

Information Requirements Table for Mining Effluent

Application Tracking Number: [Click here to enter text.](#)
 Authorization Number: [Click here to enter text.](#)
 [insert company / project name]

Applicant Summary	
Application Tracking #	
Authorization #	
Applicant / Facility Name	

Ministry of Environment	
Prepared by:	
Title	
Date	

The *Information Requirements Table (IRT) for Mining Effluent* is a tool used by Ministry of Environment staff to document specific guidance and instructions given to an applicant pursuing authorization to discharge under the *Environmental Management Act*.

Note - this document was developed to capture all the items and complexities concerning mining effluent permits.

Accordingly, for any given application, not all the items will apply and not all required items will warrant detailed discussion of methods and other concerns.

As part of the Preliminary Application Phase, MOE will discuss with the applicant the items listed in this table to determine what will be required in support of their final application. A tick mark in the "Required" column of the table indicates an information item to be included into the application package as agreed to by both parties or as directed by MOE. Should it be determined that specific methods will be used to derive this information, this will be specified with a tick mark in the "Methods" column. Specific methods may not be necessary for applications that will not require a subject matter expert review. In cases where complex impact assessments are to be undertaken, agreement on the methods used will be required. For simple methods, the methods used could be discussed with the applicant in a meeting and noted as agreed to in the table. For more complex methods, the applicant may be required to submit a "Methods Package" by an agreed date for MOE review, comment and acceptance. Once methods are accepted by MOE they should be either described in the "Methods" column or a reference made to the document describing the Methods Package.

If required, this document will form part of an Application Instruction Document (AID) which documents application submission requirements for the applicant. The AID is issued by the Director after a preliminary application meeting has occurred.

The MOE will be assessing this application against this table and it is expected that the applicant does the same prior to any preliminary meetings and/or prior to any final submissions. The Ministry will be screening the final received application against the requirements noted in the AID to ensure it is complete before resources are dedicated to a full, detailed review.

