Commonwealth Model Mining Feasibility Study Guidelines

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Authored by:

Naadira Ogeer
Chilenye Nwapi
Kartikeya Garg

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Email: gpsr@mare-nostrum.co.uk.

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Contents

Understanding Mining Feasibility Studies

The Commonwealth Secretariat has also published *Understanding Mining Feasibility Studies*, a supplementary paper that complements these Model Guidelines by providing the conceptual underpinnings and governance frameworks required for their consistent interpretation and use. It positions pre-feasibility studies and feasibility studies within the overall project development process, delineates the expected depth and quality of information, and highlights recurring limitations and risks that government reviewers should be prepared to assess.

Both that paper and these Model Guidelines can be downloaded from thecommonwealth.org/publications/model-mining-feasibility-study-guidelines

Foreword

Throughout the Commonwealth, mineral resources continue to shape national trajectories, offering the prospect of transformative growth, diversification, and technological advancement. For many of our member countries, these assets are not only a source of revenue today, but a potential pathway towards resilient, inclusive, and sustainable development tomorrow.

Yet too often, this potential remains unrealised, not because resources are lacking but because the systems that govern their development can be fragmented, outdated, or insufficiently robust to ensure value for society.

The *Model Mining Feasibility Study Guidelines* are designed to address this. They respond directly to the expressed priorities of Governments for practical, credible instruments that strengthen decision-making around mining investments and ensure that projects are developed on sound, transparent, and sustainable foundations.

At their core lies a straightforward principle: feasibility is not merely an engineering calculation or a financial forecast but a test of national interest. It determines whether a resource development will drive value creation, safeguard people and ecosystems, and contribute to long-term economic security. Done well, it is a catalyst for sustainable growth. Done poorly, it can lock countries into unfavourable outcomes for generations.

The world is evolving rapidly. The accelerating demand for critical minerals, the imperative of the low-carbon transition, and shifting expectations around ESG performance are raising both opportunities and risks. Governments are being asked to make complex, high-stakes decisions in compressed timeframes, often with gaps in information, capacity constraints, or asymmetrical power dynamics. If countries are to benefit fully from their resources, these gaps must be addressed.

The Hon. Shirley Botchwey
Secretary-General of the Commonwealth

Authors and Acknowledgments

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Introduction

Mining has the potential to bring important benefits to a country. Done well, it can generate jobs, infrastructure, foreign exchange and fiscal revenues that support a country's broader development goals. However, it also carries significant risks if projects are not carefully planned and managed. It can lead to environmental damage, community tensions, stranded assets and the loss of public trust. One of the most important decision tools governments have to steer mining in the right direction is the feasibility study.

A feasibility study is not simply a technical or financial document. It is the first and most important step in deciding whether a mining project should go ahead. It tests whether a proposed project is realistic, responsible and aligned with national development priorities. Without rigorous feasibility studies, governments risk granting approvals to projects that may be unsustainable, fail to deliver expected benefits, or create disproportionate social and environmental costs. At its core, a feasibility study should answer three simple questions.

1. Can the project work? – Is the geology proven, is the mine plan technically sound and can the resource be extracted safely?
2. Will it deliver value? – Are the economics robust, will the project contribute to national revenues and local benefits, and are financial risks well understood?
3. Is it sustainable? – Have environmental and social risks been properly assessed, are communities engaged, and does the project advance long-term development rather than short-term gain?

Governments need feasibility studies to serve as decision-making instruments rather than company promotional documents. To achieve this, regulators need clear and consistent standards that define the information required, the format in which it should be presented, and the criteria by which it will be assessed. The question of whether such studies carry binding legal force on companies, however, is a matter for each country's legal framework to determine.

These studies, ranging from preliminary or scoping studies to pre-feasibility studies (PFSs), and final or bankable feasibility studies (FSs), represent progressively detailed assessments of a project's technical, economic, environmental and social viability. A PFS serves as an early-stage analysis that bridges exploration and development, evaluating whether a deposit can be mined profitably and identifying the key risks and opportunities before committing significant resources. The FS, in contrast, provides the final, comprehensive evaluation that forms the basis for financing, construction and permitting decisions. It encompasses detailed engineering designs, precise cost estimates, and full environmental and social assessments. Each type of study thus acts as a decision gate, increasing in accuracy and complexity as the project advances from concept to investment readiness.

The level of detail required in a PFS or FS is determined by multiple factors, including project scale, geological confidence, risk profile, financing needs and national regulatory requirements. Smaller, self-funded or pilot projects may only require a basic or abbreviated study that focuses on conceptual mine design and approximate cost estimates, while large-scale, capital-intensive developments demand fully engineered, multidisciplinary analyses. Similarly, projects in high-risk jurisdictions or complex geological settings necessitate deeper assessments with expanded risk mitigation and environmental, social and governance (ESG) components.

These Model Guidelines ('the Guidelines') have been prepared to support governments in strengthening their regulatory frameworks for feasibility studies. They respond to the growing need for clarity, consistency and accountability in how feasibility assessments are undertaken and reviewed, especially in light of the growing rush for critical minerals. By setting out minimum requirements aligned with international best practice, the Guidelines aim to ensure that feasibility studies are comprehensive, transparent and tailored to national realities.

These Model Guidelines provide governments with a practical framework to:

- set minimum requirements for the content and quality of feasibility studies, ensuring they are comprehensive and comparable across projects
- strengthen regulatory oversight by offering criteria that officials can use to review studies, ask the right questions and identify gaps before approvals are granted
- embed sustainability principles by ensuring feasibility studies address social, environmental and governance issues alongside technical and financial ones
- build trust among stakeholders by making the feasibility process more transparent, participatory and aligned with community and national interests.

The Guidelines are not intended to replace national laws or policies, but to complement them. They are designed as a practical tool to help governments operationalise their regulatory mandates, bridge gaps in current practice, and align their mining sector with modern expectations of sustainability, community benefit and investor confidence. They draw on international best practice while remaining adaptable to local contexts, capacities and policy priorities. Each government can adopt, adjust and expand the model to reflect its legal system and development strategy. The development of the Guidelines also benefited from input by Commonwealth member countries and partner organisations. While the Guidelines have been developed primarily with them in mind, other countries may also adapt the Guidelines to their own contexts.

At the same time, these are model guidelines and are not legally binding. Their purpose is to provide a flexible framework that governments can voluntarily draw upon, ensuring alignment with good international practice while safeguarding national sovereignty. Given this flexibility, countries can adapt the Guidelines in ways that resonate with their priorities and long-term vision for sustainable development.

By using these Guidelines, governments can ensure that feasibility studies become more than a procedural requirement but also a strategic instrument for advancing inclusive, responsible and long-term national development. Properly applied, the Guidelines would enable mining projects to proceed where feasible and beneficial, while ensuring that risks are properly managed and that benefits are broadly shared. In this way, the Guidelines contribute directly to broader policy and resource governance objectives, including the Sustainable Development Goals, the global energy transition and national development plans. These Guidelines are thus a tool for ensuring that mineral wealth is translated into lasting public value and sustainable national progress.

How to use these Model Guidelines

This document has been developed to support national efforts to ensure that mineral resources are sustainably developed. These Model Guidelines can be tailored to produce country-specific submission guidelines to aid in strengthening the regulatory framework for mining projects.

The Model Guidelines have been developed to provide recommendations to mining regulators on what information to expect companies to submit in feasibility studies, ensuring that government officials receive all relevant information to enable informed decision-making. It has been informed by international best practice and member countries' experiences. The Model Guidelines are a template, and can be modified to suit the circumstances of the member country. However, to ensure effective national guidelines are developed from this model, the following conditions must be met.

- Alignment with appropriate national policies, laws, regulations and agreements.
- The elements contained within the Guidelines are meant to be the baseline. While national styles, legal frameworks and project-specific circumstances may vary, influencing the level of detail provided under each element, the Model Guidelines have been designed to ensure that the government receives adequate information to enable informed decision-making on critical aspects of the project, including strategic, technical, economic, social and environmental matters. Therefore, no element should be omitted to avoid critical gaps in analysis and to maintain comparability across projects.
- For emphasis, the level of detail requested under each relevant sub-section is not the same across every mining project. These are dependent on, and proportional to, several interrelated factors, including project size and complexity, stage of resource development, perceived risk and uncertainty, regulatory requirements, and financing needs. Therefore, a 'one-size-fits-all' approach should generally be avoided, and feasibility study requirements should be examined on a case-by-case basis to judge level of need and complexity.

It is strongly recommended that the entity responsible for receiving feasibility studies should lead the development of national guidelines. Customisation of the Model Guidelines should be done in close collaboration with the relevant government institutions involved in reviewing the feasibility study. Governments should also note that feasibility reviews can only be effective when supported by strong institutional processes. Many countries report delays, inconsistent assessments, or duplication resulting from unclear roles or communication gaps between agencies. There is, thus, need for governments to structure internal reviews, including:

- co-ordinated, interdisciplinary review mechanisms
- structured checklists and evaluation tools
- opportunities for peer review or external verification in complex cases
- processes for ensuring that issues identified during feasibility review inform licensing, permitting and monitoring.

