and good housekeeping practices, and to ensure that waste materials are properly disposed of in the appropriate temporary storage facilities.	All	EIS/EA Appendix M4, Section 8.1.1
9-25	Monitoring	Project environmental staff will carry out or commission periodic waste audits to evaluate the quantities of material generated from each waste stream, the effectiveness of diversion, and the continued ability of the target receiving site to accommodate material. These audits will also review the qualifications and license status of contracted carriers and receivers.	All	EIS/EA Appendix M4, Section 8.1.1

Table 9: Mitigation, Monitoring and Commitments Related to Community Services and Infrastructure

COMMUNITY SERVICES AND INFRASTRUCTURE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
9-26	Monitoring	Track hazardous waste materials (type and quantity) and store records on site.	Construction, Operation	EIS/EA Appendix M4, Section 8.1
9-27	Monitoring	Report hazardous waste transferred off site quarterly.	Construction, Operation	EIS/EA Appendix M4, Section 8.1
9-28	Monitoring	Report waste quantities (sold waste, recycling) transferred off site monthly.	Construction, Operation	EIS/EA Appendix M4, Section 8.1
9-29	Monitoring	Report waste quantities disposed on site monthly.	Construction, Operation	EIS/EA Appendix M4, Section 8.1
9-30	Monitoring	Appropriate registration for the generation of hazardous waste will be obtained, and monitoring and manifesting requirements will be followed as determined under Regulation 347.	All	EIS/EA Appendix M4, Section 8.1.2
9-31	Monitoring	The form and frequency of follow-up reporting will be determined as the Project progresses through EA and permitting, however, it is anticipated it will include: • Copies of the waste manifests will be made available for review by inspectors on an as-requested basis • Receiving, documenting and responding to communication from external interested parties, including complaints, will also form part of reporting under the Waste Management Plan.	All	EIS/EA Appendix M4, Section 8.2
9-32	Commitment*	A traffic management plan for the realignment of Highway 11 will be developed to support required MTO permit applications.	Construction	IR# MTO_1, MTO_4, MTO_6, MTO_7
9-33	Commitment*	GGM is supportive of other initiatives to improve the regional energy supply, and has been engaged with government representatives and community leaders to share	Closure	IR# AZA-AFN-GFN_36, AZA-

Table 9: Mitigation, Monitoring and Commitments Related to Community Services and Infrastructure

COMMUNITY SERVICES AND INFRASTRUCTURE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		information and help identify opportunities for government initiatives to improve the reliability of power in the region. At closure, GGM will consider the fate of Project components and determine if some of the assets (including the power plant) can be repurposed by other parties for meeting other needs.		AFN-GFN_43, BZA-BNA_27
9-34	Commitment*	GGM is planning to install a potable water reservoir at the Project site to minimize the impact of peak usage at shift change as well as minimize impact on the Municipal potable water distribution system.	All	IR# MMAH_2
9-35	Commitment*	In the event the municipal sewage treatment plant issues are not addressed in time for the temporary camp, a third-party sewage disposal contractor would have the flexibility to transport the waste to the nearest available sewage treatment plant, or permitted disposal site.	Construction	IR# MMAH_2, MOECC_114, MOECCC_115, MOECC_180, MOECC_194
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 10: Mitigation, Monitoring and Commitments Related to Land and Resource Use

LAND AND RESOURCE USE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
10-1	Mitigation	Provide in-kind support to assist Greenstone Snowmobile Club in improving the existing trail to Longlac.	Construction	EIS/EA Section 16.4.2.2
10-2	Mitigation	Where possible in accessible areas (e.g., along cleared rights-of-way), leave trees and other vegetation in place to buffer the view of Project components, reducing the change in viewshed and muffling nuisance noise.	Construction, Operation	EIS/EA Section 16.4.2.2
10-3	Mitigation	Site the majority of Project components so as to achieve a 120-m setback for the surface rights reservation area on claim to lease lands and a 30-m high water mark setback for patent lands; existing vegetation will remain in these areas.	Construction	EIS/EA Section 16.4.2.2
10-4	Mitigation	Implement progressive rehabilitation works, including stabilization and rehabilitation of aggregate source areas, the north cell of the TMF, plateaus and benches of WRSAs A, B, and C and the overburden storage areas.	Construction, Operation	EIS/EA Section 16.4.2.2
10-5	Mitigation	Remove construction-related buildings, access roads and laydown areas following construction.	Construction	EIS/EA Section 16.4.2.2
10-6	Mitigation	Initiate revegetation as soon as practical after Project components are no longer needed.	All	EIS/EA Section 16.4.2.2
10-7	Mitigation	Rehabilitation will be designed to meet desired end land uses, end land uses will be identified in the Closure Plan, in consultation with agencies, stakeholders and Aboriginal communities, as the Project progresses.	Closure	EIS/EA Section 16.4.2.2
10-8	Mitigation	Maintain access to mining claims located on the peninsula east of the PDA.	All	EIS/EA Section 16.4.3.2
10-9	Mitigation	Use established watercourse crossings and avoid obstructions to navigation.	All	EIS/EA Section 16.4.4.2
10-10	Mitigation	Construction activities will be undertaken in a way to prevent debris from flowing into a navigable waterbody.	Construction	EIS/EA Section 16.4.4.2
10-11	Commitment	Maintain alternate access within the PDA to the Southwest Arm of Kenogamisis Lake during construction and operation.	Construction, Operation	EIS/EA Section 16.4.4.2

