
EIA Technical Review Guideline: Non-Metal and Metal Mining

Volume I Part 2 Example Terms of Reference

Regional Document prepared under the CAFTA DR Environmental Cooperation Program to Strengthen Environmental Impact Assessment (EIA) Review



Prepared by CAFTA DR and US Country EIA and Mining Experts with support from:



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This document is the result of a regional collaboration under the environmental cooperation agreements undertaken as part of the Central America and Dominican Republic Free Trade Agreements with the United States. Regional experts participated in the preparation of this document, however, the guidelines do not necessarily represent the policies, practices or requirements of their governments or organizations.

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EIA Technical Review Guidelines: Non-Metal and Metal Mining

Volume I Part 2

The EIA Technical Review Guidelines for Non-Metal and Metal Mining were developed as part of a regional collaboration to better ensure proposed mining projects undergoing review by government officials, non-governmental organizations and the general public successfully identify, avoid, prevent and/or mitigate potential adverse impacts and enhance potential beneficial impacts throughout the life of the projects. The guidelines are part of a broader program to strengthen environmental impact assessment (EIA) review under environmental cooperation agreements associated with the “CAFTA-DR” free trade agreement between the United States and five countries in Central America and the Dominican Republic.

The guidelines were prepared by regional experts from the CAFTA-DR countries and the United States in both the government organizations responsible for the environment and mining and leading academics designated by the respective Ministers supported by the U.S. Agency for International Development (U.S. AID) contract for the Environment and Labor Excellence Program and grant with the Central America Commission for Environment and Development (CCAD). The guidelines draw upon existing materials from within and outside these countries and from international organizations and do not represent the policies, practices or requirements of any one country or organization.

The guidelines are available in English and Spanish on the international websites of the U.S. Environmental Protection Agency (U.S. EPA), the International Network for Environmental Compliance and Enforcement (INECE), and the Central American Commission on Environment and Development (CCAD): www.epa.gov/oita/, www.inece.org/, www.sica.int/ccad/. Volume 1 contains the guidelines with a glossary and references which track with internationally recognized elements of environmental impact assessment; Volume 2 contains Appendices with detailed information on mining, requirements and standards, predictive tools, and international codes; and Volume 1, part 2 contains example Terms of Reference cross-linked to Volumes 1 and 2 for exploration and exploitation for non-metal and metal mining projects respectively for use by the countries to adopt or adapt for their EIA program requirements.



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EXAMPLE TERMS OF REFERENCE (TOR)

Terms of Reference are used by countries and international organizations to describe both general and specific requirements for the preparation of an environmental impact assessment, in this instance tailored to proposed projects for commercial mining. Volume 1, Part 2 contains example Terms of Reference (TORs) cross-referenced to Volumes 1 and 2 of the “EIA Technical Review Guideline for Non-Metal and Metal Mining”. The Example Terms of Reference are printed separately to facilitate use by countries as they prepare their own EIA program requirements for mining projects.

Two sets of example Terms of Reference (TORs) are provided, one set of TORs for Non-Metal Mining and one set of TORs for Metal Mining. In both sets there are three sections to the TOR: PART A is an overview describing general expectations for the preparation of the environmental impact assessment. PART B addresses detail for mining related to exploration and PART C addresses exploitation. The details in the example TORs address each element of the EIA analysis and documentation including what should be included in the description of the proposed project and alternatives; environmental setting; assessment of impacts; mitigation and monitoring measures; an environmental management plan; a signed commitment statement; and key supporting materials.

1 EXAMPLE TERMS OF REFERENCE (TOR) FOR NON-METAL MINING

A.	OVERVIEW	1-2
B.	EXPLORATION	3-8
C.	EXPLOITATION	9-28

2 EXAMPLE TERMS OF REFERENCE (TOR) FOR METAL MINING

A.	OVERVIEW	1-2
B.	EXPLORATION	3-8
C.	EXPLOITATION	9-28

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1 TERMS OF REFERENCE (TOR) FOR NON-METAL MINING

A. OVERVIEW

These terms of reference (TOR) describe the minimum requirements for the development of the Environmental Impact Assessment (EIA) for proposed non-metal mining projects. Both the TOR and the cross referenced EIA Technical Review Guidelines for Mining should be used to establish minimally acceptable conditions for satisfying the requirement to submit an EIA. The TOR is divided into three sections: A. Overview, B. Exploration and C. Exploitation. Including all phases in the one TOR should help to ensure adequate planning for all phases. Parts A and B are all that are needed for the exploration phase. If exploration is followed by exploitation, then a new EIA following Part C would be prepared.

The basic format for the EIA document that should be followed is:

- Table of Contents
- Acronyms and Abbreviations
- Executive Summary
- General Information
- Project and Alternatives Description
- Environmental Setting
- Assessment of Impacts
- Mitigation and Monitoring Measures
- Environmental Management Plan
- Commitment Statement
- Annexes

In general, the EIA must identify and address:

- Applicable environmental standards, norms, and requirements set forth at the international, national, regional and/or local levels including those designed to meet the objectives of resource management and/or land use plans that may be in effect in and around the jurisdiction(s) in which you propose to develop the mine and in which the proposed mine might have a potential impact. In the absence of such standards, identify a set of benchmarks that can be used in the analysis and the basis for your selection. The guideline identifies standards in use by various countries and international organizations in Appendix C.
- Public/Stakeholder concerns related to impacts in and around the proposed project and alternatives at least for stakeholders within the geographic scope of potential impact. The project proponent should document specific steps taken to engage the public and other stakeholders, and engage these publics as early as possible before undertaking to prepare the EIA. Concerned publics include: local governments, persons living and working in the vicinity of the project, those with interests in resources that may be affected i.e. indigenous peoples, and those concerned about protected areas and prime agricultural lands. A summary of public outreach activities, audience, number of persons, organizations involved, concerns raised, responses to comments and actual copies of written comments received should be included in the Annex.

- All relevant plans related to the proposed mine, for example, engineering and site preparation plans for mining, reclamation and closure, environmental management, and mitigation in whatever form these may take.
- All phases of the project from feasibility studies to site preparation to operations to closure and also plans to expand capacity at the current or adjacent sites.
- Alternative approaches to meeting the purpose and need for the proposed mine during exploitation include alternative siting, configuration on the site, designing, constructing, operating and closing the mine firstly to avoid and prevent, or secondly to reduce or minimize adverse or improve beneficial environmental or socioeconomic impacts. The EIA must assess the impacts of a range of representative reasonable and technically feasible alternatives as well as the proposed mine. The alternatives to the project must include a “no action” alternative, indicating what would happen in the absence of the proposed project, as well as best practices.
- Direct, indirect and cumulative impacts and their significance level.
- Uncertainty and how that uncertainty will be addressed through monitoring and contingency plans as may be needed to reduce risk of adverse impacts in the future.
- Specific commitments, including who is responsible, what will be done, when and how it will be monitored, reported and audited to confirm that commitments are met.

These comprehensive TORs are not specific for any one kind of mining. They can be applied to sand and gravel, quarries, and other type of construction material mining operations; however, depending on the specifics of the operation some subsections may not be relevant and some details may have to be changed. For instance, if the EIA is for mineral extraction in rivers and other water bodies (i.e., a dredging operation), emphasis would be placed on the hydraulic impacts to the river system, potential changes in sediment transport of the rivers, and the cumulative impacts if other operations are within the same watershed.

Finally, a key part of the TOR is obtaining a legally binding commitment from the project proponent that the approved EIA will be implemented as presented. Such a commitment adds to the legal enforceability of the outcomes of the EIA process.

B. EXPLORATION

0 Table of Contents

A general Table of Contents for the Environmental Impact Assessment (EIA) shall be provided, organized in such a manner as to facilitate the use of the EIA by reviewers and project implementers. Larger projects should have a more detailed Table of Contents than those for smaller projects. At a minimum, the Table of Contents shall include the following:

- Acronyms and Abbreviations
- Executive Summary
- General Information
 - Objectives and Justification (purpose and need)
 - Project Proponents
 - Project Team
 - Legal and Regulatory Framework
- Project Description
- Environmental Setting:
 - Physical Environment
 - Geologic Resources
 - Soil Resources
 - Surface Water and Groundwater Resources
 - Air Resources
 - Noise and Vibration
 - Biological Environment
 - Vegetation/Flora
 - Fish and Wildlife/Fauna
 - Ecosystems: Terrestrial, Wetlands, Aquatic, Marine
 - Endangered or Threatened Species and Habitat
 - Protected Areas
 - Social-Economic-Cultural Environment
 - Socio-Economic Conditions and Resources
 - Infrastructure (i.e. Public Health, Transportation Systems, Communications, Energy)
 - Land Use (Actual and Potential)
 - Cultural, Archeological, Ceremonial and Historic
- Assessment of Impacts to Resources Described in Environmental Setting
- Mitigation and Monitoring Measures
- Environmental Management Plan
 - Overall Environmental Management Plan Organization and Policy
 - Project-wide Mitigation Plan
 - Project-wide Monitoring Plan
 - Management Plan for Other On or Off-Site Pollution Control and Infrastructure
 - Contingency Plans for each phase:
 - Performance-related Contingency Plan
 - Natural Disaster Risk Response Plan
 - Other Risk Response Plan
- Signed Commitment Statement
- Annexes
 - Public Consultation
 - Public Consultation Plan
 - Summary of Public Outreach Activities
 - Summary of Response to Comments
 - Copies of Written Comments Submitted
 - Technical Supporting Materials:
 - Maps and Plans, in the sequence mentioned in the EIA document
 - Charts and Figures
 - Details about predictive modeling used, calculations and assumptions
 - Special Studies
 - References

1 Acronyms and Abbreviations

All acronyms and abbreviations used in the EIA must be clearly and succinctly defined and described in this section. This will relieve the reader of the need to search for the first occurrence of a word and the citing of the acronym or abbreviation in the text.

2 Executive Summary

A general summary of the EIA shall be provided in this section. The summary shall be written using a vocabulary that can be easily understood by the public. It shall include at least the following information about the project from the EIA:

- Objectives and Justification (purpose and need)
- Location
- Project Proponents
- Project Description
- Environmental Setting
- Evaluation of Impacts
- Mitigation Measures
- Environmental Management Plan (including the mitigation, monitoring and contingency plans)

3 General Information

3.1 Objectives of and Justification for the Proposed Project

- 3.1.1 Objectives: A statement of the general and specific objectives (purpose) of the proposed project
- 3.1.2 Justification for the Project: Provide a justification for the proposed project (need) highlighting the benefits to surrounding communities and economic development of the region and country.

3.2 Project Proponents

Information on the following:

- 3.2.1 Names, addresses, telephone numbers, and applicable legal documentation of proponents (include identification of those financing, developing, operating and investing in the mine; summary of all legal documents presenting the legal bases for the project proponents)
- 3.2.2 Names and contact information for responsible parties within the organization
- 3.2.3 Financial viability of the company (including a certified banking statement indicating that the company is financially stable and reputable)
- 3.2.4 Bonding requirements and proof of ability to meet bonding requirements sufficient to cover the anticipated costs of environmental management during exploration, as well as the costs, by a third party, of closure and long-term post-closure liabilities associated with exploration

3.3 Project Team

This section shall provide information on the multidisciplinary team that prepares the EIA. The types of professionals included in the team shall be appropriate to the type of project and the type of environment in which the project is located and may include (but not be limited to) engineers, architects, biologists, geologist, hydrologists, air quality experts, archeologists, anthropologists, sociologists and economists. The information provided for each member of the EIA project team includes the following:

- 3.3.1 Name, address and registry number of contractors
- 3.3.2 Names, contact information, qualifications and registry numbers of key personnel involved in the study; as well an affidavit indicating their area of participation.
- 3.3.3 List of professionals/experts participating in the EIA, their areas of expertise, degrees, experience, professional registrations and stamps, seals and signatures.

3.4 Legal and Regulatory Framework

This section of the EIA shall define the legal framework under which the EIA is being completed listing and summarizing requirements or alternatives used as benchmarks, and evidence of non-applicability or compliance, including:

- 3.4.1 **Mining lease:** Information on the exploration lease/permit that demonstrates rights and access:
 - 3.4.1.1 Ownership with written authorization
 - 3.4.1.2 Governmental authorization (if required)
 - 3.4.1.3 Period of exploration lease/permit
 - 3.4.1.4 If the lease/permit area/buffer zone is ecologically fragile, a clear justification for not opting for other reserve
 - 3.4.1.5 Maps showing the exploration lease/permit area

C. Project and
Alternatives
Description

G.6 Financial
Assurance
Appendix H World
Bank Financial
Surety

Appendix C
Requirements and
Standards

- 3.4.2 Applicable environmental standards, norms and requirements set forth at the international, national, regional and/or local levels
- 3.4.3 In the absence of such standards, identify a set of benchmarks used in the analysis
- 3.4.4 Required regulatory approvals and/or permits *For all stages and their status*
- 3.4.5 Applicable land use requirements (demonstrate conformity and compliance with applicable plans).
- 3.4.6 Applicable natural resource management or protected area management measures (demonstrate conformity and compliance with all applicable plans)

4 Project Description

This section shall provide the information on the site location, physical description, and site and project details, as identified in subsections 4.1 through 4.4

4.1 Location

The general location of the exploration activities in terms of:

- 4.1.1 Political-administrative location (region, district, town or other relevant political-administrative units) with accompanying location map
- 4.1.2 Means of site access – i.e., by air, river, road, train or vehicle)
- 4.1.3 Latitude and longitude of concession corners
- 4.1.4 Maps of concession at a scale of no less than 1:50,000 or as required by the regulatory agency

4.2 Physical Description

The following general information for the location should be provided in narrative form as well as in maps with details left for section 5 Environmental Setting:

- 4.2.1 Concession boundaries
- 4.2.2 General geology and topography
- 4.2.3 Type of ore body
- 4.2.4 Results of previous surficial and geophysical surveys
- 4.2.5 Vegetative cover
- 4.2.6 Principal watersheds
- 4.2.7 Water bodies
- 4.2.8 Roads and landmarks

4.3 Project Details

Specific project details shall include:

- 4.3.1 **General Description**
 - 4.3.1.1 Overview of all proposed activities and their relationship
 - 4.3.1.2 Timeline of all exploration activities from startup through closure/rehabilitation
 - 4.3.1.3 Waste Rock, Stockpiles and/or Tailings impoundments
- 4.3.2 **Access Roads**
 - 4.3.2.1 Identify all existing roads to be used
 - 4.3.2.2 Operations plan with traffic volume, operating speeds and trip times
 - 4.3.2.3 Detailed information on any roads to be constructed
 - Timing of construction
 - Road surface and shoulder width and barriers
 - Grade
 - Construction methods including clearing and grubbing
 - Construction materials (if waste rock will be used, include geochemical specifications it must meet)
 - Compaction
 - Stream crossings and associated designs
 - Sedimentation and erosion prevention structures and practices
 - Stabilization methods for cuts and fills
 - Wildlife crossings
 - Typical elevations for each type and situation of road displaying construction materials, levels of compaction and erosion and sedimentation features
 - Borrow pits
 - Location and size (area and volume of material)
 - Operation
 - Sedimentation and erosion controls
 - Closure plan
 - Operations plan with traffic volume, operating speeds and trip times
 - 4.3.2.4 Dust control measures for construction and operation

C.3 Project Description

C.3 Project Description

D.10 Transportation
C.7.1 Roads

- 4.3.2.5 Maintenance
- 4.3.2.6 Roster for construction and maintenance equipment, specifying type and quantity by size, motor size, and fuel requirements
- 4.3.3 Exploration Infrastructure**
Details for each type of infrastructure included in the General Description of exploration activities, which may include the following:
- 4.3.3.1 Drill Pads
- Location
 - Area to be disturbed (per location and cumulative)
 - Construction methods including clearing and grubbing
 - Construction materials
 - Type of equipment to be used
 - Drilling waste handling and disposal methodology
- 4.3.3.2 Test Pits or Tunnels
- Location
 - Area to be disturbed (per location and cumulative)
 - Construction methods including clearing and grubbing
 - Construction and reinforcement materials
 - Type of equipment to be used
 - Waste rock handling and disposal methodology
- 4.3.3.3 Small-scale Test Mine
- Location
 - Area to be disturbed (per location and cumulative)
 - Construction methods including clearing and grubbing
 - Type of mining
 - Type of equipment to be used
 - Mining plan
 - Waste rock handling and disposal methodology
- 4.3.3.4 Staging Areas (location, size and design of each of the following, where applicable)
- Offices and housing
 - Warehouses and equipment yards
 - Support facilities
 - Fueling stations
 - Water and wastewater
 - Solid waste facilities especially plans for waste rock, stockpiles and/or tailings impoundments
- 4.3.3.5 Energy requirements and sources
- 4.3.3.6 Water
- Requirements (m3/day)
 - Rights
 - Sources
- 4.3.3.7 Solid waste management
- 4.3.4 Restoration/Closure Plan**
Details for restoration and closure of the following:
- 4.3.4.1 Access roads
- 4.3.4.2 Exploration infrastructure
- 4.3.4.3 Land surfaces, where applicable
- 4.3.4.4 Plan for recovery of vegetative cover
- 4.3.5 Number of Personnel to be Used (including plans to hire local contractors and labor)**

5 Environmental Setting

Based on information available from the literature, government and other special studies or sources, the EIA shall provide information on environmental setting for the different types of physical, biological and socio-economic-cultural resources as outlined above in the Table of Contents for the current situation, important trends and predicted situation in the absence of the proposed exploration. Sources of data must be provided when and where data is used. Information specific to exploration identified in sections 4.3 and 4.4 above can be included here to avoid repetition.

6 Assessment of Impacts

The EIA shall provide information on potential impacts (direct, indirect and cumulative), and the magnitude and frequency of potential impacts on resources.

**C.3 Mining Method
Appendix A
C.5 Stockpiles, Dumps
and Tailings
C.9 Mine Support
Facilities**

**C.10 Restoration and
Closure Plan**

**D. Environmental
Setting**

**Table E-1
E. Potential Impacts
F. Assessing Impacts**

Using standardized predictive methods, such as models, determine the specific range of environmental and socio-economic resources. Critical data input from project description and environmental setting analysis projecting the conditions in the environmental setting in the absence of the proposed project shall be used as the baseline upon which potential impacts are forecast.