The goal is not to add bureaucracy, but to improve predictability and rigour.

Of note is that orange font is used within brackets as a placeholder throughout the Model Guidelines. Please insert appropriate references.

Also, explanatory notes are provided in various sections (either as text boxes or in grey font) to provide some context on inclusion and risk if not adequately addressed in the feasibility study. These notes are meant to be deleted.

Please note that Commonwealth Secretariat experts are available upon request to assist member countries in the development of national guidelines.

[INSERT COUNTRY]

Guidelines for Mining Feasibility Studies

Title of document: [Feasibility Submission Guidelines]

Date of Issue: [September 2025]

Issuing Authority: [Ministry of Mining]

Explanatory notes

Please note importance of providing version control for national guidelines.

At a minimum, please include the *Date of Issue* and the *Issuing Authority*.

Section 1: Objectives of National Feasibility Study Submission Guidelines

Explanatory notes

This section is intended to provide a clear overview to the companies on the national context, including the following.

- The regulatory framework for the feasibility study.
- The feasibility study process, including the government's expectations on how it is to be engaged during the development of various components of the studies. This will help the operator incorporate and plan for those interactions as part of its project planning.
- The criteria the feasibility study will have to satisfactorily meet in order to secure approval. This will help guide the operator to ensure that these areas are adequately addressed as it develops the feasibility study.

The following are suggested section headings and illustrative text; these should be replaced with country-specific content.

1. Purpose of the Guidelines

These Guidelines set out the government's expectations of mining companies in the preparation and submission of a feasibility study to the [REGULATOR].

The [REGULATOR], pursuant to the [MINING ACT or GOVERNING LEGISLATION] is responsible for management of mining operations and a feasibility study is required under Section [indicate specific provision in legislative Instrument].

The Guidelines are generally applicable and are subordinate to the Acts and the corresponding regulations made thereunder. The objective is thus to:

- clearly outline government expectations regarding the development of a feasibility study
- provide clarity on the form and contents of the feasibility study, including supporting technical analysis and information to be submitted
- promote co-operation between companies and the government for timely and efficient review and approval of feasibility studies
- provide transparency on the elements included in a feasibility study
- provide appropriate information on the project available to the public.

2. Regulatory framework

This section should provide a list of relevant policies and legislation, including those related to environmental and social impact assessments (ESIAs). It is recommended that the specific details are not repeated within these Guidelines but clear references made to sections within relevant National Acts and Regulations etc.

3. Government–company interactions

The government recognises that the nature and complexity of each mining project may affect the content of a feasibility submission. Likewise, differences in companies' circumstances and project management processes (for progressing a discovery to first production) differ and can influence the timing of submissions (for example, whether at concept selection or closer to final investment decision), as well as the availability of information and the degree of uncertainty. A consultative and collaborative approach will enable both the operator and the government to anticipate and address issues more effectively in the preparation of the Mine Development (or Operation) Plan (MDP) to be subsequently submitted.

4. Feasibility study submissions and evaluation

For a feasibility study to be considered, the submission must conform with these Guidelines and any other requirements of the regulator.

The government recognises that no two projects are the same and will evaluate a submission on the risks and rewards of the specific development. For approval of any project, the operator will have to demonstrate that:

1. the feasibility study is formulated in accordance with international best practice and promotes efficient and optimal recovery of mineral resources
2. appropriate measures will be implemented to effectively manage health, safety, security and environmental risks across the project lifecycle; that is, across the design, construction, production, mine closure and remediation phases
3. a robust stakeholder engagement plan to ensure benefits to the host community will be developed and followed
4. there are demonstrable financial benefits to [the COUNTRY] from the development
5. the project minimises greenhouse gas (GHG) emissions and is resilient to climate uncertainties.

The [Regulator] will communicate the decision in writing [within XX days of submission], including any conditions.

Section 2: Contents of a Feasibility Study

Explanatory notes

The feasibility study should address all of the elements contained within the Guidelines. The section headings and text should be replaced with country-specific terminology and content; however, the key areas should not be deleted. These Model Guidelines have been designed to ensure that information on the key aspects of any mining project is addressed in the request for approval.

Throughout the Guidelines, please ensure definitions are consistent and state specific technical standards, units and formats to provide clarity to companies and minimise re-submissions. For example:

- In some legal frameworks, the terminology *Field or Development Area* may have different meanings in the fiscal regime. Within these Guidelines, 'Field' is used to denote the mineral deposits that the development is based on.
- What is the co-ordinate reference system (CRS) to be used when referring to positioning information? Latitude/longitude, UTM or both? Every country has a CRS list available for use: **EPSG.io: Coordinate Systems Worldwide**
- State units of measure. For example, Feet (ft) or meter (m).
- Are there any standard forms for data reporting?

The feasibility study submission should provide the government with a holistic view of the project. This section outlines the relevant areas and information that should be provided. Pertinent information, relevant and supplementary to the contents of the feasibility study, should be submitted in the appendices or as separate attachments where possible. This includes reports, independent assessments, agreements and other relevant material.

The government recognises that each project is different, depending on its nature and complexity. Therefore, some sub-sections may not be applicable or, conversely, more information may be required. The project proponent should consult with the regulator on the specifics of a submission to ensure all documentation is provided in a timely manner.

Covering page/Submittal page

Company:

Application/lease: _____

Type of application or lease for which the bankable feasibility is submitted:

____ Application for a Mining Lease

____ Application for a Restricted Mining Lease

____ Renewal/Extension of Existing Mining Lease

____ Renewal/Extension of Existing Restricted Mining Lease

Name of mine: _____

LEASE APPLICANT/HOLDER DETAILS

1. Name of Applicant/Leaseholder: _____
2. Registered address: _____
   _____
   _____
3. Postal address: _____
   _____
   _____
4. Location of lease area District: _____ Locality: _____
5. Phone: _____ Cell phone: _____
6. Email: _____ Website: _____

AUTHORS OF THE REPORT

- Name and qualifications of the authors
- Experience in proposed type of mining operation/development and area of geographic interest
- Track records of the principal authors
- Address and location
- Qualification
- Site visits
- Declaration

Date of submission

Effective date

Explanatory notes

A qualified person (QP) or competent person (CP) is the professional responsible for preparing or supervising the preparation of technical reports, including feasibility studies. A qualified person must be a minerals industry professional (preferably an engineer or geoscientist with a university degree), or equivalent accreditation, in a discipline related to mineral exploration or mining. The individual must have at least five years of relevant experience, possess expertise specific to the subject matter of the project, and be in good standing with a recognised professional association that has disciplinary authority and enforceable ethics. The QP/CP assumes professional responsibility for the accuracy and reliability of public reporting of exploration results, mineral resources and ore reserves, and must submit a signed declaration stating:

- the QP's name, address, occupation and professional associations
- their qualifications and relevant experience
- the title and effective date of the technical report
- the items of the report for which the QP is responsible
- the date of the most recent site inspection
- whether the QP is independent of the issuer
- any prior involvement with the property.

Part I: Executive Summary

This section should provide a high-level summary of the key components of the feasibility study. It should enable a non-specialist reader to reach an informed opinion about the feasibility of the proposed development. The summary should adequately address how the proposal meets the required conditions for approval as described in Section 1 of these Guidelines.

It should include an overview of the following.

- The development strategy and preferred concept selected: Particulars of the contract area (map, beneficial ownership, exploration history, estimates of total mineral deposits), development strategy for optimising mineral recovery from the contract area, scope of the mining development (project area, mineral deposits to be developed), possible development concepts, and rational for the selected option, including comparative economic analysis. It should indicate relevant assumptions and decision criteria.
- The proposed project: Range of estimates for resources and production, description of the drilling and completion campaign, facilities and infrastructure, expected operating efficiency, and other key matters. It should provide a summary table of a base case, upside and downside for key project parameters, including hydrocarbons in place, recoverable resources, reserves, production, capital costs and operating costs.
- How health, safety, security and the environment (HSSE) have been integrated into the design and operation of the proposed development.
- The decommissioning plan for the development.
- The social and economic impacts of the project, with a description of the overall expected benefits to the country under three scenarios (base case, upside and downside).
- The project schedule and key milestones, including first production, critical path activities and measures that will be employed to effectively manage risks and ensure delivery of the project on time and budget.

Explanatory notes

An FS submission is a holistic view of a development and as such, will be associated with many technical assessments and reports. If clear instructions are not provided on the structure of the submission, the voluminous data can be overwhelming, to the detriment of understanding the critical assumptions behind the development and the inherent risks.

Best practice is for a succinct non-technical summary of the project (including risk management) and how the country will benefit from the development. This approach also has the added benefit of enabling this part of the feasibility study to be the basis for broader government discussions (for example, by Cabinet and/or Parliament) and for consultations (for example, among government agencies or with the public).