Table 10: Mitigation, Monitoring and Commitments Related to Land and Resource Use

LAND AND RESOURCE USE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
10-12	Commitment	Communicate Project activities, locations and timing throughout construction, operation and closure to affected land and resource users, interest groups, the MNRF and local authorities.	All	EIS/EA Section 16.4.2.2
10-13	Commitment	Use signage at locations around the perimeter of the PDA to alert local land and resource users of the presence of the Project and its components.	All	EIS/EA Section 16.4.2.2
10-14	Commitment	GGM will continue to meet with affected tenure holders on a regular basis (i.e., semi-annually) to discuss issues and concerns and to provide Project updates.	Construction, Operation	EIS/EA Section 16.4.3.2
10-15	Commitment	GGM will continue discussions regarding accommodation for the lost trapping area associated with GE022 and GE021and will also discuss access to GE022 following the closure of Lahtis Road, and trapping on GGM's patented lands prior to the start of construction and where there is currently little activity.	Construction	EIS/EA Section 16.4.3.2 EIS/EA Section 16.4.3.2
10-16	Commitment	GGM will continue discussions with BMA licence holder GE-21A-032 to reach an equitable solution to lost land and bait traps.	Construction	
10-17	Commitment	Communicate Project activities, locations and timing throughout construction, operation and closure to affected trappers, guide outfitters, and bait harvesters leading up to construction and throughout the life of the Project.	Construction	EIS/EA Section 16.4.3.2
10-18	Commitment	GGM will continue to consult with MNRF and the eFRL holder (Ne-Daa-Kii-Me-Naan Inc.) to address, to the extent possible, access to the PDA and the harvest of Crown timber that will be removed as part of site preparation. Timber removal will be completed in accordance with the *Crown Forest Sustainability Act* and *Crown Timber Act.*	Construction	EIS/EA Section 16.4.3.2
10-19	Commitment	GGM will continue negotiations with Ne-Daa-Kii-Me-Naan Inc. to obtain an Overlapping Agreement and to harvest the trees under their pulp mill licence.	Construction	EIS/EA Section 16.4.3.2
10-20	Commitment	GGM will seek a Release of Tree Reservation under the *Public Lands Act* to remove trees on patent lands which have timber rights reserved to the Crown.	Construction	EIS/EA Section 16.4.3.2
10-21	Commitment	GGM will obtain necessary patent claims, mining leases, licences of occupation and staked claims in areas that are overlapped by the Project.	Construction	EIS/EA Section 16.4.3.2

Table 10: Mitigation, Monitoring and Commitments Related to Land and Resource Use

LAND AND RESOURCE USE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
10-22	Commitment	Communicate Project activities affecting watercourses used for navigation (e.g., treated effluent discharge locations and freshwater intake in Kenogamisis Lake) to relevant land and resource users, interest groups, the MNRF and local authorities leading up to construction and throughout the life of the Project. The communication strategy will include the use of public announcements using local media.	Construction	EIS/EA Section 16.4.4.2
10-23	Commitment	Engage local boaters, resource users and the MNRF to address navigation issues as well as access and safety issues in the vicinity of the treated effluent discharge locations and freshwater intake related to navigation along watercourses affected by the Project.	Construction	EIS/EA Section 16.4.4.2
10-24	Commitment	Post signs along the perimeter of the PDA to alert boaters of the presence of the Project and its activities and facilities.	Construction	EIS/EA Section 16.4.4.2
10-25	Commitment*	GGM will continue to consult with the MNRF following approval of the Final EIS/EA regarding information requirements to support subsequent permitting under the Crown Forest Sustainability Act.	Construction	IR# MNRF_36
10-26	Commitment*	GGM commits to providing MNRF with GIS information related to the footprint of any harvesting for its review on an annual basis, as needed to confirm compliance with any harvest licenses issued.	All	IR# MNRF_37
10-27	Commitment*	GGM understands that MNRF permits and approvals are required under the LRIA and will work with the MNRF to advance specific permitting requirements.	Construction	IR# MNRF_9
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 11: Mitigation, Monitoring and Commitments Related to Heritage Resources

HERITAGE RESOURCES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
11-1	Mitigation	Buffer Zones: • A buffer zone of 60 m will be implemented to isolate Community Heritage Resource (CHR) 1 from Project activities • The 60 m construction buffers at CHR 1 will be noted on all construction plans and communicated to the construction team leads. • Site plan controls, such as flagging, will be used to prevent Project activity from occurring within the 60 m buffer zone. • If Project activities need to encroach upon the 60 m buffer zone, GGM will consult a qualified building condition specialist, specializing in structures built to 20th century or later Euro-Canadian construction standards, prior to the commencement of Project activities.	All	EIS/EA Section 17.4.3.2
11-2	Mitigation	Documentation and salvage: • Documentation and salvage will be undertaken where retention or relocation is not feasible, as is the case with Euro-Canadian architectural and/or historical resources. • Documentation creates a public record of the structure(s), which provides a land use history, construction details, and photographic record of the resource. • Through the selective salvage of identified heritage attributes and other materials, some of the cultural heritage value or interest (CHVI) of each property will be retained. • Documentation will be performed by a heritage professional with experience in historical documentation and familiar with Euro-Canadian historical background and material culture. This person will preferably be a member of the Canadian Association of Heritage Professionals. • Documentation will involve, as appropriate, creating photographic documentation, basic floor plans, and a site-specific history to make a historical record of the architectural and/or historical resources. • Any salvage of architectural and/or historical resources will be undertaken by a reputable salvage company.	Construction	EIS/EA Section 17.4.3.2