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1 PROJECT DESCRIPTION AND OVERVIEW - This section is an introduction to the application and provides background information on the project and the proponent.			
1.1 Describe the application including proposed facilities and processes (including mining and milling processes, maps and flowsheets if applicable).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
1.2 Provide company overview.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
1.3 Identify the project location including site and surrounding land uses, watershed and water uses.).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
1.4 Describe relevant regulatory processes outside of EMA (Environmental Assessment, concurrent applications, etc.).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
2 PROJECT DESCRIPTION (may use existing EA project description if applicable)			
2.1 Describe the project history and list related reports.).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
2.2 Describe the products and markets.).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
2.3 Describe major activities, infrastructure and waste management related to:	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
2.3.1 Site preparation and construction).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
2.3.2 Operations, and).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
2.3.3 Closure and post-closure	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
3 METEOROLOGY AND CLIMATE			
3.1 Provide a detailed map showing the location of all site-specific and regional climate stations in relation to project facilities	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
3.2 Describe relevant meteorological and climate information sources for parameters such as wind speed and direction, precipitation, temperature and evaporation.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
3.3 Submit all climate data in an appendix (electronic preferred) including site photos, precipitation, temperature, snow water equivalent, etc. and provide monthly and annual summaries of relevant climatic parameters in this chapter.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
3.4 Provide recurrence interval analysis of annual precipitation, short-term rainfall and/or snowmelt events (as appropriate).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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3.5 Identify information gaps and describe site-specific meteorological data collection methods proposed to augment existing regional data	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
3.6 Identify the potential impacts of projected climate change on the projects operations, closure and post-closure phases.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4 GEOLOGY			
4.1 Regional Geology			
4.1.1 Provide an overview of the geology of the area, with emphasis on the regional framework. This will include a description of the tectonic belt(s), terrain(s), physiography, and regional metamorphism and structure.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.1.2 Describe geologic units or lithology in key areas of the project property such as tailings dam(s) and mill site: distance to bedrock, overburden type.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.2 Deposit (Ore) Geology			
4.2.1 Summarize the mine site geology, including descriptions of major rock units, stratigraphy, structure, metamorphism, geochemistry, paleontology and details about the ore deposit.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.2.2 Provide a detailed stratigraphic description.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.2.3 Describe ore deposit information, including: Ore mineralogy, alteration type, deposit character, deposit classification, age of mineralization, general ore controls and average assay values and reserve information (proven probable and possible	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.3 Metal Leaching/Acid Rock Drainage Geochemistry			
4.3.1 Provide and describe ML/ARD characterization results for all mine components and materials exposed and produced, ensuring that geochemical and spatial variability is captured and that test work informs and is relevant to the proposed storage environment.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.3.2 Assess the lag times to ARD onset for all potentially acid-generating materials, and assess metal leaching potential/behaviour for all materials to be generated.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.3.3 Develop geochemical source terms for water quality modelling purposes (water quality modelling is listed in section 4.3.2).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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4.3.4 Describe and justify source term modelling methods and provide calculation examples.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.3.5 Provide site-specific geochemical criteria defining potentially ML/ARD materials, as required to support waste management/handling.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
4.3.6 Include all ML/ARD characterization data, analyses and interpretations.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
5 TOPOGRAPHY, SURFACE DRAINAGE FEATURES AND NATURAL HAZARDS			
5.1 Describe pre-mine topography and surface drainage features.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
5.2 Provide detailed maps showing all drainage basins (local and regional) that will be affected by the proposed mine, areas of groundwater discharge, wetlands and notable topographic features (e.g., glaciers).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
5.3 Provide information on natural hazards relevant to the site, such as snow avalanches, landslides and earthquakes.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6 WATER QUANTITY			
6.1 Surface Water - Hydrology			
6.1.1 Provide a detailed hydrologic analysis of key surface drainages within the project area, to define seasonal flow regimes of local drainages. Provide monthly and annual stream flow/runoff summaries and critical low flow metrics.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.1.2 Describe and justify baseline study design, methods of hydrometric station installation, sampling methods and QA/QC procedures.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.1.3 Include all hydrological data in an appendix (electronic preferred), including rating curves, manual measurements, plots of site-specific discharge, site photos, etc.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.1.4 Provide a conceptual hydrologic or water balance model for the site illustrating worst case scenarios for low and high flows.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.1.5 Provide recurrence interval analyses of peak and low flow events (instantaneous, annual, etc. as appropriate).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.1.6 Provide calibration/validation statistics and plots for hydrological model.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.1.7 Identify spatial or temporal gaps in the database, and provide record periods for all gauging stations (regional and project specific).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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6.1.8 For projects with life span greater than 20 years, include an assessment of the potential impacts of climate change on the project water balance.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2 Groundwater - Hydrogeology			
6.2.1 Describe existing and potential uses of groundwater down-gradient of the property boundary.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.2 Describe aquifers and aquitards within and downstream of the mine property, including the geological units in which groundwater occurs and the units' characteristics.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.3 Describe and justify baseline study design, methods and QA/QC procedures, following guidance in the Water and Air Baseline Guidance document.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.4 Provide a minimum of 1 year of water level data from observation wells and assess all relevant units for aquifer characteristics (e.g. storativity, hydraulic conductivity, etc).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.5 Provide piezometric contour maps depicting groundwater flow direction and hydro-stratigraphic cross-sections.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.6 Develop and provide methods and outcomes of a conceptual hydrogeological model (considering seasonal variation) of the project area.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.7 Identify and justify the assumptions in the conceptual hydrogeological model.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.8 Provide calibration/validation statistics and plots for the groundwater model.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.9 Conduct a sensitivity analysis for any groundwater flow and level modeling, considering variation in hydraulic conductivity, wet and dry conditions, etc.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.10 Provide all well logs, pump/slug test results, core pictures etc. in an appendix.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.11 Identify spatial or temporal gaps in the database.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
6.2.12 Describe existing and potential uses of groundwater down-gradient of the property boundary.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7 Water Quality			