Part II: Technical Analysis and Evaluation

Explanatory Notes

The company and government technical teams should be engaging throughout the process of moving from discovery to feasibility submission. Ideally, the government technical teams should have line of sight to many of the supporting detailed assessments and reports ahead of the formal submission. It is therefore recommended that, where possible, a synopsis of such reports is provided for the feasibility study submission. For completeness in government's record keeping these should be submitted as appendices/ separate attachments.

Part II of the submission should provide a comprehensive review of the technical analysis and evaluation of the feasibility study elements. For each section, the description should be brief and focused on the complexities and risks of the development. Where possible and appropriate, documents and reports should be referenced and attached separately. Where a particular sub-section is not relevant to a development, this should be discussed with [the Regulator] and omitted.

1. Introduction

- Outline the purpose and scope of the feasibility study, including the basis of report (relevant standards or codes to be followed).
- Typically, include a statement of responsibility (qualified persons, competent persons), a disclosure of affiliations and independence, and details the applicable legal framework.

2. Project description and tenure

a. Project description

Provide an outline of the legal tenure, mineral rights and obligations, the status of licenses and permits, the land ownership and surface rights, and include a jurisdictional regulatory compliance summary.

b. Legal requirements, permitting and regulatory compliance

- Outline the legal and regulatory framework governing the project, including applicable mining laws and reporting standards.
- Describe the permitting process and requirements for operating a mine in the area, including environmental permits, water rights and land use approvals. Host country agreements or fiscal regimes.

3. Geological setting and deposit type

Understanding the geological setting and deposit type is a vital step in evaluating the potential of a mining project. A feasibility study must provide both a regional and local geological setting, supported by accurate mapping, cross-sections and interpretations of the deposit model. A clear geological picture not only validates

exploration results but also provides the technical justification necessary for mining strategies considered subsequently in the feasibility study. This section should do the following.

- Describe the regional geology, structural features and mineralisation trends, along with their relationship to the project area.
- Provide a detailed description of local geology, lithology and mineralisation. This should be accompanied by scaled geological maps of the project area (surface and subsurface).
- Describe classification of the deposit, mineralisation style, controls of mineralisation and cross-sections, block diagrams, or 3D models illustrating deposit geometry.

4. Exploration data, sampling and data verification

It is vital that mining feasibility studies should be founded on reliable exploration data. Exploration history, sampling methods and verification processes provide the evidence upon which mineral resource estimates are built. Transparent documentation of sampling, data collection and handling, and quality assurance measures is essential to ensure credibility. Specifically, governments should undertake the following.

- Document all previous exploration activities, identify and assess historical datasets for reliability, and note any data gaps in historical work.
- Describe sampling methods used, record drill campaigns including drill types, and ensure detailed geological and geotechnical core logging.
- Outline preparation steps, specify accredited laboratories used and methods of analysis.
- Insert quality assurance/quality control (QA/QC) measures, monitor QA/QC laboratory results, and flag and resolve any failures or inconsistencies.
- Ensure an independent review of exploration and sampling data by QP/CP, including resampling and cross-checking laboratory results and database entries.
- Identify which datasets were used in mineral resource calculations and ensure transparency in the justification of data inclusion/ exclusion.

5. Mineral resource and reserve estimates

Explanatory notes

Resource and reserve estimation provides the foundation for all technical, economic and financial evaluations of a mining project. Feasibility studies must therefore present resource and reserve estimates with transparent disclosure of data quality, assumptions, cut-off grades, price decks, recovery factors and classification criteria. They should demonstrate the link between geological confidence, mine design and scheduling, metallurgical recoveries, and commercial terms to show how resources are converted to reserves. Consistency with RPEEE (reasonable prospects for eventual economic extraction) is essential, as is cross-referencing to environmental, permitting and social factors that may constrain extraction. This ensures that reserve declarations provide decision-makers, financiers and regulators with a bankable and defensible basis for mine development. International reporting codes, such as the Committee for Mineral Reserves International Reporting Standards (CRIRSCO), the umbrella international body behind a a family of regional and country-specific standards that include the Australasia's Joint Ore Reserves Committee (JORC), Pan-European Reserve and Resources Committee, the Canadian Institute of Mining (CIM), and the South African Mineral Resource Committee, and the UN Framework Classification for Resources (UNFC) emphasise that mineral reserves represent the economically mineable portion of a mineral resource, constrained by modifying factors and supported by a defensible mine plan. A reserve is therefore not simply metal in the ground, but material that can be extracted profitably under defined technical, legal, environmental, social and market conditions, as of the effective date.

This section should demonstrate that a defined portion of the mineral resource can be mined and processed profitably under clearly stated assumptions and practical constraints, as of the effective date. A mineral reserve is not just metal in the ground; it is the subset of measured/indicated resources that, after applying modifying factors and a defensible mine plan, qualifies as proved or probable because it generates positive cash flow and satisfies legal, technical, environmental, social and market conditions.

The section should set out the methods, data and assumptions used to convert resources to reserves; the cut-off grade methodology and price decks; the mine design and schedule that constrain what is actually extractable; the metallurgical basis for recoveries and product quality; and any commercial terms (payabilities, penalties) that affect value. It should also document data quality, state the effective date and classification criteria, and link the reserve statement to the project's environmental, permitting, social and market context so that profitability is demonstrated on a bankable basis. The overall objective is to demonstrate, with transparent evidence, the quantity and grade/quality of mineralisation that has reasonable prospects for eventual economic extraction (RPEEE), provide a sound basis for mine design and reserve conversion.

At a minimum, the section should do the following.

- Define the resource categories and the rationale for the classification.
- Show how reasonable prospects were demonstrated (for example, pit-shell/stope-optimisation envelopes, realistic cut-offs, metallurgical assumptions, access/permitting constraints).
- Describe and justify the estimation method.
- Describe the geological model and domaining: That is, explain mineralisation style, controls (structure, stratigraphy, alteration), oxidation/weathering profiles and deleterious elements; and define hard/soft boundaries for lithology, grade, oxidation and geometallurgy (so justifying choices with statistics and geology).
- In terms of the classification criteria (measured/indicated/inferred), provide objective criteria tied to data spacing, geological continuity, variogram ranges/Kriging efficiency or slope of regression, estimation pass and reconciliation where available (the decision rules).
- Quantify estimation uncertainty (for example, conditional simulation spread, classification-specific confidence ranges), discuss sensitivities to key assumptions (price, recovery, density, deleterious penalties), and disclose data gaps, biases or domains excluded due to uncertainty.
- Identify cut-off grades along with the confidence levels of the assessment; present the assumptions and limiting factors.
- Indicate what changes may trigger an update to the estimates.
- Retain data and models for regulatory audit.
- Include a one-page non-technical summary of the reserve estimates for policy and community readers.

This section should be documented with such transparency as to let a third party reviewing it reproduce the logic from resource model to proved/probable tonnes. The estimate must be prepared and signed by a qualified or competent person with relevant commodity/deposit-type experience, professional registration and disclosed independence (or rationale provided for non-independence).

6. Metallurgical and processing methods

Explanatory notes

Metallurgical testing and process design are at the core of establishing whether a mining project can deliver a marketable product at the required recovery, quality, throughput and cost. This section expects the proponent to demonstrate, with verifiable evidence, that the proposed metallurgical and processing route can consistently turn the run-of-mine material into saleable products at the stated recovery, quality, throughput and cost, under real operating conditions and across the full range of ore variability. The submission must link laboratory and pilot-scale test work to a defensible flowsheet, mass and water balances, equipment sizing, product specifications, tailings and residue management, utilities demand, emissions, and operability/maintainability, with all assumptions stated and stress-tested. International good practice (for example, CIM Best Practice Guidelines for Mineral Processing, JORC Code requirements, International Council on Mining and Metals (ICMM) guidance, International Finance Corporation (IFC) Performance Standards (PS) – notably PS3 on resource efficiency, pollution prevention and emissions, and PS4 on community health and safety) emphasises that process design must be based on verifiable laboratory and pilot-scale test work that reflects the full variability of the orebody.

The feasibility study should show how test results underpin a robust and defensible flowsheet, with clear linkages to mass and water balances, recovery assumptions, equipment sizing, utilities demand, product quality specifications, and waste/tailings handling. Assumptions should be transparent, and uncertainties clearly identified and stress-tested to demonstrate operability and maintainability under realistic conditions. Accordingly, the following particulars should be included.