Table 11: Mitigation, Monitoring and Commitments Related to Heritage Resources

HERITAGE RESOURCES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		• The determination of viable salvage materials will be made by the salvage company or selected charity. A record of salvage activities will be maintained and appended to the historical record. • A copy of all documentation will be deposited at the local library in Geraldton.		
11-3	Mitigation	Commemoration: • Commemoration will be undertaken in order to create a record of past occupation and past mining activity, involving the associated architectural and/or historical resources. Any previously conducted documentation and salvage mitigation will form the basis for commemoration for Euro-Canadian resources. • All identified architectural and/or historical resources will be considered for commemoration, dependent upon Project-specific mitigation measures. • An agreement has been signed between the Municipality and GGM to support the Municipality's future plans with respect to these facilities. GGM also encourages the participation of interested stakeholders during these discussions.	Construction	EIS/EA Section 17.4.3.2
11-4	Commitment	If an archaeological resource is discovered: • Construction or operation activities will cease within a 20 m radius of the archaeological resource. • Work will be stopped immediately and MTCS will be contacted prior to the implementation of procedures and mitigation as required under the OHA and the *2011 Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). • A licensed archaeologist will be retained, and a Stage 2 archaeological assessment will be conducted with the involvement of Aboriginal communities. • GGM will work collaboratively with local Aboriginal communities to develop a communication procedure should previously undocumented archaeological resources be discovered. • Follow-up Stage 3 or Stage 4 archaeological investigations will be conducted as required by the OHA and the 2011 Standards and Guidelines for Consultant Archaeologists, as necessary.	Construction, Operation	EIS/EA Section 17.4.2.2

Table 11: Mitigation, Monitoring and Commitments Related to Heritage Resources

HERITAGE RESOURCES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		• Construction will proceed once the archaeological or heritage resources of CHVI have been mitigated through the accepted option.		
11-5	Commitment	Key construction and operation staff will be trained in: • recognition of basic archaeological artifacts such as Aboriginal material culture (e.g., clay ceramics, lithic artifacts, and faunal remains) • recognition of Euro-Canadian material culture (e.g., refined ceramics, glassware, construction debris, and personal effects) • recognition of in-situ archaeological features such as tent rings or other camp site features • overview of the history of potential and documented historical use and occupation of the area in case a potential archaeological resource is found during Project construction and operation. • The staff training would also include a brief history of potential and documented historical use and occupation of the PDA and LAA/RAA.	Construction, Operation	EIS/EA Section 17.4.2.2 and Appendix M14, Section 6.2.1
11-6	Commitment	If human remains are encountered, GGM will stop work immediately and contact the police or coroner, Registrar or Deputy Registrar of the Cemeteries Regulation section of the Ontario Ministry of Government and Consumer Services, as well as the Archaeology Program Unit of the MTCS.	Construction, Operation	EIS/EA Section 17.4.2.2
11-7	Reporting	It is anticipated that those elements relevant to the Conceptual Archaeology and Heritage Resource Management 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.	All	EIS/EA Appendix M14, Section 8.2
11-8	Commitment*	LIDAR imaging will be included as part of the additional Stage 2 archaeological assessment.	Construction	IR# AZA-AFN-GFN_53

Table 11: Mitigation, Monitoring and Commitments Related to Heritage Resources

HERITAGE RESOURCES				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
11-9	Commitment*	GGM will work with Aboriginal communities through the environmental committee(s) and contract a licensed archaeologist to develop and deliver a training module for the identification of archaeological resources.	Construction	IR# AZA-AFN-GFN_56
11-10	Commitment*	GGM will develop and implement a training program for staff on the Archaeology and Heritage Resources Management Plan which will include a component on training for artifact identification and notification protocols.	Construction	IR# MNDM_8
11-11	Commitment*	Only very limited Stage 2 field work remains to be conducted within the PDA. It is a standard practice to conduct additional Stage 2 archaeological field work as specific footprints are refined during detailed engineering prior to construction. As the Project moves forward, detailed engineering will refine footprint details allowing to further refine where the additional Stage 2 field work will be conducted.	Construction	IR# MTCS_1
11-12	Commitment*	While not anticipated, if there is any additional Stage 3 or Stage 4 archaeological investigation required because of the Stage 2 field work, then those investigations will also be conducted prior to the beginning of construction works in those areas.	Construction	IR# MTCS_1
11-13	Commitment*	GGM will consult with interested Aboriginal communities prior to engaging an archaeologist for any further archaeology work that may be required.	All	Updated EIS/EA Appendix O, Section 6.4 IR# CEAA_52
11-14	Commitment*	GGM will consult with Aboriginal communities regarding disposition and treatment of any heritage resources that may be found.	All	Updated EIS/EA Appendix O, Section 6.4 IR# CEAA_52
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 12: Mitigation, Monitoring and Commitments Related to Traditional Land and Resource Use