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7.1 Groundwater Quality			
7.1.1 Describe and justify baseline study design, methods, analysed parameters and QA/QC procedures. Provide rationale, if design and methods differs from those described in the <i>Water and Air Baseline Guidance Document</i> .	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.1.2 Provide data summaries (using appropriate statistics) that characterize spatial and temporal variations and identify location, frequency, duration and magnitude of applicable standards or environmental quality guideline exceedances.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.1.3 Identify certified laboratories that conducted sample analysis.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.1.4 Provide a detailed map with groundwater sampling locations, potential seepage areas, proposed or existing discharge points and potential areas of disturbance.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.1.5 Identify and discuss QA/QC concerns related to the data, following the procedures in the BC Field Sampling Manual.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.1.6 Identify spatial or temporal data gaps.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2 Surface Water Quality			
7.2.1 Describe and justify baseline study design, methods, analysed parameters and QA/QC procedures. Provide rationale, if design and methods differs from , following guidance in those described in the Water and Air Baseline Guidance Document.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2.2 Identify downstream surface water users.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2.3 Provide data summaries (using appropriate statistics) that characterize spatial and temporal variations and identify location, frequency, duration and magnitude of applicable standards or environmental quality guideline exceedances.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2.4 For lakes provide limnological characterizations, at a representative deep station for each basin. Sampling design should be adequate to support determination of trophic status.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2.5 Provide raw data in tables, including applicable method detection limits (in appendices – electronic preferred).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2.6 Identify certified laboratories that conducted sample analysis.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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7.2.7 Provide a detailed map with surface water sampling locations in relation to proposed or existing discharge locations and areas of disturbance.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2.8 Identify safe site specific thresholds (e.g. background water quality, SSWQOs, or SBEBS) and a sound weight of evidence to support these for sites where parameter concentrations exceed WQGs naturally (ensure this refers to un-impacted baseline)	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2.9 Identify and discuss QA/QC concerns related to the data, following the procedures in the BC Field Sampling Manual.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.2.10 Identify spatial or temporal data gaps.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.3 Sediment Quality			
7.3.1 Describe and justify baseline study design, methods, parameters analysed and QA/QC procedures, following guidance in the Water and Air Baseline guidance document.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.3.2 Provide data summaries (using appropriate statistics) that characterize spatial and temporal variations and identify location, frequency, duration and magnitude of applicable standards or environmental quality guideline exceedances.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.3.3 Provide raw data in tables, including applicable method detection limits (in appendices – electronic preferred).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.3.4 Identify certified laboratories that conducted sample analysis.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.3.5 Provide a detailed map with sediment sampling locations, and proposed or existing discharge locations and areas of disturbance.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.3.6 Identify and discuss QA/QC concerns related to the data, following the procedures in the BC Field Sampling Manual.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
7.3.7 Identify spatial or temporal data gaps.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
8 Aquatic Life			
8.1 Describe and justify baseline study design, methods, measuring endpoints, parameters analysed and QA/QC procedures, following guidance in the Water and Air Baseline guidance document. Multiple years of data are recommended.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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8.2 Identify certified laboratories that conducted sample analysis.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
8.3 Provide a detailed map with sampling locations, and proposed or existing discharge locations and areas of disturbance and other water and sediment quality sample locations.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
8.4 Provide data summaries (using appropriate statistics to determine biological significance) that characterize spatial and temporal variations and identify location, frequency, duration and magnitude of effects on aquatic resources.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
8.5 Provide raw data in tables, including applicable method detection limits (in appendices – electronic preferred).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
8.6 Demonstrate that the baseline aquatic life monitoring program is sufficiently robust to assist future monitoring in detecting a biologically significant predetermined change.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
8.7 Identify spatial or temporal data gaps.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9 Discharges and Treatment - Information in this section establishes the location and quality and quantity of each of the proposed effluent discharges, including process water, storm water and seepages. Design and use of proposed pollution control works and management practices are described.			
9.1 Summary			
9.1.1 Provide an overview of contaminant sources in process, storm and/or seepage water.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.1.2 Describe the proposed water management plan.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.1.3 Describe the proposed source control and/or best management practices.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2 Specific Information Requirements for Effluent Storage and Discharge			
9.2.1 Characterize and/or predict raw water quality for all site-waters, including source, quantity, chemistry and toxicity; describe methodology. This should include water from pits and/or underground facilities, tailings impoundments, waste rock storage, seepage collection, ore and soil stockpiles, etc. Water quality and quantity from ancillary facilities must also be characterized	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.2 Describe how best achievable technology and best management practices will be applied to limit contaminant loading.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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9.2.3 Describe all proposed effluent discharge locations and sources, as well as proposed timing and frequency of discharge.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.4 Indicate the expected daily maximum and mean discharge flow rates (m ³ /d); maximum annual flow rates (m ³ /a) should also be provided for runoff-driven discharges (i.e. the total annual discharge that will not be exceeded in any given year).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.5 Indicate the maximum concentrations of contaminants of concern that are proposed for the discharges.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.6 Provide explanation and detailed design for effluent discharge works.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.7 Describe the proposed sampling and flow measuring facilities at discharge points.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.8 Explain the storm water management system and provide detailed design for proposed storm water works.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.9 For settling ponds, specify and justify the design flood events for structural integrity and for removal of suspended solids.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.10 Describe any proposed use of settling aids, including a toxicity evaluation.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.11 Explain how fast settled solids are expected to fill any proposed settling ponds and provide a plan for sediment removal.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.12 Provide a site-specific erosion and sedimentation control plan.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.2.13 Estimate monthly effluent discharge dilution ratios for all discharges.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.3 Information Requirements for Wastewater Treatment Plants			
9.3.1 Describe and provide a schematic of the treatment method including processes, inputs and outputs.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.3.2 Explain how the proposed treatment system compares to best achievable technology.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.3.3 Specify the treatment design criteria including treatment capacity, retention times, and input and output water quality.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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9.3.4 Provide treatment system detailed design, power requirements, construction and commissioning schedule and projected capital and operating costs.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.3.5 Provide rationale for expected treatment effectiveness, including an evaluation of potential variable operating conditions.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.3.6 Describe all treatment process by-products (liquid, solid and gaseous), including quantity and quality, and provide a management plan for each, including sludge management plan if applicable.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.3.7 Describe the treatment plant's preventative maintenance plan.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.4 Site Contamination			
9.4.1 Describe current and potential future soil and/or groundwater contamination in the project area.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.4.2 Provide water use determination as per <i>Technical Guidance 6</i> of the Contaminated Sites Regulation.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.4.3 Identify remedial strategies to be used to mitigate and/or remediate contamination.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.4.4 Identify monitoring proposal to aid in characterizing potential groundwater contamination.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.4.5 Describe and justify measures proposed to manage site contamination during construction, operation and closure.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.5 Sewage Disposal (not Required if an MWR registration is being pursued as the MWR registration requirement address these concerns)			
9.5.1 Describe the disposal plan for sewage generated on-site.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
9.5.2 If sewage is proposed to be included in the effluent permit, provide justification and technical information supporting this discharge. Specify why sewage disposal is not proposed as a registration under the Municipal Wastewater Regulation.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10 Environmental Effects Prediction for EMA - This section assesses potential residual environmental effects and evaluates the risks of the mine project on human health and water users including aquatic and terrestrial resources.			
10.1.1 Identify the environmental values that may be at risk due to mine related activities.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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10.1.2 Identify and justify spatial and temporal boundaries for effects predictions.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.1.3 Identify critical contaminant sources.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.2 Summary			
10.2.1 Summarize potential impacts by media and location, using tables.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.2.2 Illustrate graphically the pathways from contaminant sources to receptors.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.2.3 Summarize risk to surface, groundwater and aquatic resources.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.3 Groundwater Quantity and Quality			
10.3.1 Describe and justify impact prediction approach (incl. study boundaries, assessment and measurement endpoints, models and methods).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.3.2 Provide predicted effects on groundwater, surface water, interaction between ground and surface water, water uses and receptors.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.3.3 Provide a conceptual model to describe the contaminant transport through groundwater from source to receptors and establish a risk assessment process.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.3.4 Estimate probabilities of occurrence of each pathway/exposure combination, estimate risk and develop a matrix to manage risk.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.3.5 Identify data gaps, and uncertainty in models, and how they will be addressed.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.3.6 Discuss risk reduction options and adaptive management strategies.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.4 Surface Water Quantity and Quality			
10.4.1 Describe and justify study boundaries, assessment (e.g., drinking water quality; aquatic life) and measurement endpoints (chemical, toxicological or biological).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.4.2 Describe and justify modelling methods to predict how surface water quantity and quality may be affected within, and downstream of, the property.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.5 Water Quantity			