- Describe mineralogical, textural and grain-size characteristics; liberation size; hardness/competency; and distribution of deleterious elements (for example, arsenic, mercury, antimony, fluorine, organics for coal).
- Provide details on the processing methods (for example, flotation, leaching, milling, etc.) for extracting valuable minerals from the ore.
- Present a variability programme covering all ore domains, weathering profiles and life-of-mine blend scenarios (including high/low grade, transitional and oxide/sulfide boundaries).
- Provide a representative sampling plan, compositing strategy, chain-of-custody and sample mass sufficiency checks.
- Present the metallurgical test work programme, summarising test objectives, laboratories used (with accreditation status), methods and dates.
    - Report test conditions, replicates, raw datasets and error margins, and show how tests reflect plant operating conditions.
- Describe the process selection, justifying the selected processing route versus credible alternatives (technical, economic, environmental and social trade-offs).
- State expected overall recovery, stage recoveries and product grades with confidence ranges.

  - This should demonstrate compliance with market specifications (for example, concentrate moisture, penalty elements, size distribution, acid solubility for industrial minerals).
- Present the flow sheet of the processing plant (from run-of-mine to final product(s)) and associated infrastructure of flow sheets and recovery assumptions.
- Indicate major equipment, design criteria, nameplate and effective capacities, mechanical availability, and critical spares philosophy.
- Detail the management of tailings and mine waste; the management plan should also take into account water use.
- Describe the metallurgical accounting system, sampling points, frequency and calculation methods; this should align with recognised industry practices.
- Identify key technical risks (for example, variability sensitivity, impurity spikes, scaling, froth stability, rheology, blinding/plugging, corrosion) and mitigations, and provide contingency allowances in the design, schedule and operating cost for unresolved uncertainties.
  - Address maintainability, access, materials of construction and corrosion/abrasion allowances.
- Present the process control and operability, describing the control philosophy, key instruments and analysers, alarm setpoints, and interlocks.
- Identify all reagents and consumables, expected consumption rates per tonne of ore and per tonne of product, storage and handling, hazards, and supply chain arrangements.
- Describe the materials handling and stockpiling.
- Provide an estimate of tailings and other residues, and describe the disposal method.
- Identify potential by-products and recovery circuits (for example, precious metals, rare earth elements, sulfuric acid, gypsum).
- Identify air emissions, wastewater streams, noise/vibration and waste inventories arising from processing; describe mitigation and monitoring. The study should confirm compatibility with permitting requirements.
- Identify key technical risks and mitigation strategies.
- Include a sensitivity analysis showing sensitivities of recovery, product quality, reagent consumption, energy use and unit operating cost to plausible changes in feed grade, hardness, impurity levels and water quality/availability.
- Demonstrate how this section of the study aligns with other sections.

7. Mining methods and production

Explanatory notes

The choice of mining method is a central feasibility decision that determines safety, costs, schedule, permitting pathways and ultimately, the project's bankability. The feasibility study should set out the trade-offs considered (for example, open pit versus underground, or alternative stoping/caving methods), the geotechnical and hydrogeological basis for design, planned dilution and ore loss, and productivity assumptions and the resulting mine layout, sequence and schedule. Method selection must be explicitly linked to environmental, social and governance (ESG) considerations, including water management, waste and tailings handling, emissions, noise, community constraints, and closure planning. International good practice (for example, CIM Best Practice Guidelines for Mine Engineering, ICMM guidance on health, safety and environmental performance, IFC Performance Standards – notably PS1 on integrated management systems, PS2 on labour and safety, PS3 on resource efficiency, PS4 on community health and safety, and PS6 on biodiversity) emphasises that method selection must be evidence based, risk informed and integrated with the full life-of-mine (LOM) plan.

a. Mining methods

The objective here is to demonstrate that the selected mining method is the safest, most practical and most economically viable option under the stated assumptions, and that it integrates seamlessly with processing, infrastructure, tailings, closure and market requirements. The regulator should be able to trace a clear line from data to design to schedule to costs, see the key risks and controls, and confirm legal, technical and safety compliance – that is, that the plan integrates with processing, tailings and closure, and market requirements to deliver reserves safely and profitably. The section should provide an overview of the following.

- Summarise the methods evaluated (for example, open pit, underground; sub-level open stoping, longhole, block/panel caving, truck-shovel).
- Describe the selected mining method and the rationale for its selection, along with the mine design, mining sequencing, dilution, recovery rates, production rates and expected mine life.
- Outline the trade-offs in the selection.
- Outline the production planning and scheduling.
- Provide a detailed timeline for each stage of the mining operation, from construction to the ramp-up of production and full-scale operations, including key milestones and expected production rates.
- Describe the equipment and infrastructure needed for the selected method.
- Describe the geotechnical considerations (domains, rock mass classification, structures, strength parameters, pit-slope or underground support criteria; lab and field test programme; back-analysis).
- Describe the hydrogeological considerations (aquifers, inflows, pore pressures, depressurisation plan, dewatering system, water balance, seasonal variability; impacts on stability and productivity).

- Outline the costs and economics of the selected mining method, including the basis for the estimates.
- Describe the main risks of the selected method (geotechnical failure, hydro inflows, ventilation/heat stress, supply-chain, labour/skills, community impacts).
- Describe monitoring plans for mitigating identified risks, trigger action response plans, contingency designs and alternative access/sequence.
- Outline the workforce plan (numbers/skills, shifts, training), critical competencies, contractor versus owner–operator model, and key safety systems and leading indicators.
- Confirm alignment of the mining method with resource/reserve, processing, tailings/waste, water, power, logistics, ESIA and closure sections of the feasibility study.

A regulator reviewing this section must be able to verify that: (i) the mining method is technically and legally feasible; (ii) dilution/ore loss and productivity are evidence-based; (iii) schedules and costs are defensible; (iv) key risks and controls are explicit; and (v) the methods integrate with processing, environmental/closure and market realities.

b. Human resources and management plans

Explanatory notes

People are a critical feasibility driver: staffing decisions shape costs, schedule, safety and the ability of a project to start up on time and sustain operations. The feasibility study should set out staffing needs by project phase (construction, commissioning, operations), identify recruitment sources and strategies, and demonstrate how workforce housing, transport and camp capacity will be aligned with mobilisation schedules. It should also describe key health and safety policies, systems and commitments, training and supervision, and key workforce policies on diversity, inclusion, grievance mechanisms and fair treatment. International good practice (such as IFC Performance Standards (PS2 on labour and working conditions, PS4 on community health and safety), the International Labour Organization (ILO) Core Labour Standards, ICMM's People and Performance principles, and the IFC/European Bank for Reconstruction and Development (EBRD) Guidance on Workers' Accommodation) stresses that workforce planning must integrate recruitment, training, housing, transport, supervision and retention within a framework of legal compliance and fair labour practices.

The objective in this section is to demonstrate that the project will be staffed by the right people at the right time, under safe and equitable conditions, and that human resource commitments are realistic, costed and fully integrated with logistics, accommodation and operational requirements. It should make clear the decision-ready implications (budget, timing, readiness gates like camp capacity and transport, legal compliance for labour/visas) so a regulator can see that the workforce plan is realistic, costed and integrated with construction logistics, accommodation and operational needs. Among other things, this section should include the following.

- Provide workforce requirements by phase (construction, commissioning, steady-state operations) and by function (mine; process plant; maintenance; health, safety and environment (HSE); community; logistics; administration).
- Include an organisational chart showing reporting lines and critical roles.
- Provide a recruitment strategy and plan and time-to-fill assumptions for critical roles
- Provide local and regional hiring targets and high-level enablers (apprenticeships, bridging programmes, credential recognition).
- Describe the proponent's concept of pay equity and how it will ensure fair and equitable compensation for all staff.
- Include health, safety and environmental (HSE) considerations for employees.
- Confirm core workforce policies in relation to health and safety, non-discrimination and anti-harassment, gender-based violence prevention, code of conduct, discipline and investigations, whistleblowing, and access to a confidential grievance process.
- Outline its approach to unionisation and collective bargaining (if relevant), and strike/lockout.
- Provide practical measures to support gender inclusion and diversity goals. These might include personal protective equipment (PPE) sizing, facilities (washrooms, lactation room), safe transport, inclusive uniforms and flexible rostering, where practicable.

c. Procurement plans

Explanatory notes

Alongside workforce planning, effective procurement is essential to ensuring that a mining project can be delivered on time, within budget and in a way that supports sustainable development. Procurement is a central driver of project feasibility: timely, transparent and cost-effective acquisition of goods and services determines whether a project can be built and operated on schedule, within budget, and in compliance with regulatory, environmental and community obligations. International good practice (such as the Organisation for Economic Co-operation and Development (OECD) Due Diligence Guidance for Responsible Supply Chains, the Extractive Industries Transparency Initiative (EITI) procurement standards, the ICMM Mining Principles, and IFC Performance Standards on the supply chain (PS2 and PS6)) stresses that procurement must not only focus on cost and delivery but also integrate transparency and anti-corruption measures, fair competition, human rights due diligence and opportunities for local suppliers. The feasibility study should set out the project's procurement strategy across phases (construction, commissioning, operations), identify critical supplies and services, and outline how contracting and purchasing will be managed to support local content, sustainability and ethical supply chain standards.