TRADITIONAL LAND AND RESOURCE USE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
12-1	Mitigation	Where there is interest, provide opportunities to local communities for harvesting of plants for traditional purposes prior to construction.	Construction	EIS/EA Section 18.4.2.2
12-2	Mitigation	Incorporate plant species of interest to Aboriginal communities into the Closure Plan as feasible.	Closure	EIS/EA Section 18.4.2.2
12-3	Mitigation	Avoid the use of chemical herbicides.	Construction, Operation	EIS/EA Section 18.4.2.2
12-4	Mitigation	Implement detailed recording and mapping of spiritual or cultural sites in partnership with Aboriginal community representatives, make a decision about the relative importance of the site and, if warranted, establish how to maintain and control access.	All	EIS/EA Section 18.4.5.2
12-5	Mitigation	Where there is interest, provide opportunities to local communities for harvesting of plants for traditional purposes prior to construction.	Construction	EIS/EA Section 18.4.5.2
12-6	Mitigation	Through Project design the length and location of roads have been considered in order to reduce potential access restrictions.	Construction	EIS/EA Section 18.4.5.2
12-7	Mitigation	A Pipe Ceremony will be held prior to commencement of construction under the direction of local Aboriginal communities.	Construction	EIS/EA Section 18.4.5.2
12-8	Commitment	Maintain alternate access within the PDA to the Southwest Arm of Kenogamisis Lake during construction and operation.	Construction, Operation	EIS/EA Section 18.4.2.2
12-9	Commitment	GGM recognizes, as a result of consultation input, 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.	Operation	EIS/EA Section 18.4.4.2
12-10	Commitment*	If new TK information is received, GGM will review the results of the Final EIS/EA, including related to key EA milestones such as baseline studies, alternatives assessment, environmental effects assessment including mitigation and monitoring, and other conclusions or commitments to confirm if refinements are required.	All	IR# MOECC_153, MOECC_155, MOECC_156, CEAA_44, BZA-BNA_33

Table 12: Mitigation, Monitoring and Commitments Related to Traditional Land and Resource Use

TRADITIONAL LAND AND RESOURCE USE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
12-11	Commitment*	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 TLRU assessment to determine whether additional mitigation is required with respect to Project design and/or the environmental management and monitoring plans (EMMPs).	All	IR# AZA-AFN-GFN_58, CEAA_44, MOECC_155
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 13: Mitigation, Monitoring and Commitments Related to Spill Prevention and Response

SPILL PREVENTION AND RESPONSE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
13-1	Mitigation	Document operational procedures for tasks that have an identified risk, such as fuel handling, process reagents handling, explosives reagents handling, and waste management.	All	EIS/EA Appendix M8, Section 7.1.1
13-2	Mitigation	Certify vehicles and drivers for transportation of dangerous goods.	All	EIS/EA Appendix M8, Section 7.1.1
13-3	Mitigation	Ensure vehicle cargos are adequately contained and secured.	All	EIS/EA Appendix M8, Section 7.1.1
13-4	Mitigation	Conduct preventative maintenance of (but not limited to) vehicles, equipment, and storage containers.	All	EIS/EA Appendix M8, Section 7.1.1
13-5	Mitigation	Conduct regular housekeeping and environmental audits of facilities.	All	EIS/EA Appendix M8, Section 7.1.1
13-6	Mitigation	Measure and record fuel levels in tanks and compare with records of deliveries and dispensing as part of a regular capacity audit.	All	EIS/EA Appendix M8, Section 7.1.1
13-7	Mitigation	Compressed gas pressure for large site storage tanks will be measured and records of deliveries and dispensing compared as part of a regular capacity audit.	All	EIS/EA Appendix M8, Section 7.1.1
13-8	Mitigation	Fuel delivery will comply with appropriate regulations, standards, and best management practices, including Transportation of Dangerous Goods Regulations.	All	EIS/EA Appendix M8, Section 7.1.1
13-9	Mitigation	Fuel transfer procedures will include best management steps to ensure no overtopping of tanks or spillage. In addition, inventories will be tracked regularly to check on possible losses.	All	EIS/EA Appendix M8, Section 7.1.1

Table 13: Mitigation, Monitoring and Commitments Related to Spill Prevention and Response

SPILL PREVENTION AND RESPONSE				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
13-10	Mitigation	Implement a risk evaluation program for identifying vulnerabilities and management of improvements.	All	EIS/EA Appendix M8, Section 7.1.1
13-11	Mitigation	Document inspection schedules and procedures for dangerous goods and hazardous materials stored on site.	All	EIS/EA Appendix M8, Section 7.1.1
13-12	Monitoring	Monitor pipelines (visual inspection) and TMF discharge pipeline (pressure/flow monitoring system) daily	Operation	EIS/EA Appendix M8, Section 8.1
13-13	Monitoring	Monitor contact water collection system either daily or monthly depending on season and weather conditions.	Construction, Operation	EIS/EA Appendix M8, Section 8.1
13-14	Monitoring	Monitor excavation, loading and transport of historical tailings and contaminated soil daily.	Construction, Operation	EIS/EA Appendix M8, Section 8.1
13-15	Monitoring	Visually inspect dams daily	Construction, Operation	EIS/EA Appendix M8, Section 8.1
13-16	Monitoring	Visually inspect fuel and chemical storage areas monthly.	Construction, Operation	EIS/EA Appendix M8, Section 8.1
13-17	Monitoring	If a spill occurs that requires notification to the MOECC under Section 92 of the EPA, both the prevention portion and the contingency portion of plans will be reviewed and revised as required.	All	EIS/EA Appendix M8, Section 8.1
13-18	Commitment*	In the event there is a spill remedial measures will be implemented and if warrant a water monitoring program would be implemented based on the site-specific conditions and final confirmatory sampling following implementation of the remedial activities.	All	IR# MOECC_120
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 14: Mitigation, Monitoring and Commitments Related to Soil Management