7 Mitigation and Monitoring Measures

For all adverse impacts the EIA shall identify measures and alternatives to avoid or reduce impacts and monitor results at a level of detail sufficient to demonstrate its effectiveness in addressing the concern or performance criterion. In those cases in which predicted impacts would exceed a national or international standard or criteria, the EIA shall propose specific mitigation and monitoring measures to assure that these standards or criteria are not exceeded throughout the life of the mine.

8 Environmental Management Plan

The EIA shall include an Environmental Management Plan to prevent, mitigate and monitor adverse impacts identified in the EIA individually or in relevant groupings. Plans will describe actions to be taken in sufficient detail to provide a basis for subsequent auditing of compliance with commitments made in the EIA process including who is responsible, how and when it will be implemented, what will be done and what results will be achieved, why it is being done, and how to know whether it is effective in addressing the underlying concerns. The environmental management plan shall have the following elements:

8.1 Project-wide mitigation plan (see Section 9). It has two elements:

- 8.1.1 Environmental resource mitigation (such as air, water)
- 8.1.2 Socio-economic-cultural mitigation (relocation, etc.)

8.2 Project-wide monitoring plan

Monitoring is usually specific to monitoring of surface and ground water.

8.3 Contingency plans

Plans are for response if monitoring demonstrates that performance measures are not being met.

9 Signed Commitment Statement

The EIA shall contain a legally binding signed letter of commitment to meeting the terms of the EIA. The statement will be signed by the authorized representative of the proponent company with assurance that all financial surety measures as required by the regulatory agency have been met.

10 Annexes

These should be numbered and duly referenced in the text.

10.1 Public Consultation

- 10.1.1 Public consultation plan
- 10.1.2 A summary of public outreach activities
- 10.1.3 A summary of response to comments
- 10.1.4 Actual copies of written comments

10.2 Technical Supporting Documents

- 10.2.1 Include maps, plans, charts and figures in the sequence mentioned in the EIA document.
- 10.2.2 Zoning maps with resources and results of impacts
- 10.2.3 Special studies, if relevant but not readily accessible

10.3 References

- 10.3.1 Submit a list of all references, (books, articles, technical reports and other information sources) cited in the various chapters of the EIA study (full biographic references, and the following conventional procedures cited in the literature: author, year, title, source, number of pages, and city of publication or issuance.

G. Mitigation and Monitoring Measures

G.2 Exploration Table G-1

H. Environmental Management Plan

Table G-1

G.5 Monitoring and Oversight

B. EIA Process and Public Participation

C EXPLOITATION

0 Table of Contents

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 - Soil Resources
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 - Air Resources
 - Noise and Vibration
 - Biological Environment
 - Vegetation/Flora
 - Fish and Wildlife/Fauna
 - Ecosystems: Terrestrial, Wetlands, Aquatic, Marine
 - Endangered or Threatened Species and Habitat
 - Protected Areas
 - Social-Economic-Cultural Environment
 - Socio-Economic Conditions and Resources
 - Infrastructure (i.e. for Public Health, Transportation Systems, Communications and Energy)
 - Land Use (actual and potential)
 - Cultural, Archeological, Ceremonial and Historic
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 - Project- wide Monitoring Plan
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 - Natural Disaster Risk Response Plan
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 - Summary of Response to Comments
 - Copies of Written Comments Submitted
 - Technical Supporting Materials:
 - Maps and Plans, in the sequence mentioned in the EIA document
 - Charts and Figures
 - Details about predictive modeling used, calculations and assumptions
 - Special Studies
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- Objectives and Justification (purpose and need)
- Location
- Project Proponents
- Project Description
- Other Project Alternatives
- Environmental Setting
- Evaluation of Impacts
- Mitigation Measures
- Environmental Management Plan (including mitigation, monitoring and contingency plans)

3 General Information

3.1 Objectives of and Justification for the Proposed Project

- 3.1.1 **Objectives:** A statement of the general and specific objectives (purpose) of the project, including whether it is a new project, an expansion of an existing project (e.g., increase in mine land area or increase in annual production) or modernization of an existing operation. This section also should identify the proposed use of minerals by the proponent (sale as raw material, sale as processed material, use as intermediates in production of a final product, etc.)
- 3.1.2 **Justification for the Project:** Provide a justification for the project (need) highlighting the benefits to surrounding communities and economic development of the region and country.

3.2 Project Proponents

Information on the following:

- 3.2.1 Names, addresses, telephone numbers, and applicable legal documentation of proponents (include identification of those financing, developing, operating and investing in the mine; summary of all legal documents presenting the legal bases for the project proponents)
- 3.2.2 Names and contact information for responsible parties within the organization
- 3.2.3 Financial viability of the company (including a certified banking statement indicating that the company is financially stable and reputable)
- 3.2.4 Bonding requirements and proof of ability to meet bonding requirements sufficient to cover the anticipated costs of environmental management during exploration, as well as the costs, by a third party, of closure and long-term post-closure liabilities associated with exploration

3.3 Project Team

This section shall provide information on the multidisciplinary team that prepares the EIA. The types of professionals included in the team shall be appropriate to the type of project and the type of environment in which the project is located and may include (but not be limited to) engineers, architects, biologists, geologist, hydrologists, air quality experts, archeologists, anthropologists, sociologists and economists. The information provided for each member of the EIA project team includes the following:

- 3.3.1 Name, address and registry number of contractors
- 3.3.2 Names, contact information, qualifications and registry numbers of key personnel involved in the study; as well an affidavit indicating their area of participation.
- 3.3.3 List of professionals/experts participating in the EIA, their areas of expertise, degrees, experience, professional registrations and stamps, seals and signatures.

3.4 Legal and Regulatory Framework

This section of the EIA shall define the legal framework under which the EIA is being completed listing and summarizing requirements or alternatives used as benchmarks, and evidence of non-applicability or compliance, including:

- 3.4.1 **Mining lease:** Information that demonstrates rights and access:
- 3.4.1.1 Ownership with written authorization

C. Project and
Alternatives
Description

G.6 Financial
Assurance
Table G-8
Appendix H
World Bank Financial
Surety

Appendix C
Requirements and
Standards

- 3.4.1.2 Governmental authorization (if required)
- 3.4.1.3 Period of exploration lease/permit
- 3.4.1.4 If the lease/permit area/buffer zone is ecologically fragile, a clear justification for not opting for other reserve
- 3.4.1.5 Maps showing the exploration lease/permit area
- 3.4.2 **Mineral Reserve:** Present a discussion of mineral ownership, proven mineral reserve, rated capacity and life of the mining operation.
- 3.4.3 Applicable environmental standards, norms and requirements set forth at the international, national, regional and/or local levels
- 3.4.4 In the absence of such standards, identify a set of benchmarks used in the analysis
- 3.4.5 Required regulatory approvals and/or permits *For all stages and their status*
- 3.4.6 Applicable land use requirements (demonstrate conformity and compliance with applicable plans).
- 3.4.7 Applicable natural resource management or protected area management measures (demonstrate conformity and compliance with all applicable plans)

4 Project and Alternatives Description

The project proponent shall submit a full description and locations of the proposed project and reasonable alternatives including ancillary operations such as the camp/ housing for construction and operation phases, quarry or pit areas, crushing, transport, sanitary services, waste disposal and transportation infrastructure. etc. as addressed through 4.1-4.5 below. It must include at a minimum:

4.1 Location

The general location of the exploration activities in terms of:

- 4.1.1 Political-administrative location (region, district, town or other relevant political-administrative units) with accompanying location map
- 4.1.2 Means of site access – i.e., by air, river, road, train or vehicle)
- 4.1.3 Latitude and longitude of concession corners
- 4.1.4 Maps of concession boundaries at a scale of no less than 1:50,000 or as required by the regulatory agency

4.2 Summary of Proposed Project and Alternatives

All project alternatives that are reasonable and feasible and meet the purpose and need for the proposed project shall be identified, summarized in this section, and evaluated in the EIA. In addition to the proposed project, such alternatives include, alternative locations, alternative site configuration of elements of the project, alternative size and output capacity, and alternative plans for construction, operation and closure of the mine including best practices that may avoid and/or reduce the adverse environmental or socio-economic-cultural impacts.

4.3 Project Details

The EIA shall provide specific project details for the proposed project and each alternative as identified in subsections 4.5.1 through 4.5.10. The level of detail presented should be the same for the proposed project and each alternative evaluated. The following project details shall be provided for each alternative:

4.3.1 General

- 4.3.1.1 Type (open pit, underground or both, mineral extraction in rivers and other water bodies [i.e., dredging]) and method of mining (manual, semi-mechanized or mechanized)
- 4.3.1.2 A description of each process step
- 4.3.1.3 Site drawing (digitized) showing project layout of all project components and their relationship to each other
- 4.3.1.4 Flow charts showing the path of all inputs and outputs from ore removal through collection, transportation, beneficiation and other processing, and load-out and delivery, including the flow of waste material from generation through treatment and disposal
- 4.3.1.5 Summary table showing the type, quantity and size of each component
- 4.3.1.6 Construction sequence for all project components
- 4.3.1.7 Production information
 - Types and quantities of ore that will be extracted and processed during different phases of the project
 - Estimated quantities of final products to be produced, by product type and in grams, kilograms or tonnes (as appropriate to the mineral)
 - Estimated quantities of overburden, waste rock and spoil to be disposed during different phases of the project
- 4.3.1.8 Transport of mineral and other materials outside mining lease area
 - Type of transport (road, rail, conveyor, rope way, waterway, pipeline, etc.)

C. Project and
Alternatives
Description

C.4 Project
Alternatives

- Map with the program for road construction
- Estimated quantities by year:
 - Ore
 - Waste Material
- 4.3.1.9 Operation information
 - Number and type of employees (by local hire and non-local hire)
 - Days per week
 - Hours per day
 - Shifts per day
- 4.3.1.10 Overall energy requirements and sources
- 4.3.1.11 Overall water needs
 - Requirements (m3/day)
 - Rights
 - Sources
- 4.3.1.12 Overall volume of wastewater treatment and/or discharges from:
 - Mining (dewatering)
 - Processing
 - Domestic wastewater (camp and support facilities)
- 4.3.1.13 Waste Rock, Stockpiles and/or Tailings impoundments

In addition to these general requirements, the following information is required for applicable components of the project:

4.3.2 Open Pit Mining

If the mine is to be open-pit (quarry, borrow pit, etc.) this section should contain a Mining Plan explaining how mining shall be done on a year by year basis for the first five years of mine life with conceptual plans for remainder of mine life. The plan should contain the following:

- 4.3.2.1 Mine Design
 - Stripping ratio (relation of tonnes of waste rock to mineral)
 - Thickness and amount (in m3) of top soil
 - Thickness of overburden (minimum, maximum and average)
 - Benches
 - For overburden and ore
 - Sizes (height and width)
 - By year
 - Slopes (stability, angles and lengths)
 - Area and depth by year (table and map)
 - Schedule for execution of mining activities
 - Typical Pit Cross Section (showing stripping/benching)
 - Transport/access ramps and in-mine roads
 - Pit backfilling sequences
 - Lighting if nighttime operations are proposed (including source of energy)
- 4.3.2.2 Clearing and Grubbing
 - Area by year
 - Methods
 - Topsoil stockpiling
 - Disposal or salvaging of debris
- 4.3.2.3 Excavation
 - Methods
 - Blasting plan and schedule
- 4.3.2.4 Transportation of material within the mine area
 - Type
 - In-mine (e.g. ramps, conveyors, etc.)
 - For ore from the mine to the processing area
 - For wastes from the mine or processing area to disposal
 - Estimated quantities by year:
 - Ore
 - Waste Material
- 4.3.2.5 Water and Dewatering
 - Water supply (needs, quantity, source, treatment, storage and transport)
 - Dewatering (how, how often, how much, predicted cone of depression, transport, treatment, and disposal)
- 4.3.2.6 Run-on and runoff channels, erosion and sediment control structures, overflow ponds, and discharge outfalls (designs and map with locations)

**C.9 Mine Support
Facilities
Appendix A
What is Mining?**

**C.7 Transportation
Facilities**

**C.9 Mine Support
Facilities**

4.3.2.7 Equipment Roster, specifying type and quantity by: size, motor size, and fuel requirements for each activity: • Clearing and grubbing • Excavation • Hauling ○ Vehicles (plus average trips per day) ○ In-pit conveyors • Personnel transport • Dewatering • Dust control • Power generation 4.3.2.8 Onsite Support Facilities – location and design information for the following: • Offices including toilet facilities • Storage • Machinery housing • Repair shops • Fuel stations	C.9 Mine Support Facilities Appendix A. What is Mining?
4.3.3 Underground Mines <i>If underground mining will be used this section should contain a Mining Plan explaining how mining shall be done on a year by year basis for the first five years of mine life with conceptual plans for remainder of mine life. The plan shall contain the following:</i>	C.9 Mine Support Facilities
4.3.3.1 Mine Design • Detailed descriptions of method ○ Stopping ○ Cut and fill ○ Room and pillar ○ Block caving • Location of the shafts (primary and secondary) • Map showing tunnel extensions by year • Roof support	
4.3.3.2 Clearing and Grubbing • Area by year • Methods • Topsoil stockpiling • Disposal or salvaging of debris	
4.3.3.3 Excavation • Methods • Blasting plan and schedule	
4.3.3.4 Hauling in the mine area • Type of conveyance systems ○ In-mine ○ For ore from mine to processing ○ For waste rock from mine or processing to disposal • Estimated quantities by year: ○ Ore ○ Waste rock	C.7 Transportation Facilities
4.3.3.5 Water and Dewatering • Water supply (needs, quantity, source, treatment, storage and transport) • Dewatering (how, how often, how much, predicted cone of depression, transport, treatment, and disposal)	C.8 Water-Control Facilities
4.3.3.6 Equipment Roster, specifying type and quantity by: size, motor size, and fuel requirements for each activity: • Clearing and grubbing • Excavation • Hauling ○ Vehicles (plus average trips per day) ○ In-mine conveyors ○ Lifts • Personnel transport ○ To mine entrance ○ Inside mine • Dewatering • Dust control	

- Ventilation
- Power generation
- Compressed air
- 4.3.3.7 Onsite Support Facilities – location and design information for the following:
 - Offices including toilet facilities
 - Storage
 - Machinery housing
 - Repair shops
 - Fuel stations
- 4.3.3 **Dredging (where authorized by national legislation)**

If mineral extraction in rivers and other water bodies (i.e., dredging) will be used this section should contain a Dredging Plan explaining how dredging shall be done on a year by year basis for the first five years of mine life with conceptual plans for remainder of mine life. The plan should contain the following:

 - 4.3.3.1 Legal authorization for the dredging
 - 4.3.3.2 Name of river to be exploited
 - 4.3.3.3 Size of the static and dynamic reserve of material
 - 4.3.3.4 Dimensions of area to be exploited
 - Map showing extent of dredging operations
 - Longitudinal and transversal cross-sections of the river to be dredged
 - 4.3.3.5 Operation Description
 - Operational hours – daily, weekly and seasonal operating frequencies
 - Average upstream extraction movement
 - Time table of advancement on the river
 - Time necessary to extract minerals in the entire area
 - Procedures to be used when woody debris and fallen trees are encountered
 - Status of operation
 - 4.3.3.6 River or shoreline access
 - Timing and extent of clearing, grubbing and other disturbance
 - Stream crossings (design and materials)
 - Runoff, erosion and sedimentation control
 - 4.3.3.7 River diversions and flood control – including instream berms
 - 4.3.3.8 Hauling within the area of exploitation
 - Type of conveyance
 - From dredging to processing
 - For spoil material, from processing to disposal
 - Estimated quantities by year:
 - Ore
 - Spoil material
 - 4.3.3.9 Proximity to other operators
 - 4.3.3.10 Equipment Roster, specifying type and quantity by: size, motor size, and fuel requirements for each activity:
 - Clearing and grubbing
 - Dredging
 - Hauling Vehicles (plus average trips per day)
 - Personnel transport
 - 4.3.3.11 Onsite Support Facilities – location and design information for the following:
 - Offices including toilet facilities
 - Storage
 - Machinery housing
 - Repair shops
 - Fuel stations
- 4.3.4 **Stockpiles, Rock Waste and Tailings**
 - 4.3.4.1 Location, heights and areas (hectares) of all stockpiles and rock waste dumps
 - 4.3.4.2 Specifications for liner, slopes and benches
 - 4.3.4.3 Clearing and grubbing
 - 4.3.4.4 Disposal of debris from clearing and grubbing
 - 4.3.4.5 Chemical and physical characterization of materials to be deposited in dumps, piles and/or in tailings impoundments
 - 4.3.4.6 Engineering design of structures
 - Foundations and drainage structures

C.4.3 Dredging

C.6 Stockpiles, Dumps and Tailings
D.3 Waste rock, Wall Rock and Ore Characteristics

- Dimensions, volume and slopes by year
- Acid drainage and leachate controls
- Stability analysis
- 4.3.4.7 Transport ramps onto structures
- 4.3.4.8 Erosion, runoff and sediment control structures (locations and designs)
- 4.3.4.9 Dust control measures and, if applicable, rates of application
- 4.3.4.10 Equipment roster specifying type and quantity by: size, motor size, and fuel requirements for each type of equipment
- 4.3.5 **Processing Facilities**
 - 4.3.5.1 Types and locations of each processing facility
 - Brief description of the processing plants
 - Schematic of processing including means of transport between steps
 - Process specific flow charts with details for ore, other inputs and waste flows
 - 4.3.5.2 Design of each processing unit
 - Facility schematics (showing locations and sizes of component parts)
 - Area to be temporarily disturbed during construction and occupied by the facility
 - Clearing and grubbing, including disposal of debris
 - Construction activities, including timing
 - Volumes of ore to be treated per unit of time (e.g., tonnes per day)
 - Volumes of waste (solid and liquid) to be generated per unit of time (e.g., tonnes per day)
 - Equipment roster specifying type and quantity by: size, motor size, and fuel requirements for each type of equipment (including power generation equipment)
 - Water use requirements
 - Wastewater treatment facilities
 - Air emission controls
 - Dust control (construction and operation)
 - Noise control
- 4.3.6 **Onsite Support Facilities** – location and design information for the following:
 - Offices including toilet facilities
 - Laboratories
 - Power generation
 - Storage
 - Machinery housing
 - Repair shops
 - Fuel stations
 - Sanitary facilities
- 4.3.7 **Mining Camp**

Description of the camp including but not limited to:

 - 4.3.7.1 A map showing all facilities at a legible scale appropriate to the size of the project
 - Buildings by type (use) and size
 - Roads
 - Electrical transmission lines and/or substation
 - Drainage
 - 4.3.7.2 Transition from construction camp to final mine camp
 - 4.3.7.3 Water supply and distribution
 - Distribution system
 - Use (m3/day)
 - Rights
 - Sources
 - 4.3.7.4 Waste handling and disposal components
 - Sewers
 - Wastewater treatment
 - Solid waste facilities
 - 4.3.7.5 Energy generation and use requirements
- 4.3.8 **Roads**
 - 4.3.8.1 Identify all existing roads to be used
 - Traffic volume, operating speeds and trip times
 - 4.3.8.2 Detailed information on any roads to be constructed
 - Timing of construction

C.5 Processing
Appendix A
What is Mining?