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10.5.1 Describe predicted effects of mine related activities on water balance, flows and water levels.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.5.2 Identify whether current regional trends or projected changes in stream flow or climate could potentially affect dilution, water management infrastructure, ability to provide sufficient water covers where required, etc. during and after the life of the project.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6 Water and Sediment Quality			
10.6.1 Describe and justify impact prediction approach (incl. study boundaries, assessment and measurement endpoints, models and methods).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.2 Identify key discharges, seepages, or disturbance regimes and associated contaminants.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.3 Determine the extent of the IDZ for all proposed discharges, including methodology and rationale.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.4 Provide predicted incremental changes over existing receiving environment water and sediment quality at critical points downstream (within IDZ, edge of IDZ, near field and far field) and during critical time periods (e.g. low dilution 7Q ₁₀ , high flows, spawning, hatching, etc.) This should be included for all mine phases.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.5 Conduct a sensitivity analysis for the water quality model that considers a range of hydro-climatic conditions (wet and dry events) that are representative of the streamflow variability in the project area.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.6 Describe and justify modelling approach and make calculations and tabulated data available for government review.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.7 Identify sites, parameters and time periods, when water or sediment quality is expected to exceed WQG or SQG.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.8 Demonstrate through a weight of evidence approach that effluents or seepages will not cause acute and/or chronic toxicity.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.9 Develop a conceptual model or framework to describe the transport of key contaminants from source to receptors.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.6.10 Estimate probabilities of occurrence of each pathway/exposure combination and develop a risk assessment matrix or other process to prioritize and manage risk.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