SOIL MANAGEMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
14-1	Mitigation	Avoid excessively wet conditions that are unsafe for machinery during soil salvage operations or will be done at winter time under frozen conditions when possible.	Construction, Operation	EIS/EA Appendix M9, Section 7.2.3
14-2	Mitigation	Avoid excessive traffic during the salvage process to reduce the potential for admixing.	Construction, Operation	EIS/EA Appendix M9, Section 7.2.3
14-3	Mitigation	Confine traffic to established routes to avoid unnecessary compaction of soil in undisturbed areas.	Construction, Operation	EIS/EA Appendix M9, Section 7.2.3
14-4	Mitigation	Implement erosion and sediment control measures (as per the Conceptual Erosion and Sediment Control Plan).	Construction, Operation	EIS/EA Appendix M9, Section 7.2.3
14-5	Commitment	The organic/muck soils will be moved and stockpiled separately, as possible, from the topsoils and overburden.	Construction, Operation	EIS/EA Appendix M9, Section 7.4.3
14-6	Mitigation	Soil will be stockpiled in the identified locations where it will not be moved or subject to further disturbance to address admixing and physical deterioration concerns.	Construction, Operation	EIS/EA Appendix M9, Section 7.4.3
14-7	Mitigation	Limit the height and slope of stockpiles. Where possible, slopes will be 3:1 and bench heights will not exceed 20 m.	Construction, Operation	EIS/EA Appendix M9, Section 7.4.3
14-8	Mitigation	Whenever possible, orient stockpiles to reduce wind erosion and stockpiles will not be stored at heights of land to reduce wind exposure.	Construction, Operation	EIS/EA Appendix M9, Section 7.4.3
14-9	Mitigation	Identify soil stockpile locations with signage to prevent removal of material from the site or contamination with other materials.	Construction, Operation	EIS/EA Appendix M9, Section 7.4.3

Table 14: Mitigation, Monitoring and Commitments Related to Soil Management

SOIL MANAGEMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
14-10	Mitigation	Covers may be used or vegetation will be established on stockpiles to reduce exposure to wind and water erosion and establishment of invasive plants.	Construction, Operation	EIS/EA Appendix M9, Section 7.4.3
14-11	Commitment	Land-farm Management Plan will be developed for the Project if on site soil bioremediation is optioned during construction or operations.	Construction, Operation	EIS/EA Appendix M9, Section 7.5
14-12	Monitoring	Soil quality sampling and analyses for identifying contaminated areas will be carried out during non-frozen ground days during drier periods	Construction	EIS/EA Appendix M9, Section 8.1
14-13	Monitoring	Soil quality sampling and analyses for rehabilitation will be carried out to identify future uses of stockpiles during non-frozen ground days during drier periods	Construction, Operation	EIS/EA Appendix M9, Section 8.1
14-14	Mitigation*	TP22, TP23, TP25 and TP33 were located within the Macleod tailings. The reddish purple/burgundy coloured soils are consistent with descriptions of burgundy tailings in previous studies of the Macleod tailings. These areas will be remediated as part of the mine development.	Construction	IR# MOECC_52
14-15	Mitigation*	With respect to the PCB exceedance at TP26, it is possible that PCB-containing equipment, such as transformers, was historically present in the Macleod plant site. These areas will be remediated as part of the mine development.	Construction	IR# MOECC_53
14-16	Commitment*	GGM is committed to the responsible long-term management of historical tailings within the PDA and will be carrying out additional laboratory work to simulate storage conditions in the new TMF to confirm geochemical behaviour to inform detailed design of the deposition plan. This will involve investigating layering design approaches, and the detailed engineering plan including any engineering updates to the segregation strategy will be reviewed by the ITRB.	Construction	IR# MOECC_191, CEAA_89, CEAA_90
14-17	Commitment*	As part of an agreement with Hydro One, GGM will be committed to perform a Phase 1 and Phase 2 Environmental Site Assessment at the designated new location for the Longlac Transformer Station.	Construction	IR# HONI_2