The objective in this section is to demonstrate that the project can secure the right goods and services at the right time, in a manner that is reliable, transparent and aligned with national development priorities. It should show the regulator that procurement commitments are realistic, costed and fully integrated with construction schedules, logistics, local supplier capacities and sustainability objectives. Among other things, this section should include the following.

- Provide a high-level procurement plan by project phase (construction, commissioning, steady-state operations), identifying critical equipment, materials and service contracts.
- Identify long-lead items and critical spares, with procurement lead times and contingency plans.
- Outline procurement governance structures, namely, policies, delegation of authority, approvals, audit trails and anti-corruption safeguards.
- Include local content and supplier development targets, with enablers such as training, certification support and supplier finance options.
- Describe its approach to transparency, competition and avoidance of conflict of interest in tendering and contract award.
- Include policies on responsible supply chains – human rights due diligence, conflict mineral avoidance, environmental performance of suppliers, fair labour practices, and grievance mechanisms for suppliers and contractors.
- Identify logistics and customs arrangements for imported equipment, including compliance with national import rules, tariffs and exemptions, where applicable.
- Demonstrate integration of procurement with construction and operations schedules (for example, warehousing, transport, delivery sequencing).
- Provide cost assumptions and currency risk management measures for major procurement items.
- Describe contingency planning for supply chain disruption (for example, in cases of geopolitical risks, transport bottlenecks, pandemics, natural disasters etc).
- Provide practical measures to support small and medium enterprise (SME) participation, women-owned and community-based businesses, and technology transfer opportunities.

d. Gender and inclusion analysis

Explanatory notes

Gender and inclusion outcomes directly influence a project's ability to secure and maintain its workforce, operate safely, obtain permits, meet permit and lender requirements, and sustain community support (social licence). They can therefore affect costs, schedule and risk. This section should show, using credible, sex-disaggregated and further-disaggregated evidence, that the project has identified gender-specific risks, gaps and opportunities across all phases and has built in concrete, budgeted actions to prevent harm and deliver fair benefits. The analysis must use an intersectional lens (how gender intersects with age, disability, indigeneity, migration status and other factors) and should follow the 'avoid-minimise-mitigate-remedy' hierarchy to risks. It should demonstrate how findings have shaped project design, procurement strategies, workforce planning, community agreements, monitoring frameworks and grievance mechanisms. International frameworks (including IFC Performance Standards (PS1 on management systems and stakeholder engagement, PS2 on labour and working conditions, PS4 on community health and safety), the UN Guiding Principles on Business and Human Rights, the ILO Core Labour Standards, the World Bank Gender Strategy, and ICMM guidance on diversity and inclusion) emphasise that mining projects must identify and address gender-specific risks and opportunities across all phases of development.

The objective here is to show that gender and inclusion considerations are not an 'add-on' but are embedded into technical, financial and social planning, with concrete, budgeted actions that prevent harm and deliver fair benefits. This allows regulators, communities and financiers to trace a clear line from evidence to design decisions, costs and long-term commitments. Among others, the feasibility study should do the following.

- State how 'gender', 'gender inclusion', 'intersectionality', and 'vulnerable or under-represented groups' are defined for this project and jurisdiction.
- Provide a gender baseline drawn from recent, representative data with sex-disaggregated and, where feasible, intersectional-disaggregated indicators (for example, by age, disability). This should include a map of existing services and gaps (health, childcare, transport, finance, training, justice) relevant to women and men.
- Include workforce diversity forecasts and a gender action plan.
- Identify key gender-related risks that could materially affect project execution (for example, exclusion from jobs, gender-based violence risks in camps or transport, inequitable land compensation). It should show how gender analysis has influenced mine layout, camp design, transport arrangements, sanitation, personal protective equipment (PPE) and shift patterns.
- State realistic, time-bound targets for women's participation in employment and local procurement. It should outline programmes (at a high level) that support meeting these targets, with costs reflected in operating budgets.
- Confirm the existence of company policies and codes of conduct addressing harassment, non-discrimination and gender-based violence.

- Present a summary of the allocated budget for gender-inclusion measures.
- Provide inclusion analysis for stakeholder engagement.

e. Implementation schedule

Explanatory notes

A clear and realistic implementation schedule is central to assessing project viability. It underpins cost and cash-flow forecasts, sequencing of permits and approvals, and team and contractor readiness. It shows what happens when, in what order and what must be ready first. It must show the main activities, which tasks must finish before others can start, which tasks can run at the same time, the key milestones and approvals (including environmental and social items), and the chain of tasks that controls the overall finish date. It should also show time buffers and the main schedule risks, so the plan is realistic. To meet international good practice, scheduling should align with recognised frameworks: the Project Management Institute's (PMI's) PMBOK® Guide (schedule planning/controls), ISO (International Organization for Standardization) 21502 (project management guidance), ISO 31000 (risk integration and contingencies), and, where applicable, sustainability and lender standards such as IFC Performance Standards (notably PS1 on management systems and action plans, PS5 on land acquisition/resettlement timing, PS6 on biodiversity constraints/seasonality), the Equator Principles, and the World Bank Environmental and Social Framework (ESF) (for example, ESS1/ESS5/ESS6). For engineering/procurement/construction interfaces, reference the International Federation of Consulting Engineers (FIDIC) contract requirements for baseline programmes, progress updates and float management. Sector guidance from ICMM can inform stakeholder engagement milestones embedded in the schedule.

The section should, among other things, include the following.

- Provide a readable timeline that covers site preparation, earthworks, civil works, structural and mechanical installation, electrical and instrumentation, utilities, tailings and water works, mine pre-strip, commissioning, and ramp-up.
- Provide a simple diagram or list that makes clear:
  - tasks that must finish before the next task starts (for example, foundations before setting equipment)
  - tasks that can run at the same time without conflict (for example, building fit-out while pipe racks are erected in another area)
  - tasks that need to finish together (if any).
- Outline dated milestones, such as investment decision, award of the main construction contract, first concrete, equipment set in place, first ore to mill, first product and start of regular production.
- For equipment, indicate any supply risks and risk mitigation measures.
- Identify the main events that could delay the schedule (for example, permit timing, supplier delays, weather, logistics, land access, community actions) and how much of a time buffer has been allowed for each.

- Indicate when access roads and bridges, camps and housing will be completed.
- Show the flow from pre-checks to dry testing, to running with material, to performance testing and then ramp-up to full output.
- Show how progress will be tracked and reported.
- Include a timeline chart (bar-chart/Gantt style) that is easy to read.

8. Infrastructure and logistics

Explanatory notes

Infrastructure and logistics determine whether a project can be built and operated reliably, permitted on time, financed, and sustained through changing conditions. They drive cost, schedule, operability and risk, and often depend on third-party capacity (grid connections, roads, rail, ports, pipelines, aviation). This part of the feasibility study should show how the site will work day-to-day: getting power and water in, moving people and materials to and from the site, and getting the product out. It should include a clear analysis of transportation needs – what roads, rail and ports are available, their condition and capacity, how they change with seasons, and how raw materials and finished products will be moved. It must also examine power supply and water requirements for mining and processing, workforce housing, site access, and other logistics (storage, fuel, communications, emergency services). To align with international good practice, this section should draw on: IFC Performance Standards (notably PS1 management systems and action plans; PS2 worker accommodation and labour; PS3 resource efficiency/energy/water; PS4 community health, safety and traffic risk; PS5 land access; PS6 biodiversity constraints); IFC General Environmental, Health and Safety (EHS) Guidelines and sector EHS Guidelines (mining; roads; rail; ports, harbors and terminals; electric power transmission and distribution); the World Bank ESF (for example, ESS1/ESS3/ESS4/ESS5/ESS6); ICMM guidance (haul road safety, tailings interface where relevant, and community impacts); the UN Environment Programme's (UNEP's) Global Industry Standard on Tailings Management (GISTM), where tailings-related infrastructure interfaces exist; IFC/EBRD Workers' Accommodation guidance for camps; and ISO 55001 (asset management), ISO 14001 (environmental management) and ISO 31000 (risk).

Among other things, the following particulars should be included.

- Define on-site and off-site scope: power, water (raw/process/potable), wastewater, communications/information technology (IT), fuel, workshops/warehouses, camp/clinic, roads/rail/port/airstrip, and product storage/handling.
- Identify interfaces with processing/water balance, tailings/waste, environment and social (E&S) issues, climate resilience, security and stakeholder/land access.
- Describe and justify selected routes for construction and operations (heavy-haul roads, rail, river/port, airstrip); design basis (axle loads, grades, bridges, pavements); and seasonal windows and climate allowances.
- Describe the power supply and distribution options (grid, captive generation, renewables).