C.9 Mine Support
Facilities

D.10 Transportation
C.7.1 Roads

CAFTA-DR AND US COUNTRY EXPERTS SUPPORTED BY USAID-ENVIRONMENT AND LABOR EXCELLENCE-CCAD-USEPA PROGRAM 15

- Contingency measures if initial efforts are unsuccessful
- 4.3.10.16 Quantity, quality and source of soil needed for restoration
- 4.3.10.17 Erosion control structures
- 4.3.10.18 Slope stability (where necessary)

5 Environmental Setting

Based on information available from the literature, government, preliminary exploration activities (geophysical surveys, prospecting, etc.) and other special studies or sources, the EIA shall provide information on environmental setting for the physical, biological, and socio-economic-cultural environments through narrative, maps and tables for the current situation, important trends and predicted situation in the absence of the proposed project. Sources of data must be provided when and where data is used. This shall include the following information:

Physical Environment:

5.1 Geologic Resources

The EIA shall include a description of the following:

- 5.1.1 Cross Sections of the geology including soil horizons
 - 5.1.1.1 Geologic characteristics at locations for waste rock storage
- 5.1.2 Topography and slope conditions and geomorphology
- 5.1.3 Seismicity and stability characteristics
- 5.1.4 Geochemistry of ore, wall rock and waste rock
 - 5.1.4.1 Geochemical characterization
 - 5.1.4.2 Potential for acid rock drainage
 - Detailed description used to evaluate acid rock drainage (ARD) potential (all methodologies shall be based on internationally accepted methods as presented in the GARD Guide)
 - 5.1.4.3 Potential for leaching of radioactive materials
 - 5.1.4.4 Potential for leaching of toxic substances and heavy metals
- 5.1.5 Types of rock, mineralization and any structural deformation by local folding and faulting

5.2 Soil Resources

The EIA shall describe baseline soil resources using narrative, maps and tables in terms of the following:

- 5.2.1 Types and uses
- 5.2.2 Fertility
- 5.2.3 Potential uses of soils
- 5.2.4 Erosion potential
- 5.2.5 Quantity and quality available for revegetating and restoring the area of exploitation at end of mining
- 5.2.6 URP (productive unit of soil)

5.3 Water Resources

Baseline information shall be collected and following information shall be provided:

5.3.1 Surface Water

- 5.3.1.1 Location of all springs, streams, rivers, wetlands, lakes and reservoirs in and around project area (map)
- 5.3.1.2 Inventories of consumptive and non-consumptive use
- 5.3.1.3 Delineation of watersheds and water drainage pattern in the study area using cadastral/aerial/remote sensing satellite imageries (map)
 - Runoff characteristics of watersheds
- 5.3.1.4 Surface water balance (existing withdrawal of surface water)
 - Existing uses by type and volume
 - Capacity
- 5.3.1.5 Flow of streams and rivers (including seasonal fluctuations)
 - 2-, 10-, 25-, 50- and 100-year runoff events and associated floodplains for streams and rivers (mapped)
- 5.3.1.6 Seasonal fluctuations in area and volume of wetlands, lakes and reservoirs

5.3.2 Groundwater

- 5.3.2.1 Hydrogeologic characteristics of the area (vadose zone and aquifers)
 - Flow regime
 - Flow direction
 - Influences of geologic structures (faults, contacts, bedrock fracturing, etc) and surface water bodies
- 5.3.2.2 Location and characteristics of all existing springs and wells (on topographic map)
 - Flow/yield data for each spring and well (including water levels in

D. Environmental Setting

D.2 Geology

D.3 Waste Rock, Wall Rock and Ore Characteristics

D.4 Soils and Geology

D.5 Surface Water Appendix E Acid Mine Drainage GARD Guide

D.6 Groundwater

- wells)
 - Depth and construction information for each well
 - Existing uses by type and volume
 - Capacity available
- 5.3.2.3 Groundwater recharge data
- 5.3.2.4 Groundwater potential yield
 - Availability
 - Water table levels (dry and rainy season)
- 5.3.2.5 Baseline modeling
 - Basis for model selection
 - Input requirements
 - Modeling results
- 5.3.3 **Water Quality**
 - 5.3.3.1 Existing water quality data
 - Locations of all water quality monitoring stations in and around the project area (with direction and distance from the site)
 - Water quality data for each station
 - Analysis of physical, chemical and biological water quality
 - 5.3.3.2 Supplemental sampling and analysis (Sampling and Analysis Program in annex)
 - Proposed locations of representative monitoring stations (upstream and downstream of proposed project activities)
 - Monitoring program design with at least a year of baseline data being collected
 - Parameters (including as appropriate, chemical, physical, heavy metals, radiological and biological)
 - Frequency of collection
 - Analytic methods
 - 5.3.3.3 Water quality characterization
 - 5.3.3.4 Surface water and groundwater standards that apply to the project.
- 5.4 **Air and Climate**

Baseline information for air resources shall be collected for at least one year or as required by the regulatory agency and shall include at a minimum the following:

 - 5.4.1 **Climate and Meteorology**
 - 5.4.1.1 Source of data (meteorological station(s) from which climatological data have been obtained)
 - 5.4.1.2 Temperature variations
 - 5.4.1.3 Relative humidity
 - 5.4.1.4 Solar radiation and evaporation rates
 - 5.4.1.5 Rainfall (total precipitation, rainfall intensity, and duration by month)
 - 5.4.1.6 Statistical analysis of the data
 - 5.4.2 **Wind rose (Wind direction and speed, 24 hourly data)**
 - 5.4.3 **Air Quality Monitoring Data**
 - 5.4.3.1 Source of data (locations of monitoring stations, both upwind and downwind, with direction and distance from the project)
 - 5.4.3.2 Constituents sampled (representatives of potential emissions from the project such as SPM, RSPM, SO₂, NO_x, CO, Heavy Metals in SPM [Fe, Mn, Pb] and fugitive dust)
 - 5.4.3.3 Air quality characterization
- 5.5 **Noise and Vibration**

The EIA shall include a noise level study that details:

 - 5.5.1 Location of monitoring Stations
 - 5.5.2 Daytime and night time noise levels (measured in decibels)
 - 5.5.3 Inventory of existing noise sources
- Biologic Environment**
 - 5.6 **Vegetation/Flora**
 - 5.6.1 Vegetative mapping
 - 5.6.1 Species and structure (abundance, density, etc.)
 - 5.7 **Fish and Wildlife/Fauna**
 - 5.7.1 Species (including status, i.e. endemic, migratory, exotic, endangered, threatened, keystone, etc.)
 - 5.7.2 Breeding areas
 - 5.7.3 Mating and brooding seasons
 - 5.7.4 Migratory corridors (if applicable)

**D. Environmental
Setting**

D.7 Air

D.8 Ecosystems

5.8 Ecosystems: Terrestrial, wetlands, aquatic, marine

5.9 Endangered species and habitats

5.10 Protected areas

The specific location and boundaries of relevant national parks, sanctuaries, reserves, etc.

Socio-Economic-Cultural Environment

5.11 Socio-Economic Conditions

Identify nearby human settlements including the following information for each settlement:

- 5.11.1 Population (size, gender and age distribution)
- 5.11.2 Cultural characteristics (religion, ethnic composition, languages spoken, etc.)
- 5.11.3 Economic activities (employers, employment and incomes)
- 5.11.4 Tax base
- 5.11.5 Crime rates
- 5.11.6 Literacy rates
- 5.11.7 Community organizations
- 5.11.8 Public Health and Safety
 - 5.11.8.1 Level of emergency services and access to clinics, doctors, hospitals
 - 5.11.8.2 Diseases in the project area (including the sources of data and the methodology used to collect and analyze the data)
 - 5.11.8.3 Existing practice for assessment of occupational health
- 5.11.9 Skills, services and goods availability in the communities

5.12 Infrastructure

For each human settlement identified in subsection 5.12, describe the infrastructure in or serving the settlement, including the following information:

- 5.12.1 Transportation infrastructure
 - 5.12.1.1 Roads

This section of the EIA addresses baseline conditions of transportation and traffic patterns on existing roads. The EIA shall provide information on following:

 - Location and condition of all existing roads
 - Surface materials
 - Erosion and sediment control
 - Maintenance programs (what, when and whom)
 - Description of anticipated third-party improvements (government or entity other than the proponent)
 - Traffic patterns and densities on roads within affected project vicinity
 - Safety levels and current circulation issues, and capacity
 - 5.12.1.2 Airports or airstrips
 - 5.12.1.3 Other transportation infrastructure as applicable, e.g. railroads, and pipelines
- 5.12.2 Public health infrastructure
 - 5.12.2.1 Drinking water supplies and treatment
 - 5.12.2.2 Wastewater treatment and management
 - 5.12.2.3 Solid and hazardous waste management and treatment
- 5.12.3 Communications infrastructure
 - 5.12.3.1 Types of communications systems
 - 5.12.3.2 Types of transmission (wired or wireless)
 - 5.12.3.3 Locations of transmission lines (if applicable)
 - 5.12.3.4 Locations of microwave towers and/or antennae (if applicable)
- 5.12.4 Energy infrastructure
 - 5.12.4.1 Types of energy
 - 5.12.4.2 Sources including location and description of generating facilities in the area of influence
 - 5.12.4.3 Transmission lines and/or pipelines
 - 5.12.4.4 Fuel storage facilities

5.13 Cultural, Archeological, Ceremonial and Historic and Resources

Identify all cultural, archaeological, ceremonial and historic resources within the area of influence, including the following information:

- 5.13.1 Data and maps relating to archeological, cultural, ceremonial, and historic sites in the direct vicinity of the project
- 5.13.2 Information on indigenous people or other traditional cultures, if any

**D. Environmental
Setting**

**D. 12 Socio-economic
Conditions**

D.10 Transportation

**D.9 Cultural and
Historic resources**

5.14 Land Use

Describe actual and potential land use showing location, size and proximity within and surrounding the project area, including land use maps, and to extent possible, integrated into one map.

- 5.14.1 Population centers, including information and locations of
 - 5.14.1.1 Schools
 - 5.14.1.2 Cemeteries
 - 5.14.1.3 Churches
 - 5.14.1.4 Other public buildings
 - 5.14.1.5 Housing (including housing density)
 - 5.14.1.6 Commercial areas
- 5.14.2 Agricultural lands
- 5.14.3 Forested lands
- 5.14.4 Protected areas (including but not limited to)
 - 5.14.4.1 National parks
 - 5.14.4.2 Wildlife refuges
- 5.14.5 Wetlands
- 5.14.6 Other environmentally sensitive areas
- 5.14.7 Tourism and recreation areas
 - 5.14.7.1 Recreation facilities
 - 5.14.7.2 Eco-cultural-tourist locations
- 5.14.8 Indigenous peoples
 - 5.14.8.1 Settlements/communities
 - 5.14.8.2 Traditional use areas e.g. hunting and fishing areas
 - 5.14.8.3 Important vistas
- 5.14.9 Other Culturally sensitive areas
- 5.14.10 Flood plains and water bodies
- 5.14.11 Coastal zones
- 5.14.12 Other land uses as appropriate

6 Assessment of Impacts

The EIA shall provide information on potential impacts (direct, indirect and cumulative), and both the magnitude and frequency of potential impacts on physical, biological, social-economic-cultural resources potentially resulting from the proposed project and alternatives. The assessment shall use standardized predictive methods, such as models, to determine the specific range of impacts on environmental and socio-economic resources. The EIA shall identify which impacts are significant and the criteria used to make this judgment. Critical data input from project description and environmental setting analysis projecting the conditions in the environmental setting in the absence of the proposed project shall be used as the baseline upon which potential impacts are forecast. The EIA shall also identify sources of data used in the analysis and the uncertainties associated with the outputs of each method used.

Physical Impacts

6.1 Geologic Resources

Potential impacts to geologic resources shall be described including but not limited to the following:

- 6.1.1 Landslide hazards
- 6.1.2 Dam failure
- 6.1.3 Subsidence prediction study
- 6.1.4 Changes in topography and drainage patterns
- 6.1.5 (Impacts due to leaching or ARD should be addressed in the Water section)

6.2 Soil Resources

Potential impacts to land resources shall be described including but not limited to the following:

- 6.2.1 Soil quality
 - 6.2.1.1 Contamination by mining wastes (water and air bourn)
 - 6.2.1.2 Impacts on use
- 6.2.2 Erosion

6.3 Water Resources

Potential impacts to surface water and groundwater resources during mine construction, operation and post-closure shall be described including but not limited to the following:

- 6.3.1 **Geomorphology**
 - 6.3.1.1 Modification/diversion in the existing drainage pattern
 - 6.3.1.2 Downstream scouring and upstream head cutting
 - 6.3.1.3 Bank erosion (surface water discharges, stream crossings and dredging)
 - 6.3.1.4 Potential for increased flash flooding

D.11 Land Use

E. Potential Impacts
F. Assessing Impacts
F.2.11 Cumulative Impacts
F.1.5 Evaluation of the Significance of the Impacts
Tables E-2 to E-6

F.2.6 Soils and Geology

Appendix D: Erosion and Sedimentation

E.4.1 Surface Water and Groundwater
F.2.2 Surface Water
F.2.3 Groundwater

6.3.2 Quantity

- 6.3.2.1 Water bodies likely to be created due to mining activities
- 6.3.2.2 Impact of water withdrawal, dewatering and mine operation on surface water and groundwater
 - Model results
 - Water table levels
 - Well production
 - Spring and stream flows
- 6.3.2.3 Effects of dams on downstream seepage

6.3.3 Quality

- 6.3.3.1 Water quality modeling (surface water and groundwater models)
 - Basis for model selection
 - Input requirements
 - Modeling results
 - Indicators of water quality
- 6.3.3.2 Runoff, erosion and sedimentation from roads, disturbed areas, waste piles and stream crossings
 - Sources
 - Receiving waters
 - Concentrations
 - Physical parameters
 - Chemical parameters
 - Biological parameters
- 6.3.3.3 ARD from mine and waste sites (if applicable)
 - Sources
 - Receiving waters
 - Concentrations
- 6.3.3.4 Other leachates from mine, waste sites and landfills
 - Sources
 - Receiving waters
 - Concentrations
- 6.3.3.5 Radioactive contamination (if applicable)
 - Sources
 - Receiving waters
 - Concentrations
- 6.3.3.6 Discharges
 - Sources (e.g., dewatering, wastewater, storm water)
 - Receiving waters
 - Concentrations
 - Physical parameters
 - Chemical parameters
 - Biological parameters
- 6.3.3.7 Spills and accidents
 - Chemical, hazardous waste and fuel spills
 - Overflows from ponds during storm events or electricity failures
 - Containment failures
- 6.3.3.8 Pit lake water quality at meaningful times after closure (e.g., while pit is filling, 100 years after closure, and at equilibrium)
- 6.3.3.9 Impact on surrounding groundwater

6.4 Air Resources

Potential impacts to air resources shall be described including but not limited to the following:

- 6.4.1 Air quality modeling
 - 6.4.1.1 Basis for model selection
 - 6.4.1.2 Input requirements
 - 6.4.1.3 Modeling results
- 6.4.2 Potential impacts on ambient air quality, including fumes, fugitive dust, and hazardous air pollutants (e.g., mercury)
 - 6.4.2.1 Sources (e.g., mining operations, processing facilities, fixed and mobile equipment emissions)
 - 6.4.2.2 Concentrations
 - Isopleth distribution
 - Tabular
 - 6.4.2.3 Receptors (e.g., communities, schools, water bodies, ecosystems)

**Appendix E Guide for
Acid Rock Drainage**

**E.4.2 Air and Noise
F.2.1 Air Resources
Table F-1**

6.5 Noise and Vibration

Potential impacts to noise shall be described including but not limited to the following:

- 6.5.1 Noise modeling
 - 6.5.1.1 Basis for model selection
 - 6.5.1.2 Input requirements
 - 6.5.1.3 Modeling results
- 6.5.2 Potential noise levels at different representative sites in the project area and in communities near the project area
- 6.5.3 Potential vibration due to blasting and movement of heavy equipment, and related damage to materials and structures

Biologic Impacts

Potential impacts to biological resources shall be described including but not limited to the following:

6.6 Vegetation/Flora

Alterations in vegetative cover due to:

- 6.6.1 Deforestation or wetlands destruction
- 6.6.2 Other vegetative type conversions
 - 6.6.2.1 Direct vegetative removal
 - 6.6.2.2 Indirect (e.g., poisoning by dust and air contaminants)
- 6.6.3 Wildfires
- 6.6.4 Increased road access in remote areas leading to destruction of existing vegetative cover (land use changes)

6.7 Fish and Wildlife/Fauna

- 6.7.1 Loss of habitat, migratory routes/corridors and breeding or spawning areas due to changes in vegetative cover/wetlands loss)
- 6.7.2 Disturbance of habitat, migratory routes/corridors and breeding/spawning grounds due to mining activities and human settlement associated with mining (e.g. noise, vibration, illumination, vehicular movement)
- 6.7.3 Loss or contamination of drinking water
- 6.7.4 Poisoning (e.g., air emissions, direct contact with toxic waste/substances)
- 6.7.5 Animals attracted to garbage and food waste at mine camps
- 6.7.6 Increased hunting
- 6.7.7 Off-road vehicle use
 - 6.7.7.1 Contaminated runoff
 - 6.7.7.2 Wastewater discharges
 - 6.7.7.3 Air emissions
 - 6.7.7.4 Changes in flow regimes
 - 6.7.7.5 Increased fishing

6.8 Ecosystems impacts

6.8.1 Terrestrial Ecosystems

6.8.2 Wetland Ecosystem

Destruction or modification due to:

- 6.8.2.1 Vegetative removal
- 6.8.2.2 Draining or filling of wetlands
- 6.8.2.3 Contaminated runoff
- 6.8.2.4 Wastewater discharges
- 6.8.2.5 Air emissions
- 6.8.2.6 Changes in flow regimes
- 6.8.2.7 Wildfire
- 6.8.2.8 Increased road access in remote areas leading to destruction/modification

6.8.3 Aquatic Ecosystems

Alterations in aquatic ecosystems (streams, rivers and lakes) due to:

- 6.8.3.1 Contaminated runoff
- 6.8.3.2 Wastewater discharges
- 6.8.3.3 Air emissions
- 6.8.3.4 Changes in flow regimes
- 6.8.3.5 Changes in stream, river or lake morphology (e.g., from bank modifications, crossings, dredging)

6.9 Endangered or threatened species or habitats (particularly from

F.2.5 Noise and Vibration

Tables E-1 to E-4
E.4.4 Ecosystems
D.8 Ecosystems
F.2.7 Biologic Resources

F.2.11 Cumulative Impacts

- cumulative impacts)
- 6.9.1 Biodiversity
- 6.9.2 Individual species (with special emphasis on rare, endemic and threatened species)

6.10 Protected Areas

Socio-Economic-Cultural Impacts

6.11 Socio-economic Conditions and Resources

The EIA shall assess potential positive and negative impacts to socio-economic resources including but not limited to the following:

- 6.11.1 Increased individual incomes
 - 6.11.1.1 Direct employment at the mine
 - 6.11.1.2 Indirect employment generated by mining activities
 - 6.11.1.3 Increased purchases from local businesses
 - 6.11.1.4 Other economic activities stimulated in the community as a result of the mine
- 6.11.2 Employment opportunities for local residents
- 6.11.3 Increased tax base
- 6.11.4 Resource royalties
- 6.11.5 Commitment to community development support from the mining company
- 6.11.6 Displacement and relocation of current residents or community resources
- 6.11.7 Displacement or disruption of people's livelihoods (e.g., fishing, hunting, grazing, farming, forestry and tourism)
- 6.11.8 Reduction in quality of life for residents from visual and noise impacts
- 6.11.9 Public finance requirements – will more infrastructure need to be built and maintain to meet the demands of increase population in the areas of public education and public service (water, sanitation, roads, etc.)
- 6.11.10 Increased crime (drugs, alcohol, prostitution, etc.)
- 6.11.11 Population
- 6.11.12 Displacement of human settlements during the life of the mine
- 6.11.13 Change in character of community (negative)
- 6.11.14 Housing market (during construction and operation and after closure)
- 6.11.15 Change in religious, ethnic or cultural makeup of community
- 6.11.16 Potential impacts on public health
- 6.11.17 **Worker Health and Safety**

Potential impacts to worker health and safety shall be described including but not limited to the following:

 - 6.11.17.1 Identification of hazardous jobs and number of workers exposed with duration of exposure
 - 6.11.17.2 Occupational diseases due to exposure to dust and other mining related activities such as handling of explosives, solvents, petroleum products etc.
 - 6.11.17.3 Identification of physical risks and mine safety aspects
 - 6.11.17.4 Potential for fires

6.12 Land Use

- 6.12.1 Changes in land use by both area and location
- 6.12.2 Identification of any components of the proposed project that would fall within 25- or 100-year flood plains
- 6.12.3 Impacts of subsidence on houses and other structures
- 6.12.4 Impacts on visual resources and landscapes
- 6.12.5 Impacts on the natural landscape

6.13 Cultural and Historic Resources

The EIA shall evaluate potential impacts to archeological, cultural, ceremonial and historic resources including but not limited to the following:

- 6.13.1 Damage and alteration
- 6.13.2 Removal from historic location
- 6.13.3 Introduction of visual or audible elements that diminish integrity
- 6.13.4 Neglect that causes deterioration
- 6.13.5 Loss of medicinal plants
- 6.13.6 Loss of access to traditional use areas
- 6.13.7 Potential impacts to previously inaccessible areas from development/improvement of roads

6.14 Infrastructure

E.4.6 Socio-Economic
Impacts

F.2.8 Socioeconomic

F.2.7 Socio-economics

F.2.9 Vulnerable
Populations

E.4.5 Human Health

F.1.5 Evaluation of the
Significance of the
Impacts

E.4.8 Land Use

E.4.7 Cultural and
Historic Resources
F.2.8 Cultural and
Historical

- 6.14.1 Public infrastructure requirements – will more infrastructure need to be built and maintain to meet the demands of increase population in the areas of public education and public service (water, sanitation, roads, etc.)
- 6.14.2 **Transportation Systems**
This section of the EIA addresses impacts of transportation and traffic patterns on existing roads. The impacts of new roads on water quality, biological resources and land use should be addressed in those respective sections. The EIA shall assess potential impacts to transportation systems including but not limited to the following:
- 6.14.2.1 Potential changes to traffic patterns, densities, and traffic safety issues in area affected by project
 - 6.14.2.2 A determination of vehicular traffic density outside Mining Lease Area (before, during, and after the proposed activities)
 - 6.14.2.3 Potential for traffic accidents
 - 6.14.2.4 Congestion
 - 6.14.2.5 Noise
- 6.14.3 Potential impacts to previously inaccessible areas from improvement of roads, public health infrastructure, energy and communications infrastructure

7 Mitigation and Monitoring Measures

This section of the EIA must include measures designed to mitigate potential adverse impacts including those to avoid and prevent, and if needed, to reduce or minimize adverse impacts. The project proponent must include measures considered to be “best practices” among any alternative measures.

Here and/or in the Environmental Management Plan section, proposed mitigation shall be described in auditable terms and at a level of detail sufficient to demonstrate its effectiveness in addressing the concern or performance criterion, including, its anticipated level of effectiveness and/or measurable performance, and design specifications.

The monitoring plan must include monitoring throughout the life of the mine for each potential mitigation to confirm the effectiveness of the measure and support contingency plans to provide assurance that the project, at the site preparation, construction, operation, expansion, and closure stages will meet applicable environmental requirements/standards by law, and fall within the limits of impacts deemed acceptable upon approval of the EIA. Some important items to address in the mitigation plan and associated monitoring plans include, but are not limited to the following:

Physical Impacts

7.1 Geologic Resources

- 7.1.1 Pre-excavation, onsite geological inspection and geotechnical study protocols to determine slope stability and landslide risks
- 7.1.2 Slopes in pits and waste piles built and maintained to avoid landslides and favor revegetation and soils formation
- 7.1.3 Slope stabilization by constructing retaining walls, using vegetation, geotextile, or other mechanical methods
- 7.1.4 Blasting Plan (summary of relevant measures with full document in Annex) to reduce the risk to civil infrastructure, flora, fauna and communities and to prevent slope destabilization
- 7.1.5 Use of signage to mark areas where slopes are not stable as a preventive measure in the event of a landslide

7.2 Soil Resources

- 7.2.1 Topsoil management measures
- 7.2.2 Erosion and sediment measures
- 7.2.3 Restoration/Rehabilitation Plan (summary of relevant measures with full document in Annex)
 - 7.2.3.1 Concurrent restoration/rehabilitation of mined out area to meet
 - 7.2.3.2 Final restoration/rehabilitation of disturbed areas
- 7.2.4 Minimize soil disturbance
- 7.2.5 Mitigation measures unique to specific alternatives

7.3 Water Resources

- 7.3.1 Water Quality Management Plan (summary of relevant measures with full document in Annex)
 - 7.3.1.1 Dewatering
 - 7.3.1.2 Process wastewater
 - 7.3.1.3 Sewage and domestic wastewater
 - 7.3.1.4 ARD
 - 7.3.1.5 Nonpoint sources

G. Mitigation and Monitoring Measures
Table G-2 Mining Impact Mitigation Measures
Appendix F Sampling and Analysis Plan

G.2.5 Waste Management

G.3 Restoration
G.4 Post-Closure
Table G-3

Appendix D Erosion and Sedimentation

G.2.2 Water Resource Management
Appendix E Acid Rock Drainage Guide
GARD

7.3.2 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)

7.4 Solid and Hazardous Waste

7.4.1 Solid Waste Management Plan (summary of relevant measures with full document in Annex)

7.4.2 Hazardous Waste Management Plan (summary of relevant measures with full document in Annex)

7.4.3 Restoration/Rehabilitation Plan (summary of relevant measures with full document in Annex)

7.4.4 Transport system construction and maintenance to avoid erosion and sedimentation

7.4.5 Off-road vehicle use restrictions

7.4.6 Waste minimization practices

7.4.7 Mitigation measures unique to specific alternatives

7.5 Air Resources

7.5.1 Dust control measures

7.5.2 Emissions control measures

7.5.2.1 Emissions reduction equipment

7.5.2.2 Maintenance and inspection of equipment and vehicle using combustion engines to reduce emissions

7.5.3 Spill Prevention and Containment Plan (see 7.3.2)

7.5.4 Hazardous Materials Management Plan (see 7.4.2)

7.5.5 Mitigation measures unique to specific alternatives

7.6 Noise and Vibration

7.6.1 Noise control measures

7.6.1.1 Noise reduction technologies (suppression equipment, berms, noise barriers, etc.)

7.6.1.2 Time of day limitations on blasting and movement of heavy equipment when in close proximity to houses not being operated during evening hours

7.6.2 Blasting Plan (summary of relevant measures with full document in Annex)

7.6.3 Mitigation measures unique to specific alternatives

Biological Impacts

7.7 Biological Resources

7.7.1 Restoration/Rehabilitation Plan (summary of relevant measures with full document in Annex)

7.7.2 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)

7.7.3 Hazardous Materials Management Plan (summary of relevant measures with full document in Annex)

7.7.4 Modify facility and activity locations and timing to avoid critical ecosystems, migratory routes and breeding/spawning grounds

7.7.5 Off-road vehicle use restrictions to prevent damage to ecosystems

7.7.6 Surface water diversion limitations to maintain in-stream values

7.7.7 Controls on hunting and fishing within the project area

7.7.8 Control of noxious and evasive weeds

7.7.9 Measures to compensate for loss of forests, wetlands or other critical ecosystems

7.7.10 Blasting Plan (summary of relevant measures with full document in Annex)

7.7.11 Mitigation measures unique to specific alternative

**Table G-2 Mining
Impact Mitigation
Measures**

**G.2.3 Air Pollution
Control
Table G-4**

Socio-economic-cultural Impacts

7.8 Socio-economic Conditions and Resources

- 7.8.1 Rehabilitation Program for people displaced by the project (summary of relevant measures with full document in Annex)
- 7.8.2 Visual/Landscape Management Plan (summary of relevant measures with full document in Annex)
- 7.8.3 Criteria and method for calculating compensation for loss of land and crops
- 7.8.4 Training locals for employment in the project
- 7.8.5 Development of a "Code of Conduct" (with associated training program) for workers to show respect to the local populations and their culture and social rules
- 7.8.6 Blasting Plan (summary of relevant measures with full document in Annex)
- 7.8.7 Mitigation measures unique to specific alternatives
- 7.8.8 Public Health Program to protect local population from potential health problems caused by the mining operation (summary of relevant measures with full document in Annex)

7.8.9 Worker Health and Safety

- 7.8.9.1 Development of an Occupational Health, Industrial Safety and Accidents Prevention Program with appropriate accident prevention program, reporting and periodic review (summary of relevant measures with full document in Annex)
- 7.8.9.2 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)
- 7.8.9.3 Hazardous Materials Management Plan (summary of relevant measures with full document in Annex)
- 7.8.9.4 Fire Prevention and Control Plan (summary of relevant measures with full document in Annex)
- 7.8.9.5 Mitigation measures unique to specific alternatives

7.9 Cultural and Historic Resources

- 7.9.1 Modify facility and activity locations to avoid significant archeological, cultural, ceremonial and historic sites
- 7.9.2 If avoidance is not possible, conduct appropriate resource recovery operations before disturbing the sites
- 7.9.3 Clearly delineate boundaries and post signs identifying existing archeological, cultural and historic sites on roadsides and within the mine/mine area boundaries so that they are easily recognized by the machinery operators and other workers
- 7.9.4 Development of a training program so that staff recognize and respect culturally and archeological sensitive areas
- 7.9.5 Development protocols for use during construction and operation stages for identifying and responding to archeological, cultural, ceremonial and historic sites not identified during the preliminary surveys
- 7.9.6 In the event that a historical, etc. site was found, they will stop activities at the site and report to the government

7.10 Infrastructure

7.10.1 Transportation Systems

This section of the EIA addresses mitigation measures for transportation and traffic patterns on existing roads. Mitigation of impacts of new roads on water quality, biological resources and land use should be addressed in those respective sections.

- 7.10.1.1 Transportation Plan (summary of relevant measures with full document in Annex)
- 7.10.1.2 Placement of traffic signals
- 7.10.1.3 Establishing, posting and enforcing speed limits for the vehicles that transport material
- 7.10.1.4 Training employees, contractors and subcontractors on measures to reduce or avoid potential accidents
- 7.10.1.5 Hiring and training security personnel devoted exclusively to preventing accidents in the access road and controlling the speed of the vehicles transporting mine material Mitigation measures unique to specific alternatives

7.10.2 Other infrastructure: public health, communications, energy impacts

**Table G-2 Mining
Impact Mitigation
Measures**

8 Environmental Management Plan

The EIA shall include an Environmental Management Plan to prevent, mitigate and monitor adverse impacts identified in the EIA either individually or in relevant groupings. Plans will describe actions to be taken in sufficient detail to provide a basis for subsequent auditing of compliance with commitments made in the EIA process including who is responsible, how and when it will be implemented, what will be done and what results will be achieved, why it is being done, and how to know whether it is effective in addressing the underlying concerns. The environmental management plan shall have the following elements:

8.1 Overview of Environmental Management Organization and Policy

Describe the project management and how environmental management and organization relates to overall project responsibility. Describe the personnel and performance accountability system for design, operation, maintenance and closure for implementation of mitigation and monitoring measures

8.1.1 Describe the Environmental policy

Policy that will govern the Project throughout its implementation, including at least the objectives, scope, commitment to continuous improvement, control and environmental monitoring and good relationship with neighboring populations and countries, as well as the commitment to internal controls such as compliance and environmental monitoring and routine audits.

8.1.2 Persons responsible for the implementation of mitigation measures, in each phase

8.2 Project-wide mitigation plan including an implementation schedule. It has two elements:

8.2.1 Environmental resource mitigation (such as air, water)

8.2.2 Socio-economic-cultural mitigation (relocation, etc.)

8.3 Project-wide monitoring plan (usually specific to monitoring of surface and ground water)

8.3.1 Short-term and long-term monitoring of resource condition, including but not limited to:

8.3.1.1 Slope stability

8.3.1.2 Water Quality Monitoring Program

- Where, how and when monitoring shall be conducted
- Parameters to be monitored
- Monitoring frequencies
- Sampling and analytical protocols to be used

8.3.1.3 Air Quality Monitoring Program

- Where, how and when monitoring shall be conducted
- The Parameters to be monitored
- The monitoring frequencies
- The sampling and analytical protocols to be used

8.3.1.4 Noise and Vibration

8.3.1.5 Cultural, ceremonial archeological and historic resources in the vicinity of the mine

8.3.2 Short-term and long-term monitoring to ensure that the mitigation measures are functioning as predicted and that rehabilitation is working

8.4 Management of other on or off-site environmental pollution control and infra structure

This section should address management of critical elements of pollution control and infrastructure that are not otherwise included in the mitigation plan because they were considered an essential part of the proposed project.

8.5 Contingency plans

Contingency plans shall be prepared and described to address a) failure to meet specific performance criteria established by law or necessary for the project to meet its commitments in the EIA and b) respond to natural and other risks previously identified and mitigated in the EIA in the event reasonable and feasible mitigation measures to address the risks are inadequate.

8.5.1 Performance-related Contingency Plans: Steps that will be taken should monitoring indicate that:

8.5.1.1 Environmental standards are not being met

8.5.1.2 Impacts are greater than predicted

8.5.1.3 The mitigation measures and/or rehabilitation are not performing as predicted

8.5.2 Natural Disaster Risk Response Plan (assumes that risk identification and risk reduction have been addressed in other parts of the EIA)

8.5.3 Other Risks Response plan (assumes that risk identification and risk reduction have been addressed in other parts of the EIA)

H. Environmental Management Plan

Table G-2 Mining Impact Mitigation Measures

G.7.2 Water Quality Monitoring Example

9 Signed Commitment Statement

The EIA shall contain a legally binding signed letter of commitment to meeting the terms of the EIA. The statement must be signed by the authorized representative of the proponent company with assurance that all financial surety measures as required by the regulatory agency have been met.

10 Annexes

Annexes should be numbered and duly referenced in the text.

10.1 Public Consultation

- 10.1.1 Public consultation plan
- 10.1.2 A summary of public outreach activities
- 10.1.3 A summary of response to comments
- 10.1.4 Actual copies of written comments

10.2 Technical Supporting Documents

- 10.2.1 Include maps, plans, charts and figures in the sequence mentioned in the EIA document.
- 10.2.2 Zoning maps with resources and results of impacts
- 10.2.3 Detailed materials on predictive tools/models and assumptions used for the assessment if too detailed for the body of the EIA
- 10.2.4 Special studies, if relevant but not readily accessible

10.3 References

- 10.3.1 Submit a list of all references, (books, articles, technical reports and other information sources) cited in the various chapters of the EIA study (full biographic references, and the following conventional procedures cited in the literature: author, year, title, source, number of pages, and city of publication or issuance.

B. EIA Process and Public Participation

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2 TERMS OF REFERENCE (TOR) FOR METAL MINING

A. OVERVIEW

These terms of reference (TOR) describe the minimum requirements for the development of the Environmental Impact Assessment (EIA) for proposed non-metal mining projects. Both the TOR and the cross referenced EIA Technical Review Guidelines for Mining should be used to establish minimally acceptable conditions for satisfying the requirement to submit an EIA. The TOR is divided into three sections: A. Overview, B. Exploration and C. Exploitation. Including all phases in the one TOR should help to ensure adequate planning for all phases. Parts A and B are all that are needed for the exploration phase. If exploration is followed by exploitation, then a new EIA following Part C would be prepared.