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10.6.11 Identify data gaps and uncertainties and describe how they would be addressed in adaptive management and environmental monitoring programs.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.7 Aquatic Resources and other Receptors			
10.7.1 Describe and justify study boundaries and assessment endpoints and discuss relevance of measurement endpoints.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.7.2 Develop conceptual models or frameworks to describe the contaminant transport linking sources to receptors and establish a risk assessment process.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.7.3 Describe and discuss the potential for bioaccumulation or bioconcentration of contaminants, and the associated risk to assessment endpoints (i.e., fish health, fish reproduction, consumers of fish, etc.).	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.7.4 Predict changes in aquatic resources at species, community and/or ecosystem levels as appropriate due to water quality and water quantity changes.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.7.5 Identify risks to other receptors, including wildlife, livestock, human health.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.7.6 Identify data gaps and uncertainties and describe how they would be addressed in adaptive management and environmental monitoring plans.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.8 Safe Discharge Plans			
10.8.1 Propose safe discharge plans for all discharges to surface or groundwater, that ensure protection of all down-gradient or downstream users.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.8.2 Provide an emergency preparedness plan including identification of, and contingency and mitigation procedures for, any event capable of affecting discharge quality and/or human health	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
10.8.3 Assess potential for residual environmental risk following contingency plan implementation	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
11 Discharge and Environmental Monitoring Requirements for EMA Permits - This section provides a proposal for a monitoring program to evaluate waste management performance, receiving environment conditions, mine activity effects on the receiving water, and to verify and adapt predictions. This information will be used to develop monitoring requirements under the EMA effluent permit.			
11.1 Discharge Monitoring - Describe and justify the proposed monitoring study design.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