Table 14: Mitigation, Monitoring and Commitments Related to Soil Management

SOIL MANAGEMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
14-18	Commitment*	As part of an agreement with Hydro One, GGM will be committed to perform a Phase 1 and Phase 2 Environmental Site Assessment at the designated new location for the GOC.	Construction	IR# HONI_3
14-19	Commitment*	For properties currently owned by others, the soil management requirements will be site-specific and planned to be addressed separately from the mine's Soil Management Plan because these site-specific plans can only be completed once property ownership is transfer to GGM pending advancement of the Project.	Construction	IR# MOECC_23, MOECC_86
14-20	Commitment*	Further delineation of soil quality will be completed in preparation for construction activities and will be used to refine the Final Soil Management Plan.	Construction	IR# MOECC_23, MOECC_48, MOECC_57, MOECC_78, MOECC_86, MOECC_256, MOECC_278, CEAA_88
14-21	Commitment*	In the Final Soil Management Plan, soils are planned to be delineated into four categories: soils suitable for closure revegetation use, soil suitable for placement in the WRSAs (to fill void space or to cover the inert landfill cells, use as grading material over historical tailings prior to placement of enhanced cover), soil with higher metals content that are to be placed in the TMF along with the relocated historical tailings, and soils to be hauled off site (e.g. hydrocarbon impacted soils). Further discussion of the environmental criteria to be used for each of these categories will be held with the MOECC during the permitting phase of the Project. Additional soil sampling is planned to refine estimates and corresponding management options prior to construction.	Construction	IR# MOECC_57, MOECC_86, MOECC_94, MOECC_256, MOECC_266, MOECC_278, CEAA_15, CEAA_88
14-22	Commitment*	The Final Soil Management Plan will include measures to ensure that all solid and liquid is contained during transportation.	Construction	IR# MOECC_91
14-23	Commitment*	Further refinement of the soil chemistry will be carried out to inform the next iteration of the soil management plan prior to construction, and will consider topsoil and subsoils separately.	Construction	IR# MOECC_256

Table 14: Mitigation, Monitoring and Commitments Related to Soil Management

SOIL MANAGEMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
14-24	Commitment*	GGM commits to taking all sediment from the water management treatment system to the TMF. Sediment that may collect in the ditches will either be from the excavated ditches themselves or runoff from the waste rock and operational pads.	All	IR# MOECC_92
14-25	Commitment*	Areas of known historical contamination will be flagged prior to disturbance, and run-off collected and treated prior to discharge as needed.	Construction	IR# MOECC_117
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 15: Mitigation, Monitoring and Commitments Related to Explosives Management

EXPLOSIVES MANAGEMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
15-1	Commitment	The explosives storage facility will be designed and sited in accordance with the Explosives Act and regulations as published by the Explosives Regulatory Division of Natural Resources Canada (NRCan).	Construction, Operation	EIS/EA Appendix M11, Section 7.1
15-2	Commitment	Magazines will be kept locked at all times when an authorized person is not present.	Construction, Operation	EIS/EA Appendix M11, Section 7.1
15-3	Commitment	Clearly visible “Danger Explosives” and “No Smoking or Open Flame” signage will be posted on the magazines and warning signs will be on the road approaching the storage areas.	Construction, Operation	EIS/EA Appendix M11, Section 7.1
15-4	Commitment	There will be no stockpiling/storage of explosives at locations other than the explosives storage and manufacturing facilities.	Construction, Operation	EIS/EA Appendix M11, Section 7.2
15-5	Commitment	Prior to blasting, a blast clearance will be provided to the blasting team from the Greenstone Regional Airport and Nakina Airport and internally from GGM personnel.	Construction, Operation	EIS/EA Appendix M11, Section 7.3
15-6	Commitment	Staff will be notified of blasts by various means which may include (but are not limited to): daily health and safety “tailgate” meetings, signage at standard locations around the site, mine radio announcements, and electronic means.	Construction, Operation	EIS/EA Appendix M11, Section 7.3
15-7	Mitigation	The immediate area of the blast will be surveyed for wildlife within a few hours prior to a blast, with blasting temporarily suspended should sensitive species (moose, bear) or Species at Risk be observed.	Construction, Operation	EIS/EA Appendix M11, Section 7.3
15-8	Mitigation	For blasting which occurs within the vicinity of a fish-bearing waterbody, the detailed blast design will consider DFO regulatory requirements.	Construction, Operation	EIS/EA Appendix M8, Section 7.1.1
15-9	Monitoring	Keep available weekly reporting from explosives contractor of quantities of explosives and explosive components on site.	Construction, Operation	EIS/EA Appendix M8, Section 7.1.1

Table 15: Mitigation, Monitoring and Commitments Related to Explosives Management

EXPLOSIVES MANAGEMENT				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
15-10	Monitoring	Record weekly explosives usage (timing and quantities).	Construction, Operation	EIS/EA Appendix M8, Section 7.1.1
15-11	Monitoring	Record complaints and subsequent follow up (monthly and/or weekly).	Construction, Operation	EIS/EA Appendix M8, Section 8.1
15-12	Monitoring	Timely reporting of incidents and near misses with regard to the manufacture, transport, and use of explosives at the Project.	Construction	EIS/EA Appendix M8, Section 8.1
15-13	Monitoring	Information collected from reporting will be reviewed by the Drill and Blast Supervisor to determine the effectiveness of the mitigation measures in this plan and adjustments made as needed in accordance with the adaptive management approach for the Project.	Construction, Operation	EIS/EA Appendix M8, Section 8.1