The basic format for the EIA document that should be followed is:

- Table of Contents
- Acronyms and Abbreviations
- Executive Summary
- Project and Alternatives Description
- Environmental Setting
- Assessment of Impacts
- Mitigation and Monitoring Measures
- Environmental Management Plan
- Commitment Statement
- Annexes

In general, the EIA should identify and address:

- Applicable environmental standards, norms, and requirements set forth at the international, national, regional and/or local levels including those designed to meet the objectives of resource management and/or land use plans that may be in effect in and around the jurisdiction(s) in which you propose to develop the mine and in which the proposed mine might have a potential impact. In the absence of such standards, identify a set of benchmarks that can be used in the analysis and the basis for your selection. The guideline identifies standards in use by various countries and international organizations in Appendix C.
- Public/Stakeholder concerns related to impacts in and around the proposed project and alternatives at least for stakeholders within the geographic scope of potential impact. The project proponent should document specific steps taken to engage the public and other stakeholders, and engage these publics as early as possible before undertaking to prepare the EIA. Concerned publics include: local governments, persons living and working in the vicinity of the project, those with interests in resources that may be affected i.e. indigenous peoples, and those concerned about protected areas and prime agricultural lands. A summary of public outreach activities, audience, number of persons, organizations involved, concerns raised, responses to comments and actual copies of written comments received should be included in the Annex.

-
- All relevant plans related to the proposed mine, for example, engineering and site preparation plans for mining, reclamation and closure, environmental management, and mitigation in whatever form these may take.
 - All phases of the project from feasibility studies to site preparation to operations to closure and also plans to expand capacity at the current or adjacent sites.
 - Alternative approaches to meeting the purpose and need for the proposed mine including alternative siting, configuration on the site, designing, constructing, operating and closing the mine firstly to avoid and prevent, or secondly to reduce or minimize adverse or improve beneficial environmental or socioeconomic impacts. The EIA must assess the impacts of a range of representative reasonable and technically feasible alternatives as well as the proposed mine. The alternatives to the project must include a “no action” alternative, indicating what would happen in the absence of the proposed project, as well as best practices.
 - Direct, indirect and cumulative impacts and their significance level.
 - Uncertainty and how that uncertainty will be addressed through monitoring and contingency plans as may be needed to reduce risk of adverse impacts in the future.
 - Specific commitments, including who is responsible, what will be done, when and how it will be monitored, reported and audited to confirm that commitments are met.

These comprehensive TORs are not specific for any one kind of mining. They can be applied to sand and gravel, quarries, and other type of construction material mining operations; however, depending on the specifics of the operation some subsections may not be relevant and some details may have to be changed. For instance, if the EIA is for mineral extraction in rivers and other water bodies (i.e., a dredging operation), emphasis would be placed on the hydraulic impacts to the river system, potential changes in sediment transport of the rivers, and the cumulative impacts if other operations are within the same watershed.

Finally, a key part of the TOR is obtaining a legally binding commitment from the project proponent that the approved EIA will be implemented as presented. Such a commitment adds to the legal enforceability of the outcomes of the EIA process.

B. EXPLORATION

0 Table of Contents

A general Table of Contents for the Environmental Impact Assessment (EIA) shall be provided, organized in such a manner as to facilitate the use of the EIA by reviewers and project implementers. Larger projects should have a more detailed Table of Contents than those for smaller projects. At a minimum, the Table of Contents shall include the following:

- Acronyms and Abbreviations
- Executive Summary
- General Information
 - Objectives and Justification (purpose and need)
 - Project Proponents
 - Project Team
 - Legal and Regulatory Framework
- Project Description
- Other Project Alternatives
- Environmental Setting:
 - Physical Environment
 - Geologic Resources
 - Soil Resources
 - Surface Water and Groundwater Resources
 - Air Resources
 - Noise and Vibration
 - Biological Environment
 - Vegetation/Flora
 - Fish and Wildlife/Fauna
 - Ecosystems: Terrestrial, Wetlands, Aquatic, Marine
 - Endangered or Threatened Species and Habitat
 - Protected Areas
 - Social-Economic-Cultural Environment
 - Socio-Economic Conditions
 - Infrastructure (i.e. for Public Health, Transportation Systems, Communications and Energy)
 - Land Use (actual and potential)
 - Cultural, Archeological, Ceremonial and Historic
- Assessment of Impacts to Resources Described in Environmental Setting
- Mitigation and Monitoring Measures
- Environmental Management Plan
 - Overall Environmental Management Plan Organization and Policy
 - Project-wide Mitigation Plan
 - Project-wide Monitoring Plan
 - Management Plan for Other On or Off-Site Pollution Control and Infrastructure
 - Contingency Plans for each phase:
 - Performance-related Contingency Plan
 - Natural Disaster Risk Response Plan
 - Other Risk Response Plan
- Signed Commitment Statement
- Annexes
 - Public Consultation
 - Public Consultation Plan
 - Summary of Public Outreach Activities
 - Summary of Response to Comments
 - Copies of Written Comments Submitted
 - Technical Supporting Materials:
 - Maps and Plans, in the sequence mentioned in the EIA document
 - Charts and Figures
 - Details about predictive modeling used, calculations and assumptions
 - Special Studies
 - References

1 Acronyms and Abbreviations

All acronyms and abbreviations used in the EIA must be clearly and succinctly defined and described in this section. This will relieve the reader of the need to search for the first occurrence of a word and the citing of the acronym or abbreviation in the text.

2 Executive Summary

A general summary of the EIA shall be provided in this section. The summary shall be written using a vocabulary that can be easily understood by the public. It shall include at least the following information about the project from the EIA:

- Objectives and Justification (purpose and need)
- Location
- Project Proponents
- Project Description
- Environmental Setting
- Evaluation of Impacts
- Mitigation Measures
- Environmental Management Plan (including the mitigation, monitoring and contingency plans)

3 General Information

3.1 Objectives of and Justification for the Proposed Project

- 3.1.1 Objectives: A statement of the general and specific objectives (purpose) of the proposed project
- 3.1.2 Justification for the Project: Provide a justification for the proposed project (need) highlighting the benefits to surrounding communities and economic development of the region and country.

3.2 Project Proponents

Information on the following:

- 3.2.1 Names, addresses, telephone numbers, and applicable legal documentation of proponents (include identification of those financing, developing, operating and investing in the mine; summary of all legal documents presenting the legal bases for the project proponents)
- 3.2.2 Names and contact information for responsible parties within the organization
- 3.2.3 Financial viability of the company (including a certified banking statement indicating that the company is financially stable and reputable)
- 3.2.4 Bonding requirements and proof of ability to meet bonding requirements sufficient to cover the anticipated costs of environmental management during exploration, as well as the costs, by a third party, of closure and long-term post-closure liabilities associated with exploration

3.3 Project Team

This section shall provide information on the multidisciplinary team that prepares the EIA. The types of professionals included in the team shall be appropriate to the type of project and the type of environment in which the project is located and may include (but not be limited to) engineers, architects, biologists, geologist, hydrologists, air quality experts, archeologists, anthropologists, sociologists and economists. The information provided for each member of the EIA project team includes the following:

- 3.3.1 Name, address and registry number of contractors
- 3.3.2 Names, contact information, qualifications and registry numbers of key personnel involved in the study; as well an affidavit indicating their area of participation.
- 3.3.3 List of professionals/experts participating in the EIA, their areas of expertise, degrees, experience, professional registrations and stamps, seals and signatures.

3.4 Legal and Regulatory Framework

This section of the EIA shall define the legal framework under which the EIA is being completed listing and summarizing requirements or alternatives used as benchmarks, and evidence of non-applicability or compliance, including:

- 3.4.1 **Mining lease:** Information that demonstrates rights and access:
 - 3.4.1.1 Ownership with written authorization
 - 3.4.1.2 Governmental authorization (if required)
 - 3.4.1.3 Period of exploration lease/permit
 - 3.4.1.4 If the lease/permit area/buffer zone is ecologically fragile, a clear justification for not opting for other reserve
 - 3.4.1.5 Maps showing the exploration lease/permit area

C. Project and
Alternatives
Description

G.6 Financial
Assurance
Appendix H World
Bank Financial
Surety

Appendix C.
Requirements and
Standards

- 3.4.2 Applicable environmental standards, norms and requirements set forth at the international, national, regional and/or local levels
- 3.4.3 In the absence of such standards, identify a set of benchmarks used in the analysis
- 3.4.4 Required regulatory approvals and/or permits *For all stages and their status*
- 3.4.5 Applicable land use requirements (demonstrate conformity and compliance with applicable plans).
- 3.4.6 Applicable natural resource management or protected area management measures (demonstrate conformity and compliance with all applicable plans)

4 Project and Alternatives Description

This section shall provide the information on the site location, physical description, and site and project details, as identified in subsections 4.1 through 4.4.

4.1 Location

The general location of the exploration activities in terms of:

- 4.1.1 Political-administrative location (region, district, town or other relevant political-administrative units) with accompanying location map
- 4.1.2 Means of site access – i.e., by air, river, road, train or vehicle)
- 4.1.3 Latitude and longitude of concession corners
- 4.1.4 Maps of concession at a scale of no less than 1:50,000 or as required by the regulatory agency

4.2 Physical Description

The following general information for the location should be provided in narrative form as well as in maps with details left for section 5 Environmental Setting:

- 4.2.1 Concession boundaries
- 4.2.2 General geology and topography
- 4.2.3 Type of ore body
- 4.2.4 Results of previous surficial and geophysical surveys
- 4.2.5 Vegetative cover
- 4.2.6 Principal watersheds
- 4.2.7 Water bodies
- 4.2.8 Roads and landmarks

4.3 Project Details

Specific project details shall include:

- 4.3.1 **General Description**
 - 4.3.1.1 Overview of all proposed activities and their relationship
 - 4.3.1.2 Timeline of all exploration activities from startup through closure/rehabilitation
 - 4.3.1.3 Waste Rock, stockpiles and tailings impoundments
- 4.3.2 **Access Roads**
 - 4.3.2.1 Identify all existing roads to be used
 - 4.3.2.2 Operations plan with traffic volume, operating speeds and trip times
 - 4.3.2.3 Detailed information on any roads to be constructed
 - Timing of construction
 - Road surface and shoulder width and barriers
 - Grade
 - Construction methods including clearing and grubbing
 - Construction materials (if waste rock will be used, include geochemical specifications it must meet)
 - Compaction
 - Stream crossings and associated designs
 - Sedimentation and erosion prevention structures and practices
 - Stabilization methods for cuts and fills
 - Wildlife crossings
 - Typical elevations for each type and situation of road displaying construction materials, levels of compaction and erosion and sedimentation features
 - Borrow pits
 - Location and size (area and volume of material)
 - Operation
 - Sedimentation and erosion controls
 - Closure plan
 - Operations plan with traffic volume, operating speeds and trip times
 - 4.3.2.4 Dust control measures for construction and operation

C.3 Project
Description

C.3 Project
Description

D.10 Transportation
C.7.1 Roads

- 4.3.2.5 Maintenance
- 4.3.2.6 Roster for construction and maintenance equipment, specifying type and quantity by size, motor size, and fuel requirements
- 4.3.3 **Exploration Infrastructure**
Details for each type of infrastructure included in the General Description of exploration activities, which may include the following:
- 4.3.3.1 Drill Pads
- Location
 - Area to be disturbed (per location and cumulative)
 - Construction methods including clearing and grubbing
 - Construction materials
 - Type of equipment to be used
 - Drilling waste handling and disposal methodology
- 4.3.3.2 Test Pits or Tunnels
- Location
 - Area to be disturbed (per location and cumulative)
 - Construction methods including clearing and grubbing
 - Construction and reinforcement materials
 - Type of equipment to be used
 - Waste rock handling and disposal methodology
- 4.3.3.3 Small-scale Test Mine
- Location
 - Area to be disturbed (per location and cumulative)
 - Construction methods including clearing and grubbing
 - Type of mining
 - Type of equipment to be used
 - Mining plan
 - Waste rock handling and disposal methodology
- 4.3.3.4 Staging Areas (location, size and design of each of the following, where applicable)
- Offices and housing
 - Warehouses and equipment yards
 - Support facilities
 - Fueling stations
 - Water and wastewater
 - Solid waste facilities especially plans for waste rock, stockpiles and/or tailings impoundments
- 4.3.3.5 Energy requirements and sources
- 4.3.3.6 Water
- Requirements (m3/day)
 - Rights
 - Sources
- 4.3.3.7 Solid Waste Management
- 4.3.4 **Restoration/Closure Plan**
Details for restoration and closure of the following:
- 4.3.4.1 Access roads
- 4.3.4.2 Exploration infrastructure
- 4.3.4.3 Land surfaces, where applicable
- 4.3.4.4 Plan for recovery of vegetative cover
- 4.3.5 **Number of Personnel to be Used (including plans to hire local contractors and labor)**

5 Environmental Setting

Based on information available from the literature, government and other special studies or sources, the EIA shall provide information on environmental setting for the different types of physical, biological and socio-economic-cultural resources as outlined above in the Table of Contents for the current situation, important trends and predicted situation in the absence of the proposed exploration project. Sources of data must be provided when and where data is used.

6 Assessment of Impacts

The EIA shall provide information on potential impacts (direct, indirect and cumulative), and the magnitude and frequency of potential impacts on resources.

**C.3 Mining Method
Appendix A: What is
Mining?**

**C.5 Stockpiles, Dumps
and Tailings**

**C.9 Mine Support
Facilities**

**C.10 Restoration and
Closure Plan**

**D. Environmental
Setting**

**Table E-1
E. Potential Impacts
F. Assessing Impacts**

Using standardized predictive methods, such as models, determine the specific range of environmental and socio-economic resources. Critical data input from project description and environmental setting analysis projecting the conditions in the environmental setting in the absence of the proposed project shall be used as the baseline upon which potential impacts are forecast.

7 Mitigation and Monitoring Measures

For all adverse impacts, the EIA shall identify measures and alternatives to avoid or reduce impacts and monitor results at a level of detail sufficient to demonstrate its effectiveness in addressing the concern or performance criterion. In those cases in which predicted impacts would exceed a national or international standard or criteria, the EIA shall propose specific mitigation and monitoring measures to assure that these standards or criteria are not exceeded throughout the life of the mine.

8 Environmental Management Plan

The EIA shall include an Environmental Management Plan to prevent, mitigate and monitor adverse impacts identified in the EIA either individually or in relevant groupings. Plans will describe actions to be taken in sufficient detail to provide a basis for subsequent auditing of compliance with commitments made in the EIA process including who is responsible, how and when it will be implemented, what will be done and what results will be achieved, why it is being done, and how to know whether it is effective in addressing the underlying concerns. The environmental management plan shall have the following elements:

8.1 Project-wide mitigation plan (see Section 9). It has two elements:

8.1.1 Environmental resource mitigation (such as air, water)

8.1.2 Socio-economic-cultural mitigation (relocation, etc.)

8.2 Project-wide monitoring plan (usually specific to monitoring of surface and ground water)

8.3 Contingency plans (if monitoring demonstrates that performance measures are not being met).

9 Signed Commitment Statement

The EIA shall contain a legally binding signed letter of commitment to meeting the terms of the EIA. The statement will be signed by the authorized representative of the proponent company with assurance that all financial surety measures as required by the regulatory agency have been met.

10 Annexes

Annexes should be numbered and duly referenced in the text.

10.1 Public Consultation

10.1.1 Public consultation plan

10.1.2 A summary of public outreach activities

10.1.3 A summary of response to comments

10.1.4 Actual copies of written comments

10.2 Technical Supporting Documents

10.2.1 Include maps, plans, charts and figures in the sequence mentioned in the EIA document.

10.2.2 Zoning maps with resources and results of impacts

10.2.3 Details of any predictive tools or models used and assumptions but too detailed for the body of the EIA

10.2.4 Special studies, if relevant but not readily accessible

10.3 References

10.3.1 Submit a list of all references, (books, articles, technical reports and other information sources) cited in the various chapters of the EIA study (full biographic references, and the following conventional procedures cited in the literature: author, year, title, source, number of pages, and city of publication or issuance.

G. Mitigation and Monitoring Measures

Table G-1

G.5 Monitoring and Oversight

H. Environmental Management Plan

B. EIA Process and Public Participation

C EXPLOITATION

0 Table of Contents

A general Table of Contents for the Environmental Impact Assessment (EIA) shall be provided. The Table of Contents should be organized in such a manner as to facilitate the use of the EIA by reviewers and project implementers. EIAs for larger projects should have a more detailed Table of Contents than those for smaller projects. At a minimum, the Table of Contents should include the following:

- Acronyms and Abbreviations
- Executive Summary
- General Information
 - Objectives and Justification (purpose and need)
 - Project Proponents
 - Project Team
 - Legal and Regulatory Framework
- Project and Alternatives Description
- Environmental Setting:
 - Physical Environment
 - Geologic Resources
 - Soil Resources
 - Surface Water and Groundwater Resources
 - Air Resources
 - Noise and Vibration
 - Biological Environment
 - Vegetation/Flora
 - Fish and Wildlife/Fauna
 - Ecosystems: Terrestrial, Wetlands, Aquatic, Marine
 - Endangered or Threatened Species and Habitat
 - Protected Areas
 - Social-Economic-Cultural Environment
 - Socio-Economic Conditions
 - Infrastructure (i.e. for Public Health, Transportation Systems, Communications and Energy)
 - Land Use (Actual and Potential)
 - Cultural, Archeological, Ceremonial and Historic
- Assessment of Impacts to Resources Described in Environmental Setting
- Mitigation and Monitoring Measures
- Environmental Management Plan
 - Overall Environmental Management Plan Organization and Policy
 - Project-wide Mitigation Plan
 - Project-wide Monitoring Plan
 - Management Plan for Other On or Off-Site Pollution Control and Infrastructure
 - Contingency Plans for each phase:
 - Performance-related Contingency Plan
 - Natural Disaster Risk Response Plan
 - Other Risk Response Plan
- Signed Commitment Statement
- Annexes
 - Public Consultation
 - Public Consultation Plan
 - Summary of Public Outreach Activities
 - Summary of Response to Comments
 - Copies of Written Comments Submitted
 - Technical Supporting Materials:
 - Maps and Plans, in the sequence mentioned in the EIA document
 - Charts and Figures
 - Details about predictive modeling used, calculations and assumptions
 - Special Studies
 - References

1 Acronyms and Abbreviations

All acronyms and abbreviations used in the EIA must be clearly and succinctly defined and described in this section. This will relieve the reader of the need to search for the first occurrence of a word and the citing of the acronym or abbreviation in the text.