Information Requirements Table for Mining Effluent

Application Tracking Number: [Click here to enter text.](#)
 Authorization Number: [Click here to enter text.](#)
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Information	Requirements	Comments	Location in Final Application
11.2 Receiving Environment Monitoring - Describe and justify the proposed monitoring program and biological measurement endpoints. Include cumulative effects monitoring.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
11.3 Aquatic Effects Monitoring - Describe and justify the proposed weight of evidence assessment monitoring program.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
11.4 Quality Assurance Requirements - Describe and justify proposed quality assurance/quality control procedures.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		
11.5 Describe proposed data assessment techniques and reporting, including reporting frequency and content.	Required <input type="checkbox"/> Methods <input type="checkbox"/>		

Guidance Documents to be considered when determining Information Items Required and appropriate Methods to be used:

- [British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, BC Ministry of Water, Land and Air Protection, January 2003¹](#)
- [Effluent Permitting Process under the Environmental Management Act – An Overview for Mine Project Applicants, BC Ministry of Environment, April 2013²](#)
- [Developing a Mining Sediment and Erosion Control Plan, BC Ministry of Environment, December 2014](#)
- [Guidance for Assessing the Design, Size and Operation of Sedimentation Ponds Used in Mining \(draft\), BC Ministry of Environment, Lands and Parks, May 9, 2001³](#)
- [Guidance on Applications for Permits Under the Environmental Management Act – Technical Assessment, BC Ministry of Environment, September 10, 2010⁴](#)
- [Guidelines for Groundwater Modelling to Assess Impacts of Proposed Natural Resource Development Activities, BC Ministry of Environment, April 2012⁵](#)
- [Guidelines for Metal Leaching and Acid Rock Drainage at Mine sites in British Columbia”, BC Ministry of Energy and Mines, August 1998⁶](#)
- [Manual of British Columbia Hydrometric Standards v.1, Ministry of Environment, March 12, 2009⁷](#)
- [Policy for Metal Leaching and Acid Rock Drainage at Mine sites in British Columbia, Ministry of Energy and Mines and Ministry of Environment, Lands and Parks, July 1998⁸](#)
- [Technical Guidance 6 on Contaminated Sites – Water Use Determination, Version 2, Ministry of Environment, July 2010.](#)
- [Terms of Reference Environmental Impact Assessment And Technical Assessment Report for Environmental Management Act Effluent Permit Applications, BC Ministry of Environment, 2014](#)

¹ http://www.env.gov.bc.ca/epd/wamr/labsys/field_man_pdfs/fld_man_03.pdf

² http://www.env.gov.bc.ca/epd/industrial/mining/pdf/effluent_permitting_guidance_doc_mining_proponents_apr2013.pdf

³ http://www2.gov.bc.ca/assets/gov/topic/C0188F632AEC266B044F8A2B756F055F/industrial_waste/settling_ponds.pdf

⁴ <http://www2.gov.bc.ca/gov/DownloadAsset?assetId=7AD12B8CF1B94CF29619BD9871FB5740&filename=assessment.pdf>

⁵ http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/groundwater_modelling_guidelines_final-2012.pdf

⁶ <http://www.empr.gov.bc.ca/Mining/Permitting-Reclamation/ML-ARD/Pages/Guidelines.aspx>

⁷ http://www.for.gov.bc.ca/hts/risc/pubs/aquatic/hydrometric/man_BC_hydrometric_stand_V1.0.pdf

⁸ <http://www.empr.gov.bc.ca/MINING/PERMITTING-RECLAMATION/ML-ARD/Pages/Policy.aspx>

Information Requirements Table for Mining Effluent

Application Tracking Number: [Click here to enter text.](#)
Authorization Number: [Click here to enter text.](#)
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- [Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators, BC Ministry of Environment, October 9, 2012⁹](#)

[All guidance documents listed on the following web-page: http://www2.gov.bc.ca/gov/content/environment/waste-management/industrial-waste/mining-smelting](http://www2.gov.bc.ca/gov/content/environment/waste-management/industrial-waste/mining-smelting)

⁹ http://www2.gov.bc.ca/gov/DownloadAsset?assetId=E49A49E800814C8FB2D6868B7F119AD6&filename=water_air_baseline_monitoring.pdf