Table 16: Mitigation, Monitoring and Commitments Related to Consultation

CONSULTATION				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
16-1	Commitment	Consultation has been ongoing prior to and throughout the EIS/EA process, and will continue with local Aboriginal communities, through the life of the Project.	All	EIS/EA, Section 24.2
16-2	Commitment*	GGM will support training of Aboriginal people through agreements with communities, seeking joint funding of programming, preparedness training, and providing on-the-job training.	All	Updated EIS/EA Appendix O, Section 6.4 IR# CEAA_52
16-3	Commitment*	GGM will provide opportunities to affected Aboriginal communities to review and comment on permits, the Closure Plan, Environmental Management Plans, and monitoring.	All	Updated EIS/EA Appendix O, Section 6.4 IR# CEAA_52
16-4	Commitment*	GGM will meet regularly (or at least annually) with affected Aboriginal communities to share information about the Project.	All	Updated EIS/EA Appendix O, Section 6.4 IR# CEAA_52
16-5	Commitment*	GGM has supported, and will continue to support, the use of Aboriginal environmental monitors and/or technicians.	All	Updated EIS/EA Appendix O, Section 6.4 IR# CEAA_52
16-6	Commitment*	GGM commits to supporting Aboriginal cultural practices through community driven initiatives.	All	Updated EIS/EA Appendix O, Section 6.4 IR# CEAA_52
16-7	Commitment*	GGM is committed to monitoring and information sharing. It is anticipated that those elements relevant to the environmental monitoring and management plans will be assembled into a report and provided to interested parties on an annual basis during construction and operation, and during closure in years when monitoring is carried out.	All	IR# CLFN_1

Table 16: Mitigation, Monitoring and Commitments Related to Consultation

CONSULTATION				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
16-8	Commitment*	A preliminary agreement was previously signed with Hydro One to begin to discuss and studies for the project. Going forward, two agreements are planned to be signed between Hydro One and GGM. These agreements will cover the responsibility of each party concerning the relocation of Hydro One's infrastructure.	All	IR# HONI_1
16-9	Commitment*	GGM will continue to share project information with RSMIN to address its areas of interest through the implementation of appropriate mitigation measures that have been identified for the Project.	All	IR# RSMIN_1
16-10	Commitment*	GGM will support RSMIN values through hiring as many regional employees as possible and working with local conservation groups to promote the high standard of environmental awareness and concern that now exists within the area.	All	IR# RSMIN_12
16-11	Commitment*	The information on fish species that are important to RSMIN, and the fish consumption methods used by RSMIN community members, will be considered in refining future monitoring programs.	All	IR# RSMIN_2
16-12	Commitment*	Water quality and fish tissue monitoring results will be shared with Aboriginal communities upon request.	All	IR# CEAA_93
16-13	Commitment*	GGM commits to establish and fund the AZA, AFN, GFN Environment Advisory Committee (EAC) and to fund the training of the First Nation Community Consultation and Environmental Monitor (1 position for each First Nation). Activities to be undertaken by the EAC include assisting in the development and implementation of management and monitoring plans including Adaptive Management Planning, Environmental Assessment Compliance Monitoring Program, Socio-economic Monitoring Plan, Wild Foods Monitoring Program, review of regulatory permits, plans, monitoring reports and other aspects related to the environmental management and performance of the Project (e.g. Goldfield Creek diversion), and other topics reasonably brought forward by the EAC.	All	GGM letter to AZA, AFN and GFN dated June 14, 2018
16-14	Commitment*	GGM commits to work with AZA, AFN and GFN to develop a Consultation and Implementation Plan to communicate Project developments. An Implementation Coordinator will be funded by GGM for each First Nation (AZA, AFN, GFN) to oversee the implementation of Project related commitments and liaise with GGM for the first	Construction	GGM letter to AZA, AFN and GFN dated June 14, 2018

Table 16: Mitigation, Monitoring and Commitments Related to Consultation

CONSULTATION				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		three years of the agreement. At the end of the funding period this role will be assumed by the Community Consultation and Environmental Monitor.		
16-15	Commitment*	GGM commits to supporting reasonable community-based engagement and cultural activities including youth engagement in traditional teachings for fishing, hunting, harvesting and other land/water uses; participation in plant, fish and wildlife species salvage prior to construction and participation in revegetation efforts in the PDA and LAA.	All	GGM letter to AZA, AFN and GFN dated June 14, 2018
16-16	Commitment*	GGM is committed to ongoing consultation with the MNO as the project advances, including information sharing and opportunities related to the advancement of the Closure Plan, fish habitat offsetting, Environmental Management and Monitoring Plans, and reasonable support for cultural practices through community driven initiatives. GGM is also providing an opportunity for the MNO to have an Environmental Monitor (otherwise referred to as a Metis Liaison) and an Environmental Committee comprised of representatives of GGM and MNO to provide input on adaptive management for the Project.	All	Ongoing consultation with MNO IR# MNO_26
16-17	Commitment*	Where MNRF has a permitting authority for the Project, the corresponding EMMP with linkage to the permit will be discussed with MNRF.	All	IR# MNRF_102
16-18	Commitment*	Additional detail on the crossing to access aggregate site T2, (such as plans, profiles, cross sections) requires detailed engineering and will be available for review and discussion with MNO as the Project advances to permitting detail.	Construction	IR# MNO_52
16-19	Commitment*	GGM will continue to engage MNRF throughout the permitting phase regarding MNRF authorizations. Additional details will be provided during the permitting phase, including development of a road use strategy (RUS) for each of the roads and associated infrastructure.	Construction	IR# MNRF_51
16-20	Commitment*	GGM acknowledges that each aggregate permit application must be a stand-alone document including details of the natural environment, hydrogeology, etc. as required by the ARA. Pre-consultation with the MNRF will ensure that necessary information is included in the applications.	Construction	IR# MNRF_16
* - indicates items that have been added since the submission of the Final EIS/EA				