2 Executive Summary

A general summary of the EIA shall be provided in this section. The summary shall be written using a vocabulary that can be easily understood by the public. It shall include at least the following information about the project from the EIA:

- Objectives and Justification (purpose and need)
- Location
- Project Proponents
- Project Description
- Other Project Alternatives
- Environmental Setting
- Evaluation of Impacts
- Mitigation Measures
- Environmental Management Plan (including the mitigation, monitoring and contingency plans)

3 General Information

3.1 Objectives of and Justification for the Proposed Project

- 3.1.1 **Objectives:** A statement of the general and specific objectives (purpose) of the proposed project, including whether it is a new project, an expansion of an existing project (e.g., increase in mine land area or increase in annual production) or modernization of an existing operation. This section also should identify the proposed use of minerals by the proponent (sale as raw material, sale as processed material, use as intermediates in production of a final product, etc.)
- 3.1.2 **Justification for the Project:** Provide a justification for the proposed project (need) highlighting the benefits to surrounding communities and economic development of the region and country.

3.2 Project Proponents

Information on the following:

- 3.2.1 Names, addresses, telephone numbers, and applicable legal documentation of proponents (include identification of those financing, developing, operating and investing in the mine; summary of all legal documents presenting the legal bases for the project proponents)
- 3.2.2 Names and contact information for responsible parties within the organization
- 3.2.3 Financial viability of the company (including a certified banking statement indicating that the company is financially stable and reputable)
- 3.2.4 Bonding requirements and proof of ability to meet bonding requirements sufficient to cover the anticipated costs of environmental management during exploration, as well as the costs, by a third party, of closure and long-term post-closure liabilities associated with exploration

3.3 Project Team

This section shall provide information on the multidisciplinary team that prepares the EIA. The types of professionals included in the team shall be appropriate to the type of project and the type of environment in which the project is located and may include (but not be limited to) engineers, architects, biologists, geologist, hydrologists, air quality experts, archeologists, anthropologists, sociologists and economists. The information provided for each member of the EIA project team includes the following:

- 3.3.1 Name, address and registry number of contractors
- 3.3.2 Names, contact information, qualifications and registry numbers of key personnel involved in the study; as well an affidavit indicating their area of participation.
- 3.3.3 List of professionals/experts participating in the EIA, their areas of expertise, degrees, experience, professional registrations and stamps, seals and signatures.

3.4 Legal and Regulatory Framework

This section of the EIA shall define the legal framework under which the EIA is being completed listing and summarizing requirements or alternatives used as benchmarks, and evidence of non-applicability or compliance, including:

- 3.4.1 **Mining lease:** Information that demonstrates rights and access:
- 3.4.1.1 Ownership with written authorization

C. Project and
Alternatives
Description

G.6 Financial
Assurance
Table G-8
Appendix H.
World Bank
Financial Surety

Appendix C
Requirements and
Standards

- 3.4.1.2 Governmental authorization (if required)
- 3.4.1.3 Period of exploration lease/permit
- 3.4.1.4 If the lease/permit area/buffer zone is ecologically fragile, a clear justification for not opting for other reserve
- 3.4.1.5 Maps showing the exploration lease/permit area
- 3.4.2 **Mineral Reserve:** Present a discussion of mineral ownership, proven mineral reserve, rated capacity and life of the mining operation.
- 3.4.3 Applicable environmental standards, norms and requirements set forth at the international, national, regional and/or local levels
- 3.4.4 In the absence of such standards, identify a set of benchmarks used in the analysis
- 3.4.5 Required regulatory approvals and/or permits *For all stages and their status*
- 3.4.6 Applicable land use requirements (demonstrate conformity and compliance with applicable plans).
- 3.4.7 Applicable natural resource management or protected area management measures (demonstrate conformity and compliance with all applicable plans)

4 Project and Alternatives Description

The project proponent shall submit a full description and locations of the proposed project and reasonable alternatives including ancillary operations such as the camp/ housing for construction and operation phases, quarry or pit areas, crushing, transport, sanitary services, waste disposal and transportation infrastructure. etc. as addressed through 4.1-4.5 below. It should include at a minimum:

4.1 Location

The general location of the exploration activities in terms of:

- 4.1.1 Political-administrative location (region, district, town or other relevant political-administrative units) with accompanying location map
- 4.1.2 Means of site access – i.e., by air, river, road, train or vehicle)
- 4.1.3 Latitude and longitude of concession corners
- 4.1.4 Maps of concession at a scale of no less than 1:50,000 or as required by the regulatory agency

4.2 Summary of Proposed Project and Alternatives

All project alternatives that are reasonable and feasible and meet the purpose and need for the proposed project shall be identified, summarized in this section, and evaluated in the EIA. In addition to the proposed project, such alternatives include, alternative locations, alternative site configuration of elements of the project, alternative size and output capacity, and alternative plans for construction, operation and closure of the mine including best practices that may avoid and/or reduce the adverse environmental or socio-economic-cultural impacts.

4.3 Project Details

The EIA shall provide specific project details for the proposed project and each alternative as identified in subsections 4.5.1 through 4.5.10. The level of detail presented should be the same for the proposed project and each alternative evaluated. The following project details shall be provided for each alternative:

4.3.1 General

- 4.3.1.1 Type (open pit, underground or both, mineral extraction in rivers and other water bodies [i.e., dredging]) and method of mining (manual, semi-mechanized or mechanized)
- 4.3.1.2 A description of each process step
- 4.3.1.3 Site drawing (digitized) showing project layout of all project components and their relationship to each other
- 4.3.1.4 Flow charts showing the path of all inputs and outputs from ore removal through collection, transportation, beneficiation and other processing, and load-out and delivery, including the flow of waste material from generation through treatment and disposal
- 4.3.1.5 Summary table showing the type, quantity and size of each component
- 4.3.1.6 Construction sequence for all project components
- 4.3.1.7 Production information
 - Types and quantities of ore that will be extracted and processed during different phases of the project
 - Estimated quantities of final products to be produced, by product type and in grams, kilograms or tonnes (as appropriate to the mineral)
 - Estimated quantities of overburden, waste rock and spoil to be disposed during different phases of the project
- 4.3.1.8 Transport of mineral and other materials outside mining lease area
 - Type of transport (road, rail, conveyor, rope way, waterway, pipeline, etc.)
 - Map with the program for road construction

C Project and
Alternatives
Description

C.4 Project
Alternatives

- Estimated quantities by year:
 - Ore
 - Waste Material
 - 4.3.1.9 Operation information
 - Number and type of employees (by local hire and non-local hire)
 - Days per week
 - Hours per day
 - Shifts per day
 - 4.3.1.10 Overall energy requirements and sources
 - 4.3.1.11 Overall water needs
 - Requirements (m3/day)
 - Rights
 - Sources
 - 4.3.1.12 Overall volume of wastewater treatment and/or discharges from:
 - Mining (dewatering)
 - Processing
 - Domestic wastewater (camp and support facilities)
 - 4.3.1.13 Overall volume of waste rock and tailings
- In addition to these general requirements, the following information is required for applicable components of the project:*
- 4.3.2 **Open Pit Mining**
If the mine is to be open-pit (quarry, borrow pit, etc.) this section should contain a Mining Plan explaining how mining shall be done on a year by year basis for the first five years of mine life with conceptual plans for remainder of mine life. The plan should contain the following:
- 4.3.2.1 Mine Design
 - Stripping ratio (relation of tonnes of waste rock to mineral)
 - Thickness and amount (in m3) of top soil
 - Thickness of overburden (minimum, maximum and average)
 - Benches
 - For overburden and ore
 - Sizes (height and width)
 - By year
 - Slopes (stability, angles and lengths)
 - Area and depth by year (table and map)
 - Schedule for execution of mining activities
 - Typical Pit Cross Section (showing stripping/benching)
 - Transport/access ramps and in-mine roads
 - Pit backfilling sequences
 - Lighting if nighttime operations are proposed (including source of energy)
 - 4.3.2.2 Clearing and Grubbing
 - Area by year
 - Methods
 - Topsoil stockpiling
 - Disposal or salvaging of debris
 - 4.3.2.3 Excavation
 - Methods
 - Blasting plan and schedule
 - 4.3.2.4 Transportation of material within the mine area
 - Type
 - In-mine (ramps, conveyors, etc.)
 - For ore from the mine to the processing area
 - For wastes from the mine or processing area to disposal
 - Estimated quantities by year:
 - Ore
 - Waste Material
 - 4.3.2.5 Water and Dewatering
 - Water supply (needs, quantity, source, treatment, storage and transport)
 - Dewatering (how, how often, how much, predicted cone of depression, transport, treatment, and disposal)
 - 4.3.2.6 Run-on and runoff channels, erosion and sediment control structures, overflow ponds, and discharge outfalls (designs and map with locations)

**C.9 Mine Support
Facilities
Appendix A. What is
Mining?**

**C.7 Transportation
Facilities**

**C.8 Water Control
Facilities
Appendix D: Erosion
and Sedimentation
Control**

- 4.3.2.7 Equipment Roster, specifying type and quantity by: size, motor size, and fuel requirements for each activity:
- Clearing and grubbing
 - Excavation
 - Hauling
 - Vehicles (plus average trips per day)
 - In-pit conveyors
 - Personnel transport
 - Dewatering
 - Dust control
 - Power generation
- 4.3.2.8 Onsite Support Facilities – location and design information for the following:
- Offices including toilet facilities
 - Storage
 - Machinery housing
 - Repair shops
 - Fuel stations
- 4.3.3 **Underground Mines**
- If underground mining will be used this section should contain a Mining Plan explaining how mining shall be done on a year by year basis for the first five years of mine life with conceptual plans for remainder of mine life. The plan shall contain the following:*
- 4.3.3.1 Mine Design
- Detailed descriptions of method
 - Stopping
 - Cut and fill
 - Room and pillar
 - Block caving
 - Location of the shafts (primary and secondary)
 - Map showing tunnel extensions by year
 - Roof support
- 4.3.3.1 Clearing and Grubbing
- Area by year
 - Methods
 - Topsoil stockpiling
 - Disposal or salvaging of debris
- 4.3.3.2 Excavation
- Methods
 - Blasting plan and schedule
- 4.3.3.3 Hauling in the mine area
- Type of conveyance systems
 - In-mine
 - For ore from mine to processing
 - For waste rock from mine or processing to disposal
 - Estimated quantities by year:
 - Ore
 - Waste rock
- 4.3.3.4 Water and Dewatering
- Water supply (needs, quantity, source, treatment, storage and transport)
 - Dewatering (how, how often, how much, predicted cone of depression, transport, treatment, and disposal)
- 4.3.3.5 Equipment Roster, specifying type and quantity by: size, motor size, and fuel requirements for each activity:
- Clearing and grubbing
 - Excavation
 - Hauling
 - Vehicles (plus average trips per day)
 - In-mine conveyors
 - Lifts
 - Personnel transport
 - To mine entrance
 - Inside mine
 - Dewatering
 - Dust control

C.3 Project Description

C.9 Mine Support Facilities

Appendix A. What is Mining?

C.7 Transportation Facilities

C.8 Water-Control Facilities

- Ventilation
- Power generation
- Compressed air
- 4.3.3.6 Onsite Support Facilities – location and design information for the following:
 - Offices including toilet facilities
 - Storage
 - Machinery housing
 - Repair shops
 - Fuel stations
- 4.3.4 **Dredging (where authorized by national legislation)**

If mineral extraction in rivers and other water bodies (i.e., dredging) will be used this section should contain a Dredging Plan explaining how dredging shall be done on a year by year basis for the first five years of mine life with conceptual plans for remainder of mine life. The plan should contain the following:

 - 4.3.4.1 Legal authorization for the dredging
 - 4.3.4.2 Name of river to be exploited
 - 4.3.4.3 Size of the static and dynamic reserve of material
 - 4.3.4.4 Dimensions of area to be exploited
 - Map showing extent of dredging operations
 - Longitudinal and transversal cross-sections of the river to be dredged
 - 4.3.4.5 Operation Description
 - Operational hours – daily, weekly and seasonal operating frequencies
 - Average upstream extraction movement
 - Time table of advancement on the river
 - Time necessary to extract minerals in the entire area
 - Procedures to be used when woody debris and fallen trees are encountered
 - Status of operation
 - 4.3.4.6 River or shoreline access
 - Timing and extent of clearing, grubbing and other disturbance
 - Stream crossings (design and materials)
 - Runoff, erosion and sedimentation control
 - 4.3.4.7 River diversions and flood control – including instream berms
 - 4.3.4.8 Hauling within the area of exploitation
 - Type of conveyance
 - From dredging to processing
 - For spoil material, from processing to disposal
 - Estimated quantities by year:
 - Ore
 - Spoil material
 - 4.3.4.9 Proximity to other operators
 - 4.3.4.10 Equipment Roster, specifying type and quantity by: size, motor size, and fuel requirements for each activity:
 - Clearing and grubbing
 - Dredging
 - Hauling Vehicles (plus average trips per day)
 - Personnel transport
 - 4.3.4.11 Onsite Support Facilities – location and design information for the following:
 - Offices including toilet facilities
 - Storage
 - Machinery housing
 - Repair shops
 - Fuel stations
- 4.3.5 **Stockpiles, Rock Waste and Tailings**
 - 4.3.5.1 Location, heights and areas (hectares) of all stockpiles and rock waste dumps
 - 4.3.5.2 Specifications for liner, slopes and benches
 - 4.3.5.3 Clearing and grubbing
 - 4.3.5.4 Disposal of debris from clearing and grubbing
 - 4.3.5.5 Chemical and physical characterization of materials to be deposited in dumps, piles or in tailings impoundments
 - 4.3.5.6 Engineering design of structures
 - Foundations and drainage structures

C.4.3 Dredging

**C.6 Stockpiles,
Dumps and
tailings
D.3 Waste rock,
Wall Rock and
Ore
Characteristics**

- Dimensions, volume and slopes by year
- Acid drainage and leachate controls
- Stability analysis
- 4.3.5.7 Transport ramps onto structures
- 4.3.5.8 Erosion, runoff and sediment control structures (locations and designs)
- 4.3.5.9 Dust control measures and, if applicable, rates of application
- 4.3.5.10 Equipment roster specifying type and quantity by: size, motor size, and fuel requirements for each type of equipment
- 4.3.6 **Processing Facilities**
 - 4.3.6.1 Types and locations of each processing facility
 - Brief description of the processing plants
 - Schematic of processing including means of transport between steps
 - Process specific flow charts with details for ore, other inputs and waste flows
 - 4.3.6.2 Design of each processing unit
 - Facility schematics (showing locations and sizes of component parts)
 - Area to be temporarily disturbed during construction and occupied by the facility
 - Clearing and grubbing, including disposal of debris
 - Construction activities, including timing
 - Volumes of ore to be treated per unit of time (e.g., tonnes per day)
 - Volumes of waste (solid and liquid) to be generated per unit of time (e.g., tonnes per day)
 - Equipment roster specifying type and quantity by: size, motor size, and fuel requirements for each type of equipment (including power generation equipment)
 - Water use requirements
 - Wastewater treatment facilities
 - Air emission controls
 - Dust control (construction and operation)
 - Noise control
 - 4.3.6.3 Onsite Support Facilities – location and design information for the following:
 - Offices including toilet facilities
 - Laboratories
 - Power generation
 - Storage
 - Machinery housing
 - Repair shops
 - Fuel stations
 - Sanitary facilities
- 4.3.7 **Mining Camp**

Description of the camp including but not limited to:

 - 4.3.7.1 A map showing all facilities at a legible scale appropriate to the size of the project
 - Buildings by type (use) and size
 - Roads
 - Electrical transmission lines and/or substation
 - Drainage
 - 4.3.7.2 Transition from construction camp to final mine camp
 - 4.3.7.3 Water supply and distribution
 - Distribution system
 - Use (m3/day)
 - Rights
 - Sources
 - 4.3.7.4 Waste handling and disposal components
 - Sewers
 - Wastewater treatment
 - Solid waste facilities
 - 4.3.7.5 Energy generation and use requirements

C.3 Project Description
C.9 Mine Support Facilities

Appendix A. What is Mining?