- Describe the water supply source options (surface/groundwater/third-party/municipal) and wastewater/process water handling (collection, treatment, discharge/reuse).
- Describe the mode(s) and routing from plant to offtake/port, storage and handling (for example, concentrate moisture/covered sheds, sampling, weighbridges, shiploader interface).
- Describe the layout concepts for workshops, warehouses, labs, admin., camp/clinic, fuel farms, explosives magazines (regulatory stand-off distances), firefighting and emergency systems, communications/IT redundancy.
- For each option considered, state what was chosen and why, the cost and schedule impacts, any permits or agreements needed, and the main risks and how they will be managed.

9. Environment impacts

a. Environmental and social considerations

Explanatory notes

Environmental and social (E&S) issues can change the project's design rules, capital and operating costs, schedule, permit path, financing readiness, and social license. As such, they are feasibility variables, not add-ons. Key topics include water availability and quality, tailings and other waste, biodiversity and land use, air/noise/traffic, land acquisition and livelihoods, cultural heritage, and community health and safety. Lenders and insurers check compliance with national law and with standards such as the IFC Performance Standards, Equator Principles, UNEP's GISTM and the International Cyanide Management Code.

This section of the feasibility study should provide what's needed to make a decision, including a concise E&S baseline, expected impacts, the design and mitigation measures selected, remaining risks, budgets, approval/milestone gates, and governance/ownership – so the case is clear and bankable. This section should include the following.

- Define E&S scope and interfaces (site, corridors, power/water sources, ports).
- State applicable legal requirements and any adopted standards (such as IFC Performance Standards, Equator Principles, GISTM, International Cyanide Management Code), and summarise the assessment approach.
- Summarise the material environmental impacts (in terms of water, air, noise/vibration, soils, biodiversity/critical habitat, waste).
- Summarise the material social impacts (in terms of land access, livelihoods, resettlement, cultural heritage, community health and safety).
- Provide high-level site-wide water balance (make-up, recycle, storage, discharge) under normal and stress conditions.
- Identify critical habitat/protected areas interactions; and state no-go constraints and avoidance/offset requirements.

- In terms of air quality, noise and traffic, it should present emissions/noise predictions against applicable limits and the adopted package of controls (for example, enclosures, filters, road watering, speed governance, blast timing).
- In terms of land acquisition, resettlement and livelihoods, it should indicate whether physical/economic displacement will occur and present the resettlement/livelihoods package (eligibility, compensation basis, timing dependencies) and confirm provisioning in the cost model.
- In terms of cultural heritage, it should identify known tangible/intangible heritage constraints and adopted buffers.
- In terms of community health and safety, it should summarise construction/operations risks to communities (traffic, dust, noise, blasting, water, vector/disease) and the critical controls selected; and include interface with emergency services and disclosure commitments.
- In terms of residual impacts and cumulative effects, it should provide a residual significance summary after adopted measures and note any cumulative interactions with other projects/activities that affect feasibility decisions.
- Include the development of:
  - environmental baseline studies and regulatory status
  - environmental management plan and mitigation strategies
  - mine closure and rehabilitation plans.

b. Climate risk and resilience assessment

Explanatory notes

Climate hazards vary and can shift design criteria, capital and operating costs, the schedule, insurance, and bankability. Acute events (for example, extreme rainfall, flooding, wildfire, heatwaves, storms) and chronic shifts (for example, rising temperatures, changing water availability, permafrost thaw, sea-level rise) can alter hydrology, power reliability, tailings performance, worker productivity, access routes and supply chains. Lenders and insurers increasingly require decision-grade analysis aligned with frameworks such as the Task Force on Climate-related Financial Disclosures (TCFD) and International Sustainability Standards Board (ISSB) IFRS S2.

This section should present a site-specific climate risk view, show how findings change engineering standards and operating assumptions, and include costed, scheduled resilience measures with governance and monitoring so that commitments are trackable and bankable. The section should include the following.

- Define boundaries (site assets, off-site corridors, ports, power interconnects) and time horizons (construction, ramp-up, mid-life, end-of-life/closure).
- State the scenario basis and sources (for example, national climate projections, regional models) and declare assumptions and data quality.
- Provide a concise hazard matrix covering acute (extreme precipitation, flood, storm, wildfire, heat/cold snaps, lightning) and chronic (temperature rise, drought, changing snowfall/rainfall, sea-level rise, permafrost/thaw) hazards.

- Identify material hazards with potential cost/schedule impacts or critical-risk implications.
- Map exposure of critical assets/functions, for example, power supply, substations and lines, process plant, tailings and water storage, waste rock/heap leach facilities, raw water sources, access roads/bridges/rail/port, communications, camps, emergency facilities.
- Show how climate risk may alter design criteria.
- Provide wet and dry stress tests for the site-wide water balance (storage, make-up, recycling, discharge) and identify drought/overflow contingencies and permits affected.
- Summarise tailings/water facility performance under extreme events (overtop risk, storm routing, beach and freeboard assumptions, power loss scenarios) and any design changes adopted.
- Address worker heat/cold stress thresholds, equipment derating, smoke/air-quality impacts and snow/ice impacts.
- Evaluate grid reliability under climate stress.
  - Justify backup/microgrid/storage strategy and fuel diversity; include capex/opex and schedule implications (for example, interconnection lead times).
  - Assess climate risks to roads/bridges/rail/ports and reagent/fuel supply.
- Define alternate routes, seasonal windows, stockholding strategies and associated allowances.
- Carry out climate risk assessments such as impacts of drought, floods, extreme weather events.
- Identify downstream flood/sediment/quality risks and emergency-response co-ordination with authorities/communities at a principle level.
- Present resilience measures, including a prioritised, costed set of adaptations (engineering, operational and nature-based) with in-service dates, dependencies and owners. Measures could include spillway upgrades, berms, fire breaks, cooling/ventilation upgrades, backup power, additional storage, road raising.
- Include the development of infrastructure resilience design and integration of TCFD-aligned climate scenarios.

c. Greenhouse gas (GHG) emissions and decarbonisation strategy

Explanatory notes

Greenhouse gas (GHG) performance is a feasibility and environmental variable. Power and fuel choices, process chemistry, and equipment selection materially affect capital and operating costs, schedule (for example, grid interconnection, renewable permitting), and project risk. Exposure to current or emerging carbon pricing and border-adjustment policies can move the economic case, while lenders and investors increasingly require decision-grade baselines and credible pathways under frameworks such as the International Finance Corporation (IFC) Performance Standards and the Equator Principles. Offtakers and insurers also assess product carbon intensity, while renewables integration introduces reliability and resilience considerations that must be priced and scheduled.

This section of the feasibility study must provide a decision-grade inventory and intensity metrics for the base case, demonstrate how GHG analysis has shaped design and power/fuel selections, present a costed, milestone-based decarbonisation pathway with sensitivities, confirm measurement and verification readiness, and embed governance and risk entries so commitments are trackable and bankable. This section should provide an overview of the measures to quantify, monitor and minimise GHG emissions over the project's lifecycle and demonstrate how resilient the project is to climate uncertainties. Accordingly, it should include the following.

- Provide GHG baseline inventory and projections, including:
  - providing life-of-mine annual absolute emissions (tonnes of carbon dioxide equivalent (tCO_2e)) and intensity metrics aligned to the product (for example, tCO_2e per tonne of concentrate/metal) for the base case design
  - showing contributions by major sources (mobile diesel, electricity, process heat, process chemistry, fugitive emissions, reagents).
- Define organisational and operational boundaries and which emission scopes are covered: Scope 1 (direct fuel use and process emissions), Scope 2 (purchased electricity/steam), and material Scope 3 categories relevant to feasibility (for example, upstream reagents, explosives, grinding media, inbound/outbound freight, downstream processing where contractually integrated).
- Demonstrate how GHG analysis has influenced the preferred power supply (grid, captive, renewables, storage, wheeling/power purchase agreement (PPA)) and fuel choices for mobile fleet and process heat.
- Present the decarbonisation pathway – a staged pathway with quantified abatement by lever and in-service dates, prioritising:
  - avoid/reduce: energy efficiency, high-pressure grinding rolls, optimised comminution, process control, waste-heat recovery
  - replace: grid decarbonisation/renewables share, battery-electric or trolley-assist haulage, fuel switch for process heat (for example, to electricity), green reagent options where material.
- Provide a marginal abatement cost (MAC) view or equivalent table: abatement (tCO_2e/yr), capex, opex change, levelised abatement cost, dependencies.

- Outline targets for absolute and intensity reduction for construction, ramp-up and steady state.
  - Indicate whether targets align with recognised good practice (for example, science-based trajectory) without annex-level detail.
- Disclose assumed carbon price(s) in the financial model (tax/emissions trading system or internal carbon price) and provide sensitivities at low/base/high ($/$tCO_2e$) across power/fuel options and key abatement levers.
  - Identify exposure to current or proposed carbon regulation and any permit/allowance requirements that affect schedule or costs.
- Include possibilities of low-carbon alternatives, such as use of renewable energy for power supply, including fuel switching options (alternate fuels, hybrids).
- Include a summary of GHG inventory tables and plots (by source; absolute and intensity) for base case and with selected abatement.
- Include a one-page decarbonisation roadmap (milestones, in-service dates, dependencies).