Table 17: Mitigation, Monitoring and Commitments Related to Other Topics

OTHER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
17-1	Commitment	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 to closure. ITRB reports and actions undertaken by GGM to address ITRB feedback will be made available to interested stakeholders.	Construction	EIS/EA Section 24.2
17-2	Commitment	The thickened disposal option could potentially optimize TMF storage efficiency and is best evaluated once the mill successfully ramps up to the design throughput of 30,000 tonnes per day.	Operation	EIS/EA Section 24.2
17-3	Mitigation*	Design approaches in addition to the use of the highest design criteria and standards combine to mitigate the probability of an accidental dam failure. Constant dam monitoring, surveillance and maintenance by GGM as well as anticipated regulatory requirements to conduct third party dam inspections and safety reviews in compliance with the Canadian Dam Association guidelines and condition of other regulatory approvals, will further mitigate against the potential for accidental dam failure.	All	IR# RSMIN_8
17-4	Commitment*	The detailed design of the toe stabilization berms will be advanced when the results of cone penetration tests (CPTs) are available. The highway will not be commissioned until such a time as adequate geotechnical stability has been demonstrated.	Construction	IR# AZA-AFN-GFN_68
17-5	Commitment*	GGM is committed to provide all required detailed engineering information to MTO as well as fulfill all legal requirements to conclude a legal agreement with MTO before commencing construction of the new segment of Highway 11.	Construction	IR# MTO_1
17-6	Commitment*	Prior to moving the utilities associated with the Highway relocation, GGM will submit the Utility Relocation Plan to MTO for review and approval.	Construction	IR# MTO_2

Table 17: Mitigation, Monitoring and Commitments Related to Other Topics

OTHER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
17-7	Commitment*	GGM will consider the provisions of the United Nations Environment Programme (UNEP) Awareness and Preparedness for Emergencies on a Local Level (APELL) protocol in the next iteration of the Emergency Response Plan.	Construction	IR# AZA-AFN-GFN_69
17-8	Commitment*	Details of the riparian zone (along the approximately 2 km long new channel alignment (between the GFDP and SWP1) development will be provided during the permitting process associated with the Lakes and Rivers Improvement Act and DFO Authorizations.	Construction	IR# AZA-AFN-GFN_15
17-9	Commitment*	The EMMPs will be progressively developed as the Project moves through permitting, and construction, and updated based on continual improvement during operation through adaptive management. As the Project progresses towards construction and operations, the level of detail of the EMMPs is expanded upon as more Project details are advanced through detailed engineering work. Details on the monitoring locations, parameters, frequencies, triggers, methods, and reporting procedures will be developed through the permitting phase.	All	IR# AZA-AFN-GFN_3, MNDM_14, MOECC_30, MOECC_59
17-10	Commitment*	Site investigations carried out to date have characterized the dam foundation conditions and the design and dam instrumentation programs have been developed in light of this understanding. Additional work will be carried out for detailed engineering.	Construction	IR# AZA-AFN-GFN_67, GFN_15
17-11	Commitment*	A Failure Modes and Effects Analysis will be completed and informed by detailed engineering and has been acknowledged by the ITRB.	Construction	IR# MOECC_193
17-12	Commitment*	As the project proceeds and operational planning advances, the conceptual waste rock management plan will be updated including additional details on the testing program. GGM anticipates that the geochemical monitoring plan will form part of the Closure Plan for the Project.	Construction	IR# MOECC_25
17-13	Commitment*	GGM agrees to negotiate an exploration agreement for future exploration activities at Brookbank, in a reasonable time prior to undertaking or resuming exploration activities.	All	GGM letter to BZA and BNA dated June 8, 2018
17-14	Commitment*	More detailed geological descriptions will be included in Section 5 of the	Construction	IR# MNDM_1

Table 17: Mitigation, Monitoring and Commitments Related to Other Topics

OTHER				
ID Number	**Commitment/ Mitigation/ Monitoring**	**Description**	**Phase/ Timing**	**Source Reference**
		Closure Plan.		
17-15	Commitment*	Specific mitigation measures will be included in Sections 10, 11 and 12 of the Closure Plan.	Construction	IR# MNDM_2
17-16	Commitment*	Requirements for rehabilitation measures during temporary suspension and state of inactivity will be included in the Closure Plan, in accordance with O.Reg. 240/00. These measures will include water management considerations.	Construction	IR# MNDM_19
17-17	Commitment*	A description of the performance monitoring for the WRSA and TMF covers will be included in the Closure Plan.	Construction	IR# MNDM_21
17-18	Commitment*	The certified Closure Plan will include reclamation cost estimate and sequencing.	Construction	IR# MNDM_5
17-19	Commitment*	Typical waste report requirements will be included in the annual reports. Specific reporting details will be confirmed during the development of the final Waste Management Plan	Construction	IR# MOECC_104
17-20	Commitment*	A hydraulic assessment memo is planned to be included in the permit applications for the channel realignment.	Construction	IR# MOECC_177
17-21	Monitoring*	Operation of the TMF and water management facilities will be carried out according to guidance that will be provided in an Operating, Maintenance and Surveillance (OMS) Manual. The OMS sets out the management framework and responsibilities, states the design basis for the dams and ancillary hydraulic structure, provides an overview of the operating conditions, and highlights monitoring and surveillance procedures.	All	IR# AZA-AFN-GFN_70
* - indicates items that have been added since the submission of the Final EIS/EA				