4.3.8 Roads

- 4.3.8.1 Identify all existing roads to be used
Traffic volume, operating speeds and trip times
- 4.3.8.2 Detailed information on any roads to be constructed
 - Timing of construction
 - Road surface and shoulder width and barriers
 - Grade
 - Construction methods including clearing and grubbing
 - Construction materials (if waste rock will be used, include geochemical specifications it must meet)
 - Compaction
 - Stream crossings and associated designs
 - Animal crossings
 - Sedimentation and erosion prevention structures and practices
 - Stabilization methods for cuts and fills
 - Typical elevations for each type and situation of road displaying construction materials, levels of compaction and erosion and sedimentation features
 - Borrow pits
 - Location and size (area and volume of material)
 - Operation
 - Sedimentation and erosion controls
 - Closure plan
 - Traffic volume, operating speeds and trip times
- 4.3.8.3 Dust control for construction and operation
- 4.3.8.4 Maintenance
- 4.3.8.5 Roster for construction and maintenance equipment, specifying type and quantity by size, motor size, and fuel requirements
- 4.3.8.6 Opening of roads

4.3.9 Other transport systems (if applicable)

- 4.3.9.1 Rail transport – Same as for Roads with the addition of:
 - Tightest curves
 - Track construction materials
 - Turnouts and sidings
 - Railroad communications and signaling
- 4.3.9.2 Waterways
 - Location, design, construction and operation of loading docks
 - Rosters of boats used to move barges, specifying type and quantity by: size, motor size, and fuel requirements
 - Maintenance
- 4.3.9.3 Overland conveyors
 - Location, design, construction and operation of conveyors
 - Stream and road crossing designs to prevent falling debris
 - Dust control for construction and operation
 - Maintenance

4.3.10 Restoration and Closure Plan

The project description shall include a Restoration and Closure Plan with a description of restoration measures including the size of the area to be restored as well as concurrent, temporary and final restoration measures to be used and their schedule. Restoration and closure measures shall include, but not be limited to, the following types of structures:

- 4.3.10.1 Pits
- 4.3.10.2 Underground workings
- 4.3.10.3 Waste rock dumps
- 4.3.10.4 Tailings impoundments
- 4.3.10.5 Heap leach pads
- 4.3.10.6 Final disposal of hazardous and radioactive wastes
- 4.3.10.7 Stockpiles
- 4.3.10.8 Solid waste disposal facilities
- 4.3.10.9 Facilities
- 4.3.10.10 Roads
- 4.3.10.11 Electrical structures
- 4.3.10.12 Water conveyance and treatment structures

D.10 Transportation C.6.1 Roads

C.7.2 Transportation by Rail

C.7.4 Barges and Waterways

C.7.3 Conveyors

C.10 Restoration Plan

For each type of structure restoration measures should include:

- 4.3.10.13 The size of the area to be restored
- 4.3.10.14 Timing and schedule for restoration
- 4.3.10.15 Equipment and structure removal or conversion (as applicable)
- 4.3.10.16 Closure, capping and contouring (drainage) and integration to landscape
- 4.3.10.17 Revegetation measures including species, establishment and maintenance
 - Endemic species types and their interaction
 - Amount of seed or plants per hectare
 - Specifications (e.g., certified weed free)
 - Success indicators
 - Contingency measures if initial efforts are unsuccessful
- 4.3.10.18 Quantity, quality and source of soil needed for restoration
- 4.3.10.19 Erosion control structures
- 4.3.10.20 Slope stability (where necessary)

5 Environmental Setting

Based on information available from the literature, government, preliminary exploration activities (geophysical surveys, prospecting, etc.) and special studies or other sources, the EIA shall provide information on environmental setting for the physical, biological, and socio-economic-cultural environments through narrative, maps and tables for the current situation, important trends and predicted situation in the absence of the proposed project. Sources of data must be provided when and where data is used. This shall include the following information:

Physical Environment:

5.1 Geologic Resources

The EIA shall include a description of the following:

- 5.1.1 Cross Sections of the geology including soil horizons
 - 5.1.1.1 Geologic characteristics at locations for waste rock storage
- 5.1.2 Topography and slope conditions and geomorphology
- 5.1.3 Seismicity and stability characteristics
- 5.1.4 Geochemistry of ore, wall rock and waste rock
 - 5.1.4.1 Geochemical characterization
 - 5.1.4.2 Potential for acid rock drainage
 - Detailed description used to evaluate acid rock drainage (ARD) potential (all methodologies shall be based on internationally accepted methods as presented in the GARD Guide)
 - Acid drainage potential characterization
 - 5.1.4.3 Potential for leaching of radioactive materials
 - 5.1.4.4 Potential for leaching of toxic substances and heavy metals
- 5.1.5 Types of rock, mineralization and any structural deformation by local folding and faulting

5.2 Soil Resources

The EIA shall describe baseline soil resources using narrative, maps and tables in terms of the following:

- 5.2.1 Types and uses
- 5.2.2 Fertility
- 5.2.3 Potential uses of soils
- 5.2.4 Erosion potential
- 5.2.5 Quantity and quality available for revegetating and restoring the area of exploitation at end of mining
- 5.2.6 URP (productive unit of soil)

5.3 Water Resources

Baseline information shall be collected and following information shall be provided:

- 5.3.1 Surface water
 - 5.3.1.1 Location of all springs, streams, rivers, wetlands, lakes and reservoirs in and around project area (map)
 - 5.3.1.2 Inventories of consumptive and non-consumptive use
 - 5.3.1.3 Delineation of watersheds and water drainage pattern in the study area using cadastral/aerial/remote sensing satellite imageries (map)
 - Runoff characteristics of watersheds
 - 5.3.1.4 Surface water balance (existing withdrawal of surface water)
 - Existing uses by type and volume
 - Capacity

D. Environmental
Setting

D.2 Geology

D.3 Waste Rock, Wall
Rock and Ore
Characteristics
Appendix E
Guard Guide

D.4 Soils and Geology

D.5 Surface Water

- 5.3.1.5 Flow of streams and rivers (including seasonal fluctuations)
 - 2-, 10-, 25-, 50- and 100-year runoff events and associated floodplains for streams and rivers (mapped)
- 5.3.1.6 Seasonal fluctuations in area and volume of wetlands, lakes and reservoirs
- 5.3.2 **Groundwater**
 - 5.3.2.1 Hydrogeologic characteristics of the area (vadose zone and aquifers)
 - Flow regime
 - Flow direction
 - Influences of geologic structures (faults, contacts, bedrock fracturing, etc) and surface water bodies
 - 5.3.2.2 Location and characteristics of all existing springs and wells (on topographic map)
 - Flow/yield data for each spring and well (including water levels in wells)
 - Depth and construction information for each well
 - Existing uses by type and volume
 - Capacity available
 - 5.3.2.3 Groundwater recharge data
 - 5.3.2.4 Groundwater potential yield
 - Availability
 - Water table levels (dry and rainy season)
 - 5.3.2.5 Baseline modeling
 - Basis for model selection
 - Input requirements
 - Modeling results
- 5.3.3 **Water Quality**
 - 5.3.3.1 Existing water quality data
 - Locations of all water quality monitoring stations in and around the project area (with direction and distance from the site)
 - Water quality data for each station
 - Analysis of physical, chemical and biological water quality
 - 5.3.3.2 Supplemental sampling and analysis (Sampling and Analysis Program in annex)
 - Proposed locations of representative monitoring stations (upstream and downstream of proposed project activities)
 - Monitoring program design with at least a year of baseline data being collected
 - Parameters (including as appropriate, chemical, physical, heavy metals, radiological and biological)
 - Frequency of collection
 - Analytic methods
 - Water quality characterization
 - 5.3.3.3 Surface water and groundwater standards that apply to the project.
- 5.4 **Air and Climate**

Baseline information for air resources shall be collected for at least one year or as required by the regulatory agency and shall include at a minimum the following:

 - 5.4.1 **Climate and Meteorology**
 - 5.4.1.1 Source of data (meteorological station(s) from which climatological data have been obtained)
 - 5.4.1.2 Temperature variations
 - 5.4.1.3 Relative humidity
 - 5.4.1.4 Solar radiation and evaporation rates
 - 5.4.1.5 Rainfall (total precipitation, rainfall intensity, and duration by month)
 - 5.4.1.6 Statistical analysis of the data
 - 5.4.2 **Wind rose (Wind direction and speed, 24 hourly data)**
 - 5.4.3 **Air Quality Monitoring Data**
 - 5.4.3.1 Source of data (locations of monitoring stations, both upwind and downwind, with direction and distance from the project)
 - 5.4.3.2 Constituents sampled (representatives of potential emissions from the project such as SPM, RSPM, SO₂, NO_x, CO, Heavy Metals in SPM [Fe, Mn, Pb] and fugitive dust)
 - 5.4.3.3 Air quality characterization
- 5.5 **Noise and Vibration**

The EIA shall include a noise level study that details:

**D. Environmental
Setting
D.6 Groundwater**

**D.4 Soils and Geology
Appendix E GUARD
Guide**

D.7 Air

- 5.5.1 Location of monitoring Stations
- 5.5.2 Daytime and night time noise levels (measured in decibels)
- 5.5.3 Inventory of existing noise sources

Biologic Environment

5.6 Vegetation/Flora

- 5.6.1 Vegetative mapping
- 5.6.2 Species and structure (abundance, density, etc.)

5.7 Fish and Wildlife/Fauna

- 5.7.1 Species (including status, i.e. endemic, migratory, exotic, endangered, threatened, keystone, etc.)
- 5.7.2 Breeding areas
- 5.7.3 Wildlife mating and brooding seasons,
- 5.7.4 Fish spawning, timing and run
- 5.7.5 Migratory corridors (if applicable)

5.8 Ecosystems: Terrestrial, wetlands, aquatic, marine

5.9 Endangered species and habitats (Including sources of data)

5.10 Protected areas (the specific location and boundaries of relevant national parks, sanctuaries, reserves, etc.)

Socio-Economic-Cultural Environment

5.11 Socio-Economic Conditions

Identify nearby human settlements including the following information for each settlement:

- 5.11.1 Population (size, gender and age distribution)
- 5.11.2 Cultural characteristics (religion, ethnic composition, languages spoken, etc.)
- 5.11.3 Economic activities (employers, employment and incomes)
- 5.11.4 Tax base
- 5.11.5 Crime rates
- 5.11.6 Literacy rates
- 5.11.7 Community organizations
- 5.11.8 Public Health and Safety
 - 5.11.8.1 Level of emergency services and access to clinics, doctors, hospitals
 - 5.11.8.2 Diseases in the project area (including the sources of data and the methodology used to collect and analyze the data)
 - 5.11.8.3 Existing practice for assessment of occupational health
- 5.11.9 Skills, services and goods availability in the communities

5.12 Infrastructure

For each human settlement identified in subsection 5.12, describe the infrastructure in or serving the settlement, including the following information:

- 5.12.1 Transportation infrastructure
 - 5.12.1.1 Roads
 - This section of the EIA addresses baseline conditions of transportation and traffic patterns on existing roads. The EIA shall provide information on following:*
 - Location and condition of all existing roads, railroads, air strips, airports and pipelines
 - Surface materials
 - Erosion and sediment control
 - Maintenance programs (what, when and whom)
 - Description of anticipated third-party improvements (government or entity other than the proponent)
 - Traffic patterns and densities on roads within affected project vicinity
 - Safety levels and current circulation issues, and capacity
 - 5.12.1.2 Airports and airstrips
 - 5.12.1.3 Other transportation infrastructure as applicable, e.g. railroads, pipelines
- 5.12.2 Public health infrastructure
 - 5.12.2.1 Drinking water supplies and treatment
 - 5.12.2.2 Wastewater treatment and management
 - 5.12.2.3 Solid and hazardous waste management and treatment
- 5.12.3 Communications infrastructure

**D. Environmental
Setting
D.8 Ecosystems**

**D.12 Socio-economic
Conditions**

**D.10 Transportation
C.7.1 Roads**

- 5.12.3.1 Types of communications systems
- 5.12.3.2 Types of transmission (wired or wireless)
- 5.12.3.3 Locations of transmission lines (if applicable)
- 5.12.3.4 Locations of microwave towers and/or antennae (if applicable)
- 5.12.4 Energy infrastructure
 - 5.12.4.1 Types of energy
 - 5.12.4.2 Sources including location and description of generating facilities in the area of influence
 - 5.12.4.3 Transmission lines and/or pipelines
 - 5.12.4.4 Fuel storage facilities

5.13 Cultural, Archeological, Ceremonial and Historic and Resources

Identify all cultural, archaeological, ceremonial and historic resources within the area of influence, including the following information:

- 5.13.1 Data and maps relating to archeological, cultural, ceremonial, and historic sites in the direct vicinity of the project
- 5.13.2 Information on indigenous people or other traditional cultures, if any

5.14 Land Use

Describe actual and potential land use showing location, size and proximity within and surrounding the project area, including land use maps, and to extent possible, integrated into one map.

- 5.14.1 Population centers, including information and locations of
 - 5.14.1.1 Schools
 - 5.14.1.2 Cemeteries
 - 5.14.1.3 Churches
 - 5.14.1.4 Other public buildings
 - 5.14.1.5 Housing (including housing density)
 - 5.14.1.6 Commercial areas
- 5.14.2 Agricultural lands
- 5.14.3 Forested lands
- 5.14.4 Protected areas (including but not limited to)
 - 5.14.4.1 National parks
 - 5.14.4.2 Wildlife refuges
- 5.14.5 Wetlands
- 5.14.6 Other environmentally sensitive areas
- 5.14.7 Tourism and recreation areas
 - 5.14.7.1 Recreation facilities
 - 5.14.7.2 Eco-cultural-tourist locations
- 5.14.8 Indigenous peoples
 - 5.14.8.1 Settlements/communities
 - 5.14.8.2 Traditional use areas e.g. hunting and fishing areas
 - 5.14.8.3 Important vistas
- 5.14.9 Other culturally sensitive areas
- 5.14.10 Flood plains and water bodies
- 5.14.11 Coastal zones
- 5.14.12 Other land uses as appropriate

6 Assessment of Impacts

The EIA shall provide information on potential impacts (direct, indirect and cumulative), and both the magnitude and frequency of potential impacts on physical, biological, social-economic-cultural resources potentially resulting from the proposed project and alternatives. The assessment shall use standardized predictive methods, such as models, to determine the specific range of impacts on environmental and socio-economic resources. The EIA shall identify which impacts are significant and the criteria used to make this judgment. Critical data input from project description and environmental setting analysis projecting the conditions in the environmental setting in the absence of the proposed project shall be used as the baseline upon which potential impacts are forecast. The EIA shall also identify sources of data used in the analysis and the uncertainties associated with the outputs of each method used.

Physical Impacts

6.1 Geologic Resources

Potential impacts to geologic resources shall be described including but not limited to the following:

- 6.1.1 Landslide hazards
- 6.1.2 Dam failure
- 6.1.3 Subsidence prediction study
- 6.1.4 Changes in topography and drainage patterns

D.9 Cultural and
Historical Sites

D.11 Land Use

E. Potential Impacts
F. Assessing Impacts:
Predictive Tools
Tables E-1 to E-4
F.2.11 Cumulative
Impacts
F.1.5 Evaluation of the
Significance of the
Impacts

F.2.6 Soils and
Geology
Appendix D Erosion
and Sedimentation

6.1.5 (Impacts due to leaching or ARD should be addressed in the Water section)

6.2 Soil Resources

Potential impacts to land resources shall be described including but not limited to the following:

- 6.2.1 Soil quality
 - 6.2.1.1 Contamination by mining wastes (water and air bourn)
 - 6.2.1.2 Impacts on use
- 6.2.2 Erosion

6.3 Water Resources

Potential impacts to surface water and groundwater resources during mine construction, operation and post-closure shall be described including but not limited to the following:

- 6.3.1 **Geomorphology**
 - 6.3.1.1 Modification/diversion in the existing drainage pattern
 - 6.3.1.2 Downstream scouring and upstream head cutting
 - 6.3.1.3 Bank erosion (surface water discharges, stream crossings and dredging)
 - 6.3.1.4 Potential for increased flash flooding
- 6.3.2 **Quantity**
 - 6.3.2.1 Water bodies likely to be created due to mining activities
 - 6.3.2.2 Impact of water withdrawal, dewatering and mine operation on surface water and groundwater
 - Model results
 - Water table levels
 - Well production
 - Spring and stream flows
 - 6.3.2.3 Effects of dams on downstream seepage
- 6.3.3 **Quality**
 - 6.3.3.1 Water quality modeling (surface water and groundwater models)
 - Basis for model selection
 - Input requirements
 - Modeling results
 - Indicators of water quality
 - 6.3.3.2 Runoff, erosion and sedimentation from roads, disturbed areas, waste piles and stream crossings
 - Sources
 - Receiving waters
 - Concentrations
 - Physical parameters
 - Chemical parameters
 - Biological parameters
 - 6.3.3.3 ARD from mine and waste sites (if applicable)
 - Sources
 - Receiving waters
 - Concentrations
 - 6.3.3.4 Other leachates from mine, waste sites and landfills
 - Sources
 - Receiving waters
 - Concentrations
 - 6.3.3.5 Radioactive contamination (if applicable)
 - Sources
 - Receiving waters
 - Concentrations
 - 6.3.3.6 Discharges
 - Sources (e.g., dewatering, wastewater, storm water)
 - Receiving waters
 - Concentrations
 - Physical parameters
 - Chemical parameters
 - Biological parameters
 - 6.3.3.7 Spills and accidents
 - Chemical, hazardous waste and fuel spills
 - Overflows from ponds during storm events or electricity failures
 - Containment failures
 - Pit lake water quality at meaningful times after closure (e.g., while pit is filling, 100 years after closure, and at equilibrium)
 - Impact on surrounding groundwater

6.3 Air Resources

Potential impacts to air resources shall be described including but not limited to the following:

- 6.4.1 Air quality modeling

E.4.3 Soils
Appendix D
Erosion and
Sedimentation

E.4.1 Surface Water
and Groundwater
F.2.2 Surface Water
F.2.3 Groundwater

Appendix E: Acid Rock
Drainage

E.4.2 Air and Noise
F.2.1 Air Resources
Table F-1

- 6.4.1.1 Basis for model selection
- 6.4.1.2 Input requirements
- 6.4.1.3 Modeling results
- 6.4.2 Potential impacts on ambient air quality, including fumes, fugitive dust, and hazardous air pollutants (e.g., mercury)
 - 6.4.2.1 Sources (e.g., mining operations, processing facilities, fixed and mobile equipment emissions)
 - 6.4.2.2 Concentrations
- 6.4.3 Isopleth distribution
- 6.4.4 Tabular
 - 6.4.4.1 Receptors (e.g., communities, schools, water bodies, ecosystems)

6.5 Noise and Vibration

Potential impacts to noise shall be described including but not limited to the following:

- 6.5.1 Noise modeling
 - 6.5.1.1 Basis for model selection
 - 6.5.1.2 Input requirements
 - 6.5.1.3 Modeling results
- 6.5.2 Potential noise levels at different representative sites in the project area and in communities near the project area
- 6.5.3 Potential vibration due to blasting and movement of heavy equipment, and related damage to materials and structures

Biologic Impacts

Potential impacts to biological resources shall be described including but not limited to the following:

6.6 Vegetation/Flora

Alterations in vegetative cover due to:

- 6.6.1 Deforestation
- 6.6.2 Other vegetative type conversions
 - 6.6.2.1 Direct vegetative removal
 - 6.6.2.2 Indirect (e.g., poisoning by dust and air contaminants)
- 6.6.3 Wildfires
- 6.6.4 Increased road access in remote areas leading to destruction of existing vegetative cover (land use changes)

6.7 Fish and Wildlife/Fauna

- 6.7.1 Loss of habitat, migratory routes/corridors and breeding or spawning areas due to changes in vegetative cover/wetlands loss)
- 6.7.2 Disturbance of habitat, migratory routes/corridors and breeding/spawning grounds due to mining activities and human settlement associated with mining (e.g. noise, vibration, illumination, vehicular movement)
- 6.7.3 Loss or contamination of drinking water
- 6.7.4 Poisoning (e.g., air emissions, direct contact with toxic waste/substances)
- 6.7.5 Animals attracted to garbage and food waste at mine camps
- 6.7.6 Increased hunting
- 6.7.7 Off-road vehicle use
 - 6.7.7.1 Contaminated runoff
 - 6.7.7.2 Wastewater discharges
 - 6.7.7.3 Air emissions
 - 6.7.7.4 Changes in flow regimes
 - 6.7.7.5 Increased fishing