10. Social impacts

a. Human rights due diligence

Explanatory notes

Several international standards and frameworks guide how mining projects should address human rights and social risks. The *UN Guiding Principles on Business and Human Rights* provides the overarching duty of companies to respect human rights through due diligence. The *OECD Due Diligence Guidance for Responsible Mineral Supply Chains* sets expectations for companies sourcing minerals from conflict-affected and high-risk areas. Financial institutions additionally rely on the IFC Performance Standards and the Equator Principles, requiring social and human rights considerations at the feasibility stage. In parallel, the *Initiative for Responsible Mining Assurance (IRMA) Standard* offers a comprehensive benchmark, integrating human rights, conflict sensitivity and environmental stewardship into mining practice. This section highlights key components from these frameworks that governments should include in their guidelines.

A human rights impact assessment (HRIA) and a conflict sensitivity assessment (CSA) are complementary tools that are integrated into feasibility studies to ensure that projects are rights compliant and conflict aware. An HRIA focuses on the potential effect of mining activities on the rights of workers, local communities and indigenous peoples, while a CSA examines the interaction of the proposed project with the existing socio-political or resource-related tensions that may exist in the region. These assessments help companies assess risk, design mitigation strategies, and build transparent and effective engagement processes.

Importantly, any checklist for an HRIA or CSA is not a one-size-fits-all instrument, and must be adapted to the size, scale and location of the proposed project. The subjectivity of these assessments underscores the need for context-specific assessments, regular monitoring and meaningful stakeholder engagement. Broadly however, the following particulars should be included.

- Establish company human rights policy commitments, including stakeholder mapping and identification of rights-holders (workers, local communities, vulnerable groups, indigenous peoples).
- Prepare a plan for safe working conditions, training and local hiring, including occupational health and safety risk assessments, while complying with the International Labour Organization (ILO) Core Conventions that prohibit child and forced labour, allow collective bargaining and freedom of association, and ensure non-discrimination and equal pay.
- Ensure community health, safety and livelihoods, by assessing potential impacts of the proposed project on air, water and soil quality. This can include a public health impact assessment, design mitigation measures and community safety protocols, and establishing redressal mechanisms for affected communities.
- Include benefit sharing mechanisms for economic and social development, such as local employment, procurement, infrastructure and training. It is vital to assess risks of possible economic displacement and provide livelihood restoration plans, and to ensure transparency in revenue management and royalties.
- Undertake a human rights impact assessment (HRIA) that identifies actual and potential adverse impacts across labour, land and resettlement, health, cultural rights, security and supply chains.
- Document a stakeholder engagement plan with meaningful consultation, ensuring the participation of women, minorities and vulnerable groups. This includes a commitment to continuous reporting and monitoring of human rights and social performance, and the disclosure of the human rights assessment to all relevant stakeholders.
- Include independent monitoring mechanisms such as third-party audits and community observers, and establish accountability pathways for addressing possible human rights violations. This includes the design of accessible and appropriate grievance mechanisms for workers and local communities.

b. Conflict sensitivity assessment

Explanatory notes

Conflict risk can halt work, damage assets, raise insurance costs and delay permits. It can thus directly affect costs, schedule, safety and bankability. Mining feasibility studies should therefore adopt a conflict-sensitive approach grounded in leading international frameworks, such as IFC Performance Standards, UN Guiding Principles' human rights due diligence and access to remedy, the Voluntary Principles on Security and Human Rights, and the OECD five-step due diligence process for conflict-affected or high-risk supply chains. These frameworks emphasise the need to identify potential conflict drivers (land tenure, water, resettlement, cultural heritage, labour and security) through robust baselines and stakeholder mapping.

This section must show the risk of conflict around the project and how the study has assessed local dynamics (key actors, grievances, hotspots and likely triggers). It should then spell out the design changes adopted (for example, route or camp location, traffic plans, blasting windows, buffers), the budget and schedule allowances made, and the controls and governance (engagement approach, accessible grievance process, security standards, early-warning indicators and thresholds) that will prevent escalation and support safe, reliable execution. It is important to keep the focus on what's needed to make a decision; and to place methods and detailed records in the ESIA and cross-reference them here. The section should, therefore, among other things, include the following.

- Provide a snapshot of recent and latent conflict dynamics in the area. This should include the principal actors, grievances (for example, land, employment, water, artisanal and small-scale mining), hotspots and incident history.
- Identify material conflict risks to project execution (for example, protests, blockades, sabotage, criminal predation, inter-community tensions) with potential cost/schedule impact.
- Provide a list of plausible conflict sources and triggers during construction/operations (land acquisition, hiring waves, traffic, blasting, election cycles, market days/ceremonies, water abstraction changes).
- Show how conflict and 'do no harm' analysis influenced the design of the project.
- Describe the monitoring and adaptive management framework with triggers to address emerging grievances promptly, lawfully and fairly across the project life cycle.
- Describe the grievance mechanism and show its accessibility to the public.

c. Community development and social license strategy

Explanatory notes

Community priorities and 'social license' determine whether a project can secure access, permits and day-to-day operating stability. Weak alignment can trigger objections, delays, roadblocks and added cost. Community development and social licence strategies are therefore a feasibility issue and not an add-on. In line with international frameworks, they should be co-created with affected stakeholders, including engagement and disclosure standards established under the IFC Performance Standards and the World Bank's ESS10 (Environmental and Social Standards), and reference to ICMM's Mining Principles for benefit sharing, local procurement and cultural heritage stewardship.

This section must show how community priorities and social-license risks are built into the project's design, costs, schedule and risk plan. It is important to include only what's needed to make a decision: the key facts, the commitments made, the budgeted measures to deliver them, and any milestones/approval gates that affect viability and bankability. Any residual risks and owners should also be noted. The section should, therefore, among other things.

- Provide a concise summary (stakeholder mapping) of affected communities, demographics, vulnerability hotspots and priority issues (for example, water access, traffic, livelihoods, influx, safety).
- Identify material social-license risks to project execution (protests, roadblocks, legal challenges, misinformation, elite capture) with potential cost/schedule impact.
- Indicate the current status of community engagement and any memorandum of understanding (MOU)/community development agreement (CDA)/impact benefit agreements (for example, not initiated/in progress/executed).
- Present time-bound targets for local hiring by job family or category and for local/small and medium-sized enterprise (SME) procurement. This should include high-level enablers (for example, training pipelines, pre-qualification support, payment terms).
  - Confirm that targets and enabling costs are reflected in the project's financial model.
- Outline decision-level commitments for managing the impacts of construction and operations (traffic management, dust/noise, water use/quality, influx management, contractor codes of conduct).
- Describe the security approach, consistent with human rights standards and community protocols.

d. Indigenous peoples and free, prior and informed consent (FPIC) (if applicable)

Explanatory notes

Indigenous rights, where applicable, are fundamental to a project's legality, workability and long-term acceptance. They directly influence land access, permits, design choices, costs, schedule and financing. The feasibility study should show how indigenous rights and interests are integrated into project design, scheduling, cost planning and risk management. It should identify affected indigenous groups, the legal and treaty context, the current status of engagement and agreements, and any conditions that must be fulfilled before construction. It should also summarise design modifications adopted to address indigenous concerns (for example, buffers, access routes, operating windows, cultural heritage protection), headline participation and benefit commitments, and the risks, responsibilities and controls in place. International standards (including IFC Performance Standard 7 (indigenous peoples), the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), the ILO Convention 169, the Equator Principles, and the World Bank Environmental and Social Framework (ESS7)) expect that projects affecting indigenous peoples will demonstrate meaningful consultation and, where impacts are significant, progress toward free, prior and informed consent (FPIC). Lenders and courts increasingly regard failure to respect these standards as grounds for delay, litigation or withdrawal of financing.

The objective here is to provide decision-makers with a clear, factual basis to judge whether indigenous rights have been appropriately respected, whether consent or equivalent agreements are on track, and whether associated risks have been realistically incorporated into project planning. Among other things, the section should include the following.

- Provide a concise statement of whether indigenous peoples are present/affected with regard to the project, relevant legal/treaty context, land/tenure status and key cultural heritage sensitivities.
- Identify material risks to execution (for example, consent delays, access constraints, litigation/injunction risk, heritage discoveries) that could impact cost or schedule.
- Confirm current status toward free, prior and informed consent (FPIC) (for example, not initiated/in progress/conditional consent/consent obtained).
- Provide FPIC-process documentation and cultural heritage and land-use studies.
- Provide for formal agreements with indigenous people and the use of consent agreements upon conclusion of the FPIC process.
- Outline targets for indigenous employment, training/apprenticeships and supplier participation, including high-level revenue-sharing or community-investment commitments (if applicable).
    - Confirm a reflection of these commitments in the financial model.