6.8 Ecosystems impacts

6.8.1 Terrestrial Ecosystems

6.8.2 Wetland Ecosystem

Destruction or modification due to:

- 6.8.2.1 Vegetative removal
- 6.8.2.2 Draining or filling of wetlands
- 6.8.2.3 Contaminated runoff
- 6.8.2.4 Wastewater discharges
- 6.8.2.5 Air emissions
- 6.8.2.6 Changes in flow regimes
- 6.8.2.7 Wildfire
- 6.8.2.8 Increased road access in remote areas leading to destruction/modification

6.8.3 Aquatic Ecosystems

Alterations in aquatic ecosystems (streams, rivers and lakes) due to:

**F.2.5 Noise
And Vibration**

**Tables E-1 to E-4
F.2.7 Biologic
Resources**

**E.4.4 Ecosystems
D.8 Ecosystems**

- 6.8.3.1 Contaminated runoff
- 6.8.3.2 Wastewater discharges
- 6.8.3.3 Air emissions
- 6.8.3.4 Changes in flow regimes
- 6.8.3.5 Changes in stream, river or lake morphology (e.g., from bank modifications, crossings, dredging)
- 6.8.4 **Endangered or threatened species or habitats** (particularly from cumulative impacts)
- 6.8.5 Biodiversity
- 6.8.6 Individual species (with special emphasis on rare, endemic and threatened species)
- 6.9 Protected Areas**
- Socio-Economic-Cultural Impacts**
- 6.10 Socio-economic Conditions and Resources**
- The EIA shall assess potential positive and negative impacts to socio-economic conditions and resources including but not limited to the following:*
- 6.10.1 Increased individual incomes
 - 6.10.1.1 Direct employment at the mine
 - 6.10.1.2 Indirect employment generated by mining activities
 - 6.10.1.3 Increased purchases from local businesses
 - 6.10.1.4 Other economic activities stimulated in the community as a result of the mine
- 6.10.2 Employment opportunities for local residents
- 6.10.3 Increased tax base
- 6.10.4 Resource royalties
- 6.10.5 Commitment to community development support from the mining company
- 6.10.6 Displacement and relocation of current residents or community resources
- 6.10.7 Displacement or disruption of people's livelihoods (e.g., fishing, hunting, grazing, farming, forestry and tourism)
- 6.10.8 Reduction in quality of life for residents from visual and noise impacts
- 6.10.9 Increased crime (drugs, alcohol, prostitution, etc.)
- 6.10.10 Population
- 6.10.11 Displacement of human settlements during the life of the mine
- 6.10.12 Change in character of community (negative)
- 6.10.13 Public finance requirements – will more infrastructure need to be built and maintain to meet the demands of increase population in the areas of public education and public service (water, sanitation, roads, etc.)
- 6.10.14 Housing market (during construction and operation and after closure)
- 6.10.15 Change in religious, ethnic or cultural makeup of community
- 6.10.16 Potential impacts on public health
- 6.10.17 **Worker Health and Safety**
- Potential impacts to worker health and safety shall be described including but not limited to the following:*
- 6.10.18 Identification of hazardous jobs and number of workers exposed with duration of exposure
 - 6.10.18.1 Occupational diseases due to exposure to dust and other mining related activities such as handling of explosives, solvents, petroleum products etc.
 - 6.10.18.2 Identification of physical risks and mine safety aspects
 - 6.10.18.3 Potential for fires
- 6.11 Infrastructure**
- This section of the EIA addresses impacts of the proposed project and alternatives on the following types of infrastructure:*
- 6.11.1 **Public Health Infrastructure**
 - 6.11.1.1 Drinking water
 - 6.11.1.2 Solid Waste Collection, treatment, disposal
 - 6.11.1.3 Wastewater treatment
- 6.11.2 **Transportation Systems**
- This section of the EIA addresses impacts of transportation and traffic patterns on existing roads. The impacts of new roads on water quality, biological resources and land use should be addressed in those respective sections. The EIA shall assess potential impacts to transportation systems including but not limited to the following:*
- 6.11.2.1 Potential changes to traffic patterns, densities, and traffic safety issues in area affected by project
 - A determination of vehicular traffic density outside Mining Lease Area (before, during, and after the proposed activities)
 - Potential for traffic accidents

E.4.6 Socio-Economic Impacts
F.2.8 Socioeconomic
E.4.7 Cultural and Historic Resources
F.2.11 Cumulative Impacts
F.1.5 Evaluation of the Significance of Impacts

F.2.9 Vulnerable populations

E.4.5 Human Health

- Congestion
- Noise
- 6.11.1.2 Potential impacts to previously inaccessible areas from improvement of roads
- 6.11.2 **Communications Infrastructure**
- 6.11.3 **Energy Infrastructure**
- 6.12 Cultural and Historic Resources**
The EIA shall evaluate potential impacts to archeological, cultural, ceremonial and historic resources
- 6.12.1 Damage and alteration
- 6.12.2 Removal from historic location
- 6.12.3 Introduction of visual or audible elements that diminish integrity
- 6.12.4 Neglect that causes deterioration
- 6.12.5 Loss of medicinal plants
- 6.12.6 Loss of access to traditional use areas
- 6.12.7 Potential impacts to previously inaccessible areas from development/improvement of roads
- 6.13 Land Use**
- 6.13.1 Changes in land use by both area and location
- 6.13.2 Identification of any components of the proposed project that would fall within 25- or 100-year flood plains
- 6.13.3 Impacts of subsidence on houses and other structures
- 6.13.4 Impacts on visual resources and landscapes
- 6.13.5 Impacts on the natural landscape

7 Mitigation and Monitoring Measures

This section of the EIA must include measures designed to mitigate potential adverse impacts including those to avoid and prevent, and if needed, to reduce or minimize adverse impacts. The project proponent must include measures considered to be "best practices" among any alternative measures.

Here and/or in the Environmental Management Plan section, proposed mitigation shall be described in auditable terms and at a level of detail sufficient to demonstrate its effectiveness in addressing the concern or performance criterion. Including , its anticipated level of effectiveness and/or measurable performance, and design specifications.

The monitoring plan must include monitoring throughout the life of the mine for each potential mitigation to confirm the effectiveness of the measure and support contingency plans to provide assurance that the project, at the site preparation, construction, operation, expansion, and closure stages will meet applicable environmental requirements/standards by law, and fall within the limits of impacts deemed acceptable upon approval of the EIA. Some important items to address in the mitigation plan and associated monitoring plans include, but are not limited to the following:

Physical Impacts

7.1 Geologic Resources

- 7.1.1 Pre-excavation, onsite geological inspection and geotechnical study protocols to determine slope stability and landslide risks
- 7.1.2 Slopes in pits and waste piles built and maintained to avoid landslides and favor revegetation and soils formation
- 7.1.3 Slope stabilization by constructing retaining walls, using vegetation, geotextile, or other mechanical methods
- 7.1.4 Blasting Plan (summary of relevant measures with full document in Annex) to reduce the risk to civil infrastructure, flora, fauna and communities and to prevent slope destabilization
- 7.1.5 Use of signage to mark areas where slopes are not stable as a preventive measure in the event of a landslide

7.2 Soil Resources

- 7.2.1 Topsoil management measures
- 7.2.2 Erosion and sediment measures
- 7.2.3 Restoration/Rehabilitation Plan (summary of relevant measures with full document in Annex)
 - 7.2.3.1 Concurrent restoration/rehabilitation of mined out area to meet
 - 7.2.3.2 Final restoration/rehabilitation of disturbed areas
- 7.2.4 Minimize soil disturbance
- 7.2.5 Mitigation measures unique to specific alternatives

7.3 Water Resources

- 7.3.1 Water Quality Management Plan (summary of relevant measures with full

E.4.7 Cultural and
Historic Resources
F.2.8 Cultural and
Historic resource
Impact Assessment
tools

E.4.8 Land Use

G. Mitigation and
Monitoring
Measures
Table G-2 Mining
Impact Mitigation
Measures

- document in Annex)
 - 7.3.1.1 Dewatering
 - 7.3.1.2 Process wastewater
 - 7.3.1.3 Sewage and domestic wastewater
 - 7.3.1.4 ARD
 - 7.3.1.5 Nonpoint sources
 - 7.3.1.6 Solid or Hazardous Waste Sources
- 7.3.2 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)
- 7.4 Solid and Hazardous Waste**
- 7.4.1 Solid Waste Management Plan (summary of relevant measures with full document in Annex)
- 7.4.2 Hazardous Waste Management Plan (summary of relevant measures with full document in Annex)
- 7.4.3 Restoration/Rehabilitation Plan (summary of relevant measures with full document in Annex)
- 7.4.4 Transport system construction and maintenance to avoid erosion and sedimentation
- 7.4.5 Off-road vehicle use restrictions
- 7.4.6 Waste minimization practices
- 7.4.7 Mitigation measures unique to specific alternatives
- 7.5 Air Resources**
- 7.5.1 Dust control measures
- 7.5.2 Emissions control measures
 - 7.5.2.1 Emissions reduction equipment
 - 7.5.2.2 Maintenance and inspection of equipment and vehicle using combustion engines to reduce emissions
- 7.5.3 Spill Prevention and Containment Plan (see 7.3.2)
- 7.5.4 Hazardous Materials Management Plan (see 7.4.2)
- 7.5.5 Mitigation measures unique to specific alternatives
- 7.6 Noise and Vibration**
- 7.6.1 Noise control measures
 - 7.6.1.1 Noise reduction technologies (suppression equipment, berms, noise barriers, etc.)
 - 7.6.1.2 Time of day limitations on blasting and movement of heavy equipment when in close proximity to houses not being operated during evening hours
- 7.6.2 Blasting Plan (summary of relevant measures with full document in Annex)
- 7.6.3 Mitigation measures unique to specific alternatives

Biological Impacts

- 7.7 Biological Resources**
- 7.7.1 Restoration/Rehabilitation Plan (summary of relevant measures with full document in Annex)
- 7.7.2 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)
- 7.7.3 Hazardous Materials Management Plan (summary of relevant measures with full document in Annex)
- 7.7.4 Modify facility and activity locations and timing to avoid critical ecosystems, migratory routes and breeding/spawning grounds
- 7.7.5 Off-road vehicle use restrictions to prevent damage to ecosystems
- 7.7.6 Surface water diversion limitations to maintain in-stream values
- 7.7.7 Controls on hunting and fishing within the project area
- 7.7.8 Control of noxious and evasive weeds
- 7.7.9 Measures to compensate for loss of forests, wetlands or other critical ecosystems
- 7.7.10 Blasting Plan (summary of relevant measures with full document in Annex)
- 7.7.11 Mitigation measures unique to specific alternatives

**Table G-2 Mining
Impact Mitigation
Measures**

**G.2.5 Waste
Management**

**G.3 Restoration
G.4 Post-Closure**

**G.2.3 Air Pollution
Control
Table G-4**

**Table G-2 Mining
Impact Mitigation
Measures**

Socio-economic-cultural Impacts

7.8 Socio-economic Conditions

- 7.8.1 Rehabilitation Program for people displaced by the project (summary of relevant measures with full document in Annex)
- 7.8.2 Visual/Landscape Management Plan (summary of relevant measures with full document in Annex)
- 7.8.3 Public Health Program to protect local population from potential health problems caused by the mining operation (summary of relevant measures with full document in Annex)
- 7.8.4 Criteria and method for calculating compensation for loss of land and crops
- 7.8.5 Training locals for employment in the project
- 7.8.6 Development of a "Code of Conduct" (with associated training program) for workers to show respect to the local populations and their culture and social rules
- 7.8.7 Blasting Plan (summary of relevant measures with full document in Annex)
- 7.8.8 Mitigation measures unique to specific alternatives

7.9 Infrastructure

7.9.1 Transportation Systems

This section of the EIA addresses mitigation measures for transportation and traffic patterns on existing roads. Mitigation of impacts of new roads on water quality, biological resources and land use should be addressed in those respective sections.

- 7.9.1 Transportation Plan (summary of relevant measures with full document in Annex)
 - 7.9.1.1 Placement of traffic signals
 - 7.9.1.2 Establishing, posting and enforcing speed limits for the vehicles that transport material
 - 7.9.1.3 Training employees, contractors and subcontractors on measures to reduce or avoid potential accidents
 - 7.9.1.4 Hiring and training security personnel devoted exclusively to preventing accidents in the access road and controlling the speed of the vehicles transporting mine material
- 7.9.2 Mitigation measures unique to specific alternatives
- 7.9.3 **Other infrastructure: public health, communications, energy impacts**

7.10 Cultural and Historic Resources

- 7.10.1 Modify facility and activity locations to avoid significant archeological, cultural, ceremonial and historic sites
- 7.10.2 If avoidance is not possible, conduct appropriate resource recovery operations before disturbing the sites
- 7.10.3 Clearly delineate boundaries and post signs identifying existing archeological, cultural and historic sites on roadsides and within the mine/mine area boundaries so that they are easily recognized by the machinery operators and other workers
- 7.10.4 Development of a training program so that staff recognize and respect culturally and archeological sensitive areas
- 7.10.5 Development protocols for use during construction and operation stages for identifying and responding to archeological, cultural, ceremonial and historic sites not identified during the preliminary surveys
- 7.10.6 In the event that a historical, etc. site was found, they will stop activities at the site and report to the government

7.11 Worker Health and Safety

- 7.11.1 Development of an Occupational Health, Industrial Safety and Accidents Prevention Program with appropriate accident prevention program, reporting and periodic review (summary of relevant measures with full document in Annex)
- 7.11.2 Spill Prevention and Containment Plan (summary of relevant measures with full document in Annex)
- 7.11.3 Hazardous Materials Management Plan (summary of relevant measures with full document in Annex)
- 7.11.4 Fire Prevention and Control Plan (summary of relevant measures with full document in Annex)
- 7.11.5 Mitigation measures unique to specific alternatives

**Table G-2 Mining
Impact Mitigation
Measures**

8 Environmental Management Plan

The EIA shall include an Environmental Management Plan to prevent, mitigate and monitor adverse impacts identified in the EIA either individually or in relevant groupings. Plans will describe actions to be taken in sufficient detail to provide a basis for subsequent auditing of compliance with commitments made in the EIA process including who is responsible, how and when it will be implemented, what will be done and what results will be achieved, why it is being done, how to know whether it is effective in addressing the underlying concerns and contingency plans if the mitigation and risk reduction measures fail. The environmental management plan shall have the following elements:

8.1 Overview of Environmental Management Organization and Policy

- 8.1.1 Describe the project management and how environmental management and organization relates to overall project responsibility. Describe the personnel and performance accountability system for design, operation, maintenance and closure for implementation of mitigation and monitoring measures
- 8.1.2 Describe the Environmental policy
Policy that will govern the Project throughout its implementation, including at least the objectives, scope, commitment to continuous improvement, control and environmental monitoring and good relationship with neighboring populations and countries, as well as the commitment to internal controls such as compliance and environmental monitoring and routine audits.
- 8.1.3 Persons responsible for the implementation of mitigation measures, in each phase

8.2 Project-wide mitigation plan including an implementation schedule.

- 8.2.1 Environmental resource mitigation (such as air, water)
- 8.2.2 Socio-economic-cultural mitigation (relocation, etc.)

8.3 Project-wide monitoring plan

(usually specific to monitoring of surface water and ground water)

- 8.3.1 Short-term and long-term monitoring of resource condition, including but not limited to:
 - 8.3.1.1 Slope stability
 - 8.3.1.2 Water Quality Monitoring Program
 - Where, how and when monitoring shall be conducted
 - Parameters to be monitored
 - Monitoring frequencies
 - Sampling and analytical protocols to be used
 - 8.3.1.3 Air Quality Monitoring Program
 - Where, how and when monitoring shall be conducted
 - The Parameters to be monitored
 - The monitoring frequencies
 - The sampling and analytical protocols to be used
 - 8.3.1.4 Noise and Vibration
 - 8.3.1.5 Cultural, ceremonial archeological and historic resources in the vicinity of the mine
- 8.3.2 Short-term and long-term monitoring to ensure that the mitigation measures are functioning as predicted and that rehabilitation is working

8.4 Management Plan for other on or off-site environmental pollution control and infrastructure

This would address management of critical elements of pollution control and infrastructure that are not otherwise included in the mitigation plan because they were considered an essential part of the proposed project.

8.5 Contingency plans

Contingency plans shall be prepared and described to address a) failure to meet specific performance criteria established by law or necessary for the project to meet its commitments in the EIA and b) respond to natural and other risks previously identified and mitigated in the EIA in the event reasonable and feasible mitigation measures to address the risks are inadequate.

- 8.5.1 **Performance-related Contingency Plans:** Steps that will be taken should monitoring indicate that performance measures are not being met:
 - 8.5.1.1 Environmental standards are not being met
 - 8.5.1.2 Impacts are greater than predicted
 - 8.5.1.3 The mitigation measures and/or rehabilitation are not performing as predicted
- 8.5.2 **Natural Disaster Risk Response Plan** (assumes that risk identification and risk reduction have been addressed in other parts of the EIA)
- 8.5.3 **Other Risks Response plan** (assumes that risk identification and risk reduction have been addressed in other parts of the EIA)

9 Signed Commitment Statement

H. Environmental Management Plan

Table G-2 Mining Impact Mitigation Measures

G.7.2 Water Quality Monitoring Example

The EIA shall contain a legally binding signed letter of commitment to meeting the terms of the EIA. The statement must be signed by the authorized representative of the proponent company with assurance that all financial surety measures as required by the regulatory agency have been met.

10 Annexes

These should be numbered and duly referenced in the text.

10.1 Public Consultation

- 10.1.1 Public consultation plan
- 10.1.2 A summary of public outreach activities
- 10.1.3 A summary of response to comments
- 10.1.4 Actual copies of written comments

10.2 Technical Supporting Documents

- 10.2.1 Include maps, plans, charts and figures in the sequence mentioned in the EIA document.
- 10.2.2 Zoning maps with resources and results of impacts
- 10.2.3 Detailed materials on predictive tools/models and assumptions used for the assessment but too detailed for the body of the EIA
- 10.2.4 Special studies, if relevant but not readily accessible

10.3 References

- 10.3.1 Submit a list of all references, (books, articles, technical reports and other information sources) cited in the various chapters of the EIA study (full biographic references, and the following conventional procedures cited in the literature: author, year, title, source, number of pages, and city of publication or issuance.

B. EIA Process and Public Participation

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