- Indicate the design-level commitments for cultural heritage protection (buffers, chance-find protocol), a grievance mechanism that is culturally appropriate and accessible, and security conduct aligned with human rights.
- Indicate if there are any foreseeable risks (for example, indigenous protests and legal challenges) that might stop or delay project start.

e. Stakeholder engagement plan

Explanatory notes

Stakeholder engagement affects whether a project can be permitted, built on time and run without disruption, for poor engagement can trigger objections, redesigns, roadblocks and cost/schedule overruns. Lenders and regulators also check that issues raised by communities and authorities are addressed and funded. Stakeholder engagement at feasibility stage must thus be shown to meet leading international standards that financiers, regulators and buyers routinely apply. In practice, this means alignment with IFC Performance Standards, especially PS1 (assessment and management; engagement, grievance, disclosure), PS5 (land acquisition) and PS7 (indigenous peoples/ FPIC); the World Bank ESF – notably ESS10 (stakeholder engagement and information disclosure) and ESS7 (indigenous peoples/FPIC); the Equator Principles (EP4); regional lender policies (for example, EBRD PR10, the African Development Bank Integrated Safeguards System (AfDB ISS)); and responsible business benchmarks such as the UN Guiding Principles on Business and Human Rights, UNDRIP/ILO 169 on free, prior and informed consent where indigenous peoples are present, and the OECD Due Diligence Guidance.

This section should show how engagement has shaped the project's design, costs, schedule and risks, focusing only on what's needed to make a decision: the essential findings, the commitments made, the budgeted measures to deliver them and the approvals/decision gates (for example, disclosures, hearings, agreements) that affect feasibility and bankability. The section should, therefore, among other things include the following.

- Provide a detailed mapping of stakeholder groups (for example, affected communities, traditional authorities, indigenous organisations, women's and youth groups, artisanal miners, businesses, non-governmental organisations (NGOs), unions, local government, service providers). Detailed stakeholder mapping exercise should be provided, with identification and ranking, along with engagement strategies and consultation outcomes.
- Summarise key interests/concerns by theme (land, water, jobs, traffic, safety, cultural heritage, environment) and note any vulnerable or under-represented groups and accessibility needs.
- Identify material engagement-related risks to cost/schedule (for example, opposition, misinformation, elite capture, litigation, permit objections).
- Present the engagement objectives (for example, inform, consult, collaborate, seek consent where required) and design principles (for example, inclusivity, accessibility, cultural appropriateness, transparency, do-no-harm).

- Provide an engagement timeline aligned to project milestones (pre-construction, land access, mass recruitment, commissioning).
- Include rumour or mis- or dis-information management measures and a channel mix (meetings, notices, radio, social media, SMS/WhatsApp, website) suitable for local context.
- Include accessible grievance redress mechanisms for impacted persons/communities.
- Specify practical measures enabling meaningful stakeholder participation (meeting times/venues, translation/interpretation, transport stipends, childcare, disability access, separate focus groups where appropriate).
- Interface this section with other relevant sections of the feasibility study, such as conflict sensitivity assessment, human rights due diligence, community development and social licence, and indigenous peoples and free, prior and informed concept.

11. Project economics

Explanatory notes

The economics of mining projects is subject to a wide degree of uncertainty. It is critical to understand the profitability of a mining project and how government revenues will be impacted in various scenarios. Ideally the government should have independent economic models and experts to conduct independent evaluation of the feasibility of a project and the returns to the country. The government should establish what key metrics should be provided and the discount rate to enable comparisons across various projects in the country. Modelling these metrics for changes in key areas of uncertainty, for example, pricing, production and costs, will help create a shared view on what the investor and state returns could be for a particular project.

Please note that economic analysis is to be provided in the other sections to underpin decisions made in areas such as area development strategy and preferred concept selection. All economic analysis is to be performed on a consistent basis in order to ascertain pre-tax project viability, as well as the potential returns to the investors and the state. At a minimum the following metrics should be provided: net present value (NPV), internal rate of return (IRR), discounted payback period, break-even price and government take (ratio of government NPV from total pre-tax NPV). Government indicators should be provided at a granular level for understanding of the value derived from various elements – for example, royalty, taxes, state participation.

This section should provide an understanding of the economic viability of the proposed project, how robust it is to changes in key project parameters, and how benefits will be shared between the government and the company under a range of potential outcomes. All relevant aspects of the project and quantification of key uncertainties should be included. The following particulars must be provided.

- Provide the basis and methodology for economic analysis. Project economics for the proposed development are to be presented on a pre-tax and post-tax basis using a [10 per cent] discount rate and for three scenarios (Base, Low, High). The base case should be based on estimates of resources, costs, etc, that

represent the 50th percentile. [Please note different companies will use different discount rates and this can significantly impact project economics and the assessment of value to the government. To enable comparison across projects, the government should establish the discount rate to be used in consultation with the Ministry of Finance].

- Describe any factors that are critical to commercial viability and how they will be managed; for example, the market outlook for key commodities, assumptions on domestic use or export, the sales strategy, and potential offtake agreements.
  - Project financing. Details should be provided on the source of funding over development and production, including debt-to-equity ratio, borrowing costs.
  - An account should be offered of future commercial opportunities that may provide a basis for changes in the investment scope.
- Describe assumptions for generation of net cash flows used for economic analysis, including the following.
  - Annual production profile by mineral type and sales volumes by product.
  - Annual and total cost estimates, including the following.
    - A detailed breakdown of capital expenditure (capex) for the mine and processing facilities and other infrastructure.
    - A detailed breakdown of operating expenditure (opex), including labour, energy requirements, raw materials, transportation and maintenance.
    - Mine closure and remediation costs, accompanied by a description of the methodology, assumptions and basis for the cost estimates. Benchmarking of costs to similar projects should be provided. Each cost profile should be provided at a granular level for each major component.
  - Pricing and sales assumptions. Offtake contracts should be documented and should include base price, escalation factors, lag period, base values for escalation factors and the contract duration.
  - Information on tariffs and tariffing arrangements, including total annual fixed and variable costs (for use of facilities or pipelines etc.) and the basis for tariff calculations (for example, base cost per barrel, escalation factors and escalation lags).
  - All other assumptions, such as exchange rates, inflation, project financing.
- Present base case project economics and sensitivity analysis. The base case is expected to be based on P50 estimates of resources, costs etc. Key project uncertainties, such as prices, carbon pricing, costs, resource base and schedule delays, are to be quantified and economic outcomes provided. Summary metrics should be provided in tabular format and in tornado charts. In each case, royalties, taxes and government take calculations are to be presented.
- Provide a scenario analysis. A minimum of two cases are expected for the preferred development solution and are to be consistent with P10 and P90 estimates for production, with costs as outlined within the feasibility study submission. Depending on the particulars of the mining project, additional scenarios may be expected.
- Reproduce a summary of the project economics in an Excel spreadsheet.

12. Project schedule, planning and execution

An overview of the project schedule should be provided, along with critical path activities and measures that will be employed to effectively manage risks and ensure delivery of the project on time and budget. This section should do the following.

- Provide a description of the project management system.
- Describe how the competence and compliance of all personnel involved, including contractors, will be assessed and monitored.
- Outline the procurement and contracting strategy with a focus on long lead items.
- Include a list of all necessary permits required and evidence of compliance where applicable.
- Provide an integrated project schedule for production, including key events and critical milestones (for example, consultations from the stakeholder engagement plan), and cost estimates.
- Describe risk management. An overall project risk register should be provided, detailing the key risks and opportunities, along with risk management and mitigation plans.
- Present knowledge transfer and learnings. Lessons learnt at the company and industry levels should be provided, including how performance will be monitored and lessons captured across project implementation.
- Attach a separate, detailed project execution plan (PEP).
- Submit a separate commissioning plan as the project develops.

13. Other Information

- Provide any other additional information that is relevant or which forms the basis of any assumptions made.

14. Recommendations

- Assess overall feasibility of the project.
- Outline of the next steps in the development or study phase.
- Highlight the uncertainties and elaborate on the further work required.

The Commonwealth

As the rush for critical minerals continues, mining has huge potential to generate jobs, infrastructure, foreign exchange and fiscal revenues that support countries' broader development goals. However, without careful planning and management, mining can lead to environmental damage, community tensions, stranded assets and the loss of public trust.

Governments can use feasibility studies – the first and most important step in deciding whether a mining project should go ahead – as strategic instruments to ensure that mining projects advance inclusive, responsible and long-term national development.

These Model Guidelines support governments to operationalise their regulatory mandates, bridge gaps in current practice and align their mining sectors with modern expectations of sustainability, community benefit and investor confidence. Drawing on international best practice while remaining adaptable to local contexts, they provide a practical framework to:

- set minimum requirements for the content and quality of feasibility studies
- strengthen regulatory oversight
- embed sustainability principles
- build trust among stakeholders.

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